



Matrox **Altiz** >>>

High-fidelity 3D profile sensors

Overview

High-fidelity 3D scanning

Matrox® Altiz¹ is a series of high-fidelity 3D profile sensors. Each sensor features a dual-camera single-laser design that greatly lessens the scanning gaps often encountered at critical surface junctures because of optical occlusions. Unique algorithms running inside the sensor automatically generate various types of reliable 3D data—individual profiles, depth maps, or point clouds—obtained by smartly combining or selecting the pixel data from the two integrated image sensors, which is automatically sampled for a constant horizontal resolution.

Flexible operation and intuitive setup

The two cameras within a Matrox Altiz can operate either synchronously or in alternation. The former provides maximum reproduction quality and robustness; the latter delivers a scanning rate twice that of the former while still providing some defense against occlusion. Scanning volume—affecting the scanning rate—is set in convenient real-world units.

Standard interface, discrete I/Os, and power

The command and data interface of a Matrox Altiz is done via a Gigabit Ethernet port with the GigE Vision communication protocol. The sensors' 24 V-compatible digital I/Os are present for connecting to an incremental encoder and synchronizing multiple 3D sensors, which is useful when there is need to scan different sides of an object or surfaces larger than can be covered by a single 3D sensor. Matrox Altiz supports PoE for simpler cabling but also features an alternate 24 V power input.

Solid construction and varied mounting

Matrox Altiz features a sturdy IP67-rated² aluminium housing with M12 connectors that make it perfectly suited for harsh industrial environments. Isolated discrete I/Os provide protection against improper electrical hookup. Back, side, and top attachment points accepting M4-threaded screws are available for fixing a Matrox Altiz to gantries and robots. Through-hole guides are also included to enable higher-accuracy installation and the alignment of neighboring Matrox Altiz units.

3D line profiling

3D line profiling is a long-standing and well-established technique for generating a three-dimensional representation of an object. It uses the principle of laser triangulation whereby an image sensor views a laser line that projects onto an object. The laser line bends to follow the contour of the object, which results in a profile; this profile is analyzed to compute the depth or height along the width of the laser line. Object length is determined by accumulating profiles at regular intervals by either moving the 3D device over the fixed object or the object below the fixed 3D device.

Matrox Altiz at a glance

Leverage dual-camera single-laser design to deliver exceptionally high 3D reproduction fidelity

Gain from unique embedded algorithms to generate consistent profiles, depth maps, or point clouds

Benefit from truly standard GigE Vision® interface to work directly with Matrox Imaging and third-party vision software

Simplify cabling with Power-over-Ethernet (PoE) support

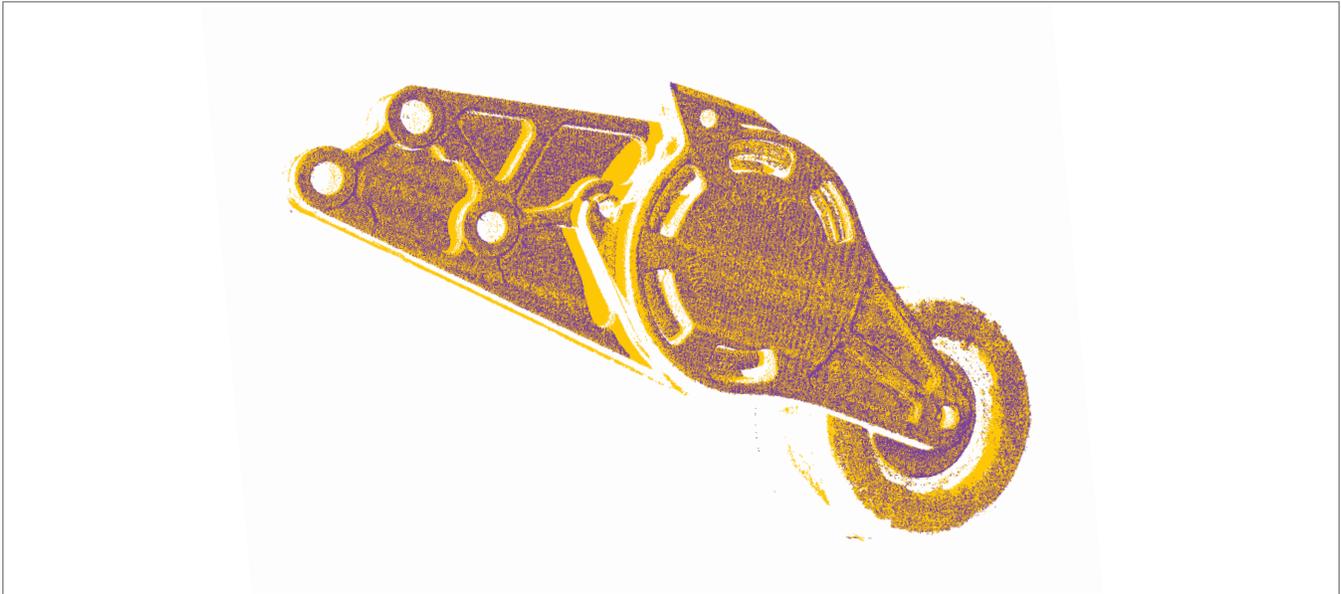
Deploy confidently in tough industrial settings thanks to a solid IP67-rated² aluminum housing and M12 connectors

