

ZERØKEY

SPATIAL INTELLIGENCE



Quantum RTLS® Datasheet

Models:

QTM-EAP10

QTM-DWR10

QTM-AGP10

QTM-DMC10

QTM-UAR10

QTM-SMR10

QTM-UMR10

Digitizes 3D location in real-time with up to 1.5 mm accuracy

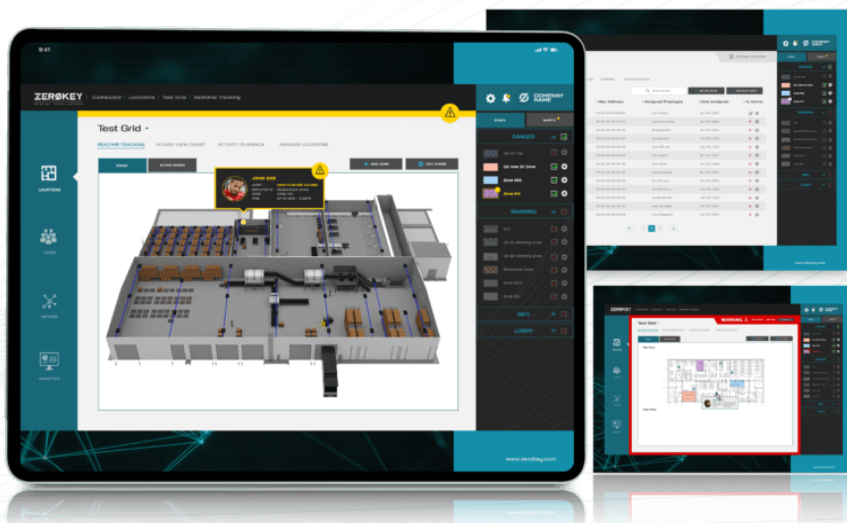
Wide-area scalability supports virtually any use case

Rapid deployment with industry-leading automatic calibration

Hyper-Accurate RTLS for Industrial Applications

Quantum RTLS is a hyper-accurate location technology that digitizes complex industrial operations in real-time with up to 1.5 mm 3D accuracy - a 100-fold accuracy gain over other location technologies, including Ultra-Wideband. The technology provides unprecedented operational visibility of manufacturing, supply chain, logistics, and human-centric workflows, enabling real-time optimization and integration of processes across entire organizations.

By precisely digitizing 3D spatial locations in real-time, Quantum RTLS is revolutionizing industrial environments, one factory, warehouse, and facility at a time.



The ZeroKey Difference

Leveraging proprietary technology supported by over 30 patents, Quantum RTLS tracks critical enterprise assets, processes, goods and people with unrivaled accuracy. Historically, the digitization of complex human-centric processes has been challenging due to the technical limitations of earlier technologies. Quantum RTLS unlocks this untapped value by precisely digitizing, digitally twinning, and streamlining manual processes in real-time to increase production efficiency, eliminate manual data entry steps, and improve first-pass yields.

Breakthrough 3D Location Technology

Quantum RTLS combines hyper-accurate 3D localization and wide-area scalability to drive optimization through total operational visibility.

The system's Mobile devices capture valuable operational data in real-time to provide a fully automated and digitally controlled factory of the future. Ultra-low latency position updates enable countless new operational efficiencies in many industries, from manufacturing to construction job sites. The ZeroKey system offers the flexibility, simplicity, and speed required to support temporary and permanent deployments ranging from large-scale wide-area coverage to localized work cell coverage.



System Specifications

3D Positioning Accuracy	up to 1.5 mm ¹
Positioning Update Rate	up to 20 Hz ²
Typical Measurement Latency	14 ms (typ.)

[1] Under unobstructed conditions with view to 6 anchor nodes configured in an ideal network geometry

[2] Dependent on the number of Mobile units

[3] Applies exclusively to the QTM-UMR10 and QTM-DWC10 devices

Features

Total business intelligence.

Actionable insights into facility-wide operations and processes drives better data-driven decision making and improved bottom-line performance.

Unparalleled accuracy.

The only industrial real-time location system (RTLS) in the market that provides up to 1.5 mm 3D positioning accuracy.

Rapid low-cost deployment.

