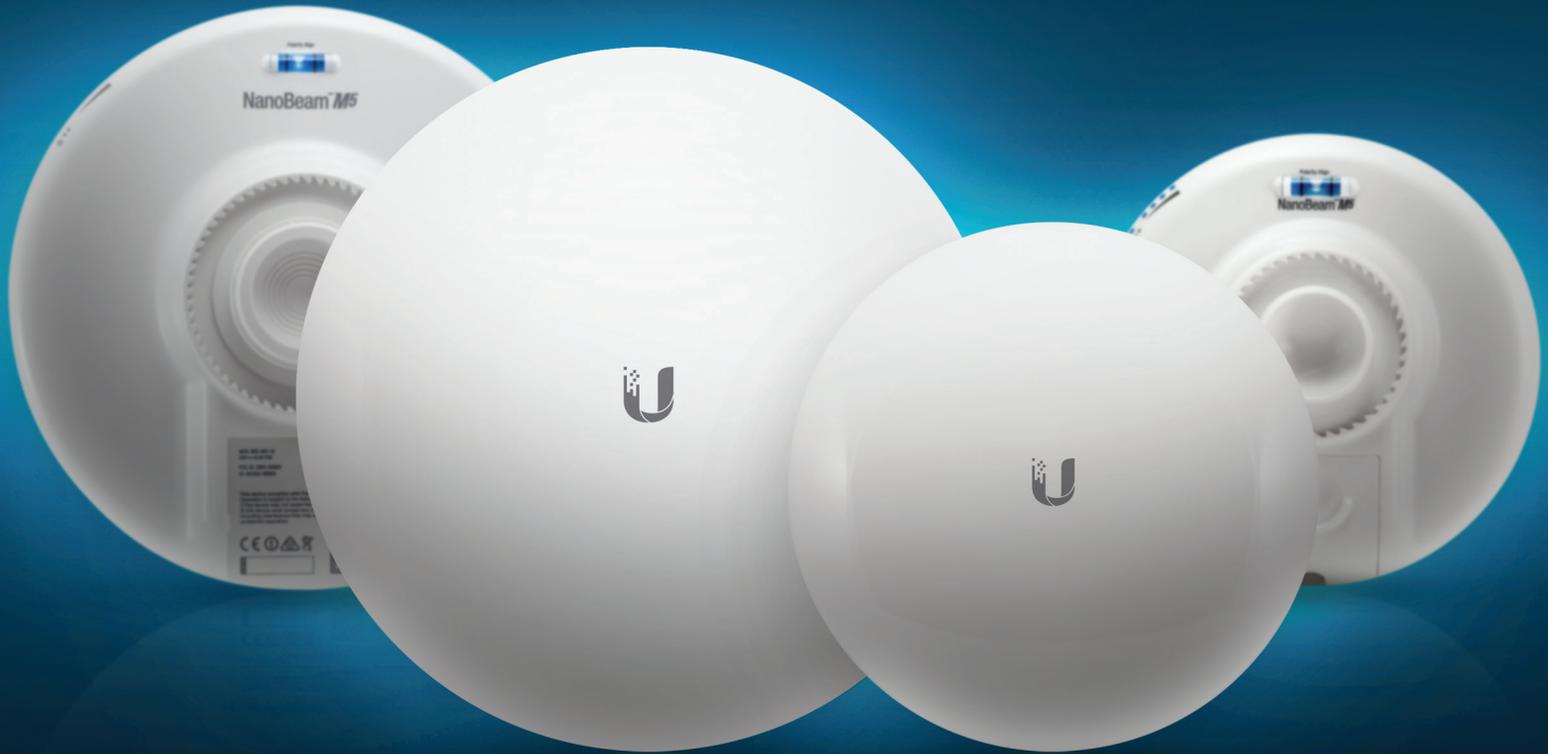


Appendix C: Datasheets of Deployed Sensors and Devices

Contents

Appendix C: Datasheets of Deployed Sensors and Devices	1
1. Radios	2
2. Cameras	62
3. RFID	74
4. Traffic Radar	100
5. Road Temperature Sensor	103
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8. Other Devices	127

1. Radios



NanoBeam[®] M

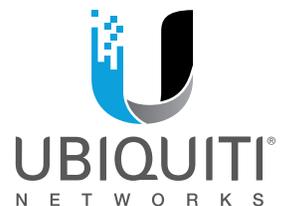
High-Performance airMAX[®] Bridge

Models: NBE-M2-13, NBE-M5-16, NBE-M5-19

Uniform Beamwidth Maximizes Noise Immunity

Innovative Mechanical Design

High-Speed Processor for Superior Performance



Overview

Starting with the first-generation NanoBridge®, Ubiquiti Networks pioneered the all-in-one design for an airMAX® product functioning as a CPE (Customer Premises Equipment). Now Ubiquiti Networks launches the latest generation of CPE, the NanoBeam®.

Improved Noise Immunity

Available for the 2.4 and 5 GHz frequency bands, the NanoBeam directs RF energy in a tighter beamwidth. With the focus in one direction, the NanoBeam blocks or spatially filters out noise, so noise immunity is improved. This feature is especially important in an area crowded with other RF signals of the same or similar frequency.

Integrated Design

The Ubiquiti® Research and Development team combined the radio and antenna to create a more efficient and compact CPE. The NanoBeam gets maximum gain out of the smallest footprint.

Providing increased performance from its faster processor and innovative mechanical design at a low cost, the NanoBeam is extremely versatile and cost-effective to deploy.

airMAX Technology Included

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

This time slot method eliminates hidden node collisions and maximizes airtime efficiency. It provides significant performance improvements in latency, throughput, and scalability compared to all other outdoor systems in its class.

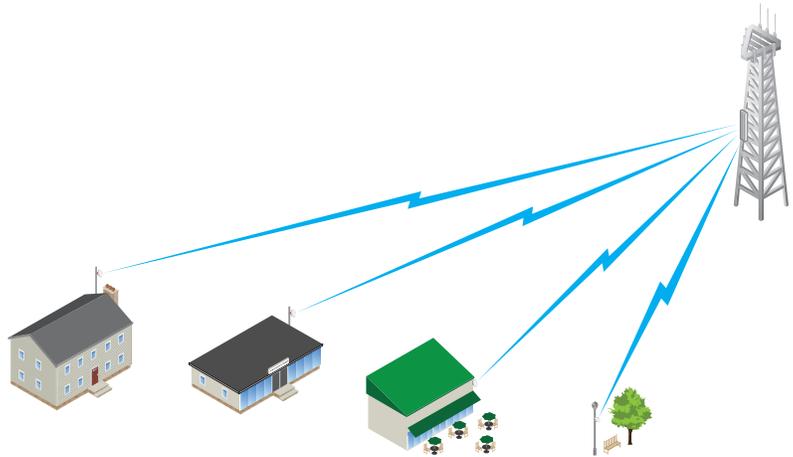
Intelligent QoS Priority is given to voice/video for seamless streaming.

Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Application Examples

PtMP Client Links



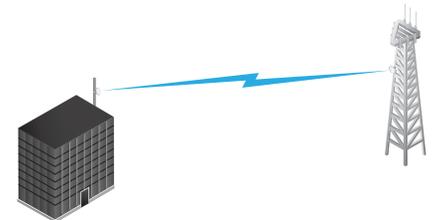
The NanoBeam used as a CPE device for each client in an airMAX PtMP network.

Wireless Client



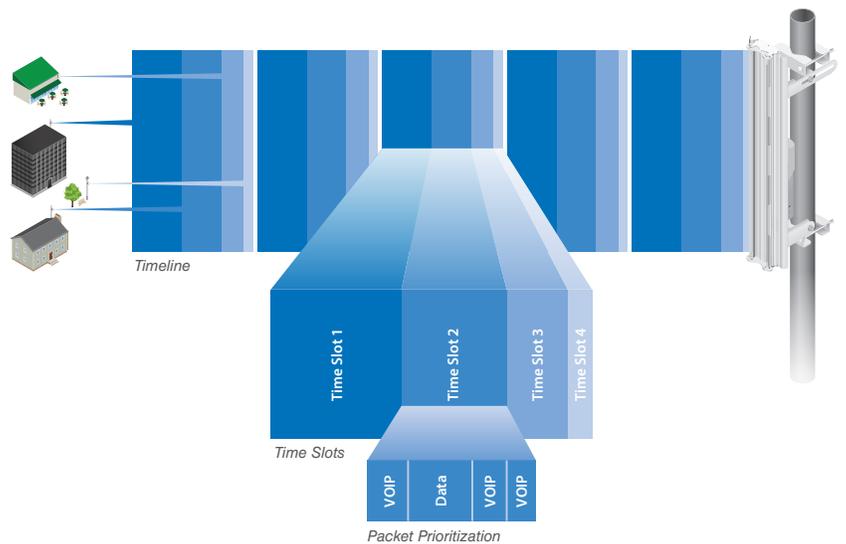
The NanoBeam as a powerful wireless client.

PtP Link



Use a NanoBeam on each side of a PtP link.

airMAX TDMA Technology



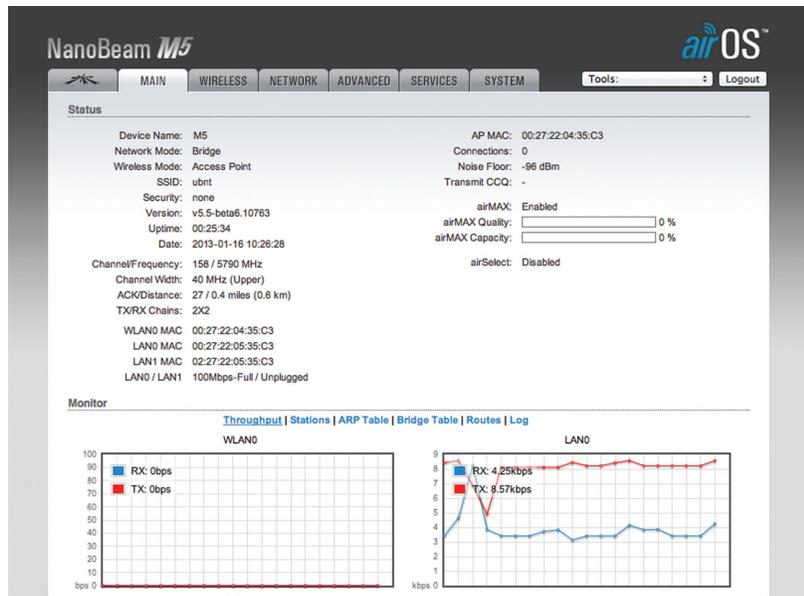
Up to 100 airMAX stations can be connected to an airMAX Sector; four airMAX stations are shown to illustrate the general concept.

Software

airOS®

airOS® is an intuitive, versatile, highly developed Ubiquiti firmware technology. It is exceptionally intuitive and was designed to require no training to operate. Behind the user interface is a powerful firmware architecture, which enables high-performance, outdoor multi-point networking.

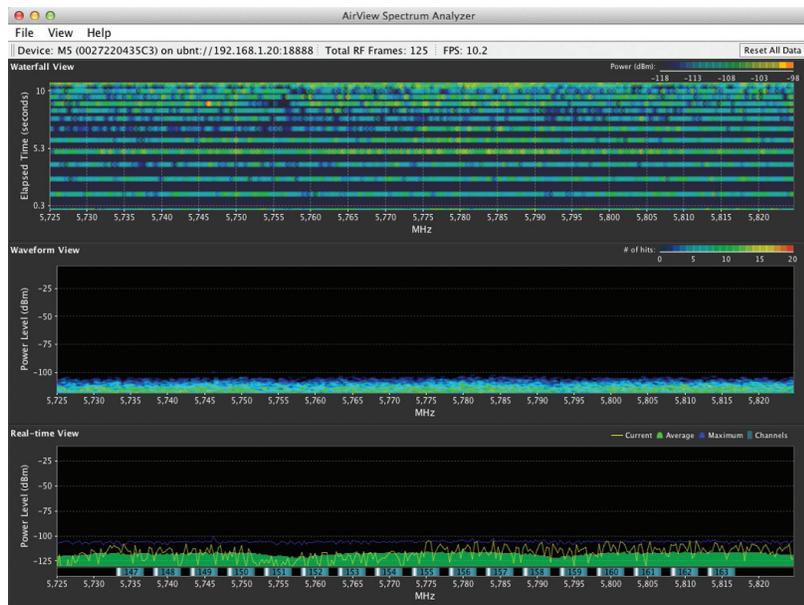
- Protocol Support
- Ubiquiti Channelization
- Spectral Width Adjustment
- ACK Auto-Timing
- AAP Technology
- Multi-Language Support



airView®

Integrated on all Ubiquiti M products, airView® provides advanced spectrum analyzer functionality: waterfall, waveform, and real-time spectral views allow operators to identify noise signatures and plan their networks to minimize noise interference.

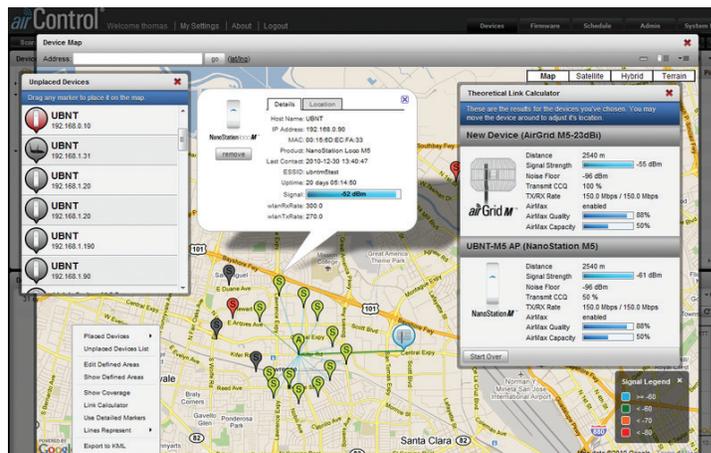
- **Waterfall** Aggregate energy over time for each frequency.
- **Waveform** Aggregate energy collected.
- **Real-time** Energy is shown in real time as a function of frequency.
- **Recording** Automate airView to record and report results.



airControl®

airControl® is a powerful and intuitive, web-based server network management application, which allows operators to centrally manage entire networks of Ubiquiti devices.

- Network Map
- Monitor Device Status
- Mass Firmware Upgrade
- Web UI Access
- Manage Groups of Devices
- Task Scheduling



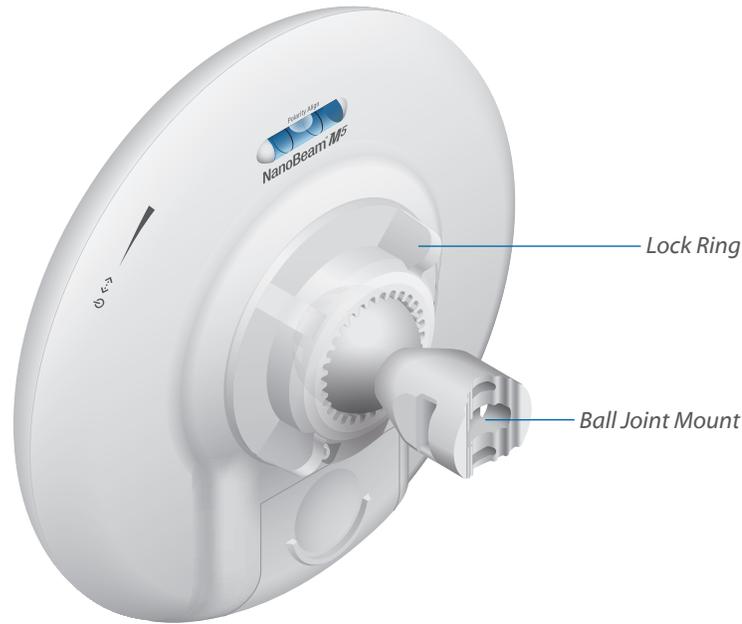
Hardware Overview

Innovative Mechanical Design

- **All-in-one design** The NanoBeam provides both the radio and antenna in the smallest possible footprint.
- **Quick and easy installation** No fasteners are required for pole-mounting, and a single wall fastener (not included) is required for wall-mounting.
- **Convenient alignment** The NanoBeam pivots on its ball joint for easy aiming.

Compact Form Factor

- **Efficient footprint** The radio and antenna are combined into a single body that takes up minimal space.
- **Versatile mounting** The NanoBeam can be mounted in almost any position needed for line of sight.
- **Aesthetics** The NanoBeam is small enough to blend discreetly into the background at a customer's location.



NBE-M5-19 with Mounting Hardware

Optional Isolator Shield Accessory



IsoBeam™

Model	NBE-M2-13	NBE-M5-16	NBE-M5-19
ISO-BEAM-16		✓	
ISO-BEAM-19	✓		✓

An RF isolator shield is available as an optional accessory to enhance signal isolation.



Installation Using the IsoBeam™

Optional Mounting Accessories

NanoBeam® Wall Mount Kit



Model	NBE-M2-13	NBE-M5-16	NBE-M5-19
NBE-WMK	✓	✓	✓

A wall mount kit is available as an optional accessory to enhance stability for wall-mounting.



Installation Using the NanoBeam Wall Mount Kit

NanoBeam® Window Mount



Model	NBE-M2-13	NBE-M5-16	NBE-M5-19
NBE-16-WM		✓	
NBE-19-WM	✓		✓

A suction cup mount is available as an optional accessory to mount the NanoBeam on a window.



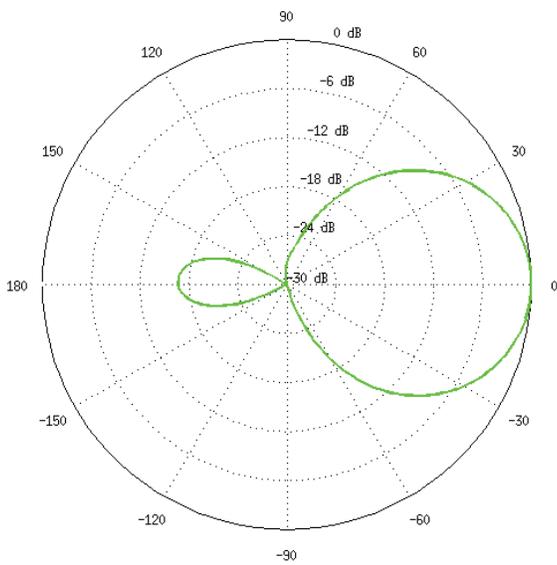
Installation Using the NanoBeam Window Mount

Specifications

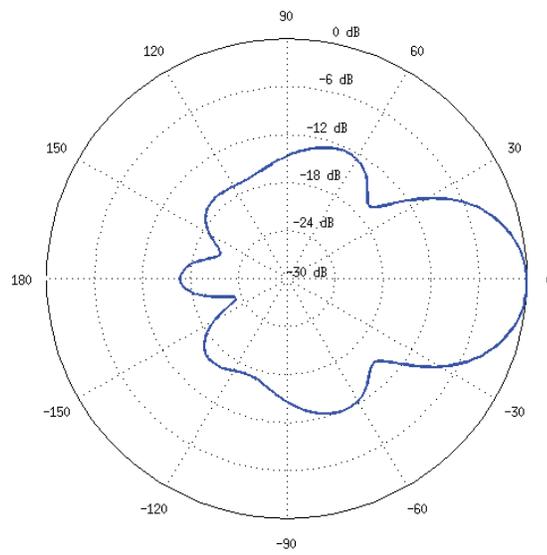
NBE-M2-13	
Dimensions	189 x 189 x 125 mm (7.44 x 7.44 x 4.92")
Weight	0.530 kg (1.17 lb)
Power Supply	24V, 0.5A PoE
Max. Power Consumption	6W
Operating Frequency	2405 - 2475 MHz
Gain	13 dBi
Networking Interface	(1) 10/100 Ethernet Port
Processor Specs	Atheros MIPS 74Kc, 560 MHz
Memory	64 MB DDR2, 8 MB Flash
LEDs	(1) Power, (1) LAN, (4) WLAN
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels
Channel Sizes	5/8/10/20/30/40 MHz
Polarization	Dual Linear
Enclosure	Outdoor UV Stabilized Plastic
Mounting	Pole-Mount (Kit Included), Wall-Mount
Wind Loading	45.4 N @ 200 km/h (10.2 lbf @ 125 mph)
Wind Survivability	200 km/h (125 mph)
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV
Operating Temperature	-40 to 80° C (-40 to 176° F)
Operating Humidity	5 to 95% Noncondensing
Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5
Vibration Test	IEC 68-2-6
Temperature Shock Test	IEC 68-2-14
UV Test	IEC 68-2-5 at 40° C (104° F), Equivalent: ETS 300 019-1-4
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5

NBE-M2-13 Output Power: 28 dBm							
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11g	1 - 24 Mbps	28 dBm	± 2 dB	802.11g	1 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	26 dBm	± 2 dBQ		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	25 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	24 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	28 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	27 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	26 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	25 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	22 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-96 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-95 dBm	± 2 dB
	MCS10	27 dBm	± 2 dB		MCS10	-92 dBm	± 2 dB
	MCS11	26 dBm	± 2 dB		MCS11	-90 dBm	± 2 dB
	MCS12	25 dBm	± 2 dB		MCS12	-86 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-83 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-77 dBm	± 2 dB
MCS15	22 dBm	± 2 dB	MCS15	-74 dBm	± 2 dB		