Benefit from several fastening points to facilitate fixing one or more sensors to gantries and robots

Streamline sensor setup and verification via the Matrox Capture Works utility for Windows® and Linux®³

Overview (cont.)

Sample part scan



Merged point cloud showing the higher scanning fidelity obtained when using two cameras instead of just one. Zones in solid yellow are only visible when scanning with the two opposed cameras.

Software Environment

Field-proven application development software

Matrox Altiz pairs well with [Matrox Imaging Library \(MIL\) X⁴](#)—a comprehensive software development kit (SDK) for Windows and Linux with a more than 25-year history of reliable performance. This toolkit features interactive software and programming functions for image capture, processing, analysis, display, and archiving. Refer to the [MIL X datasheet](#) for more information.

The 3D sensors also work with [Matrox Design Assistant X⁵](#), a Windows-based integrated development environment (IDE) based on MIL, where vision applications result from the construction of flowcharts and their human-machine interface (HMI) from the creation of web pages. Refer to the [Matrox Design Assistant X datasheet](#) for more information.

Interactive profiler setup

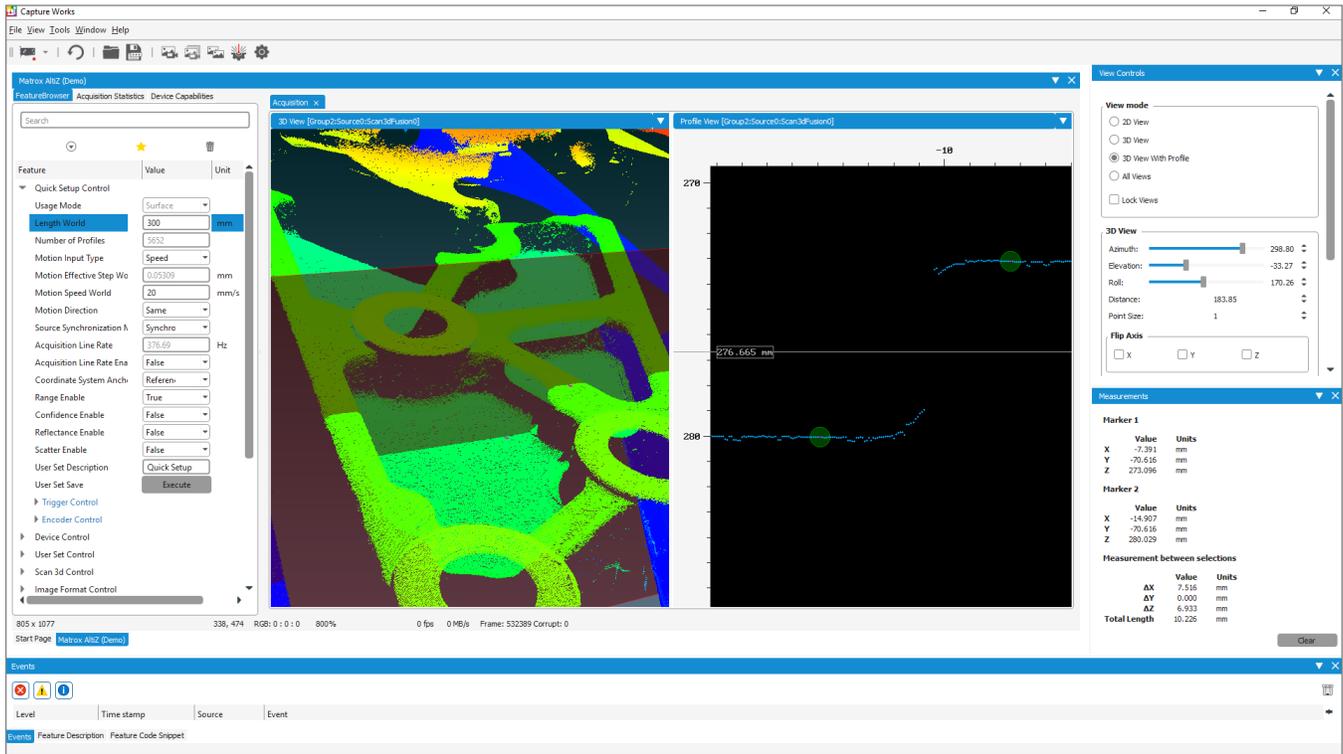
Included in MIL is Matrox Capture Works, an interactive utility for Windows and Linux³ that enables users to conveniently verify the connection to, as well as configure and test acquisition from, cameras and devices using a GenICam™-based interface standard such as Matrox Altiz. Matrox Capture Works contains views specific to the Matrox Altiz for tuning peak (laser line) extraction, configuring the scanning volume, and setting up device triggering.