Industry-leading calibration technology automatically calculates the exact location of every fixed device, eliminating the need for costly surveying or mapping throughout the deployment process.

Six Degrees of Freedom (6DoF).

Each device provides six degrees of freedom position and orientation output³. Advanced sensor fusion algorithms tightly couple multiple sensor outputs to provide highly accurate and reliable heading and orientation data.

Expandable.

Online provisioning supports rapid scalability across entire facilities, while advanced sensor fusion algorithms and multichannel operation enable simultaneous operation of a large number of devices.

Open API and extensible plugin interfaces.

Core functions of the Quantum RTLS hardware are accessible through the [ZeroKey API](#), providing direct control of devices and system operation. Sample source code examples are provided for popular platforms, including Python, C#, Java, and JavaScript.

Rapid and Low-Cost Deployment

Quantum RTLS is packed with advanced features to deliver fast and easy set-up of new positioning networks. Fixed Anchors are available in two interoperable models to efficiently deploy and scale Quantum RTLS in varying industrial environments.

The QTM-EAP10 Anchor is a daisy chainable Power-over-Ethernet (PoE 802.3at) model that reduces costs and installation time by connecting up to 10 devices on a single Ethernet connection. The QTM-UAR10 Anchor is battery operated or optionally powered via micro-USB, making it ideal for temporary installations or placement where a low-profile footprint is preferred.



QTM-EAP10
PoE Anchor

QTM-UAR10
Universal Anchor

ZeroKey Calibration
Technology

Rapid Installation: Save Money and Time

Anchors are easily secured to the included mounting hardware with toolless locking plates located on the back of the devices. The QTM-EAP10's gimbal-mounted transducer makes it possible to focus the device toward key areas, allowing optimal deployment geometries with fewer anchors. The adjustable receiver lowers installation complexity and cost by enabling clients to use opportune mounting points in a facility.

Automatic Calibration Technology

Automatic calibration technology built-in to Quantum RTLS dramatically lowers the total cost of ownership by eliminating the need for expert installers, manual surveying, specialized tools, or external support.



Anchors



QTM-EAPI10

Daisy-Chainable PoE+ (802.3at) Anchor



QTM-UAR10

Micro-USB Rechargeable Universal Anchor

Gateways

Edge Compute Device



QTM-AGPI10

Quantum RTLS Gateway with PoE+ (802.3at)



QTM-AEA10

On-Premises Positioning Server with Cloud Connectivity

Mobiles



QTM-DWR10

Lightweight, Wearable Wristband Mobile



QTM-DMC10

Ultra-compact Coin Cell Battery (2032) Mobile



QTM-SMR10

Lightweight, Wearable Mobile with Visual, Haptic, and Audible Alarm



QTM-UMR10

Micro-USB Rechargeable Universal Mobile

QTM-EAPI0



PoE+ Input	48 - 57 V	
DC Supply	48 - 57 V	
Power Dissipation	2.25 W	
PoE Standard	PoE+ 802.3at	
USB (Service Port)	Micro-USB	
Ethernet	2x RJ45	
Daisy Chain Limit	10	
Aux Port	Optional external ultrasonic transducer ¹	
DC Jack	2.1 mm / 0.08 in ID 5.5 mm / 0.21 in OD Center-pin positive	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Transmit SPL	Max 110 dB @ 50 kHz	
Ultrasonic Range	Up to 20 m / 65 ft	
Dimensions	119 x 65.9 x 31.5 mm 4.6 x 2.5 x 1.2 in	
Weight	106 g	
Material	Flame retardent FR-PC (Lexan FR Resin 945 Asia)	
Mounting	Multi-use adapter plate (114 x 121 mm)	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

[1] Requires QTM-ETC10 external transducer kit (sold separately).

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See <https://zerokey.com/patents> for a complete list of patents applicable to this product.

QTM-AGP10



PoE+ Input	48 - 57 V	
DC Supply	48 - 57 V	
Power Dissipation	1.5 W	
PoE Standard	PoE+ 802.3at	
USB (Service Port)	USB-C	
Ethernet	RJ45	
DC Jack	2.1 mm / 0.08 in ID 5.5 mm / 0.21 in OD Center-pin positive	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Dimensions	101.4 x 65 x 24.3 mm 3.99 x 2.5 x 0.9 in	
Weight	76 g	
Mounting	Multi-use adapter plate (114 x 121 mm)	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

See <https://zerokey.com/patents> for a complete list of patents applicable to this product.