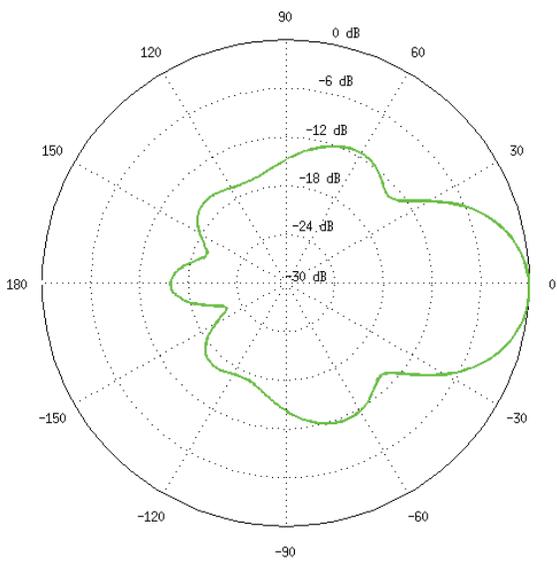
Vertical Azimuth



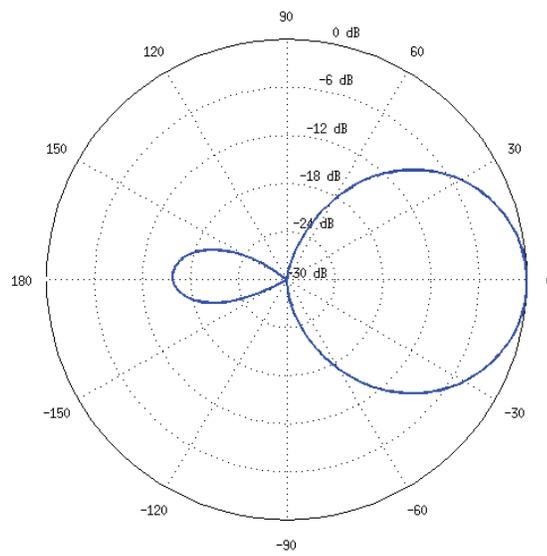
Vertical Elevation



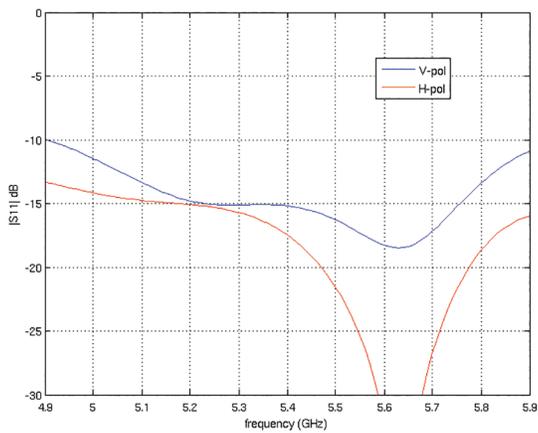
Horizontal Azimuth



Horizontal Elevation



Return Loss



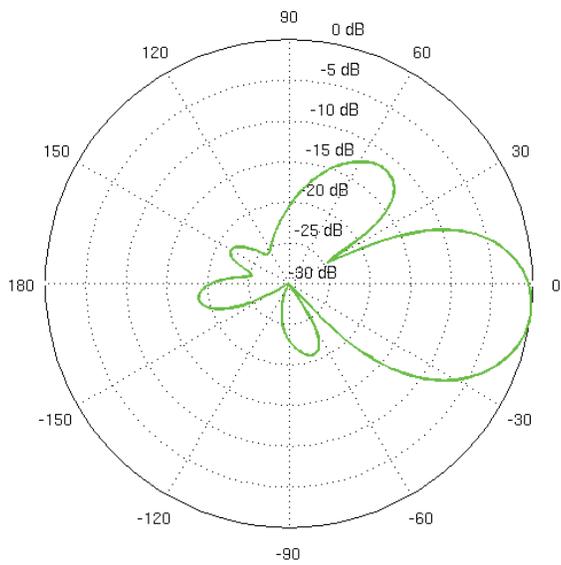
Specifications

NBE-M5-16					
Dimensions	140 x 140 x 54 mm (5.51 x 5.51 x 2.13")				
Weight	0.320 kg (0.71 lb)				
Power Supply	24V, 0.5A PoE				
Max. Power Consumption	6W				
Operating Frequency	Worldwide	USA: U-NII-1	USA: U-NII-2A	USA: U-NII-2C	USA: U-NII-3
	5150 - 5875 MHz	5150 - 5250 MHz*	5250 - 5350 MHz*	5470 - 5725 MHz*	5725 - 5850 MHz*
Gain	16 dBi				
Networking Interface	(1) 10/100 Ethernet Port				
Processor Specs	Atheros MIPS 74Kc, 560 MHz				
Memory	64 MB DDR2, 8 MB Flash				
LEDs	(1) Power, (1) LAN, (4) WLAN				
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels				
Max. VSWR	1.5:1				
Channel Sizes	5/8/10/20/30/40 MHz				
Polarization	Dual Linear				
Enclosure	Outdoor UV Stabilized Plastic				
Mounting	Pole-Mount (Kit Included), Wall-Mount				
Wind Loading	21.4 N @ 200 km/h (4.8 lbf @ 125 mph)				
Wind Survivability	200 km/h (125 mph)				
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV				
Operating Temperature	-40 to 70° C (-40 to 158° F)				
Operating Humidity	5 to 95% Noncondensing				
Wireless Approvals	FCC, IC, CE				
RoHS Compliance	Yes				
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5				
Vibration Test	IEC 68-2-6				
Temperature Shock Test	IEC 68-2-14				
UV Test	IEC 68-2-5 at 40° C (104° F), Equivalent: ETS 300 019-1-4				
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5				

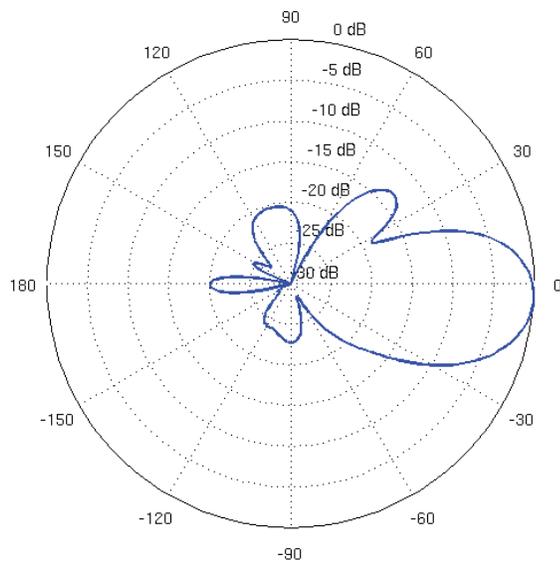
NBE-M5-16 Output Power: 26 dBm							
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	26 dBm	± 2 dB	802.11a	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	24 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	23 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	26 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	23 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	26 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	23 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		

* Some frequencies may require activation; visit: <https://www.ubnt.com/fcclabelrequest>

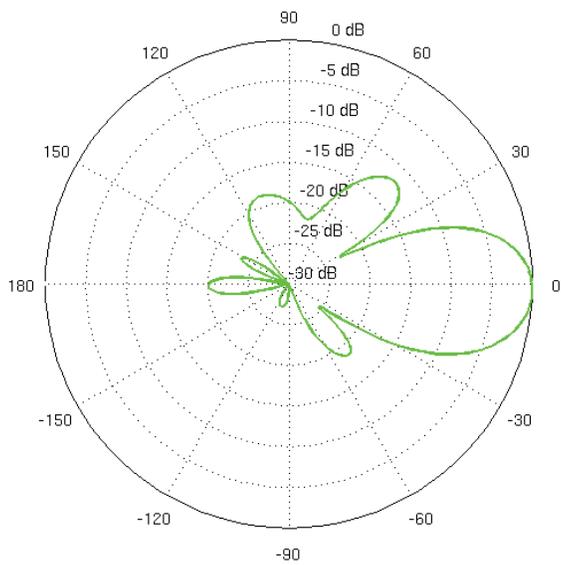
Vertical Azimuth



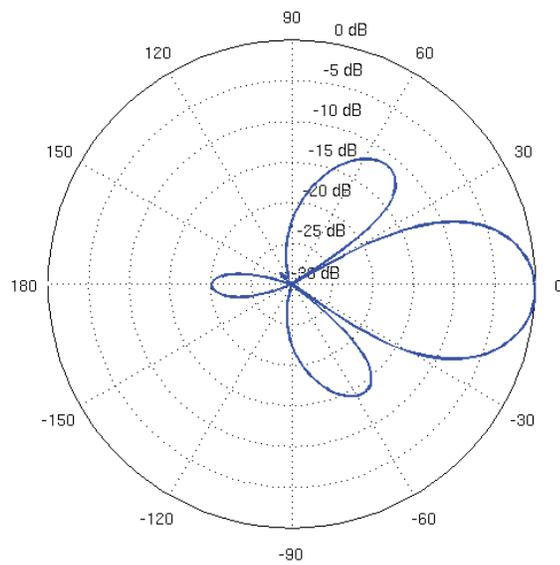
Vertical Elevation



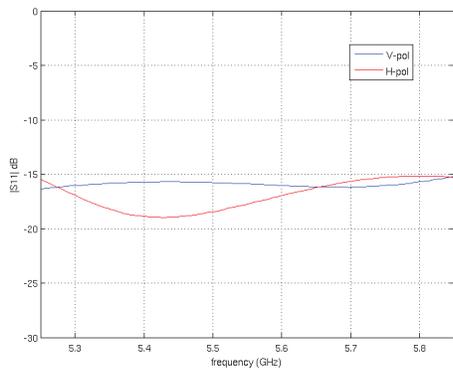
Horizontal Azimuth



Horizontal Elevation



Return Loss



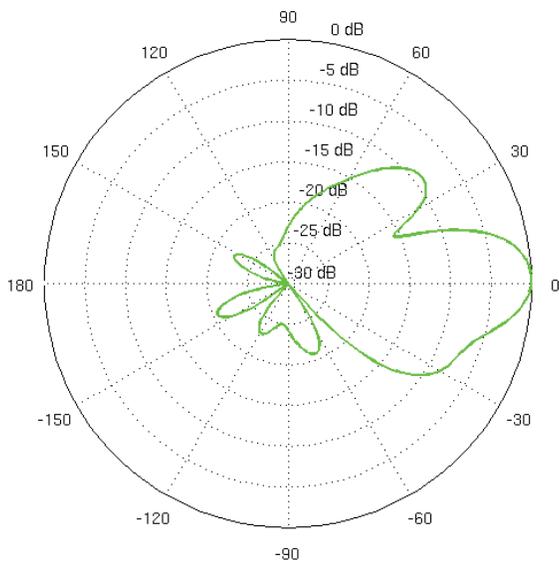
Specifications

NBE-M5-19					
Dimensions	189 x 189 x 125 mm (7.44 x 7.44 x 4.92")				
Weight	0.530 kg (1.17 lb)				
Power Supply	24V, 0.5A PoE				
Max. Power Consumption	8W				
Operating Frequency	Worldwide	USA: U-NII-1	USA: U-NII-2A	USA: U-NII-2C	USA: U-NII-3
	5150 - 5875 MHz	5150 - 5250 MHz*	5250 - 5350 MHz*	5470 - 5725 MHz*	5725 - 5850 MHz*
Gain	19 dBi				
Networking Interface	(1) 10/100 Ethernet Port				
Processor Specs	Atheros MIPS 74Kc, 560 MHz				
Memory	64 MB DDR2, 8 MB Flash				
LEDs	(1) Power, (1) LAN, (4) WLAN				
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels				
Max. VSWR	1.5:1				
Channel Sizes	5/8/10/20/30/40 MHz				
Polarization	Dual Linear				
Enclosure	Outdoor UV Stabilized Plastic				
Mounting	Pole-Mount (Kit Included), Wall-Mount				
Wind Loading	45.4 N @ 200 km/h (10.2 lbf @ 125 mph)				
Wind Survivability	200 km/h (125 mph)				
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV				
Operating Temperature	-40 to 70° C (-40 to 158° F)				
Operating Humidity	5 to 95% Noncondensing				
Wireless Approvals	FCC, IC, CE				
RoHS Compliance	Yes				
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5				
Vibration Test	IEC 68-2-6				
Temperature Shock Test	IEC 68-2-14				
UV Test	IEC 68-2-5 at 40° C (104° F), Equivalent: ETS 300 019-1-4				
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5				

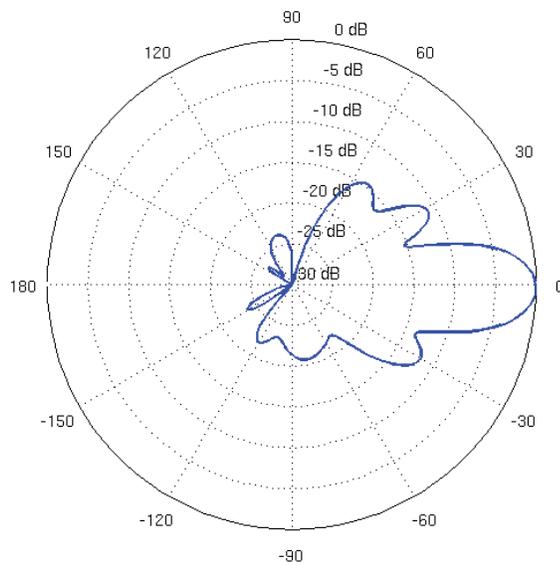
NBE-M5-19 Output Power: 26 dBm							
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	26 dBm	± 2 dB	802.11a	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	24 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	23 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	26 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	23 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	26 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	23 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		

* Some frequencies may require activation; visit: <https://www.ubnt.com/fcclabelrequest>

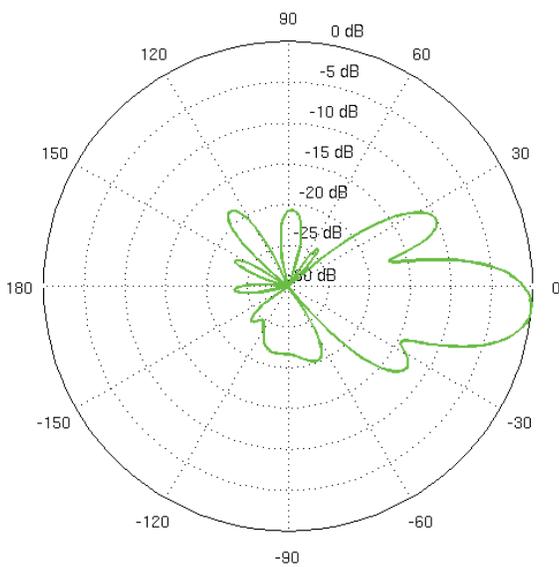
Vertical Azimuth



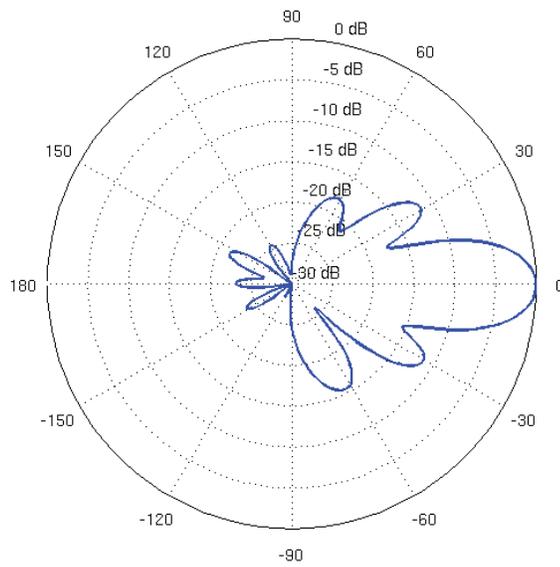
Vertical Elevation



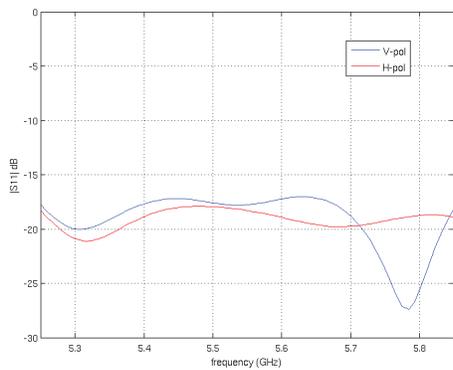
Horizontal Azimuth



Horizontal Elevation



Return Loss





NanoBeam[®] ac

High-Performance airMAX[®] ac Bridge

Models: NBE-5AC-16, NBE-5AC-19

Uniform Beamwidth Maximizes Noise Immunity

Innovative Mechanical Design

High-Speed Processor for Superior Performance



Overview

Application Examples

PtMP Client Links

Ubiquiti Networks launches the latest generation of airMAX® CPE (Customer Premises Equipment), the NanoBeam® ac.

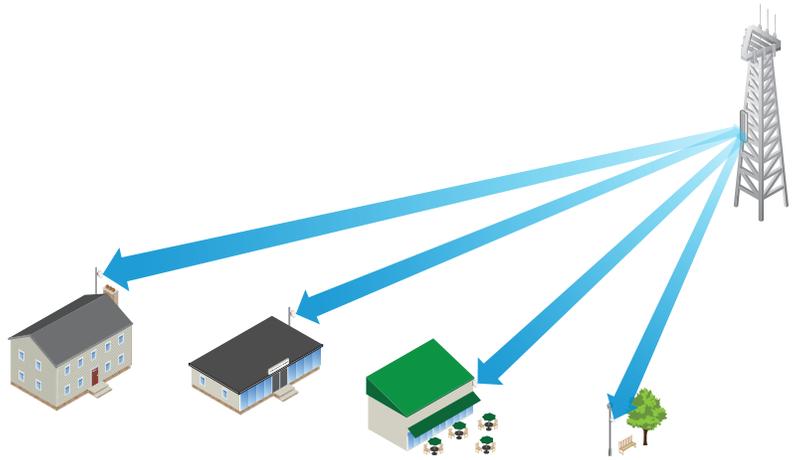
Improved Noise Immunity

The NanoBeam ac directs RF energy in a tighter beamwidth. With the focus in one direction, the NanoBeam ac blocks or spatially filters out noise, so noise immunity is improved. This feature is especially important in an area crowded with other RF signals of the same or similar frequency.

Integrated Design

The radio and antenna are combined to create a more efficient and compact CPE. The NanoBeam ac gets maximum gain out of the smallest footprint.

Providing high performance and an innovative form factor, the NanoBeam ac is versatile and cost-effective to deploy.



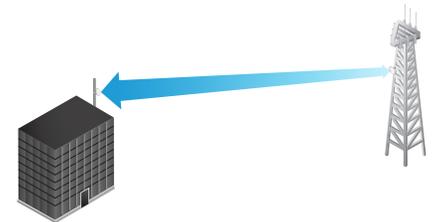
The NanoBeam ac used as a CPE device for each client in an airMAX PtMP network.

Wireless Client



The NanoBeam ac as a powerful wireless client.

PtP Link



Use a NanoBeam ac on each side of a PtP link.

Software

airOS® 7

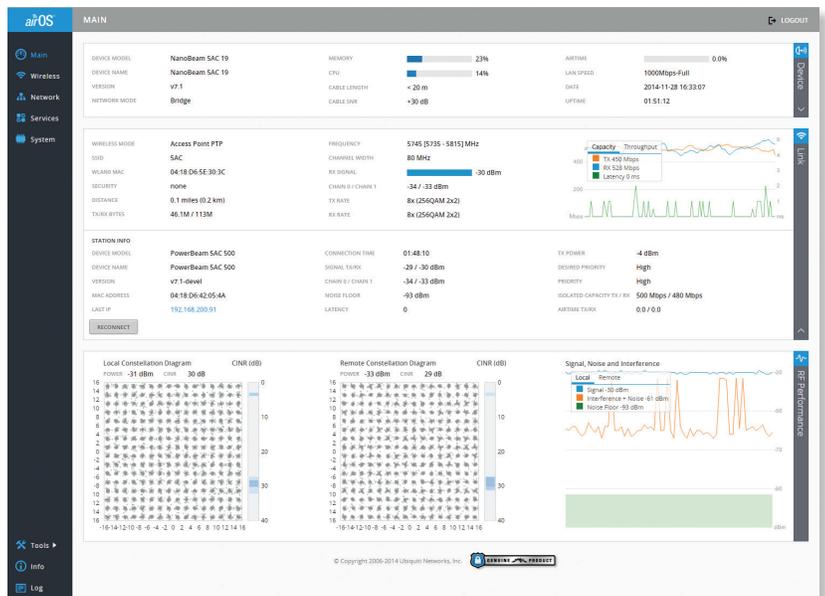
Sporting an all-new design for improved usability, airOS® v7 is the revolutionary operating system for Ubiquiti® airMAX ac products.

Powerful Wireless Features

- airMAX ac Protocol Support
- Long-Range Point-to-Point (PtP) Link Mode
- Selectable Channel Width
 - PtP: 10/20/30/40/50/60/80 MHz
 - PtMP: 10/20/30/40 MHz
- Automatic Channel Selection
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Strongest WPA2 Security

Usability Enhancements

- Dynamic Configuration Changes
- Instant Input Validation
- HTML5 Technology
- Optimization for Mobile Devices
- Detailed Device Statistics
- Diagnostic Tools, including Ethernet Cabling Test, RF Diagnostics, and airView® Spectrum Analyzer



airMAX ac devices feature a multi-radio architecture to power a revolutionary RF analytics engine.

An independent processor on the PCBA powers a second, dedicated radio, which persistently analyzes the full 5 GHz spectrum and every received symbol to provide you with the most advanced RF analytics in the industry.

Data from the spectrum analysis and RF performance monitoring is displayed on the *Main* tab and airView Spectrum Analyzer.

Real-Time Reporting

The *Main* tab displays the following RF information:

- Persistent RF Error Vector Magnitude (EVM) constellation diagrams
- Carrier to Interference-plus-Noise Ratio (CINR) histograms
- Signal-to-Noise Ratio (SNR) time series plots

Spectral Analysis

airView allows you to identify noise signatures and plan your networks to minimize noise interference. airView performs the following functions:

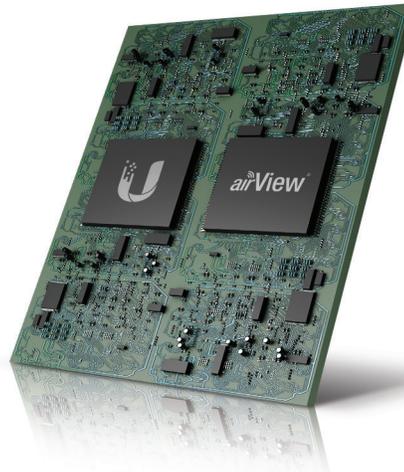
- Constantly monitors environmental noise
- Collects energy data points in real-time spectral views
- Helps optimize channel selection, network design, and wireless performance

airView runs in the background without disabling the wireless link, so there is no disruption to the network.

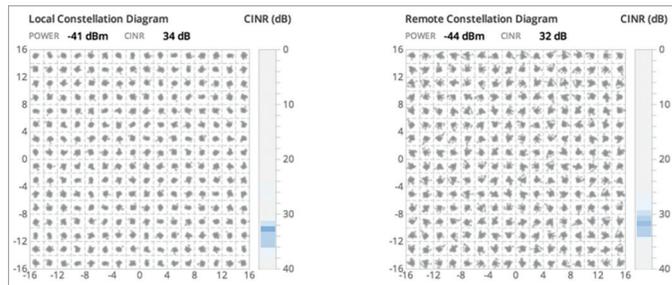
In airView, there are three spectral views, each of which represents different data.