Third-party software support

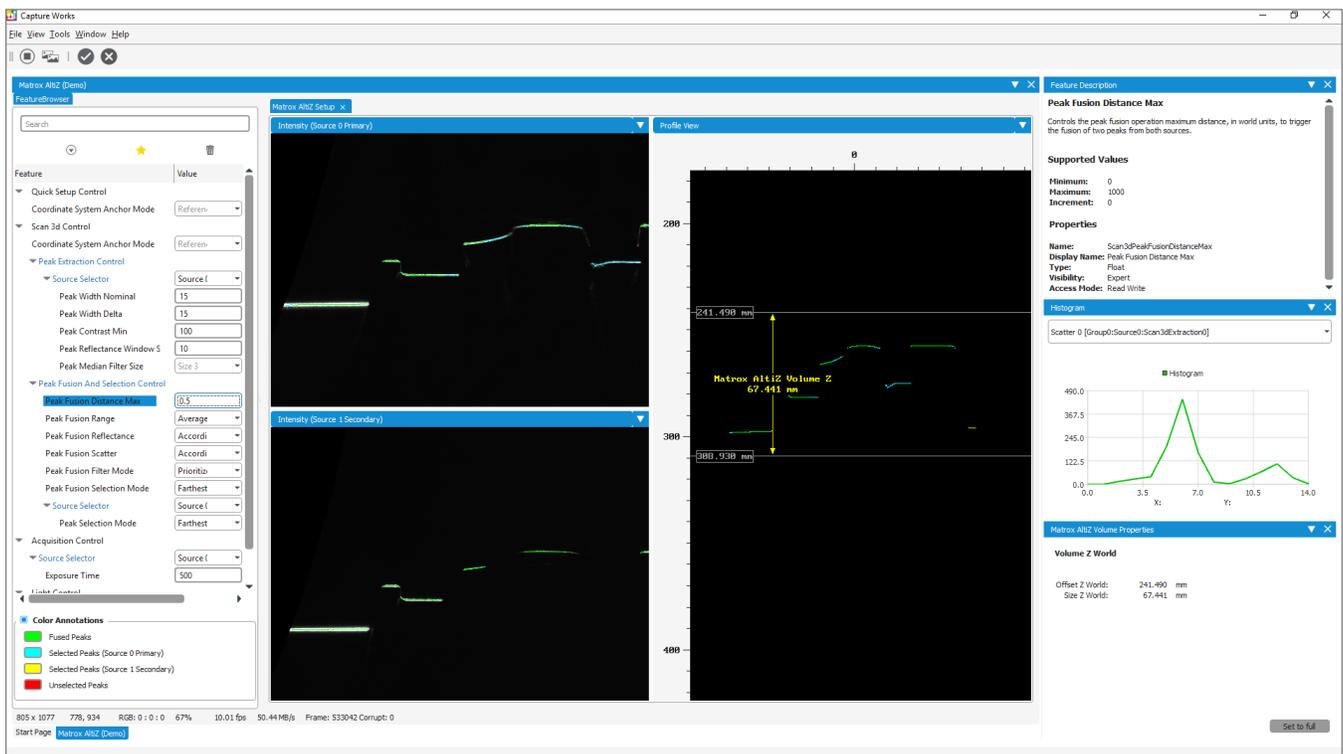
Matrox Altiz is also compatible with third-party vision software that implements support for the GigE Vision standard, GenICam GenDC specification, and GenICam PFNC 3D pixel formats.