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QTM-UAR10



Input Voltage	5 V	
Charge Time	4 h (typ.)	
Battery Life	Up to 360 h [†]	
USB	Micro-USB	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Transmit SPL	Max 110 dB @ 50 kHz	
Ultrasonic Range	Up to 20 m / 65 ft	
Dimensions	64 x 45.2 x 17.7 mm 2.5 x 1.7 x 0.6 in	
Weight	30 g	
Mounting	Fixed base plate (50.2 x 50 mm) Swivel base plate (54 x 50.2 mm)	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

[1] Refer to graph on pg. 13.

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QTM-UMR10



Input Voltage	5 V	
Charge Time	4 h (typ.)	
Battery Life	Up to 360 h [†]	
USB	Micro-USB	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Transmit SPL	Max 110 dB @ 50 kHz	
Ultrasonic Range	Up to 20 m / 65 ft	
Dimensions	64 x 45.2 x 17.7 mm 2.5 x 1.7 x 0.6 in	
Weight	30 g	
Mounting	Fixed base plate (50.2 x 50 mm) Swivel base plate (54 x 50.2 mm)	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

[1] Refer to graph on pg. 13.

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See <https://zerokey.com/patents> for a complete list of patents applicable to this product.

QTM-DWR10



Input Voltage	5 V	
Charge Time	4 h (typ.)	
Battery Life	Up to 195 h ¹	
USB (Charge Port)	Micro-USB	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Transmit SPL	Max 110 dB @ 50 kHz	
Ultrasonic Range	up to 20 m / 65 ft	
Dimensions	37.6 x 25.5 x 11.2 mm 1.4 x 1.0 x 0.4 in	240 x 25.5 x 11.2 mm with wrist strap 9.4 x 9.4 x 0.6 in with wrist strap
Weight	30 g	
Mounting	Wrist strap (20 mm) Adapter plate (39 x 28 x 5.5 mm)	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

[1] Refer to graph on pg. 13.

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See <https://zerokey.com/patents> for a complete list of patents applicable to this product.

QTM-DMC10



Input Voltage	5 V	
Battery Life	Up to 96.5 weeks [†]	
Battery Consumption per Query	0.029 uAh	
Queries per Battery (240 mAh)	7,310,344 (typ.)	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Transmit SPL	Max 110 dB @ 50 kHz	
Ultrasonic Range	Up to 20 m / 65 ft	
Dimensions	36 x 36 x 11 mm 1.4 x 1.4 x 0.4 in	47 x 36 x 15.5 mm with strap 1.8 x 1.4 x 0.6 in with strap
Weight	30 g	
Mounting	Clip-in adapter plate (47 x 18 x 13 mm)	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

[1] Refer to graph on pg. 13.

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QTM-SMR10



Input Voltage	5 V	
Charge Time	4 h (typ.)	
Battery Life	Up to 360 h [†]	
USB (Service Port)	Micro-USB	
Radio Band	2.4 GHz ISM band	
Radio Protocol	Proprietary GFSK @ 2 Mbps	
Output Power	8 dBm	
Radio Range	Up to 200 m / 0.12 mi	
Regulatory Certifications	USA, Canada, Europe, Japan, Korea, Australia, New Zealand	
Transmit SPL	Max 110 dB @ 50 kHz	
Ultrasonic Range	Up to 20 m / 65 ft	
Dimensions	47 x 72.7 x 19 mm 1.8 x 2.8 x 0.7 in	47 x 90 x 33.6 mm with clip 1.8 x 3.5 x 1.3 in with clip
Weight	30 g	
Mounting	Garment clip and lanyard ring	
Operating Temperature	-20 to 60 °C	-4 to 140 °F
Charging Temperature	0 to 60 °C	32 to 140 °F
Humidity	5 to 95% non-condensing	
Safety Certification	IEC 62368-1:2018, EN 62368-1, UL 62368-1:2019, CSA C22.2 No. 62368-1:2019	

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

[1] Refer to graph on pg. 13 titled QTM-UMR10 Battery Life.

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See <https://zerokey.com/patents> for a complete list of patents applicable to this product.