- **Waterfall** Aggregate energy collected for each frequency
- **Waveform** Aggregate energy collected
- **Ambient Noise Level** Background noise energy shown as a function of frequency

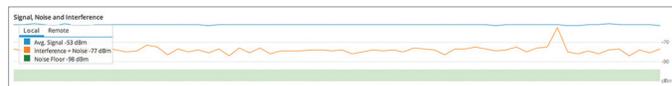
Available with a firmware upgrade to airOS v7.1, airView provides powerful spectrum analyzer functionality, eliminating the need to rent or purchase additional equipment for conducting site surveys.



Constellation Diagrams and CINR Histograms



SNR Time Series Plots



Dedicated Spectral Analysis



Technology



Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

This time slot method eliminates hidden node collisions and maximizes airtime efficiency, so airMAX technology provides performance improvements in latency, noise immunity, scalability, and throughput compared to other outdoor systems in its class.

Intelligent QoS Priority assigned to voice/video for seamless streaming.

Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Superior Performance

The next-generation airMAX ac technology boosts the advantages of our proprietary TDMA protocol.

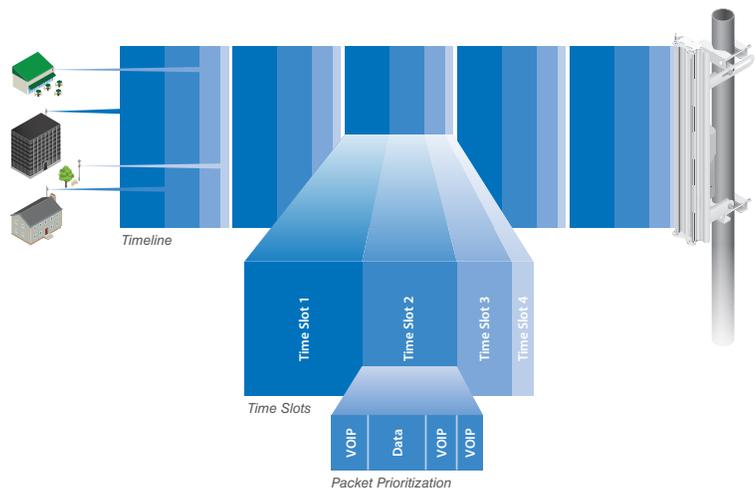
Ubiquiti's airMAX engine with custom IC dramatically improves TDMA latency and network scalability. The custom silicon provides hardware acceleration capabilities to the airMAX scheduler, to support the high data rates and dense modulation used in airMAX ac technology.

Throughput Breakthrough

airMAX ac supports high data rates, which require dense modulation: 256QAM – a significant increase from 64QAM, which is used in airMAX.

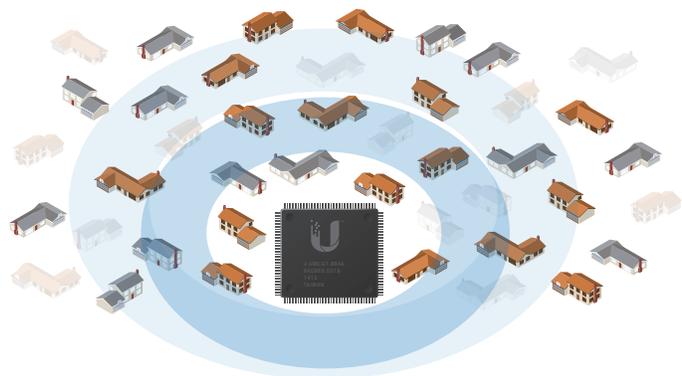
With their use of proprietary airMAX ac technology, airMAX ac products supports up to 450+ Mbps real TCP/IP throughput – up to triple the throughput of standard airMAX products.

airMAX ac TDMA Technology

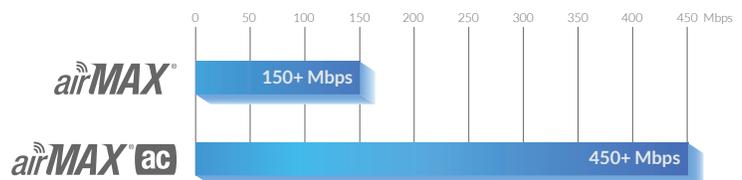


Up to 100 airMAX ac stations can be connected to an airMAX ac Sector; four airMAX ac stations are shown to illustrate the general concept.

airMAX Network Scalability



Superior Throughput Performance



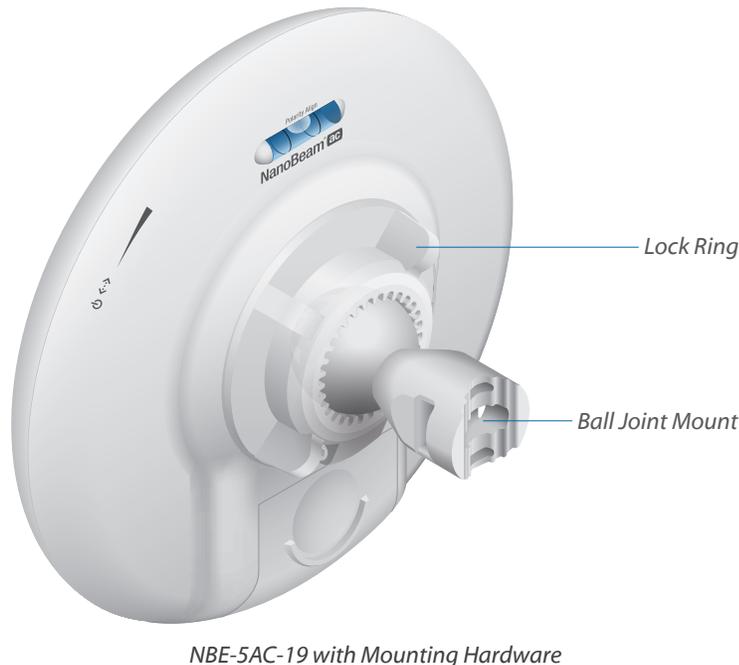
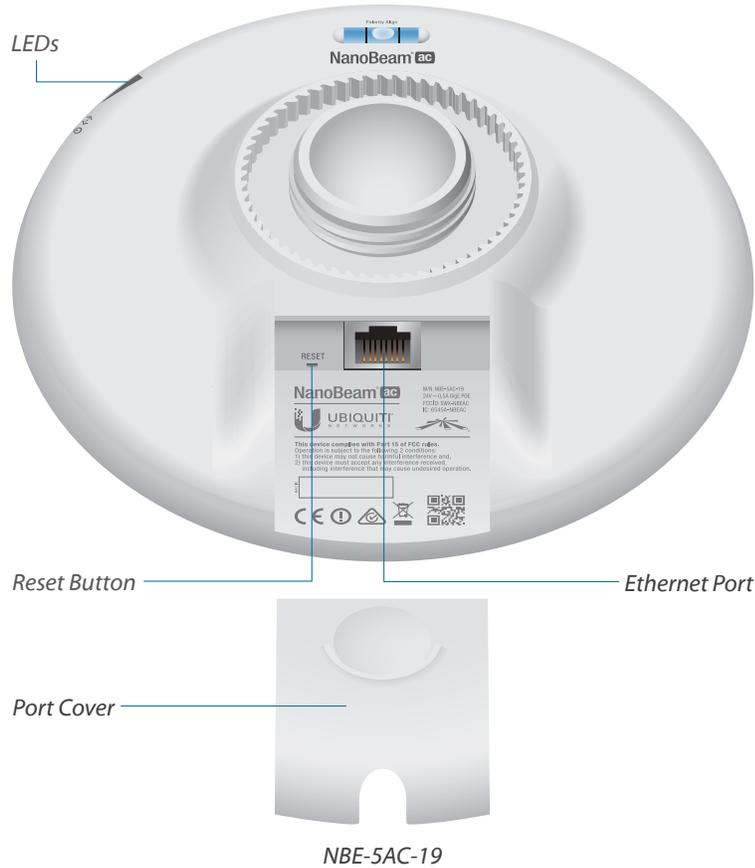
Hardware Overview

Innovative Mechanical Design

- **Efficient Footprint** The radio and antenna are combined into a single body that takes up minimal space.
- **Aesthetics** The NanoBeam ac is small enough to blend discreetly into the background at a customer's location.
- **Versatile Mounting** The NanoBeam ac can be mounted in almost any position needed for line of sight.

Ease of Installation

- **Quick Installation** No fasteners are required for pole-mounting, and a single wall fastener (not included) is required for wall-mounting.
- **Convenient Alignment** The NanoBeam ac pivots on its ball joint for easy aiming.



Models



NanoBeam[®] ac

Model	Frequency	Gain
NBE-5AC-16	5 GHz	16 dBi

NanoBeam[®] ac

Model	Frequency	Gain
NBE-5AC-19	5 GHz	19 dBi

IsoBeam Accessory



IsoBeam[™]

Model	NBE-5AC-16	NBE-5AC-19
ISO-BEAM-16	✓	
ISO-BEAM-19		✓

An RF isolator shield is available as an optional accessory to enhance signal isolation.



Installation Using the IsoBeam[™]

Mounting Accessories

NanoBeam® Wall Mount Kit



Model	NBE-5AC-16	NBE-5AC-19
NBE-WMK	✓	✓

A wall mount kit is available as an optional accessory to enhance stability for wall-mounting.



Installation Using the NanoBeam Wall Mount Kit

NanoBeam® Window Mount



Model	NBE-5AC-16	NBE-5AC-19
NBE-16-WM	✓	
NBE-19-WM		✓

A suction cup mount is available as an optional accessory to mount the NanoBeam on a window.



Installation Using the NanoBeam Window Mount

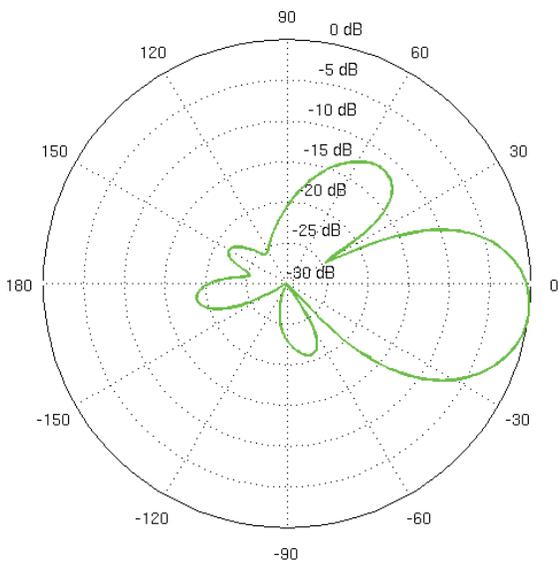
Specifications

NBE-5AC-16					
Dimensions	140 x 140 x 54 mm (5.51 x 5.51 x 2.13")				
Weight	0.320 kg (0.71 lb)				
Power Supply	24V, 0.5A Gigabit PoE				
Max. Power Consumption	6W				
Operating Frequency	Worldwide	USA: U-NII-1	USA: U-NII-2A	USA: U-NII-2C	USA: U-NII-3
	5150 - 5875 MHz	5150 - 5250 MHz*	5250 - 5350 MHz*	5470 - 5725 MHz*	5725 - 5850 MHz*
Gain	16 dBi				
Networking Interface	(1) 10/100/1000 Ethernet Port				
Processor Specs	Atheros MIPS 74Kc, 533 MHz				
Memory	64 MB DDR2, 8 MB Flash				
LEDs	(1) Power, (1) LAN, (4) WLAN				
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels				
Max. VSWR	1.5:1				
Channel Sizes	PtP Mode		PtMP Mode		
	10/20/30/40/50/60/80 MHz		10/20/30/40 MHz		
Polarization	Dual Linear				
Enclosure	Outdoor UV Stabilized Plastic				
Mounting	Pole-Mount (Kit Included), Wall-Mount				
Wind Loading	21.4 N @ 200 km/h (4.8 lbf @ 125 mph)				
Wind Survivability	200 km/h (125 mph)				
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV				
Operating Temperature	-40 to 70°C (-40 to 158°F)				
Operating Humidity	5 to 95% Noncondensing				
Wireless Approvals	FCC, IC, CE				
RoHS Compliance	Yes				
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5				
Vibration Test	IEC 68-2-6				
Temperature Shock Test	IEC 68-2-14				
UV Test	IEC 68-2-5 at 40°C (104°F), Equivalent: ETS 300 019-1-4				
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5				

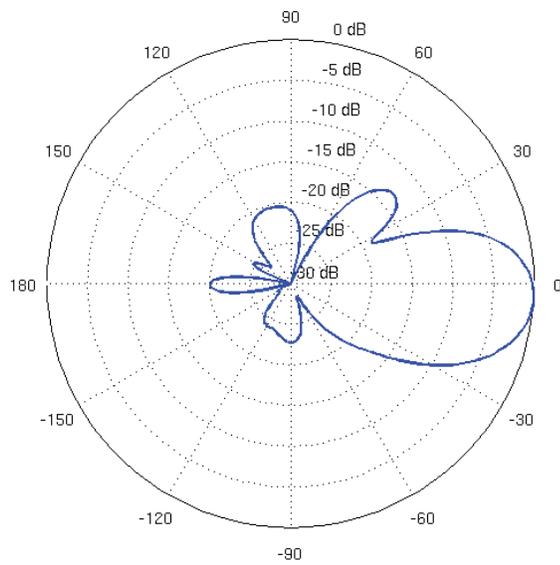
NBE-5AC-16 Output Power: 24 dBm							
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (1/2)	24 dBm	± 2 dB	airMAX ac	1x BPSK (1/2)	-96 dBm	± 2 dB
	2x QPSK (1/2)	24 dBm	± 2 dB		2x QPSK (1/2)	-95 dBm	± 2 dB
	2x QPSK (3/4)	24 dBm	± 2 dB		2x QPSK (3/4)	-92 dBm	± 2 dB
	4x 16QAM (1/2)	24 dBm	± 2 dB		4x 16QAM (1/2)	-90 dBm	± 2 dB
	4x 16QAM (3/4)	24 dBm	± 2 dB		4x 16QAM (3/4)	-86 dBm	± 2 dB
	6x 64QAM (2/3)	23 dBm	± 2 dB		6x 64QAM (2/3)	-83 dBm	± 2 dB
	6x 64QAM (3/4)	22 dBm	± 2 dB		6x 64QAM (3/4)	-77 dBm	± 2 dB
	6x 64QAM (5/6)	21 dBm	± 2 dB		6x 64QAM (5/6)	-74 dBm	± 2 dB
	8x 256QAM (3/4)	20 dBm	± 2 dB		8x 256QAM (3/4)	-69 dBm	± 2 dB
	8x 256QAM (5/6)	19 dBm	± 2 dB		8x 256QAM (5/6)	-65 dBm	± 2 dB

* Some frequencies may require activation; visit: <https://www.ubnt.com/fcclabelrequest>

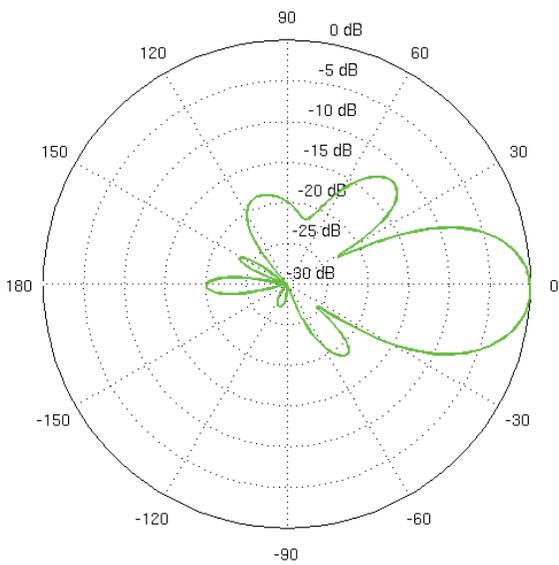
Vertical Azimuth



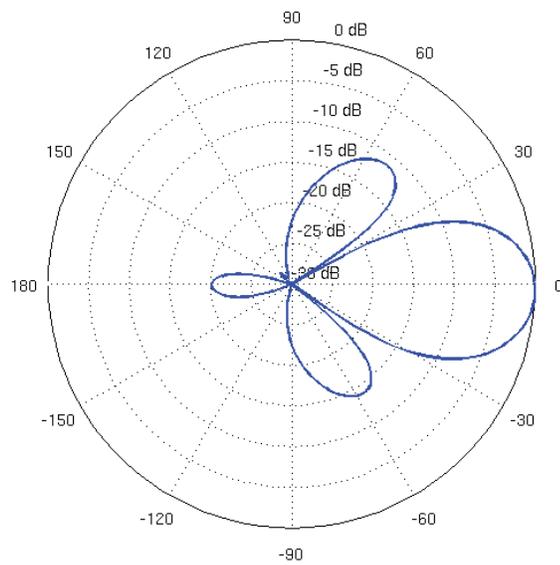
Vertical Elevation



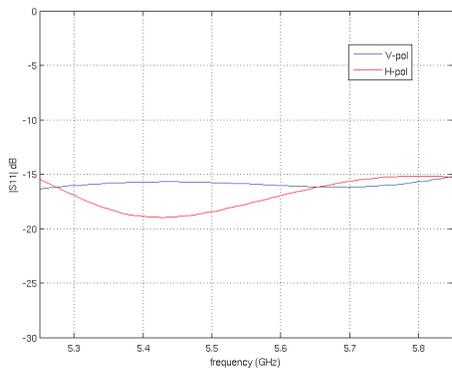
Horizontal Azimuth



Horizontal Elevation



Return Loss



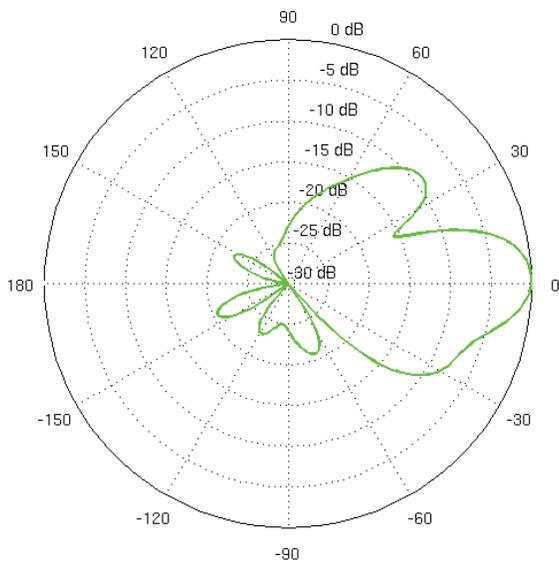
Specifications

NBE-5AC-19					
Dimensions	189 x 189 x 125 mm (7.44 x 7.44 x 4.92")				
Weight	0.530 kg (1.17 lb)				
Power Supply	24V, 0.5A Gigabit PoE				
Max. Power Consumption	8W				
Operating Frequency	Worldwide	USA: U-NII-1	USA: U-NII-2A	USA: U-NII-2C	USA: U-NII-3
	5150 - 5875 MHz	5150 - 5250 MHz*	5250 - 5350 MHz*	5470 - 5725 MHz*	5725 - 5850 MHz*
Gain	19 dBi				
Networking Interface	(1) 10/100/1000 Ethernet Port				
Processor Specs	Atheros MIPS 74Kc, 720 MHz				
Memory	128 MB DDR2, 8 MB Flash				
LEDs	(1) Power, (1) LAN, (4) WLAN				
Signal Strength LEDs	Software-Adjustable to Correspond to Custom RSSI Levels				
Max. VSWR	1.5:1				
Channel Sizes	PtP Mode		PtMP Mode		
	10/20/30/40/50/60/80 MHz		10/20/30/40 MHz		
Polarization	Dual Linear				
Enclosure	Outdoor UV Stabilized Plastic				
Mounting	Pole-Mount (Kit Included), Wall-Mount				
Wind Loading	45.4 N @ 200 km/h (10.2 lbf @ 125 mph)				
Wind Survivability	200 km/h (125 mph)				
ESD/EMP Protection	Air: ± 24 kV, Contact: ± 24 kV				
Operating Temperature	-40 to 70°C (-40 to 158°F)				
Operating Humidity	5 to 95% Noncondensing				
Wireless Approvals	FCC, IC, CE				
RoHS Compliance	Yes				
Salt Fog Test	IEC 68-2-11 (ASTM B117), Equivalent: MIL-STD-810 G Method 509.5				
Vibration Test	IEC 68-2-6				
Temperature Shock Test	IEC 68-2-14				
UV Test	IEC 68-2-5 at 40°C (104°F), Equivalent: ETS 300 019-1-4				
Wind-Driven Rain Test	ETS 300 019-1-4, Equivalent: MIL-STD-810 G Method 506.5				

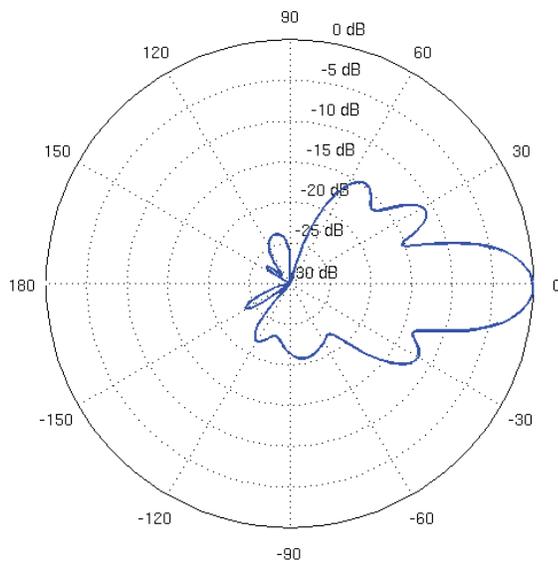
NBE-5AC-19 Output Power: 26 dBm							
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX ac	1x BPSK (1/2)	26 dBm	± 2 dB	airMAX ac	1x BPSK (1/2)	-96 dBm	± 2 dB
	2x QPSK (1/2)	26 dBm	± 2 dB		2x QPSK (1/2)	-95 dBm	± 2 dB
	2x QPSK (3/4)	26 dBm	± 2 dB		2x QPSK (3/4)	-92 dBm	± 2 dB
	4x 16QAM (1/2)	26 dBm	± 2 dB		4x 16QAM (1/2)	-90 dBm	± 2 dB
	4x 16QAM (3/4)	26 dBm	± 2 dB		4x 16QAM (3/4)	-86 dBm	± 2 dB
	6x 64QAM (2/3)	25 dBm	± 2 dB		6x 64QAM (2/3)	-83 dBm	± 2 dB
	6x 64QAM (3/4)	25 dBm	± 2 dB		6x 64QAM (3/4)	-77 dBm	± 2 dB
	6x 64QAM (5/6)	24 dBm	± 2 dB		6x 64QAM (5/6)	-74 dBm	± 2 dB
	8x 256QAM (3/4)	22 dBm	± 2 dB		8x 256QAM (3/4)	-69 dBm	± 2 dB
	8x 256QAM (5/6)	22 dBm	± 2 dB		8x 256QAM (5/6)	-65 dBm	± 2 dB