Software Environment (cont.)

Matrox Capture Works interactive utility

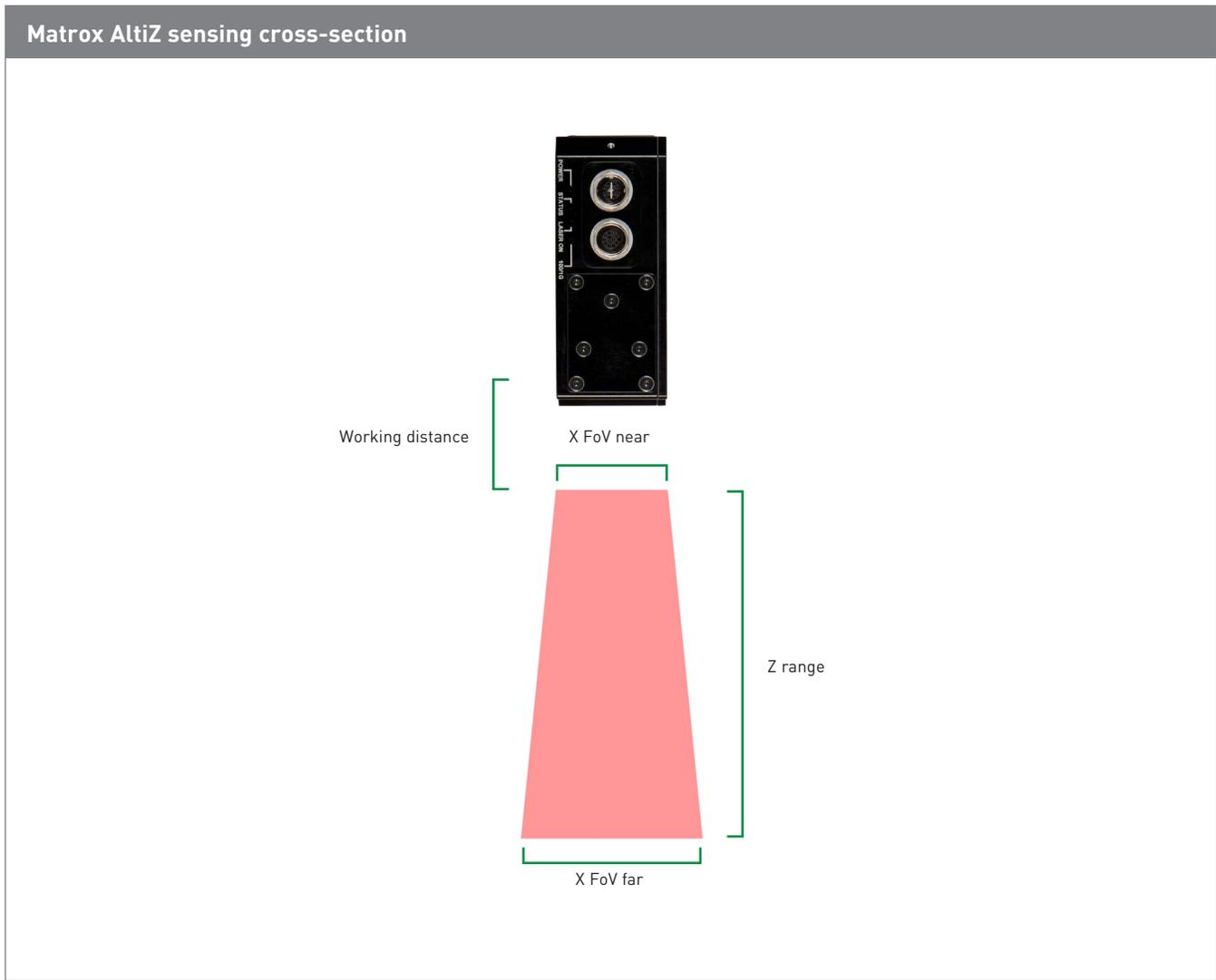


3D (point cloud) view with profile at intersecting plane and measurement markers within the Matrox Capture Works interactive utility.



Peak (laser line) extraction, fusion, and volume (Z) adjustment within the Matrox Capture Works interactive utility.

Specifications (cont.)



