

PROVISIONAL¹ Specification sheet for: Terabee 3Dcam VGA

rev 1.2

Product description

Advanced Time-of-Flight 3D camera with VGA resolution, industrial-grade interfaces and IP65 rated, rugged aluminium enclosure. compact size, lightweight and in its segment.

It is suited to multiple machine vision applications, including distance and depth sensing, object recognition, robotics, object recognition, presence detection and gesture recognition.

Key features

- VGA (640 × 480 pixels) Time-of-Flight camera
- Wide Field of View (90° × 67.5°)
- Up to 5m range (80% reflectance target, indoor)
- Up to 30 frames per second
- Gigabit Ethernet communication
- On-board computing power for customer application development
- IP65 rated enclosure

Application examples

- Depth sensing and object recognition
- Tracking and classification
- Presence detection and distance measurement
- Gesture recognition
- Robotics



Isometric front view (version with base connectors)

¹ This is a provisional specification sheet. By definition, target specifications and product details may be subject to change without prior notice. The purpose of this document is to give a good insight into the intended specifications and to seek client acceptance and feedback. The document is commercial in confidence and is not to be shared without the express written permission of Terabee.

Technical specifications

Product code	TB-3DCAM-VGAS-940 (base connectors) TB-3DCAM-VGAB-940 (back connectors)
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Performance

Detection principle	Infrared Time-of-Flight
Resolution	640 pixels × 480 pixels (VGA)
Output information	Depth and active Infrared (IR), Point cloud; Passive Infrared
Range ^{(a)(b)}	0.35 m to 5 m
Frame rate ^(c)	Up to 30 fps
Output distance resolution	1 mm
Accuracy ^{(a)(b)}	~5 mm (below 1 m), 1-2% (beyond 1 m)
Repeatability ^{(a)(b)}	< 1.5%
Field of View (FOV)	90° × 67.5°
Angle per pixel	0.14° × 0.14°
Image area ^(d)	2.0 m × 1.33 m, at 1 m target distance ... 10.0 m × 6.7 m, at 5 m target distance
Light source wavelength	940 nm - Laser Class 1 ^(e)
Onboard computing	Quad-core ARM Cortex A53 @ 1.2GHz, 1GB SDRAM 32 GB SD Flash. Linux® (DietPi) operating system

Electronics

Supply voltage V_{IN}	10V to 30V DC
Max power consumption ^(f)	10 W

Interfaces

Data connectivity	Proprietary protocol over TCP/IP
Digital output ^(g)	1x Open Collector (source, <500 mA) on M12 5-pin Programmable via SW as NO/NC or PWM
Serial interface (console)	RS485 (half-duplex) on <i>Connector 1 - Power (PWR)</i>
Data interface	Gigabit Ethernet on <i>Connector 2 - Ethernet (ETH)</i>
Visual notification	LED (multicolor)

Mechanics

Dimensions ^(h) [mm] L × W × H	100 × 103 × 32 (TB-3DCAM-VGAS-940) 100 × 87 × 49.5 (TB-3DCAM-VGAB-940)
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Weight ^(h)	435 g (TB-3DCAM-VGAS-940) 477 g (TB-3DCAM-VGAB-940)
Enclosure rating ^(e)	IP65
Housing material	Aluminum, acrylic glass
Type of connection	<i>Connector 1 - Power (PWR):</i> M12 A-coded male connector, 5-pin <i>Connector 2 - Ethernet (ETH):</i> M12 X-coded female connector, 8-pin
Ambient temperature operation (at $V_{IN} = 24\text{ V}$)	-10°C to +45°C
Mounting	Lateral, front and back-side with threaded holes for M5 and ¼"-20 Tripod screws Alignment (4H7) pin holes on lateral sides
Software	
Client machine	x86_64 PC
Operating system for companion Software Development Kit (SDK) and Graphical User Interface (GUI)	Linux® (Ubuntu 18.04 and 20.04, 64-bit) ⁽ⁱ⁾ Microsoft Windows® 10, 64-bit
SDK programming language(s)	C++ ^(j) , Python ^(k)
Initialization time	10 s
Third party compatibility	OpenCV, ROS (Melodic, Noetic)
Conformity	
Reference standard ^(e)	CE, RoHS, Laser Class 1, Vibration & Shock

(a) Specifications are derived from tests in controlled conditions (target with 80% diffuse reflectivity, indoor fluorescent lighting, ambient temperature around 25°C, subject to change). Note that bright sunlight, target surface reflectivity and other variables can affect camera performance.

(b) Calculated around the centre over ~20% of the total pixels. Repeatability is evaluated as one standard deviation over multiple measurements over time. Data subject to change.