* Some frequencies may require activation; visit: <https://www.ubnt.com/fcclabelrequest>

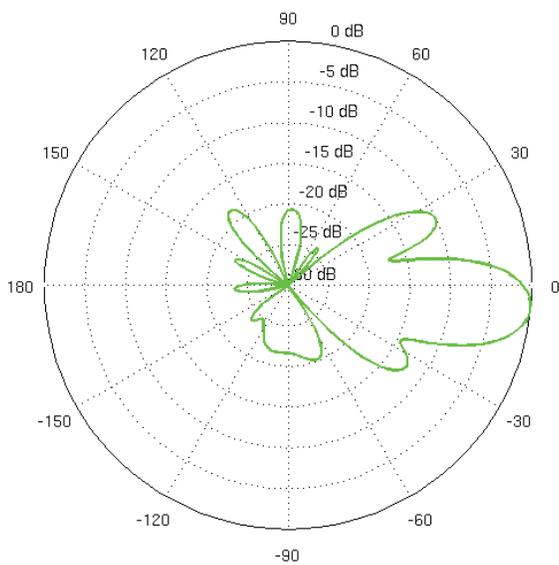
Vertical Azimuth



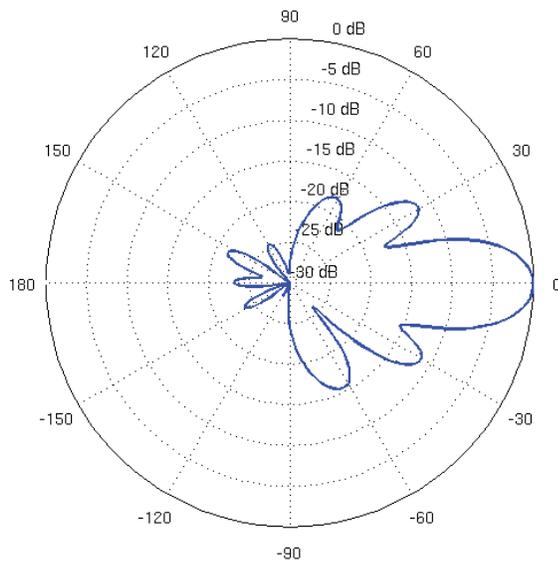
Vertical Elevation



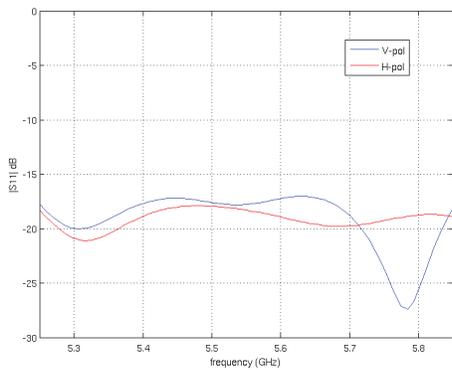
Horizontal Azimuth



Horizontal Elevation



Return Loss



www.ubnt.com

Specifications are subject to change. Ubiquiti products are sold with a limited warranty described at: www.ubnt.com/support/warranty
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rocket™ M

Powerful 2x2 MIMO airMAX® BaseStation

Models: M5, RM5-Ti, M3, M365, M2, RM2-Ti, M900

Advanced Software Technology to Maximize Performance

Plug and Play Integration with airMAX Antennas

Frequency and Channel Flexibility



Overview

Featuring mix-and-match industrial design, the Rocket™ is a Ubiquiti Networks® airMAX® BaseStation that supports speeds of up to 150+ Mbps real TCP/IP throughput. It is ideal for deployment in Point-to-Point (PtP) bridging or Point-to-MultiPoint (PtMP) airMAX applications.

Flexibility

The Rocket is available in several frequency models: 900 MHz, 2.4 GHz, 3/3.65 GHz, and 5 GHz, to support your specific application. You have the freedom to locate, deploy, and operate the Rocket in these unlicensed bands (subject to local country regulations).

The Rocket allows for a high degree of flexibility in configuring channel bandwidths: 2, 3, 5, 8, 10, 20, 25, 30, and/or 40 MHz, depending on the specific product model and local country regulations.

Plug and Play Integration

Rocket radios and airMAX antennas have been designed to seamlessly work together. Every airMAX Sector, RocketDish™, Omni, or Yagi antenna has a built-in Rocket mount, so installation requires no special tools. Snap the Rocket securely into place and mount the antenna; then you have the optimal combination of Rocket radio and airMAX antenna for your PtP or PtMP application.

airMAX Technology Included

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

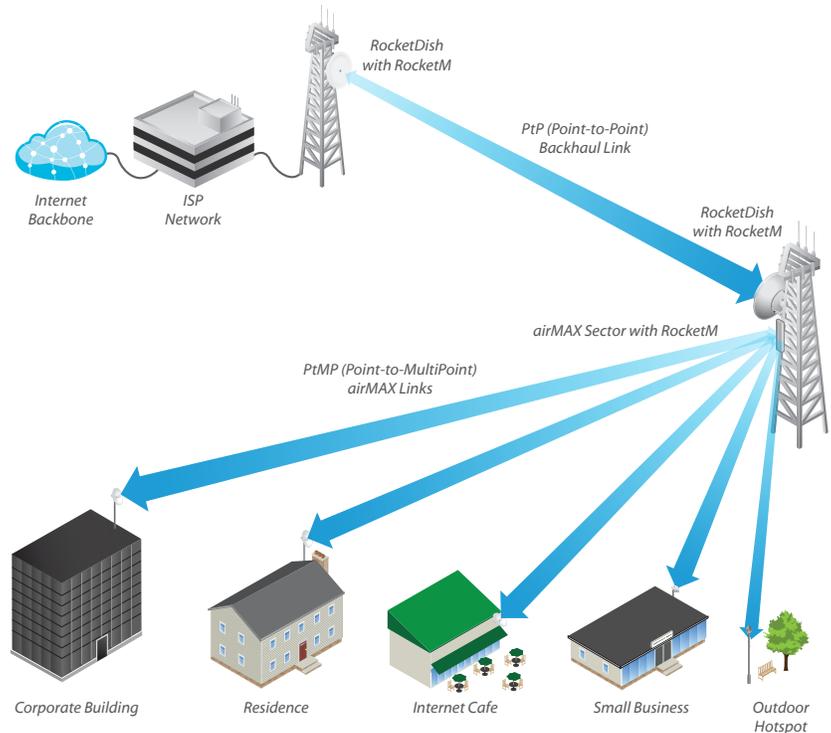
This time slot method eliminates hidden node collisions and maximizes airtime efficiency. It provides many magnitudes of performance improvements in latency, throughput, and scalability compared to all other outdoor systems in its class.

Intelligent QoS Priority is given to voice/video for seamless streaming.

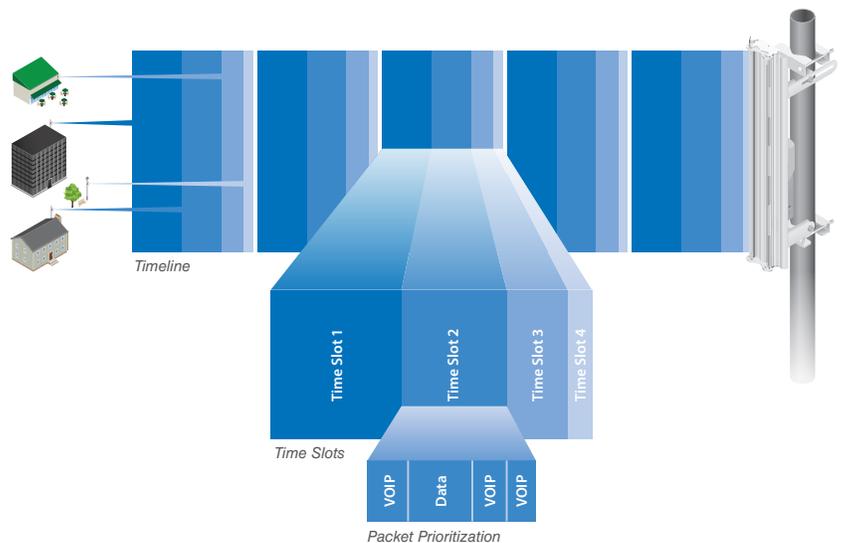
Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Application Example



airMAX TDMA Technology



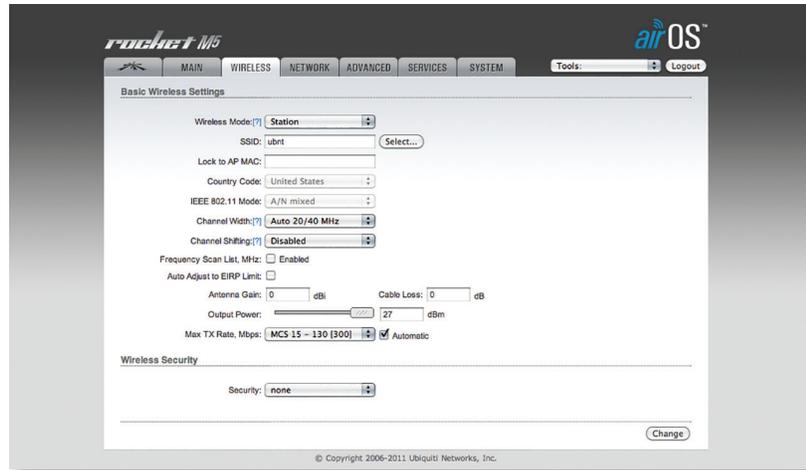
Up to 100 airMAX stations can be connected to an airMAX Sector; four airMAX stations are shown to illustrate the general concept.

Software

airOS®

Built upon an intuitive user interface foundation, airOS® 5 is an advanced operating system for Ubiquiti airMAX M Series products.

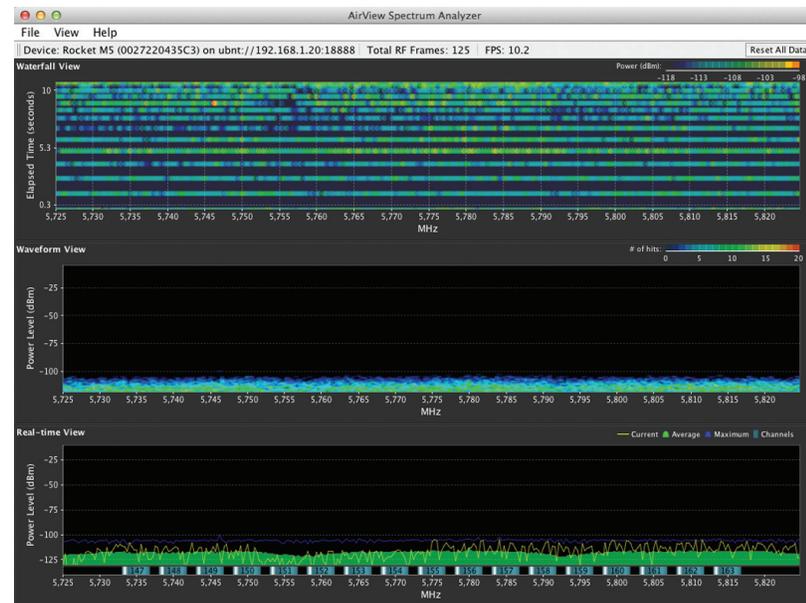
- airMAX Protocol Support
- Long-Range PtP Link Mode
- Transmit Power Control: Automatic/Manual
- Automatic Distance Selection (ACK Timing)
- Device Statistics
- Diagnostic Tools



airView®

Integrated on all Ubiquiti M products, airView® provides advanced spectrum analyzer functionality: waterfall, waveform, and real-time spectral views allow operators to identify noise signatures and plan their networks to minimize noise interference.

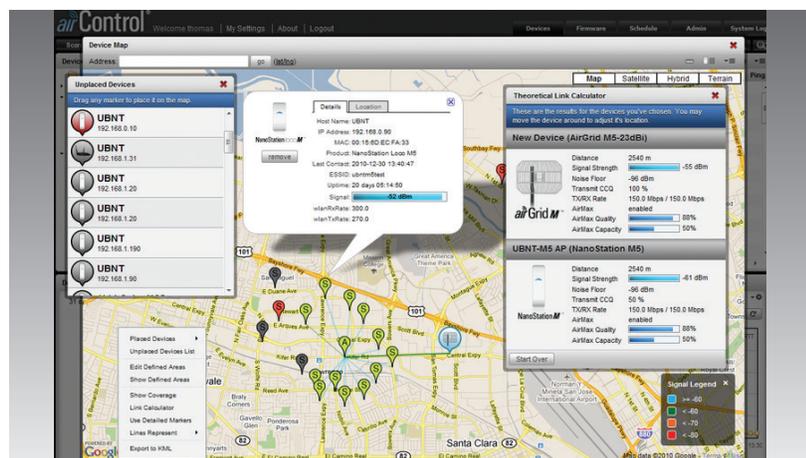
- **Waterfall** Aggregate energy over time for each frequency.
- **Waveform** Aggregate energy collected.
- **Real-time** Energy is shown in real time as a function of frequency.
- **Recording** Automate airView to record and report results.



airControl®

airControl® is a powerful and intuitive, web-based server network management application, which allows operators to centrally manage entire networks of Ubiquiti devices.

- Network Map
- Monitor Device Status
- Mass Firmware Upgrade
- Web UI Access
- Manage Groups of Devices
- Task Scheduling



DATASHEET

rocket™

5 GHz Models

The 5 GHz frequency band is free to use, worldwide, offers plentiful spectrum, and works well for long-distance links. However, 5 GHz signals have more difficulty passing through obstacles than lower-frequency signals.

M5

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.



RM5-Ti

Its Gigabit Ethernet connection delivers high throughput, and its aircraft-grade aluminum casing improves performance in harsh RF environments and extreme weather conditions.



3/3.65 GHz Models

The 3 or 3.65 GHz frequency band is noise-free in most areas; however, its use requires a license. There may be additional restrictions on its use depending on local country regulations.

M3

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.



M365

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.



2.4 GHz Models

The 2.4 GHz frequency band is free to use, worldwide; however, it is extremely crowded due to interference from other wireless devices. Also, there are only three non-overlapping, 20 MHz channels available for use.

M2

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.



RM2-Ti

Its Gigabit Ethernet connection delivers high throughput, and its aircraft-grade aluminum casing improves performance in harsh RF environments and extreme weather conditions.



900 MHz Model

The 900 MHz frequency band has a higher tolerance for obstacles that may obstruct line of sight; however noise levels are typically higher. Also its use may require a license in some parts of the world.

M900

The Rocket enclosure is built to survive harsh environments and fits the Rocket mount built into every airMAX antenna. Pair the Rocket with the appropriate antenna for your PtP link or PtMP network.



Specifications

rocket™ M5

M5 Physical / Electrical / Environmental Information

Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Enclosure Characteristics	Outdoor UV Stabilized Plastic
Processor	MIPS 74Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Max. Power Consumption	8W
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4

M5 Software Information

Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CLI
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M5 Compliance

Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

M5 Operating Frequency							
Operating Frequency				Worldwide: 5170 - 5875 MHz USA: 5725 - 5850 MHz*			
Output Power				27 dBm			
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	27 dBm	± 2 dB	802.11a	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	23 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	22 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	27 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	27 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	27 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	27 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	26 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	27 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	27 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	27 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	27 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	26 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	21 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		

* US units with FCC ID: SWX-RM5 are allowed 5250 - 5850 MHz.



Specifications



RM5-Ti Physical / Electrical / Environmental Information

Dimensions	160 x 80 x 44 mm (6.30 x 3.15 x 1.73")
Weight	350 g (12.35 oz)
Enclosure Characteristics	Die-Cast Aluminum
Processor	MIPS 74Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100/1000 Mbps (1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof), 1 SMA (GPS)
LEDs	Power, (2) Ethernet, (6) Signal Strength, GPS
Max. Power Consumption	8W
Power Supply	48V, 0.5A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return) 802.3af Compliant
ESD/EMP Protection	± 30KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4

RM5-Ti Software Information

Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CLI
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

RM5-Ti Compliance

Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

RM5-Ti Operating Frequency							
Operating Frequency				Worldwide: 5170 - 5875 MHz USA: 5725 - 5850 MHz*			
Output Power				27 dBm			
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11a	6 - 24 Mbps	27 dBm	± 2 dB	802.11a	6 - 24 Mbps	-94 dBm Min.	± 2 dB
	36 Mbps	25 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	23 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	22 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	27 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	27 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	27 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	27 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	26 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	27 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	27 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	27 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	27 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	26 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	21 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		

* US units with FCC ID: SWX-RM5T-DFS are allowed 5250 - 5850 MHz.



Specifications

rocket™ M3 / M365

M3/M365 Physical / Electrical / Environmental Information

Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Enclosure Characteristics	Outdoor UV Stabilized Plastic
Processor	MIPS 24Kc
Memory	64 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Max. Power Consumption	6.5W
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4

M3/M365 Software Information

Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CLI
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM
M3	5/8/10/20/25/40 MHz Channel Width Support
M365	5/10/20/25 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M3/M365 Compliance

Wireless Approvals	
M3	FCC, IC, CE
M365	FCC Part 90Y
RoHS Compliance	Yes

M3/M365 Operating Frequency							
Operating Frequency				3370 - 3730 MHz*			
M3				3650 - 3675 MHz			
M365				3650 - 3675 MHz			
Output Power				25 dBm			
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX	MCS0	25 dBm	± 2 dB	airMAX	MCS0	-94 dBm Min.	± 2 dB
	MCS1	25 dBm	± 2 dB		MCS1	-93 dBm	± 2 dB
	MCS2	25 dBm	± 2 dB		MCS2	-90 dBm	± 2 dB
	MCS3	25 dBm	± 2 dB		MCS3	-89 dBm	± 2 dB
	MCS4	24 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	23 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	20 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	25 dBm	± 2 dB		MCS8	-93 dBm	± 2 dB
	MCS9	25 dBm	± 2 dB		MCS9	-91 dBm	± 2 dB
	MCS10	25 dBm	± 2 dB		MCS10	-89 dBm	± 2 dB
	MCS11	25 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	24 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	23 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	20 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		

* RocketM3 not supported in the USA



Specifications

rocket™ M2

M2 Physical / Electrical / Environmental Information

Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Enclosure Characteristics	Outdoor UV Stabilized Plastic
Processor	MIPS 24Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Max. Power Consumption	6.5W
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4

M2 Software Information

Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CLI
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M2 Compliance

Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

M2 Operating Frequency							
Operating Frequency				2402 - 2462 MHz			
Output Power				28 dBm			
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11g	1 - 24 Mbps	28 dBm	± 2 dB	802.11g	1 - 24 Mbps	-97 dBm Min.	± 2 dB
	36 Mbps	26 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	25 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	24 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	28 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	27 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	25 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	22 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	27 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	25 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	22 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		



Specifications



RM2-Ti Physical / Electrical / Environmental Information

Dimensions	160 x 80 x 44 mm (6.30 x 3.15 x 1.73")
Weight	350 g (12.35 oz)
Enclosure Characteristics	Die-Cast Aluminum
Processor	MIPS 74Kc
Memory	128 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100/1000 Mbps (1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, (2) Ethernet, (6) Signal Strength
Max. Power Consumption	6.5W
Power Supply	48V, 0.5A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return) 802.3af Compliant
ESD/EMP Protection	± 30KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4

RM2-Ti Software Information

Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CLI
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 5/8/10/20/30/40 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

RM2-Ti Compliance

Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

RM2-Ti Operating Frequency							
Operating Frequency				2402 - 2462 MHz			
Output Power				28 dBm			
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
802.11g	1 - 24 Mbps	28 dBm	± 2 dB	802.11g	1 - 24 Mbps	-97 dBm Min.	± 2 dB
	36 Mbps	26 dBm	± 2 dB		36 Mbps	-80 dBm	± 2 dB
	48 Mbps	25 dBm	± 2 dB		48 Mbps	-77 dBm	± 2 dB
	54 Mbps	24 dBm	± 2 dB		54 Mbps	-75 dBm	± 2 dB
802.11n/airMAX	MCS0	28 dBm	± 2 dB	802.11n/airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	27 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	25 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	23 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	22 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	27 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	25 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	23 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	22 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		



Specifications

rocket™ M9

M900 Physical / Electrical / Environmental Information

Dimensions	160 x 80 x 30 mm (6.30 x 3.15 x 1.18")
Weight	500 g (1.1 lb)
Enclosure Characteristics	Outdoor UV Stabilized Plastic
Processor	MIPS 24Kc
Memory	64 MB SDRAM, 8 MB Flash
Networking Interface	(1) 10/100 Mbps
RF Connections	(2) RP-SMA (Waterproof)
LEDs	Power, Ethernet, (4) Signal Strength
Max. Power Consumption	6.5W
Power Supply	24V, 1A PoE Adapter
Power Method	Passive PoE (Pairs 4, 5+; 7, 8 Return)
ESD/EMP Protection	± 24KV Air / Contact
Operating Temperature	-30 to 75° C (-22 to 167° F)
Operating Humidity	5 to 95% Noncondensing
Shock and Vibration	ETSI300-019-1.4

M900 Software Information

Modes	Access Point, Station
Services	Web Server, SNMP, SSH Server, Telnet , Ping Watchdog, DHCP, NAT, Bridging, Routing
Utilities	Antenna Alignment Tool, Discovery Utility, Site Survey, Ping, Traceroute, Speed Test
Distance Adjustment	Dynamic Ack and Ackless Mode
Power Adjustment	Software Adjustable UI or CLI
Security	WPA2 AES Only
QoS	Supports Packet Level Classification WMM and User Customer Level: High/Medium/Low
Statistical Reporting	Up Time, Packet Errors, Data Rates, Wireless Distance, Ethernet Link Rate
Other	Remote Reset Support, Software Enabled/Disabled, VLAN Support, 64QAM, 3/5/8/10/20 MHz Channel Width Support
Ubiquiti Specific Features	airMAX Mode, Traffic Shaping with Burst Support, Discovery Protocol, Frequency Band Offset, Ackless Mode