Characteristic / Model	AZ1D4SR	AZ1D4SB	AZ1D4MR	AZ1D4LR
Laser color	Red (660 nm)	Blue (405 nm)	Red (660 nm)	Red (660 nm)
Working distance (from reference point)	100 mm	100 mm	185 mm	160 mm
Z range	70 mm	70 mm	225 mm	385 mm
Z resolution (near-far)	40-80 μ m	40-80 μ m	95-340 μ m	100-890 μ m
X FoV (near-far)	55-75 mm	55-75 mm	85-165 mm	110-310 mm
X resolution	38 μ m	38 μ m	82 μ m	157 μ m

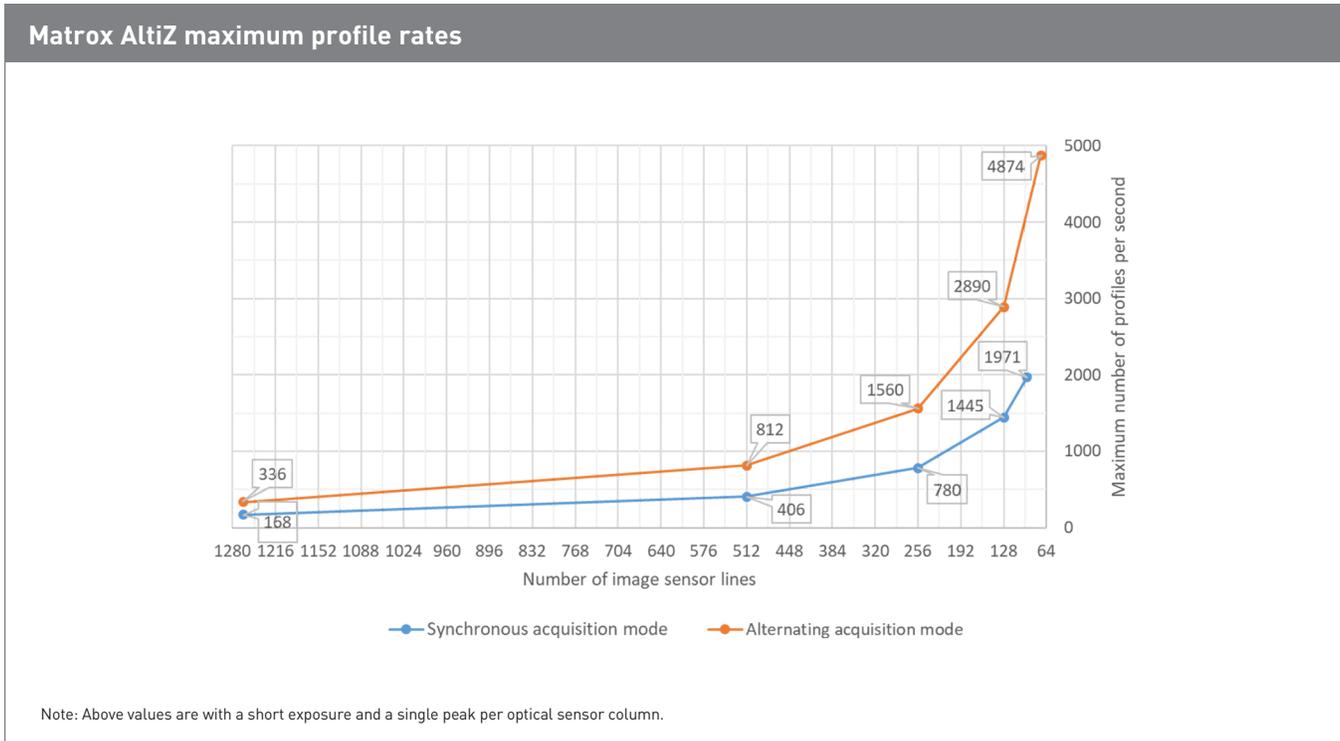
Notes:

- Values are approximate and may vary slightly between 3D sensors of a given model.
- Subsequent sub-pixel analysis can yield accuracy that is one tenth of resolution given the appropriate conditions.

Specifications (cont.)

Matrox Altiz	
3D profile sensor	
Profiling characteristics	1984 points per profile
	Refer to maximum profile rates chart
Network interface	Gigabit Ethernet
Data and command interface	GigE Vision 2.2 with GenDC 1.0
3D data output (SFNC/PFNC)	Profile (RectifiedC/Coord3D_C16 or CalibratedABC_Grid/Coord3D_ABC32f)
	Depth map (RectifiedC/Coord3D_C16)
	Point cloud (CalibratedABC_Grid/Coord3D_ABC32f)
Digital I/Os	Four (4) 24 V isolated inputs
	Encoder with A-B output
	Frame trigger
	Profile trigger
	Two (2) 24 V isolated outputs (5 KHz maximum)
	Profile trigger
Power input	PoE (IEEE 802.3af Class 0) or separate 24 V
Connectors	M12-X 8-pin for network interface and power input
	M12-A 12-pin for digital I/Os and alternate power input
Indicator LEDs	Power, status, laser, and network speed
Power consumption	12 W (0.5 A @ 24 V)
Dimensions	233 x 121 x 48 mm (9.17 x 4.76 x 1.89 in)
Weight	1.5 Kg (3.3 lbs)
Operating temperature	0°C to 45°C (32°F to 113°F)
Ventilation requirements	Natural convection
Certifications	Refer to certifications table
Compatible software	MIL X
	Matrox Design Assistant X

Specifications (cont.)



Certifications

Matrox Altiz	
3D profile sensor	
Electromagnetic compatibility	47 CFR Part 15 Class A
	ICES-001 Class A
	EN 55011/EN 61326-1 industrial environment, Class A
Electrical safety	CAN/CSA-C22.2 No. 61010-1-12, UL Std. No. 61010-1 (Third Edition)
Ingress protection	IP67 ² as per IEC 60529:1989+AMD1:1999+AMD2:2013
Laser safety	AZ1D4SR model  <p>LASER RADIATION DO NOT STARE INTO BEAM OR EXPOSE USERS OF TELESCOPIC OPTICS CLASS 2M LASER PRODUCT Wavelength : 645-665nm, P_{total} = 9mW Peak Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC/EN 60825-1 Ed. 3 (2014), as described in Laser Notice No. 56, dated May 8, 2019</p> <p>LASER APERTURE</p>
	AZ1D4SB model  <p>LASER RADIATION DO NOT STARE INTO BEAM OR EXPOSE USERS OF TELESCOPIC OPTICS CLASS 2M LASER PRODUCT Wavelength : 400-410nm, P_{total} = 8mW Peak Complies with 21 CFR 1040.10 and 1040.11 except for conformance with IEC/EN 60825-1 Ed. 3 (2014), as described in Laser Notice No. 56, dated May 8, 2019</p> <p>LASER APERTURE</p>
	AZ1D4MR and AZ1D4LR models  <p>LASER RADIATION AVOID DIRECT EYE EXPOSURE CLASS 3R LASER PRODUCT Wavelength : 645-665nm, P_{total} = 25mW Peak EN/IEC60825-1:2014 - Complies with 21 CFR 1040.10 except for deviations pursuant to Laser Notice No. 50, Dated June 24, 2007</p> <p>LASER APERTURE</p>