(c) Can vary depending on network conditions and programming/output choices.

(d) Derived from Field of View (FOV). If frame distortion removal is applied, need to consider a 5% reduction in each direction.

(e) Refer to the conformity certificate in the User Manual for details.

(f) Without NO/NC load.

(g) Nota bene. The digital output (NO/NC or PWM) pin has to be considered as 'Auxiliary' as its activation and/or modulation (PWM) logic is arbitrary, i.e. it requires the user to program the camera depending on the specific application.

(h) Including M12 connectors.

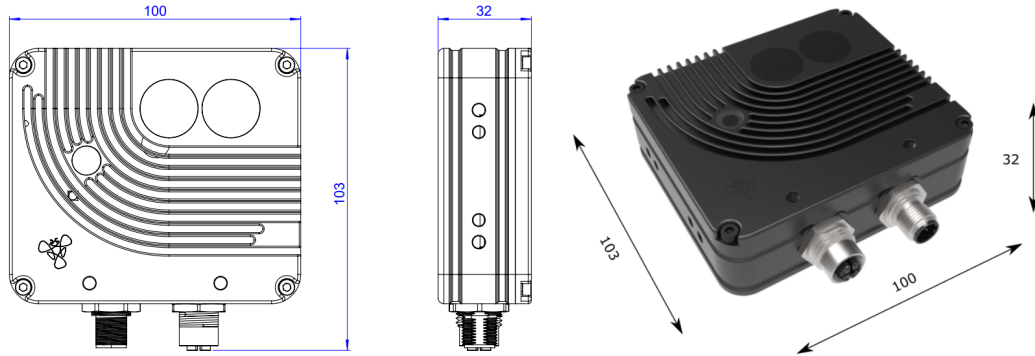
(i) Debian-based distributions in general, but only Ubuntu 18.04 and 20.04, 64-bit, tested.

(j) C++ from version 14 - Mingw64 and MSVC2019 environments (Microsoft Windows®).

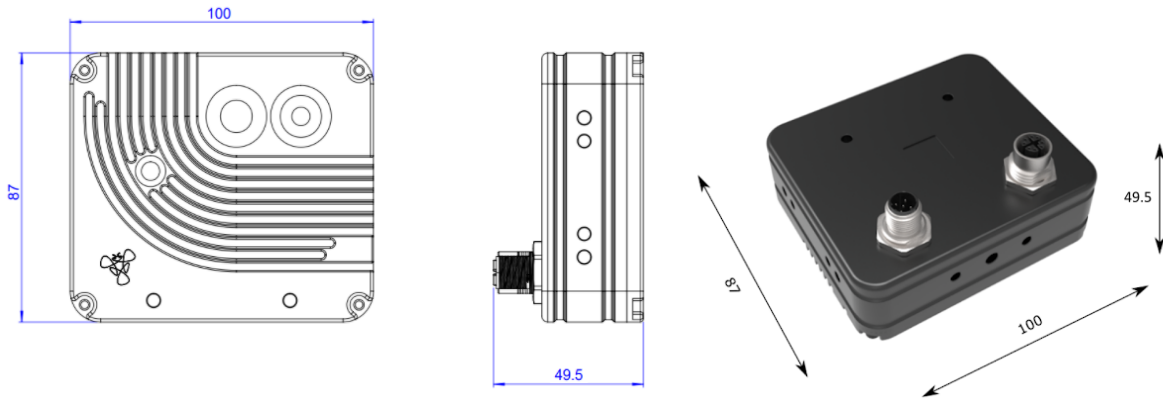
(k) Python version 3.6 (Linux®) and version 3.8 (Linux® and Microsoft Windows®).

Dimensions including connectors (in mm)

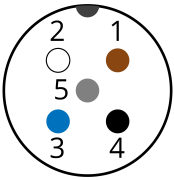
Base connectors (TB-3DCAM-VGAS-940)




Back connectors (TB-3DCAM-VGAB-940)



Connector 1 - Power (PWR) - pinout

M12 A-coded (male)	Pin No.	Function	Description
	1	V_{IN}	+10 to 30VDC power supply
	2	GND	Ref. potential (power supply and data)
	3	NO/NC - PWM	Digital output (static or PWM)
	4	Tx/Rx+	RS485 differential line (debug console)
	5	Tx/Rx-	RS485 differential line (debug console)

Connector 2 - Ethernet (ETH) - pinout

M12 A-coded (male)	Pin No.	Function	Description
	1, 2	D1+, D1-	Gigabit Ethernet
	3, 4	D2+, D2-	
	5, 6	D3+, D3-	
	7, 8	D4+, D4-	

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