M900 Compliance

Wireless Approvals	FCC, IC, CE
RoHS Compliance	Yes

M900 Operating Frequency							
Operating Frequency				902 - 928 MHz			
Output Power				28 dBm			
TX Power Specifications				RX Power Specifications			
Modulation	Data Rate	Avg. TX	Tolerance	Modulation	Data Rate	Sensitivity	Tolerance
airMAX	MCS0	28 dBm	± 2 dB	airMAX	MCS0	-96 dBm	± 2 dB
	MCS1	28 dBm	± 2 dB		MCS1	-95 dBm	± 2 dB
	MCS2	28 dBm	± 2 dB		MCS2	-92 dBm	± 2 dB
	MCS3	28 dBm	± 2 dB		MCS3	-90 dBm	± 2 dB
	MCS4	28 dBm	± 2 dB		MCS4	-86 dBm	± 2 dB
	MCS5	24 dBm	± 2 dB		MCS5	-83 dBm	± 2 dB
	MCS6	22 dBm	± 2 dB		MCS6	-77 dBm	± 2 dB
	MCS7	21 dBm	± 2 dB		MCS7	-74 dBm	± 2 dB
	MCS8	28 dBm	± 2 dB		MCS8	-95 dBm	± 2 dB
	MCS9	28 dBm	± 2 dB		MCS9	-93 dBm	± 2 dB
	MCS10	28 dBm	± 2 dB		MCS10	-90 dBm	± 2 dB
	MCS11	28 dBm	± 2 dB		MCS11	-87 dBm	± 2 dB
	MCS12	28 dBm	± 2 dB		MCS12	-84 dBm	± 2 dB
	MCS13	24 dBm	± 2 dB		MCS13	-79 dBm	± 2 dB
	MCS14	22 dBm	± 2 dB		MCS14	-78 dBm	± 2 dB
MCS15	21 dBm	± 2 dB	MCS15	-75 dBm	± 2 dB		



Antenna Compatibility



RocketM9



**RocketM2
RocketM2-Ti**

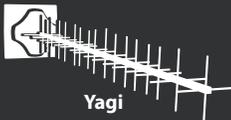


**RocketM3
RocketM365**



**RocketM5
RocketM5-Ti**

Frequency Band

	900 MHz	2.4 GHz	3/3.65 GHz	5 GHz
 Sector	AM-9M13	AM-V2G-Ti AM-2G15-120 AM-2G16-90	AM-3G18-120	AM-V5G-Ti AM-M-V5G-Ti AM-5G16-120 AM-5G17-90 AM-5G19-120 AM-5G20-90 AM-5AC21-60 AM-5AC22-45
 Rocket Dish		RD-2G24	RD-3G26	RD-5G31-AC RD-5G30-LW RD-5G30 RD-5G34
 Omni		AMO-2G10 AMO-2G13	AMO-3G12	AMO-5G10 AMO-5G13
 Yagi	AMY-9M16			





airMAX™ Omni

Next-Gen 2x2 Dual Polarity MIMO Omni Antenna

Models: AMO-2G10, AMO-2G13, AMO-3G12, AMO-5G10, AMO-5G13

High Performance, Long Range

Seamlessly Integrates with RocketM

360° Coverage

Overview

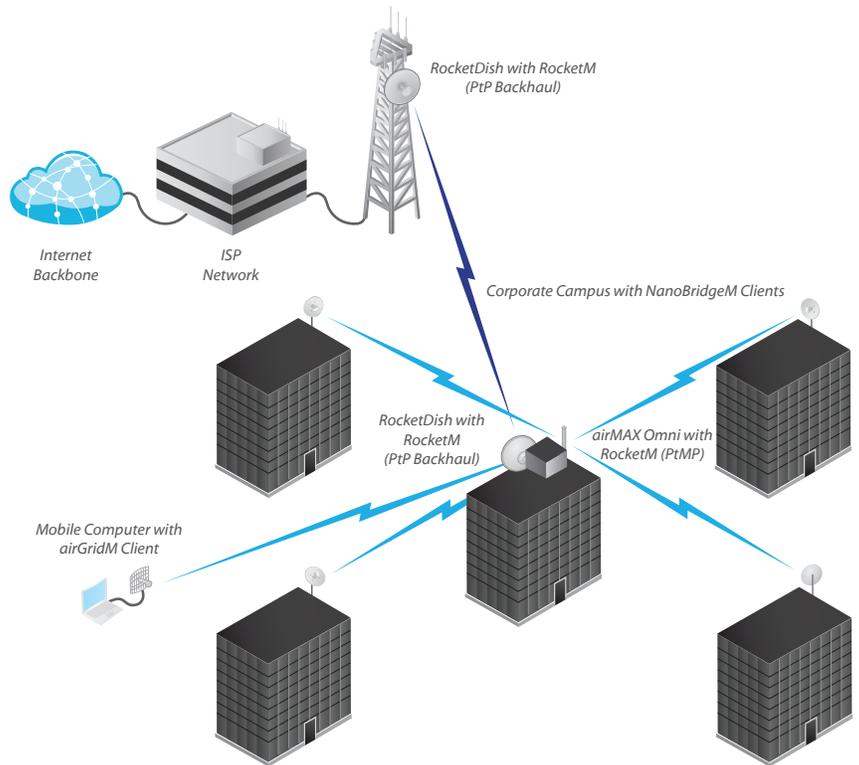
Omnidirectional Coverage

airMAX Omni is a Carrier Class 2x2 Dual Polarity MIMO Omnidirectional Antenna that was designed to seamlessly integrate with RocketM radios (RocketM sold separately).

Pair the RocketM's radio with the airMAX Omni's reach to create a powerful, 360° omnidirectional basestation.. This seamless integration gives network architects unparalleled flexibility and convenience.

On the right is one example of how airMAX Omni can be deployed:

Omni PtMP (Point to Multi-Point) Link Example



airMAX Omni antennas provide wide 360° coverage and utilize airMAX technology to produce carrier-class performance and power.

Utilize airMAX Technology*

Unlike standard Wi-Fi protocol, Ubiquiti's Time Division Multiple Access (TDMA) airMAX protocol allows each client to send and receive data using pre-designated time slots scheduled by an intelligent AP controller.

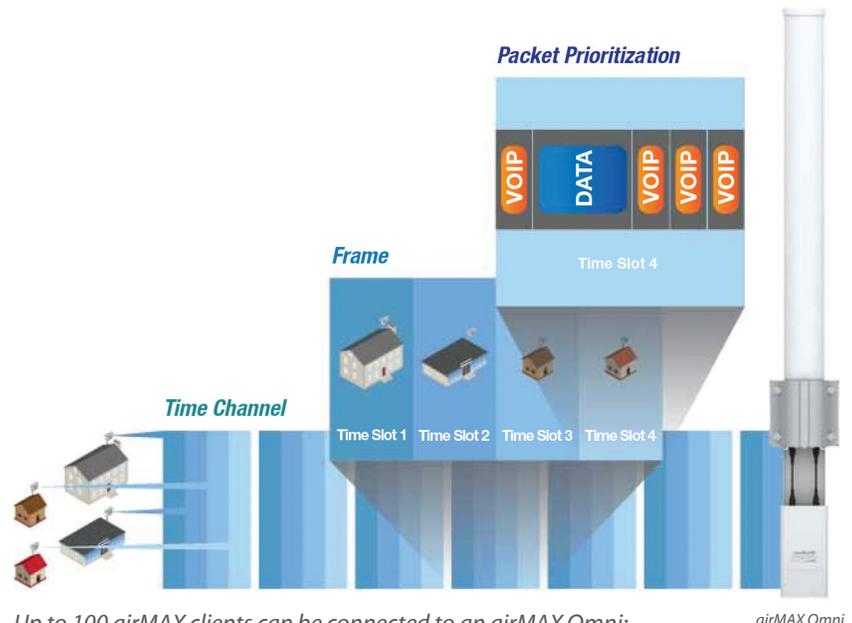
This "time slot" method eliminates hidden node collisions and maximizes airtime efficiency. It provides many magnitudes of performance improvements in latency, throughput, and scalability compared to all other outdoor systems in its class.

Intelligent QoS Priority is given to voice/video for seamless streaming.

Scalability High capacity and scalability.

Long Distance Capable of high-speed, carrier-class links.

Latency Multiple features dramatically reduce noise.



Up to 100 airMAX clients can be connected to an airMAX Omni; four airMAX clients are shown to illustrate the general concept.

* When Omni is paired with RocketM

Models



AMO-5G10
(5 GHz, 10 dBi)



AMO-5G13
(5 GHz, 13 dBi)



AMO-3G12
(3 GHz, 12 dBi)



AMO-2G10
(2.4 GHz, 10 dBi)



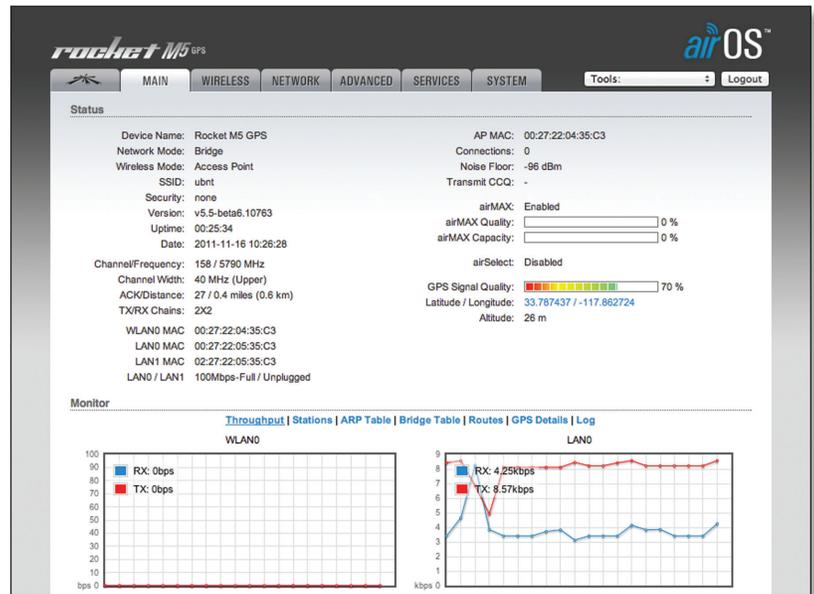
AMO-2G13
(2.4 GHz, 13 dBi)

Software

airOS™

airOS is an intuitive, versatile, highly developed Ubiquiti firmware technology. It is exceptionally intuitive and was designed to require no training to operate. Behind the user interface is a powerful firmware architecture, which enables high-performance, outdoor multipoint networking.

- Protocol Support
- Ubiquiti Channelization
- Spectral Width Adjustment
- ACK Auto-Timing
- AAP Technology
- Multi-Language Support



airView™

Integrated on all Ubiquiti M products, airView provides Advanced Spectrum Analyzer Functionality: Waterfall, waveform, and real-time spectral views allow operators to identify noise signatures and plan their networks to minimize noise interference.

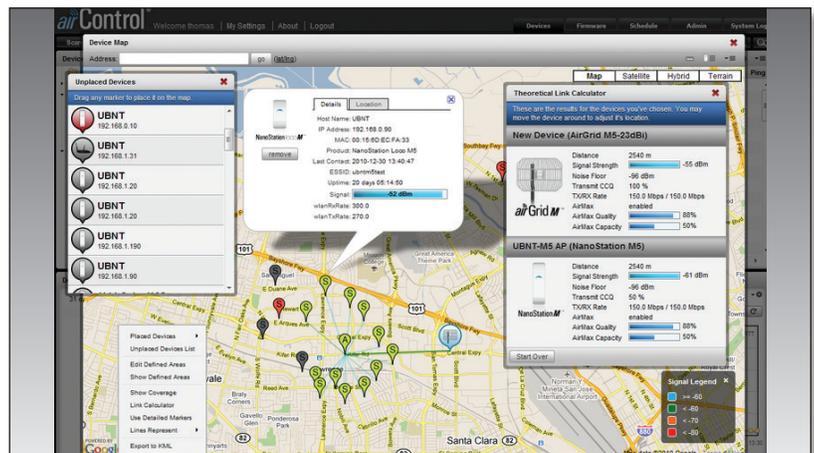
- **Waterfall** Aggregate energy over time for each frequency.
- **Waveform** Aggregate energy collected.
- **Real-time** Energy is shown real-time as a function of frequency.
- **Recording** Automize AirView to record and report results.



airControl™

airControl is a powerful and intuitive, web-based server network management application, which allows operators to centrally manage entire networks of Ubiquiti devices.

- Network Map
- Monitor Device Status
- Mass Firmware Upgrade
- Web UI Access
- Manage Groups of Devices
- Task Scheduling

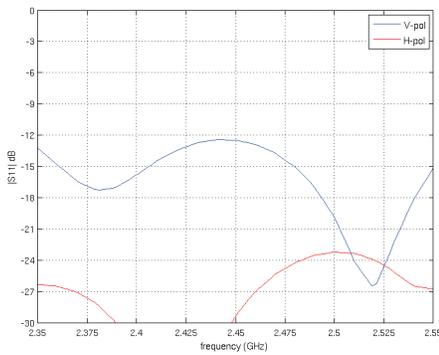


Antenna Characteristics					
Model	AMO-2G10	AMO-2G13	AMO-3G12	AMO-5G10	AMO-5G13
Dimensions* (mm)	1030 X 122 X 84	1390 X 122 X 105	1012 X 122 X 105	582 X 90 X 65	799 X 90 X 65
Weight*	2.1 kg	2.4 kg	2.05 kg	0.68 kg	0.82 kg
Frequency Range	2.35 - 2.55 GHz	2.35 - 2.55 GHz	3.4 - 3.7 GHz	5.45 - 5.85 GHz	5.45 - 5.85 GHz*
Gain	10 dBi	13 dBi	12 dBi	10 dBi	13 dBi
Elevation Beamwidth	12°	7°	8°	12°	7°
Max VSWR	1.7:1	1.7:1	1.6:1	1.6:1	1.5:1
Downtilt	4°	2°	4°	4°	2°
Wind Survivability	125 mph	125 mph	125 mph	125 mph	125 mph
Wind Loading	14 lb @ 100 mph	16 lb @ 100 mph	16 lb @ 100 mph	10 lb @ 100 mph	12 lb @ 100 mph
Polarization	Dual-Linear	Dual-Linear	Dual-Linear	Dual-Linear	Dual-Linear
Cross-pol Isolation	25 dB min.	25 dB min.	25 dB min.	25 dB min.	25 dB min.
ETSI Specification	EN 302 326 DN2	EN 302 326 DN2	EN 302 326 DN2	EN 302 326 DN2	EN 302 326 DN2
Mounting	Universal Pole Mount, RocketM Bracket, and Weatherproof RF Jumpers Included				

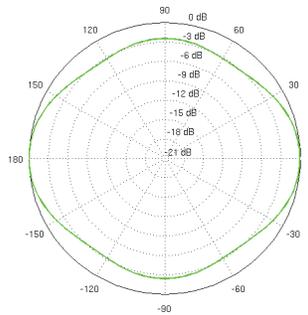
* Dimensions and weight include pole mount and exclude RocketM (RocketM sold separately)

AMO-2G10 Antenna Information

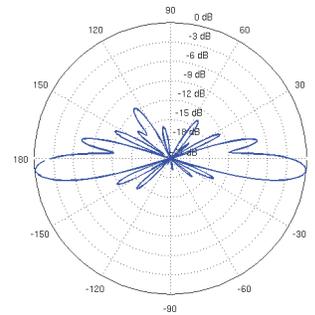
Return Loss



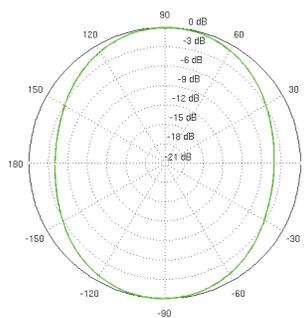
Vertical Azimuth



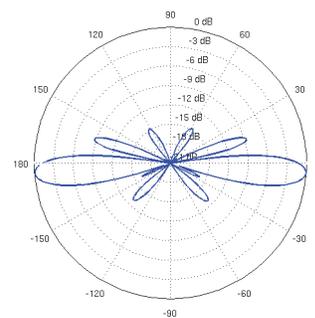
Vertical Elevation



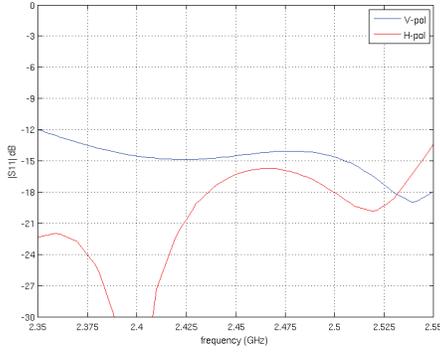
Horizontal Azimuth



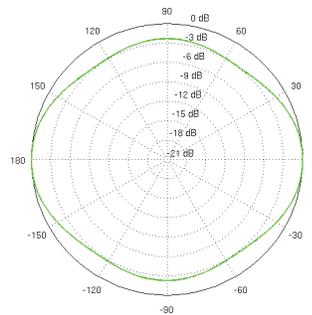
Horizontal Elevation



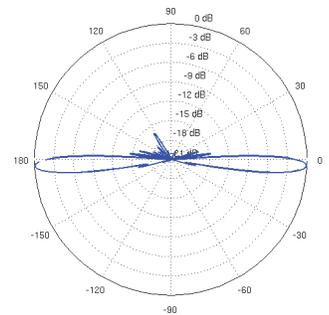
Return Loss



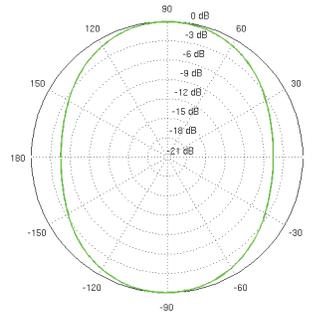
Vertical Azimuth



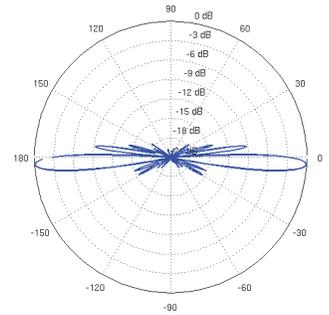
Vertical Elevation



Horizontal Azimuth

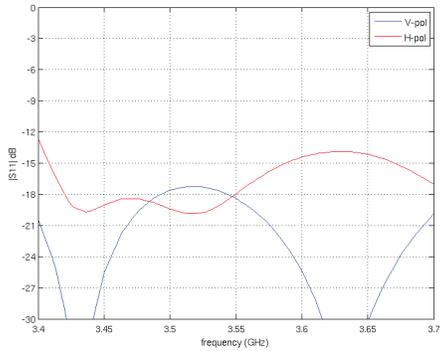


Horizontal Elevation

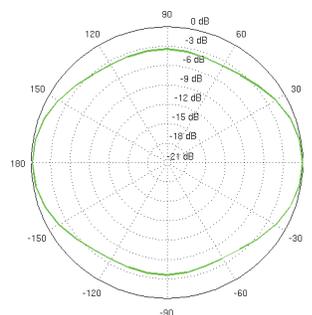


AMO-3G12 Antenna Information

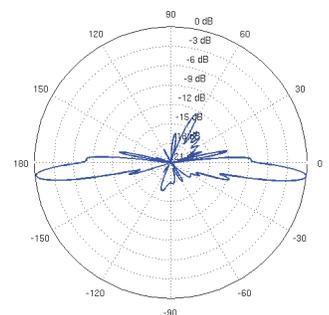
Return Loss



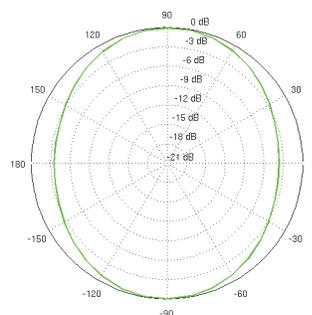
Vertical Azimuth



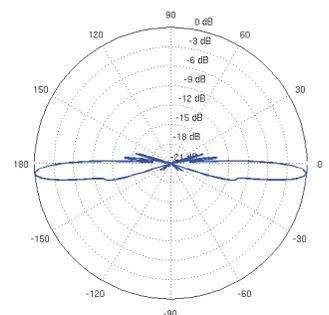
Vertical Elevation



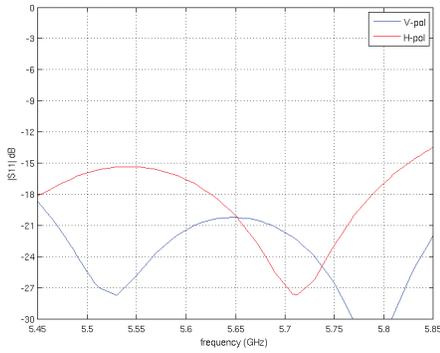
Horizontal Azimuth



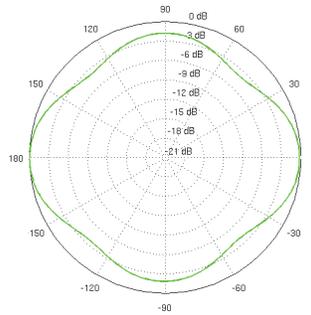
Horizontal Elevation



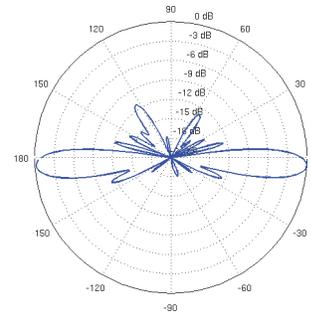
Return Loss



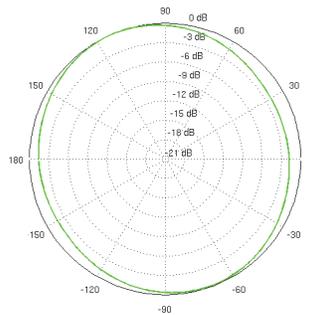
Vertical Azimuth



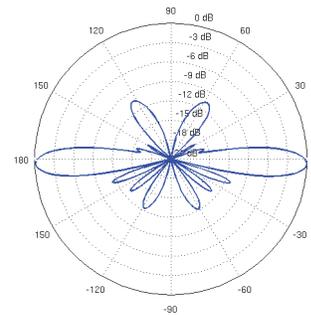
Vertical Elevation



Horizontal Azimuth

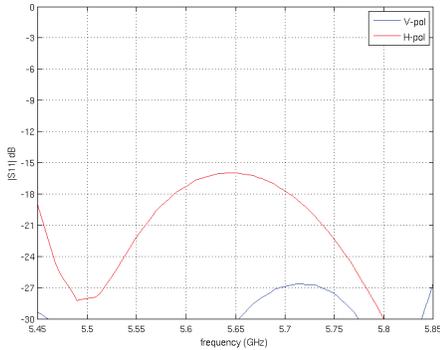


Horizontal Elevation

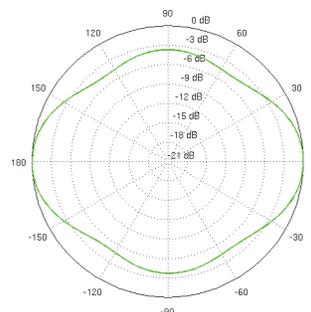


AMO-5G13 Antenna Information

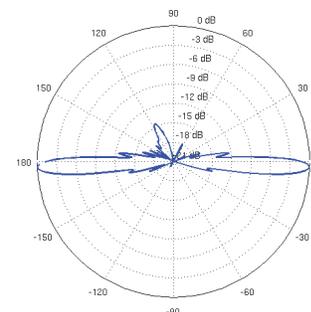
Return Loss



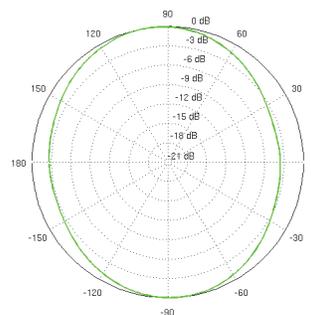
Vertical Azimuth



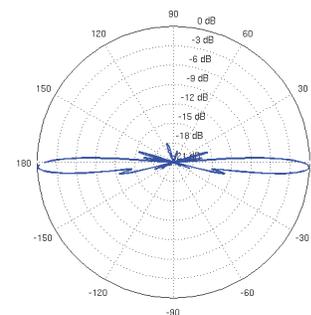
Vertical Elevation



Horizontal Azimuth



Horizontal Elevation



Appendix C: Datasheets of Deployed Sensors and Devices

TOUGH Cable™

OUTDOOR CARRIER CLASS SHIELDED

Protect your networks from the most brutal environments with Ubiquiti Networks' industrial-grade, shielded Ethernet cable, TOUGH Cable.