Ordering Information

Part number	Description
Hardware	
AZ1D4SR	Matrox Altiz 3D profile sensor with a near FoV of 55 mm, range of 70 mm, far FoV of 75 mm, and red (660 nm) laser.
AZ1D4SB	Matrox Altiz 3D profile sensor with a near FoV of 55 mm, range of 70 mm, far FoV of 75 mm, and blue (405 nm) laser.
AZ1D4MR	Matrox Altiz 3D profile sensor with a near FoV of 85 mm, range of 225 mm, far FoV of 165 mm, and red (660 nm) laser.
AZ1D4LR	Matrox Altiz 3D profile sensor with a near FoV of 110 mm, range of 385 mm, far FoV of 310 mm, and red (660 nm) laser.
Accessories	
M12-CBL-PWR10/3	9.8 ft or 3 m cable to connect alternate power and discrete I/Os. M12 to open end.
M12-CBL-ETH/5	16.4 ft or 5 m Ethernet cable. M12 to RJ45 connector.
Software	
Refer to MIL X datasheet and Matrox Design Assistant X datasheet . Note: Software sold separately.	

Endnotes:

1. The product may be protected by one or more patents; see www.matrox.com/patents for more information.
2. Matrox Altiz functionality limited under IP67 rating conditions.
3. Matrox Capture Works for Linux availability scheduled for Q4 2020.
4. MIL 10/X with appropriate service pack and update for GigE Vision.
5. With Matrox Design Assistant X re-release scheduled for Q2 2020.

The Matrox Imaging advantage



Assured quality & longevity

Adhering to industry best practices in all hardware manufacturing and software development, product designs pay careful attention to component selection to secure consistent long-term availability. Matrox Imaging is able to meet Copy Exact and Revision Change Control procurement requirements in particular circumstances, backed by a dedicated team of QA specialists.



Trusted industry standards

Matrox Imaging champions industry standards in its design and production. Leveraging these standards to deliver quality compatible products, Matrox Imaging protects its customers' best interests by ensuring hardware and software components work with as many third-party products as possible.



Comprehensive customer support

Devoted front-line support and applications teams are on call to offer timely product installation, usage, and integration assistance. Matrox Professional Services delivers deep technical assistance to help customers develop their particular applications in a timely fashion. Services include personalized training and device interfacing as well as application feasibility, prototyping, troubleshooting, and debugging.



Tailored customer training

Matrox Vision Academy comprises online and on-premises training for Matrox Imaging vision software tools. On-premises intensive training courses are regularly held at Matrox headquarters, and can also be customized for onsite delivery. The Matrox Vision Academy online training platform hosts a comprehensive set of on-demand videos available when and where needed.



Long-standing global network

Matrox Imaging customers benefit from a global network of distributors who offer complementary products and support, and integrators who build customized vision systems. These relationships are built on years of mutual trust and span the globe, ensuring customer access to only the best assistance in the industry.



About Matrox Imaging

Founded in 1976, Matrox is a privately held company based in Montreal, Canada. Imaging, Graphics, and Video divisions provide leading component-level solutions, leveraging the others' expertise and industry relations to provide innovative, timely products.

Matrox Imaging is an established and trusted supplier to top OEMs and integrators involved in machine vision, image analysis, and medical imaging industries. The components consist of smart cameras, 3D sensors, vision controllers, I/O cards, and frame grabbers, all designed to provide optimum price-performance within a common software environment.

Contact Matrox

imaging.info@matrox.com

North America Corporate Headquarters: 1 800-804-6243 or 514-822-6020

Serving: Canada, United States, Latin America, Europe, Asia, Asia-Pacific, and Oceania

www.matrox.com/imaging

The use of the terms "industrial" or "factory-floor" do not indicate compliance to any specific industrial standards.

matrox[®]

© 2020 Matrox Electronic Systems, Ltd. All rights reserved. Matrox reserves the right to change specifications without notice. Matrox and Matrox product names are either trademarks and/or registered trademarks in Canada or other countries and/or trademarks of Matrox Electronic Systems, Ltd and/or Matrox Graphics Inc. All other company and product names are registered trademarks and/or trademarks of their respective owners. The information furnished herein is believed to be accurate and reliable at time of printing; however, no responsibility license is granted under any patents or patent rights of Matrox Electronic Systems, Ltd. 05/2020