QTM-AEA10



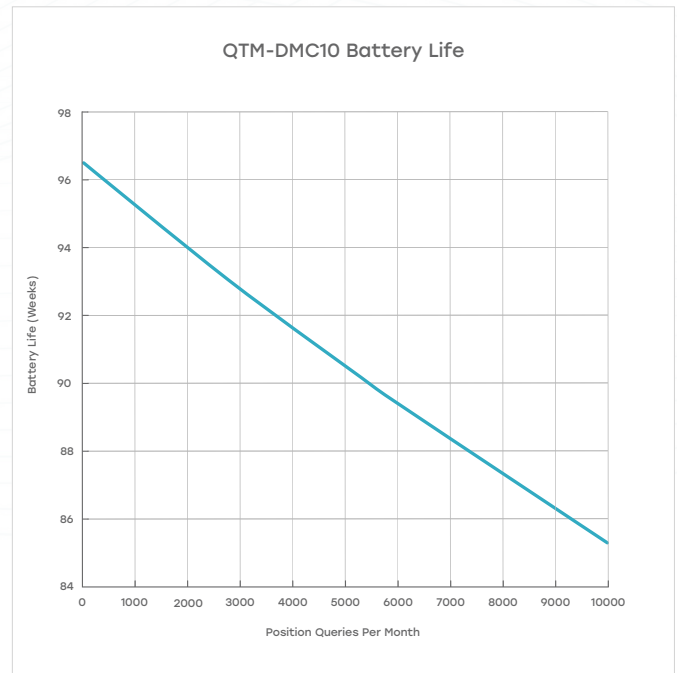
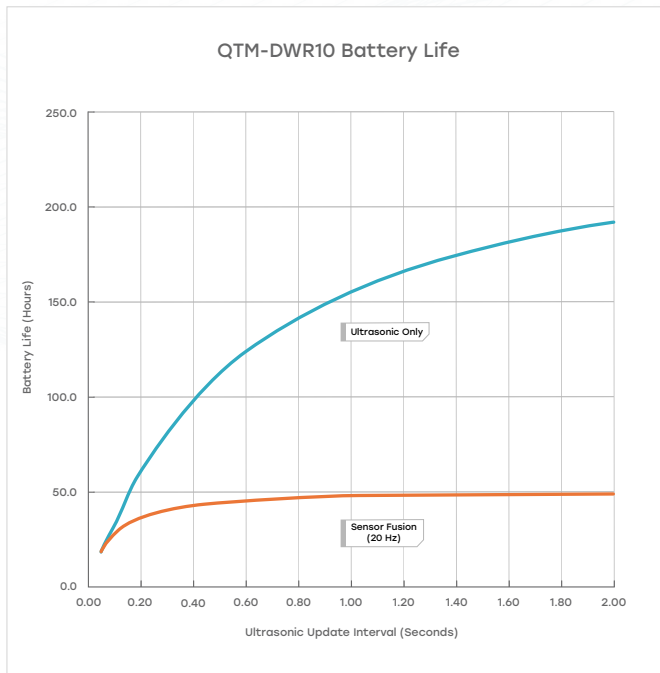
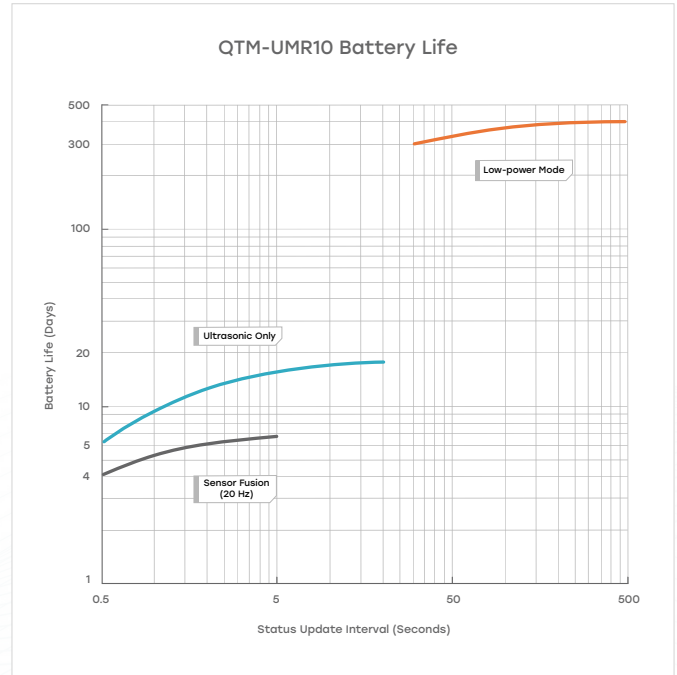
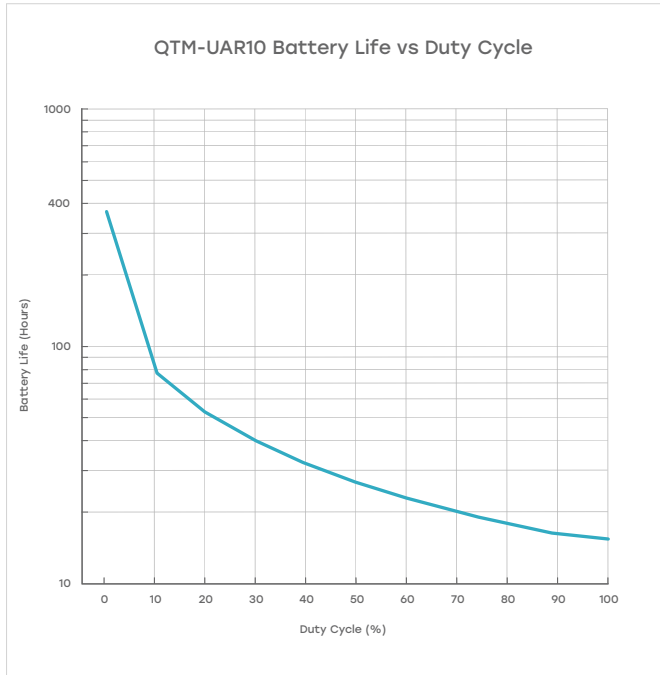
Processor	Intel 11th gen core, i5-1145g7e, 4C/8T, 1.5Ghz - 4.1Ghz turbo, 8MB Intel smart cache, 28W TDP
Graphics	Intel iris Xe graphics, 4x 4K displays supported via 1xHDMI 2.0b, 1xdisplay port 1.4, 2xUSB type-C (Alt-DP)
Memory	Dual DDR4-3200 SODIMMs, 1.2V, up to 64GB
Storage	1xM.2 22x80 socket supporting PCIe x4 gen 4, NVMe from 128GB to 8TB or SATA SSD from 128GB to 2TB, 1x 2.5 drive bay supporting 2.5 inch SARA, SSD's from 64GB to 8TB
Peripherals	Intel Wi-Fi 6 AX201, Bluetooth 5.1, 1x 2.5Gb LAN, 1 x 1.0Gb LAN, 2x front USB 3.2 gen2 type-A 2x rear USB 3.2 gen2 type-A, 2x front USB 3.2 gen2 Type-C, 1 x rear serial port
Chassis	190x102x76mm, VESA mount kit support, 1.5kg(3.4lbs) fully assembled with antennas
Expansion	2 x USB 2.0 headers, 1 x serial header, front slot for I/O expansion, 2.5" drive mount for SATA drive
Audio	3.5mm front stereo headset jack, 7.1 multichannel digital audio, via HDMI
Power	12-19VDC variable DC input, 65W 19V PSU supplied
Safety Regulations	FCC CFR title 47, chapter I, part 15, subparts b, EN 55024, EN 55032, EN 55035, CISPR 32, ICES-003, ICES-003, ETSI EN.302 489-1, ETSI EN.301 489-17
Environmental Regulations	RoHS compliant, REACH compliant
Certified Operating System	Windows 11 64-bit (Pro and home), Windows 10 64-bit (Pro and home), Windows 10 IoT Linux (Unbuntu)
Environmental Operating Temperature	0 to +40 °C

† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

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Operational Modes and Performance



† Pat. US 9/977,113, US 10/051,599, US 10/448,357, US 10/627,479, US 10/736,075, US 10/893,502, CN109073740B, KR102252251B1, US 15/339,885, US 15/982,750, US 16/031,553, US 16/560,543, US 16/820,445, US 16/919,822.

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