Increase Performance

Dramatically improve your Ethernet link states, speeds, and overall performance with Ubiquiti TOUGH Cables.

Extreme Weatherproof

Designed for outdoor use, TOUGH Cables have been built to perform even in the harshest weather and environments.

ESD Damage Protection

Protect your networks from devastating electrostatic discharge (ESD) attacks.

Extended Cable Support

TOUGH Cables have been developed to increase power handling performance for extended cable run lengths.

Bulletproof your networks

TOUGH Cable is currently available in two versions: PRO Shielding Protection and CARRIER Shielding Protection.

TOUGH Cable PRO is a Category 5e, outdoor, carrier-class shielded cable with an integrated ESD drain wire.

TOUGH Cable CARRIER is a Category 5e, outdoor, carrier-class shielded cable that features an integrated ESD drain wire, anti-crosstalk divider, and secondary shielding. It is rated to provide optimal performance on Gigabit Ethernet networks.

Additional Information:

- 24 AWG copper conductor pairs
- 26 AWG integrated ESD drain wire to prevent ESD attacks and damage
- PE outdoor-rated, weatherproof jacket
- Multi-layered shielding
- Available in lengths of 1000 ft (304.8 m)

TERMS OF USE: Ubiquiti radio devices must be professionally installed. Shielded Ethernet cable and earth grounding must be used as conditions of product warranty. TOUGH Cable is designed for outdoor installations. It is the installer's responsibility to follow local country regulations, including operation within legal frequency channels, output power, indoor cabling requirements, and Dynamic Frequency Selection (DFS) requirements.

For further information, please visit www.ubnt.com.

All specifications in this document are subject to change without notice.

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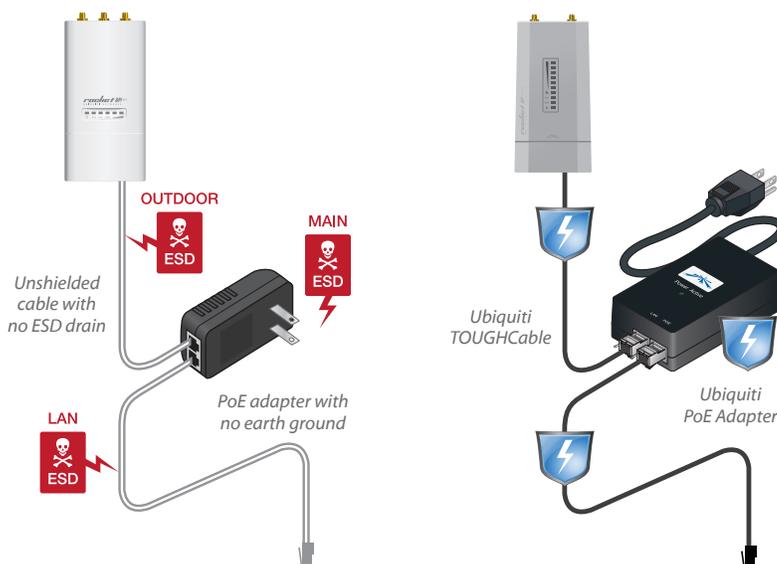


TOUGH Cable Connectors

Specifically designed for use with Ubiquiti TOUGH Cables and available in 100-pc. bags, TOUGH Cable Connectors protect against ESD attacks and Ethernet hardware damage, while allowing rapid field deployment without soldering.

ESD attacks are the leading cause for device failures. The diagram below illustrates the areas vulnerable to ESD attacks in a network.

By using a grounded Ubiquiti Power over Ethernet (PoE) Adapter along with Ubiquiti TOUGH Cable and TOUGH Cable Connectors, you can effectively protect against ESD attacks.



www.ubnt.com

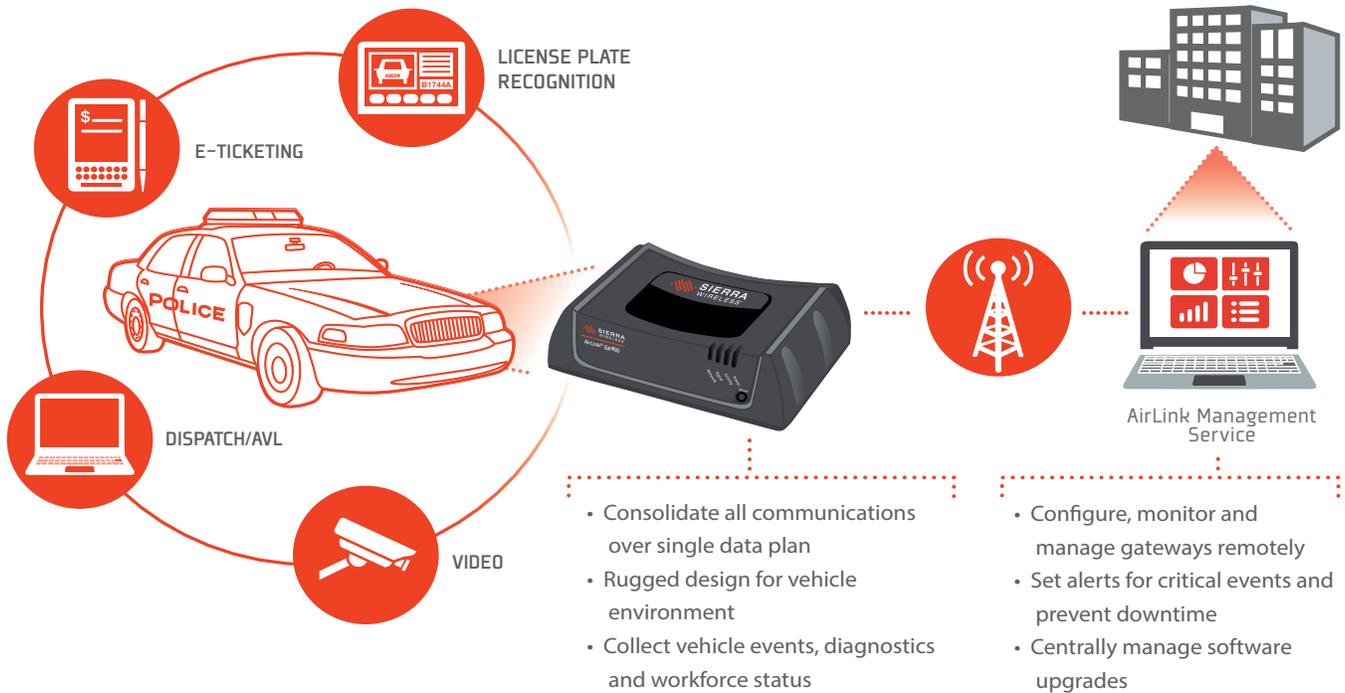
RR101112



Sierra Wireless® AirLink® GX450 Mobile Gateway

Rugged, reliable 4G mobile communications

The AirLink® GX450 is a rugged, secure mobile gateway designed to deliver mission-critical communications for in-vehicle applications. With LTE coverage on major global networks, the GX450 extends broadband connectivity to a wide range of devices and applications. It extends the enterprise network and management to the fleet, ensuring reliable, secure broadband data access for mobile users in the field.



FEATURES

- State of the art LTE coverage spanning 11 LTE frequency bands
- Provides in-vehicle network connectivity via Ethernet, Serial, Wi-Fi and USB
- Supports automatic switching to Wi-Fi networks at station/depot
- Rugged vehicle design exceeds MIL-STD-810G specifications for shock and vibration
- Integrated events engine to track vehicle status and workforce safety
- Reliable GPS report store and forward to multiple redundant servers
- Up to 5 VPN tunnels to support secure communications over cellular networks
- Remote configuration, software update, and monitoring with AirLink Management Service (ALMS)
- Integrated by industry leading solution partners in the Solution Exchange
- Industry leading warranty, including free software maintenance and accelerated hardware replacement
- Collects and transmits OBD-II vehicle diagnostics data

AIRLINK GX450 MODELS

MODEL	HARDWARE INTERFACES
GX450 base	1 Ethernet, 1 RS-232 serial, 1 digital I/O, 1 USB, 2 cellular and 1 GPS antenna connectors
Wi-Fi option	Adds 802.11 b/g/n Wi-Fi hotspot with simultaneous client mode for cellular offloading
I/O option	Adds 4 digital I/O, 4 analog input, and a second RS-232 Serial port
Ethernet option	Adds 2 more Ethernet ports for a total of 3

VEHICLE AREA NETWORKING: CONSOLIDATE CONNECTIONS

The GX450 is available in four configurations to provide vehicle-area connectivity tailored for each application environment. The base model provides connectivity for wired Ethernet, Serial and USB devices in the vehicle; an Ethernet option provides additional Ethernet ports. With the Wi-Fi option, the GX450 also includes an 802.11 b/g/n mobile access point for wireless devices and a Wi-Fi client for depot/station communications. An I/O option provides 4 digital input/outputs and 4 analog inputs to monitor external system events and sensor inputs. Consolidating all devices according to your requirements at the vehicle reduces the number of modems, antennas and subscriptions otherwise needed.

RUGGED DESIGN FOR DEMANDING VEHICLE APPLICATIONS

The GX450 is designed from the ground up to withstand the harsh environmental conditions of vehicle use. The die cast aluminum housing is sealed to meet IP64 levels of resistance to dust and water ingress. The product is tested to meet and exceed the MIL-STD-810G specification for shock, vibration, temperature and humidity. Immunity to harsh electrical transients is covered to meet international vehicle use standards.

SECURE MOBILE COMMUNICATIONS

The GX450 is loaded with features to secure your critical data. With up to 5 concurrent VPN sessions, you can ensure secure communications to multiple back-end systems. Remote authentication management allows you to use enterprise grade systems to manage access to devices in the field. Finally, port filtering and trusted IP protect the devices connected to your GX450 from unwanted access.

BENEFITS

- Supports present and future high-speed LTE networks
- Proven reliability, over 1 million AirLink devices deployed
- Secure communications from vehicle to enterprise
- Advanced situational monitoring for the mobile workforce
- Powerful remote management solution
- Lower operating costs by monitoring vehicle health

REPORT AND ALERT: DON'T JUST COMMUNICATE

As a fleet manager, you need more than just communications. You need to monitor the safety of your mobile workforce and the state of your vehicles. For example, you need to know if a worker has set off a man-down alert or if a police car has engaged the lights and siren. For this, you need the AirLink integrated events engine. This powerful tool allows you to develop custom event triggers and create tailored reports that communicate what's happening in the vehicle to third party server platforms - all without any programming. An optional OBD-II Telemetry Accessory Kit allows you to collect engine diagnostic and performance data to monitor the health of your vehicles. Best of all, through the Sierra Wireless Solution Exchange, you have access to a catalogue of world class solution partners that have already integrated this functionality into their AVL and mobile workforce solutions.

MANAGEABILITY: MANAGE, MONITOR AND ADMINISTER YOUR FLEET REMOTELY

Managing a fleet of mobile gateways is a demanding task. You need to maintain multiple device configurations, update device software, and remotely diagnose reported issues. AirLink Management Service (powered by AirVantage®) is the industry's leading device management solution. This highly advanced application supports over-the-air device registration, configuration and software updates. Dashboards display up-to-date views of the entire fleet, and custom reports can be set-up to monitor critical events and prevent downtime.

ABI Research has ranked ALMS as "Best in Class" among competing device management services.

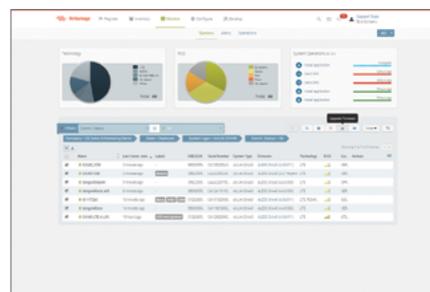
DASHBOARD



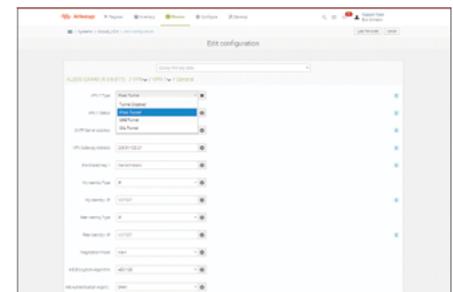
MONITOR CONNECTIVITY



SOFTWARE UPGRADES/UPDATES



SECURITY CONFIGURATION



	Specification
CELLULAR WAN	<p>North American Model (Sierra Wireless MC7354)</p> <ul style="list-style-type: none"> Carrier Approvals: Verizon, AT&T, Sprint, T-Mobile USA, US Cellular, Rogers, Bell, Telus Supported Frequency Bands <ul style="list-style-type: none"> - LTE: 1900(B2), AWS(B4), 850(B5), 700(B13), 700(B17), 1900(B25) - WCDMA: 2100(B1), 1900(B2), AWS(B4), 850(B5), 900(B8) - EV-DO/CDMA: 800(BC0), 1900(BC1), 1700(BC10) - GSM/GPRS/EDGE: Quad-band Industry Approvals: FCC, IC, PTCRB SIM Interface (2FF) <p>International Model (Sierra Wireless MC7304)</p> <ul style="list-style-type: none"> Supported Frequency Bands <ul style="list-style-type: none"> - LTE: 2100(B1), 1800(B3), 2600(B7), 900(B8), 800(B20) - WCDMA: 2100(B1), 1900(B2), 850(B5), 900(B8) - GSM/GPRS/EDGE: Quad-band Industry Approvals: CE, RCM, GCF, R&TTE Automatic SIM based network operator switching SIM Interface (2FF)
HOST INTERFACES	<p>10/100 Base-T RJ45 Ethernet port (Ethernet option includes 3 ports)</p> <p>RS-232 Serial Port on DB-9 Connector (I/O option includes additional Serial Port)</p> <p>USB 2.0 Client (Micro-B Connector)</p> <p>3 SMA antenna connectors (Primary, Secondary/Diversity, GPS)</p> <p>Active GPS antenna support</p>
INPUT/OUTPUT	<p>Configurable I/O pin on power connector</p> <ul style="list-style-type: none"> Digital Input ON Voltage: 3.3 to 30 VDC Digital Input OFF Voltage: 0 to 1.2 VDC Digital Output > 200mA @ 30VDC <p>I/O Model Only</p> <ul style="list-style-type: none"> 5 configurable digital I/O 4 configurable analog input (input voltage 0 to 30 VDC) <p>Vehicle Telemetry</p> <ul style="list-style-type: none"> OBD-II with Telemetry Accessory Kit (requires Serial Port)
LAN (ETHERNET/USB)	<p>DNS, DNS Proxy</p> <p>DHCP Server</p> <p>IP Passthrough</p> <p>VLAN</p> <p>Host Interface Watchdog</p> <p>PPPoE</p>
SERIAL	<p>TCP/UDP PAD Mode</p> <p>Modbus (ASCII, RTU, Variable)</p> <p>PPP</p> <p>Reverse Telnet</p> <p>Garmin FMI</p>
WI-FI	<p>On Wi-Fi Model Only</p> <ul style="list-style-type: none"> IEEE 802.11 b/g/n Adjustable output power (Max: 15dBm) Access point for up to 8 clients Simultaneous access point/client mode WEP, WPA-PSK, WPA2-PSK Security
NETWORK AND ROUTING	<p>Network Address Translation (NAT)</p> <p>Port Forwarding</p> <p>Host Port Routing</p> <p>NEMO/DMNR</p> <p>RRRP</p> <p>Reliable Static Route</p> <p>Dynamic DNS</p>
VPN	<p>IPsec, GRE, and SSL VPN Client</p> <p>Up to 5 concurrent tunnels</p> <p>Split Tunnel</p> <p>Dead Peer Detection (DPD)</p> <p>Multiple Subnets</p> <p>VPN Failover</p>

About Sierra Wireless

Sierra Wireless is building the Internet of Things with intelligent wireless solutions that empower organizations to innovate in the connected world. We offer the industry's most comprehensive portfolio of 2G, 3G, and 4G embedded modules and gateways, seamlessly integrated with our secure cloud and connectivity services. OEMs and enterprises worldwide trust our innovative solutions to get their connected products and services to market faster.

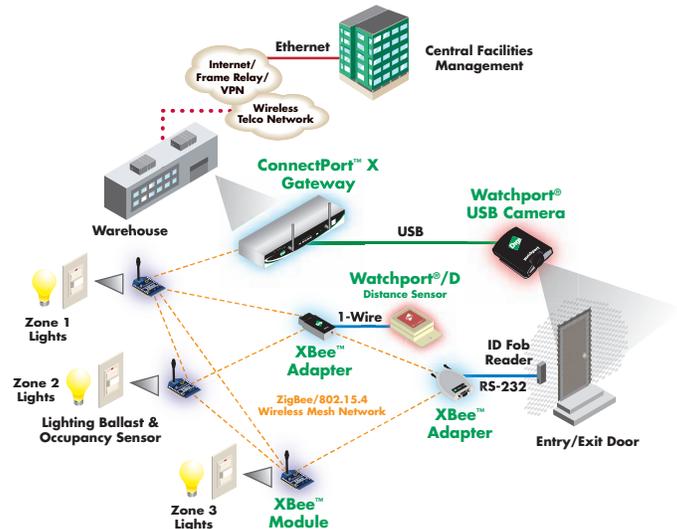
For more information, visit www.sierrawireless.com.

	Specification
SECURITY	<p>Remote Authentication (LDAP, RADIUS and TACACS+)</p> <p>DMZ</p> <p>Inbound and Outbound Port filtering</p> <p>Inbound and Outbound Trusted IP</p> <p>MAC Address Filtering</p> <p>PCI DSS V3.0 compatible</p>
SATELLITE NAVIGATION (GNSS)	<p>12 Channel GPS and GLONASS Receiver</p> <p>Acquisition Time: 1s Hot Start</p> <p>Accuracy: <2m (50%), <5m (90%)</p> <p>Tracking Sensitivity: -145dBm</p> <p>GNSS Watchdog</p> <p>Reports: NMEA 0183 V3.0, TAIP, RAP, XORA</p> <p>Multiple Redundant Servers</p> <p>Reliable Store and Forward</p>
EVENTS ENGINE	<p>Custom event triggers and reports</p> <p>Configurable interface, no programming</p> <p>Event Types: Digital Input, Network Parameters, Data Usage, Timer, Power, Device Temperature</p> <p>Report Types: RAP, SMS, Email, SNMP Trap, TCP (Binary, XML, CSV)</p> <p>Event Actions: Drive Relay Output</p>
AIRLINK MANAGEMENT SERVICE	<p>Secure cloud-based device management application</p> <p>Remote provisioning and airtime activation</p> <p>Gateway configuration and template management</p> <p>Configurable monitoring and alerting</p> <p>Over the air software and radio module firmware updates</p> <p>Auto configuration</p>
MANAGEMENT INTERFACES	<p>Web-Based User Interface</p> <p>Device Configuration Templates</p> <p>Over-the-air software and radio module firmware updates</p> <p>AT Command Line Interface (Telnet/SSH/Serial)</p> <p>SMS Commands</p> <p>SNMP</p>
APPLICATION FRAMEWORK	<p>ALEOS Application Framework (AAF)</p> <p>LUA Scripting Language</p> <p>Eclipse-based IDE</p> <p>Integrated with AirVantage®</p>
POWER	<p>Analog Ignition Sense and Power Management</p> <p>Input Voltage: 9 to 36 VDC</p> <p>Low Power mode triggered on low voltage, timer delay (ignition sense), or periodic timer</p>
ENVIRONMENTAL	<p>Operating Temperature: -30°C to +70°C / -22°F to +158°F</p> <p>Storage Temperature: -40°C to +85°C / -40°F to +185°F</p> <p>Humidity: 90% RH @ 60°C</p> <p>Military Spec MIL-STD-810G conformance to shock, vibration, thermal shock, and humidity</p> <p>IP64 rated ingress protection</p>
INDUSTRY CERTIFICATIONS	<p>Safety: IECCE Certification Bodies Scheme (CB Scheme) UL 60950</p> <p>Vehicle Usage: E-Mark (2009/19/EC), ISO7637-2</p> <p>Hazardous Environments: Class 1 Div 2</p> <p>Environmental: RoHS, REACH, WEEE</p>
SUPPORT AND WARRANTY	<p>3 year standard warranty</p> <p>Optional 2 year warranty extension</p> <p>Unrestricted device software upgrades</p> <p>1-day Accelerated Hardware Replacement available through participating resellers</p>
DIMENSIONS	<p>142 x 98 x 4.1 mm (5.6 x 3.9 x 1.6 in)</p> <p>397g (14oz.)</p>

XBee™ Adapters

ZigBee®/802.15.4 Device Adapters for Drop-in Networks

XBee adapters provide easy ZigBee/802.15.4 wireless connectivity to sensors, controllers and other devices used for remote monitoring and control. All XBee adapters can be used with Digi's ConnectPort™ IP gateways to build wireless Drop-in Networks.



Features/Benefits

- ZigBee/802.15.4 wireless mesh connectivity for all types of end-point devices
- Compatible with Digi's ConnectPort X family of IP gateways for LAN/WAN connectivity
- Multiple interface options provide broad device support: Serial, USB, 1-Wire, Digital I/O, Analog I/O
- Small form factor for easy handling and installation
- Flexible powering options include external power, N-Cell battery or both for power redundancy
- Two versions available: XBee and XBee-PRO™ (longer range)

Overview

ZigBee/802.15.4 technology enables low-cost, low-power networking of sensors, controllers and other such devices in self-configuring, self-healing wireless mesh networks. Digi's XBee adapters are used to retrofit existing devices for ZigBee/802.15.4 connectivity. Available with multiple interface options, these adapters deliver the benefits of ZigBee/802.15.4 mesh networking off-the-shelf, without the development time required when using an embedded solution. As part of Digi's Drop-in Networks product family, XBee adapters can be used with ConnectPort X gateways to "drop-in" end-to-end device networks without the need for a wired network infrastructure.

Each Digi XBee adapter contains a ZigBee/802.15.4 wireless module for network connectivity and a physical interface for device connectivity. Available interfaces include RS-232 (powered power harvesting), RS-485, USB, 1-Wire, Digital I/O and Analog I/O. Each is offered in a small form factor with various powering options that include external power supply, N-cell battery, both external and battery power for redundancy, or parasitic power drawn from the connected device. Two performance levels of XBee adapters are available: XBee and XBee-PRO. The PRO version provides greater transmit power and approximately three-times the range of the regular version.

Compatibility Note:

Two sets of XBee and XBee-PRO adapters are offered: Series 1 and Series 2. Though overall performance and product specifications are largely similar, the two series are built on distinct and non-compatible technology platforms. Thus, users must standardize on one series or the other for operability. The same is true for compatibility with the ConnectPort X gateways. Series 1 XBee adapters are compatible only with Series 1 gateways, while Series 2 XBee adapters are compatible only with Series 2 gateways. Series 1 XBee specifications appear on page 2 of this datasheet. Series 2 XBee specifications are on page 3.



FEATURES

General

- Frequency: 2.4 GHz (ISM)
- Antenna options: Integrated whip antenna

Performance: XBee

- Indoor/Urban range: Up to 100 ft (30 m)
- Outdoor RF line of sight range: Up to 300 ft (100 m)
- Transmit power output: 1 mW (0 dBm)
- RF data rate: 250,000 bps
- Receiver sensitivity: -92 dBm (1% PER)

Performance: XBee-PRO

- Indoor/Urban range: Up to 300 ft (100 m)
- Outdoor RF line of sight range: Up to 1 mile (1.6 km)
- Transmit power output: 60 mW (18 dBm)*, 100 mW EIRP*
- RF data rate: 250,000 bps
- Receiver sensitivity: -100 dBm (1% PER)

Networking and Security

- Network topologies: Point-to-Point, Point-to-Multipoint, Peer-to-Peer, Mesh
- Number of channels:
XBee: 16 - 5 MHz channels (Direct Sequence Spread Spectrum)
XBee-PRO: 12 Direct Sequence Channels (software selectable)
- Filtration options: PAN ID, Channel, Source/Destination Addresses

LEDs

- Power: Glows green when external power is supplied (not active when battery powered to limit power drain)
- Associate: Glows when unit is connected and associated on an RF network

Controls

- Device reset (internal push button)
- Identification (internal push button): Relays identification to ConnectPort X gateway

INTERFACES

Serial

- RS-232 (DB-9M)
- RS-232PH (DB-9M); power harvesting version
- RS-485 (6-position wire terminal block)
 - Switch selectable between RS-422 half duplex, RS-422 full duplex and RS-485
- 1-Wire (RJ-45)

USB

- USB 2.0 Full Speed (with ESD protection); connects to host via captive 2-meter cable

ENVIRONMENTAL

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

- Operating temperature: Externally powered: -40C to 85C
Battery powered: -18C to 55C

XBee USB

- Operating temperature: -40° C to 85° C

XBee 232PH

- Operating temperature: 0° C to 65° C

DIMENSIONS

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

Width: 1.68 in (4.26 cm)
Height: 0.99 in (2.53 cm)
Length: 3.87 in (9.84 cm)
Weight: 2.29 oz (6.50 g)

XBee USB and 232PH

Width: 1.80 in (4.57 cm)
Height: 0.83 in (2.10 cm)
Length: 2.87 in (7.29 cm)
Weight: 1.60 oz (45.36 g)

REGULATORY APPROVALS

- FCC Part 15.247 - Pending
- Industry Canada (IC) - Pending
- Europe (CE) - Pending
- EN55022, Class A - Pending
- UL60950 - Pending
- CAN/CSA C22.2 No. 60950 - Pending
- EN60950 - Pending
- RoHS compliant

POWER REQUIREMENTS

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

- Externally powered: 9-30 VDC, locking connector
- Battery powered: 3 internal N cell batteries

XBee USB

- Bus powered: +5V from USB bus
- Power consumption during normal operation:
 - XBee: 70mA
 - XBee-PRO: 70 mA (Rx) and 250 mA (Tx)
- Power consumption during suspend mode:
 - XBee and XBee-PRO: 200 uA

XBee 232PH

- Internal battery provides power when unit is operating and recharges from the serial port when in sleep mode
- Requires a sleep/wake duty cycle as part of its normal operation.
- Requires a fully functional serial port conforming to the RS232c standard for optimal operation.
- Sleep/wake duty cycle requirements will vary based on the current output of serial port
- Serial ports with more than 14VDC output (rare) are not supported and may cause malfunction
- Serial ports that provide hard power of 5 to 14VDC on one or more pins will allow the device to operate continually without a sleep/wake cycle

MODEL.....PART NUMBERS

Model/Interface	XBee	XBee-PRO
XBee/XBee-PRO RS-485	XA-A14-CS3R	XA-A14-CS3P
XBee/XBee-PRO RS-232	XA-A14-CS2R	XA-A14-CS2P
XBee/XBee-PRO 1-Wire	XA-A14-CS1R	XA-A14-CS1P
XBee/XBee-PRO Analog I/O	XA-A14-CS5R	XA-A14-CS5P
XBee/XBee-PRO Digital I/O	XA-A14-CS4R	XA-A14-CS4P
XBee/XBee-PRO USB	XA-A14-CE1R	XA-A14-CE1P
XBee/XBee-PRO RS-232PH (power harvesting)	XA-A14-CE2R	XA-A14-CE2P

Series 1 XBee Adapters are compatible only with Series 1 ConnectPort X gateways.

* When operating in Europe: XBee-PRO adapters must be configured to operate at a maximum TX power output level (power output level is set using the PL command). Additionally, European regulations stipulate an EIRP power maximum of 12.86 dBm (1 mW).

FEATURES

General

- Frequency: 2.4 GHz (ISM)
- Antenna options: Integrated whip antenna

Performance

- Indoor/Urban range: Up to 100 ft (30 m)
- Outdoor RF line of sight range: Up to 300 ft (100 m)
- Transmit power output: 1 mW (0 dBm)
- RF data rate: 250,000 bps
- Receiver sensitivity: -95 dBm (1% PER)

Networking and Security

- Network topologies: Point-to-Point, Point-to-Multipoint, Peer-to-Peer, Mesh
- Number of channels: 16 - 5 MHz channels (Direct Sequence Spread Spectrum)
- Filtration options: PAN ID, Channel, 2⁶⁴ (64-bit) addresses

LEDs

- Power: Glows green when external power is supplied (not active when battery powered to limit power drain)
- Associate: Glows when unit is connected and associated on an RF network

Controls

- Device reset (internal push button)
- Identification (internal push button): Relays identification to ConnectPort X gateway

INTERFACES

Serial

- RS-232 (DB-9M)
- RS-232PH (DB-9M); power harvesting version
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 - Switch selectable between RS-422 half duplex, RS-422 full duplex and RS-485
- 1-Wire (RJ-45)

USB

- USB 2.0 Full Speed (with ESD protection); Connects to host via captive 2-meter cable

DIMENSIONS

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

Width: 1.68 in (4.26 cm)
 Height: 0.99 in (2.53 cm)
 Length: 3.87 in (9.84 cm)
 Weight: 2.29 oz (6.50 g)

XBee USB and 232PH

Width: 1.80 in (4.57 cm)
 Height: 0.83 in (2.10 cm)
 Length: 2.87 in (7.29 cm)
 Weight: 1.60 oz (45.36 g)

POWER REQUIREMENTS

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

- Externally powered: 9-30 VDC, locking connector
- Battery powered: 3 internal N cell batteries

XBee USB

- Bus powered: +5V from USB bus
- Power consumption during normal operation:
 - XBee: 70mA
 - XBee-PRO: 70 mA (Rx) and 250 mA (Tx)
- Power consumption during suspend mode:
 - XBee and XBee-PRO: 200 uA

XBee 232PH

- Internal battery provides power when unit is operating and recharges from the serial port when in sleep mode
- Requires a sleep/wake duty cycle as part of its normal operation.
- Requires a fully functional serial port conforming to the RS232c standard for optimal operation.
- Sleep/wake duty cycle requirements will vary based on the current output of serial port
- Serial ports with more than 14VDC output (rare) are not supported and may cause malfunction
- Serial ports that provide hard power of 5 to 14VDC on one or more pins will allow the device to operate continually without a sleep/wake cycle

ENVIRONMENTAL

XBee 232, 485, 1-Wire, Analog I/O and Digital I/O

- Operating temperature: Externally powered: -40C to 85C
 Battery powered: -18C to 55C

XBee USB

- Operating temperature: -40° C to 85° C

XBee 232PH

- Operating temperature: 0° C to 65° C

REGULATORY APPROVALS

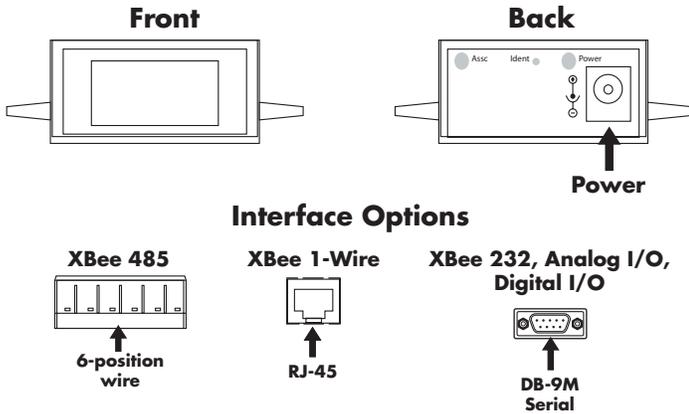
- FCC Part 15.247 - Pending
- Industry Canada (IC) - Pending
- Europe (CE) - Pending
- EN55022, Class A - Pending
- UL60950 - Pending
- CAN/CSA C22.2 No. 60950 - Pending
- EN60950 - Pending
- RoHS compliant

MODEL.....PART NUMBERS

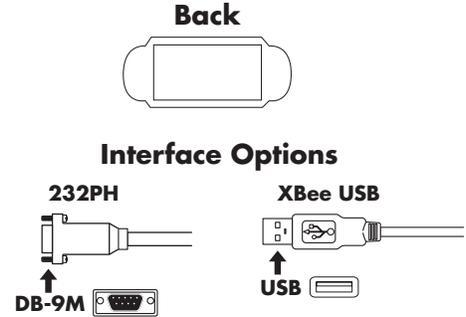
Model/Interface	XBee	XBee-PRO
XBee/XBee-PRO RS-485	XA-B14-CS3R	Available Sep 07
XBee/XBee-PRO RS-232	XA-B14-CS2R	Available Sep 07
XBee/XBee-PRO 1-Wire	XA-B14-CS1R	Available Sep 07
XBee/XBee-PRO Analog I/O	XA-B14-CS5R	Available Sep 07
XBee/XBee-PRO Digital I/O	XA-B14-CS4R	Available Sep 07
XBee/XBee-PRO USB	XA-B14-CE1R	Available Sep 07
XBee/XBee-PRO RS-232PH (power harvesting)	XA-B14-CE2R	Available Sep 07

Series 2 XBee Adapters are compatible only with Series 2 ConnectPort X gateways.

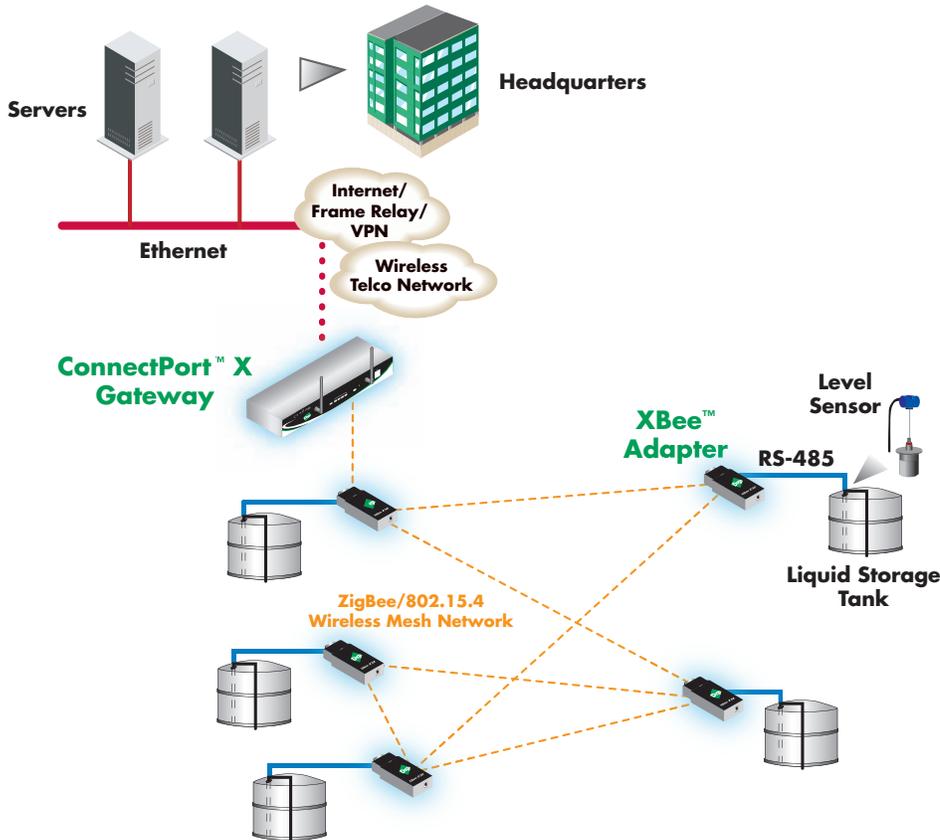
XBee 232, 485, 1-Wire, Analog I/O, Digital I/O



XBee USB, 232PH



Drop-in Network for Tank Level Monitoring



DIGI SERVICE AND SUPPORT - You can purchase with confidence knowing that Digi is here to support you with expert technical support and a strong five-year warranty. www.digi.com/support

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Digi International, the leader in device networking for business, develops reliable products and technologies to connect and securely manage local or remote electronic devices over the network or via the web. With over 20 million ports shipped worldwide since 1985, Digi offers the highest levels of performance, flexibility and quality.

www.digi.com

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LONG-RANGE 900 MHz
RF MODEMS



DIGI XBEE-PRO[®] 900HP RF MODEMS

900 MHz stand-alone RF modems provide outstanding range (up to 28 miles) in a reliable wireless solution

Digi XBee-PRO 900HP RF modems can be configured in minutes to provide reliable serial cable replacement between many different types of electronic devices. These modems utilize the Digi XBee-PRO 900HP 900 MHz RF module in an enclosure with interface options that include RS-232, RS-485, USB and Ethernet with transmission ranges of up to 28 miles.

Digi XBee-PRO 900HP RF modems allow the user to easily make their existing wired systems wireless simply by connecting to this product. They take advantage of the DigiMesh[®] networking protocol, featuring dense network operation using mesh technology.

Digi XBee-PRO 900HP RF modems can wirelessly connect a variety of devices across many applications including remote monitoring, building automation/ security, industrial automation/SCADA, fleet management/asset tracking and sensor data capture in embedded systems.

BENEFITS

- Industrial design with -40° C to 85° C operating temperature
- Superior outdoor LOS range of up to 28 miles
- RF data throughput up to 200 Kbps
- 900 MHz license-free ISM band operation
- Interface options include RS-232, RS-485, USB and Ethernet
- DigiMesh peer-to-peer mesh networking protocol
 - Self-healing and discovery for network stability
- Includes mini-USB port for simple device configuration

RELATED PRODUCTS



Digi XBee[®]-PRO
900HP Modules



XTend[®] PKG



Digi XBee[®]-PRO
Gateways



ConnectPort[®]
X2



Digi XLR PRO[®]

APPLICATION EXAMPLE



PC INSIDE
RETAIL STORE

USB/RS-232/
422/485



XBEE-PRO[®] 900HP
RF MODEM

RF Signal



XBEE-PRO[®] 900HP
RF MODEM



Digital
Signage

SPECIFICATIONS

Digi XBee-PRO® 900HP RF Modems

PERFORMANCE	
INDOOR/URBAN RANGE	10 Kbps: up to 2000 ft (610 m); 200 Kbps: up to 1000 ft (305 m)
OUTDOOR/RF LINE-OF-SIGHT RANGE	10 Kbps: up to 9 miles (15.5 km); 200 Kbps: up to 4 miles (6.5 km); w/2.1 dBi dipole antenna
TRANSMIT POWER OUTPUT	Up to 24 dBm (250 mW) software selectable
THROUGHPUT DATA RATE	10 Kbps: up to 8.8 Kbps; 200 Kbps: up to 105.5 Kbps; (When configured as point-to-multipoint)
RF DATA RATE	10 Kbps or 200 Kbps
INTERFACE DATA RATE	125-65,0000 bps (Software selectable, includes non-standard baud rates)
RECEIVER SENSITIVITY	10 Kbps: -110 dBm; 200 Kbps: -101 dBm
NETWORK AND SECURITY	
FREQUENCY	902-928 MHz (located in the 900 MHz ISM Band)
SPREAD SPECTRUM	Frequency hopping
SUPPORTED NETWORK TOPOLOGIES	Mesh, Point-to-point, Point-to-multipoint, Peer-to-peer
CHANNEL CAPACITY	8 hop sequences share 25 channels, 64 channels available (there are 64 channels available, of which the user can select 25 that are hopped through in 8 different patterns.)
ANTENNA	
CONNECTOR	RPSMA (Reverse polarity SMA)
POWER REQUIREMENTS	
POWER SUPPLY	7-30 VDC
RECEIVE CURRENT	60 mA (@9V)
TRANSMIT CURRENT	140 mA (@9V)
PHYSICAL PROPERTIES	
SIZE	4.5 in x 2.75 in x 1.125 in (11.4 cm x 7 cm x 2.9 cm)
WEIGHT	5.25 oz (150 g)
DATA CONNECTION	RS-232 female DB-9, RS-485/422 screw terminal, USB Type B, Config USB mini-B, 10/100 Ethernet
OPERATING TEMPERATURE	-40° C to 85° C (Industrial)
REGULATORY APPROVALS	
FCC PART 15.247 (U.S.A)	Yes
IC (CANADA)	Yes
C-TICK (AUSTRALIA)	Yes
ROHS	Compliant

PART NUMBERS	DESCRIPTION
XM-M92-2P-U	Digi XBee Modem, RS232 to Digi XBee-PRO 900HP, 200 Kbps
XM-M92-2P-UA	Digi XBee Modem, RS232 to Digi XBee-PRO 900HP, 200 Kbps w/Accessories
XM-M92-4P-U	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 200 Kbps
XM-M92-4P-UA	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 200 Kbps w/ Accessories
XM-M92-UP-U	Digi XBee Modem, USB to Digi XBee-PRO 900HP, 200 Kbps
XM-M92-UP-UA	Digi XBee Modem, USB to Digi XBee-PRO 900HP, 200 Kbps w/ Accessories
XM-P91-2P-U	Digi XBee Modem, RS232 to Digi XBee-PRO 900HP, 10 Kbps
XM-P91-2P-UA	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 10 Kbps
XM-P91-4P-U	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 10 Kbps
XM-P91-4P-UA	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 10 Kbps w/ Accessories
XM-P91-UP-U	Digi XBee Modem, USB to Digi XBee-PRO 900HP, 10 Kbps w/ Accessories
XM-M92-2P-AA	Digi XBee Modem, RS232 to Digi XBee-PRO 900HP, 200 Kbps w/Accessories for Australia
XM-M92-4P-AA	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 200 Kbps w/ Accessories for Australia
XM-M92-UP-AA	Digi XBee Modem, USB to Digi XBee-PRO 900HP, 200 Kbps w/ Accessories for Australia
XM-P91-2P-AA	Digi XBee Modem, RS232 to Digi XBee-PRO 900HP, 10 Kbps w/ Accessories for Australia
XM-P91-4P-AA	Digi XBee Modem, RS485 to Digi XBee-PRO 900HP, 10 Kbps w/ Accessories for Australia
XM-P91-UP-AA	Digi XBee Modem, USB to Digi XBee-PRO 900HP, 10 Kbps w/ Accessories for Australia

FOR MORE INFORMATION
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2. Cameras

AXIS Q6128-E PTZ Dome Network Camera

High-end 4K PTZ with Axis' Sharpdome technology

The compact, outdoor-ready AXIS Q6128-E delivers top performance 4K (8 MP) video at 25/30 fps, with 12x optical zoom, and autofocus. Axis' Sharpdome technology provides full scene fidelity and perfect image quality in all directions – above as well as below the horizon. Using the latest technology, AXIS Q6128-E has good low light performance, and the quick and precise pan of more than 700°/s makes it easy to change viewing position and follow fast moving objects. Axis' Speed Dry function easily removes water drips from the dome glass, providing sharp images in rainy weather. The camera also features EIS and defogging.

- > **4K resolution**
- > **Axis' Sharpdome technology**
- > **Axis' Speed Dry function**
- > **Pan performance up to 700°/s**
- > **Repaintable**



AXIS Q6128-E PTZ Dome Network Camera

Models	AXIS Q6128-E 50 Hz AXIS Q6128-E 60 Hz	File upload via FTP, SFTP, HTTP, HTTPS, and email Notification via email, HTTP, HTTPS, and TCP	
Camera			
Image sensor	1/2.3" Progressive scan CMOS	Data streaming Event data	
Lens	3.9–46.8 mm, F1.8–2.0 Horizontal field of view: 70.7°–6.2° Vertical field of view: 43.5°–3.5° Autofocus, auto-iris	Built-in installation aids Pixel counter	
Day and night	Automatically removable infrared-cut filter	General	
Minimum illumination	Color: 0.45 lux at 30 IRE, F1.8 B/W: 0.03 lux at 30 IRE, F1.8 Color: 0.6 lux at 50 IRE, F1.8 B/W: 0.05 lux at 50 IRE, F1.8	Casing IK08, IP66- and NEMA 4X-rated Repaintable metal casing (aluminum), Polycarbonate (PC) clear dome with Sharpdome technology	
Shutter time	1/10000 s to 1 s	Sustainability PVC free	
Pan/Tilt/Zoom	Pan: 360° endless, 0.05°–700°/s Tilt: +20 to -90°, 0.05°–500°/s Zoom: 12x optical, 12x digital, total 144x zoom Nadir flip, 256 preset positions, Tour recording, Guard tour, Control queue, On-screen directional indicator, Set new pan 0°, Adjustable zoom speed, Speed Dry	Memory 1 GB RAM, 256 MB Flash	
Video			
Video compression	H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles Motion JPEG	Power Axis High PoE midspan 1-port: 100–240 V AC, max 74 W Camera consumption: typical 14 W, max 51 W Axis PoE+ midspan 1-port: 100–240 V AC, max 37 W IEEE 802.3at Type 2 Class 4 Camera consumption: typical 14 W, max 25 W	
Resolutions	3840x2160 UltraHD 4K to 640x360	Connectors RJ45 10BASE-T/100BASE-TX/1000BASE-T RJ45 Push-pull Connector (IP67)	
Frame rate	Up to 50/60 fps (50/60Hz) @ 1080p Up to 25/30 fps (50/60Hz) @ 4K	Storage Support for SD/SDHC/SDXC card Support for recording to dedicated network-attached storage (NAS) For SD card and NAS recommendations see www.axis.com	
Video streaming	Multiple, individually configurable streams in H.264 and Motion JPEG Controllable frame rate and bandwidth VBR/MBR H.264	Operating conditions With 30 W midspan: -20 °C to 50 °C (4 °F to 122 °F) With 60 W midspan: -50 °C to 50 °C (-58 °F to 122 °F) Arctic Temperature Control: Start-up as low as -40 °C (-40 °F) Humidity 10–100% RH (condensing)	
Image settings	Compression, color, brightness, sharpness, white balance, exposure control, exposure zones, rotation, fine tuning of behavior at low light, electronic image stabilization (EIS), manual shutter time, text and image overlay, image freeze on PTZ Defogging, backlight compensation Highlight compensation 24 individual 3D privacy masks	Storage conditions -40 °C to 70 °C (-40 °F to 158 °F)	
Network			
Security	Password protection, IP address filtering, HTTPS ^a encryption, IEEE 802.1X ^a network access control, Digest authentication, User access log, Centralized Certificate Management	Approvals EMC EN 55022 Class A, EN 55024, EN 50121-4, IEC 62236-4, EN 61000-3-2, EN 61000-3-3, EN 61000-6-1, EN 61000-6-2, FCC Part 15 Subpart B Class A, ICES-003 Class A, VCCI Class A, RCM AS/NZS CISPR22 Class A KCC KN22 Class A, KN24 Safety IEC/EN/UL 60950-1, IEC/EN/UL 60950-22 Environment IEC/EN 62262 IK08, IEC/EN 60529 IP66, NEMA 250 Type 4X, IEC 60068-2-1, IEC 60068-2-2, IEC 60068-2-78, IEC 60068-2-14, IEC 60068-2-6, IEC 60068-2-27, IEC 60068-2-30, ISO4892-2 Midspan: EN 60950-1, GS, UL, cUL, CE, FCC, VCCI, CB, KCC, UL-AR	
Supported protocols	IPv4/v6, HTTP, HTTPS ^a , SSL/TLS ^a , QoS Layer 3 DiffServ, FTP, CIFS/SMB, SMTP, Bonjour, UPnP™, SNMP v1/v2c/v3 (MIB-II), DNS, DynDNS, NTP, RTSP, RTP, SFTP, TCP, UDP, IGMP, RTCP, ICMP, DHCP, ARP, SOCKS, SSH, NTCP	Dimensions With mounting hook: 274x165x165 mm (10 13/16 x 6 1/2 x 6 1/2 in) Without mounting hook: 256x165x165 mm (10 1/16 x 6 1/2 x 6 1/2 in)	
System integration			
Application Programming Interface	Open API for software integration, including VAPIX [®] and AXIS Camera Application Platform; specifications at www.axis.com AXIS Video Hosting System (AVHS) with One-Click Connection ONVIF [®] Profiles S and G, specifications at www.onvif.org	Weight 3.0 kg (6.5 lb)	
Analytics	Video motion detection, Active Gatekeeper, Shock detection, Autotracking Support for AXIS Camera Application Platform enabling installation of third-party applications, see www.axis.com/acap	Included accessories IP66-rated RJ45 connector kit, High PoE Midspan 1-port, Installation Guide, Windows decoder 1-user license	
Event triggers	Detectors: Live Stream Accessed, Motion Detection, Shock Detection Hardware: Network, Temperature Input Signal: Manual Trigger, Virtual Inputs PTZ: Autotracking, Error, Moving, Preset Reached, Ready Storage: Disruption, Recording System: System Ready Time: Recurrence, Use Schedule	Optional accessories AXIS T91/T94 Mounting Accessories, Axis High PoE midspans For more accessories, see www.axis.com	
Event actions	Overlay text, PTZ preset, guard tour, video recording to edge storage, autotracking, day/night mode, pre- and post-alarm video buffering, send SNMP Trap	Video management software AXIS Companion, AXIS Camera Station, Video management software from Axis' Application Development Partners available on www.axis.com/techsup/software	
		Languages English, German, French, Spanish, Italian, Russian, Simplified Chinese, Japanese, Korean, Portuguese, Traditional Chinese	
		Warranty Axis 3-year warranty and AXIS Extended Warranty option, see www.axis.com/warranty	

a. This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (www.openssl.org), and cryptographic software written by Eric Young (ey@cryptsoft.com).

Environmental responsibility:

www.axis.com/environmental-responsibility

DS-2CD4585F-IZH

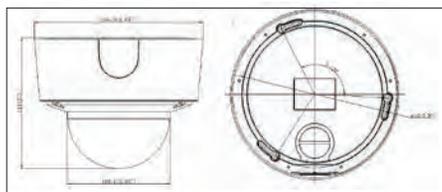
4K Smart IP Outdoor Dome Camera



Key Features

- Up to 4096 x 2160 High Resolution
- WDR, 3D DNR
- Multi-Video Streams
- On-Board Storage, Up to 128 GB
- Up to 40 Meters IR Range
- Motorized Lens with Smart Focus
- Vandal Resistant and IP66
- Smart Heater
- People Counting

Dimensions



DS-2CD4585F-IZH	
Camera Module	
Image Sensor	1/1.7" progressive scan CMOS
Minimum Illumination	0.014 lux @ (f/1.4, AGC on), 0 lux with IR
Shutter Speed	1 s to 1/100,000 s
Lens	2.8 to 12 mm @ f/1.4
Lens Mount	Φ14
Angle Adjustment	Pan: 0° to 355°, tilt: 0° to 75°, rotation: 0° to 355°
Auto-Iris	DC drive
Day/Night	IR cut filter with auto switch
Digital Noise Reduction	3D DNR
Wide Dynamic Range	DWDR
Compression Standard	
Video Compression	H.264/MJPEG
H.264 Type	Baseline Profile/Main Profile/High Profile
Video Bit Rate	32 Kbps to 16 Mbps
Audio Compression	G.711/G.722.1/G.726/MP2L2
Audio Bit Rate	64 Kbps (G.711)/16 Kbps (G.722.1)/16 Kbps (G.726)/32-128 Kbps (MP2L2)
Image	
Maximum Resolution	4096 × 2160
Frame Rate	30 fps (4096 × 2160, 3840 × 2160, 1920 × 1080, 1280 × 720)
Image Settings	Independent with main stream and sub stream, 30 fps (1280 × 720)
BLC	Supported, zone optional
Defog	Supported
Day/Night Switch	Auto/Schedule/Triggered by Alarm In
ROI	Supported
Picture Overlay	24-bit BMP format overlay, zone optional
Network	
Network Storage	MicroSD/SDHC/SDXC card with ANR (up to 128 GB), NAS (supports NFS, SMB/CIFS)
Alarm Trigger	Line crossing detection, intrusion detection, scene change detection, audio exception detection, motion detection, dynamic analysis, tampering alarm, network disconnect, IP address conflict, storage exception
Protocols	TCP/IP, ICMP, HTTP, HTTPS, FTP, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.1X, QoS, IPv6, Bonjour
Security	One-key recovery, flash-prevention, three streams, heartbeat, mirror, password protection, video mask, watermark, IP address filtering, anonymous access
Standard	ONVIF, PSIA, CGI, ISAPI
Communication Interface	1 RJ-45 10M/100M Ethernet interface
Smart Features	
Behavior Analysis	Line crossing detection, intrusion detection, region entrance, region exiting, unattended baggage, object removal
Line Crossing Detection	Cross a pre-defined virtual line
Intrusion Detection	Enter and loiter in a pre-defined virtual region
Region Entrance	Enter a pre-defined virtual region from the outside place
Region Exiting	Exit from a pre-defined virtual region
Unattended Baggage	Objects left over in the pre-defined region such as the baggage, purse, dangerous materials
Object Removal	Objects removed from the pre-defined region, such as the exhibits on display
Exception Detections	Scene change detection, sudden audio increase/decrease detection, audio loss detection, defocus detection
Statistics	Object counting (entrance and exit object number is counted and shown on screen in real time)
General	
Protection Level	IP66
Impact Protection	IEC60068-275Eh, 20J; EN50102, up to IK10
Operating Conditions	-30° C to 60° C (-22° F to 140° F) -H: -40° C to 60° C (-40° F to 140° F) Humidity 95% or less (non-condensing)
Power Supply	12 VDC/24 VAC/PoE (802.3af), -H: 12 VDC/24 VAC/PoE (802.3at)
IR Distance	10 to 40 m
Power Consumption	Maximum 17.5 W
Dimensions	Φ164.9 mm × 127 mm (Φ6.49" × 5")
Weight	2100 g (4.62 lbs)

DS-2DF6236-AEL

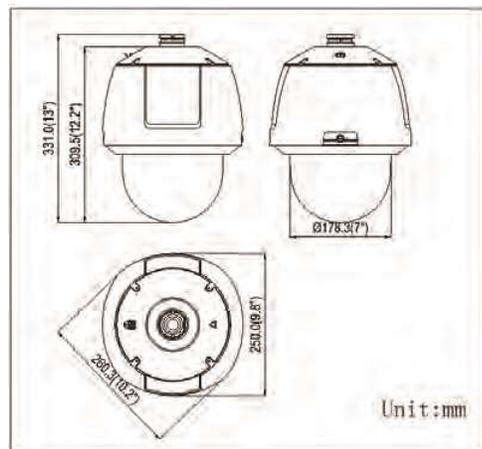
2 MP Ultra-Low Light Smart PTZ Camera



Key Features

- 1/1.9" HD CMOS Sensor
- Optical Defog
- 2 MP (1920 x 1080) Full HD
- 36x Optical Zoom
- Ultra-Low Illumination
- 120 dB True WDR
- Smart Tracking
- Smart Detection
- EIS (Electronic Image Stabilization)
- Hi-PoE/24 VAC Power (PoE Power Injector Included)

Dimensions



DS-2DF6236-AEL	
Camera Module	
Image Sensor	1/1.9" progressive scan CMOS
Minimum Illumination	f/1.5, AGC on: color: 0.002 lux, B/W: 0.0002 lux
Max. Image Resolution	1920 × 1080
Focal Length	5.7 mm to 205.2 mm, 36x
Digital Zoom	16x
Zoom Speed	Approximately 3.3 s (optical wide to tele)
Angle of View	58.7° to 2.0° (wide to tele)
Min. Working Distance	10 mm to 1500 mm (wide to tele)
Aperture Range	f/1.5 to f/3.4
Focus Mode	Auto/semiautomatic/manual
WDR	120 dB
S/N Ratio	≥55 dB
Shutter Speed	1 s to 1/30,000 s
AGC	Auto/manual
White Balance	Auto/manual/ATW/indoor/outdoor/daylight lamp/sodium lamp
Day/Night	IR cut filter
Privacy Mask	24 privacy masks programmable; optional multiple colors and mosaics
Optical Defog	Yes
Enhancement	3D DNR, EIS, HLC/BLC, SVC
Pan and Tilt	
Range	Pan: 360° endless; tilt: -15° to 90° (auto flip)
Speed	Pan manual speed: 0.1° to 300°/s, pan preset speed: 540°/s, tilt manual speed: 0.1° to 240°/s, tilt preset speed: 400°/s
Number of Presets	300
Patrols	8 patrols, up to 32 presets per patrol
Patterns	4 patterns, with the recording time not more than 10 minutes per pattern
Park Actions	Preset/patrol/pattern/auto scan/tilt scan/random scan/frame scan/panorama scan
Scheduled Tasks	Preset/patrol/pattern/auto scan/tilt scan/random scan/frame scan/panorama scan/dome reboot/dome adjust/aux output
Smart Features	
Smart Tracking	Manual/panorama/intrusion trigger/line crossing trigger/region entrance trigger/region exiting trigger
Smart Detection	Intrusion detection, line crossing detection, audio exception detection, region entrance, region exiting
ROI Encoding	Supports 24 areas with adjustable levels
Alarm	
Alarm I/O	7/2
Alarm Trigger	Intrusion detection, line crossing detection, region entrance, region exiting, motion detection, audio exception detection, dynamic analysis, tampering alarm, network disconnect, IP address conflict, storage exception
Alarm Action	Preset, patrol, pattern, microSD/SDHC card recording, relay output, notification on client, send e-mail, upload to FTP, trigger channel
Input/Output	
Monitor Output	1.0 V[p-p]/75 Ω, NTSC composite, BNC
Audio Input	1 mic in/line in interface, line input: 2 to 2.4 V[p-p]; output impedance: 1 K Ω, ±10%
Audio Output	1 audio output interface, line level, impedance: 600 Ω
Network	
Ethernet	10Base-T/100Base-TX, RJ-45 connector
Main Stream	30 fps (1920 × 1080, 1280 × 960, 1280 × 720)
Sub Stream	30 fps (704 × 480, 352 × 240, 176 × 120)
Third Stream	30 fps (1920 × 1080, 1280 × 960, 1280 × 720, 704 × 480, 352 × 240, 176 × 120)
Image Compression	H.264/MJPEG/MPEG4, H.264 encoding with Baseline/Main/High profile
Audio Compression	G.711ulaw/G.711alaw/G.726/MP2L2/G.722/PCM
Protocols	IPv4/IPv6, HTTP, HTTPS, 802.1X, QoS, FTP, SMTP, UPnP, SNMP, DNS, DDNS, NTP, RTSP, RTP, TCP, UDP, IGMP, ICMP, DHCP, PPPoE
Simultaneous Live Views	Up to 20 users
MicroSD Memory Card	Supports up to 128 GB microSD/SDHC/SDXC card, supports Edge recording
User/Host Level	Up to 32 users, 3 levels: administrator, operator, and user
Security Measures	User authentication (ID and PW); host authentication (MAC address); IP address filtering
System Integration	
Application Programming	Open-ended API, supports ONVIF, PSIA, CGI, and ISAPI
Web Browser	IE 7+, Chrome 18+, Firefox 5.0+, Safari 5.02+, supports multi-language
RS-485 Protocols	HIKVISION, Pelco-P, Pelco-D, self-adaptive
Power	Hi-PoE and 24 VAC, maximum 60 W
Working Temperature	-40° C to 65° C (-40° F to 149° F)
Humidity	90% or less
Protection Level	IP67, IK10, TVS 4,000 V lightning protection, surge protection and voltage transient protection
Certifications	FCC, CE, UL, RoHS, IEC/EN 61000, IEC/EN 55022, IEC/EN 55024, IEC/EN60950-1
Dimensions	Φ178.3 mm × 331.0 mm (Φ7.02" × 13.03")
Weight (approximate)	~8 kg (~17.64 lbs)

Accessories

WMP-L, Wall Mount
DS-1661ZJ, Pendant Mount

DS-1602ZJ-Pole, Pole Mount
DS-1005KI, USB Joystick
DS-1602ZJ-Corner, Corner Mount
CPM-S, Ceiling Pendant Mount

DS-1602ZJ-Box, Box Mount
CPM-L, Ceiling Pendant Mount



Full HD / 1,920 x 1,080 H.264 Weather Proof Camera featuring Optical 30x zoom and Super Dynamic

Key Features

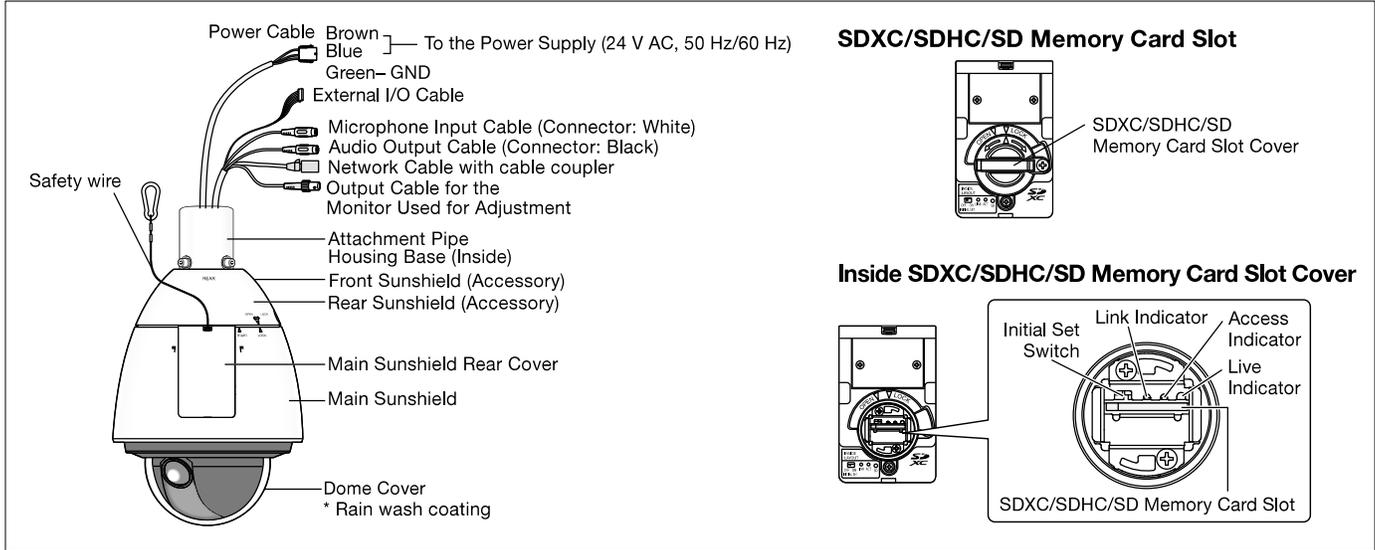
- 1080p Full HD images up to 30 fps
- Super high resolution at Full HD / 1,920 x 1,080
- Multiple H.264 (High profile) streams and JPEG streams ensure simultaneous real time monitoring and high resolution recording.
- Full frame (Up to 30 fps) transmission at 1,920 x 1080 image size
- **30x optical zoom**
90x extra optical zoom at 640x360 resolution with 12x digital zoom enabling 1080x zoom.
- **Super Dynamic** and ABS (Adaptive Black Stretch) technologies deliver 128x wider dynamic range compared to conventional cameras.
- **Face Super Dynamic** technology ensures clear face image.
- High sensitivity with Day/Night (ICR*) function :
0.15 lx (Color), 0.018 lx (B/W) at F1.6
* ICR: IR Cut filter Removal
- **VIQS** (Variable Image Quality on Specified area) technology allows the designated **2 areas** to retain higher image quality while the excluded area will have a decreased image quality, which enables to use lower image file size and bit rate.
VIQS can be set on preset position (1 to 8) and except preset.
- **Smart coding Technology : Group of Pictures (GOP) control** function removes unnecessary information from the frame for realizing efficient encoding.
GOP control can save the network bandwidth and the disk space of recorder effectively.
- Electronic sensitivity enhancement: Auto (Up to 16x) / OFF
- Selectable light control modes :
Outdoor scene / Indoor scene (50 Hz) / Indoor scene (60 Hz) / Fix shutter
Indoor scene (50 Hz / 60 Hz) : Flicker caused by fluorescent lightning will be automatically compensated.
- **360 degrees endless Panning**
- Advanced auto tracking: The camera automatically pans and tilts to follow a moving subject and keep it in the center of the image.
- PTZ control can be taken very smoothly on the user friendly GUI with 16 speeds pan/tilt and new "Drag and Zoom" operation enabling finer control. 256 speeds available for system with WV-CU950 system controller.
- Up to 256 preset positions
- 360 map shot: 8 thumbnail images at 45 deg. intervals make it simple to direct the camera easily by clicking on a thumbnail.
- Industrial grade Pan / Tilt / Zoom mechanism for high reliability
- VMD (Video Motion Detection) with 4 programmable detection areas, 15 steps sensitivity level and 10 steps detection size
- Privacy Zone can mask up to 32 private areas, such as house windows and entrances/exits.
- Camera title display: Up to 20 alphanumeric characters on the browser
- Alarm sources including 3 terminal input, VMD and Panasonic alarm command can trigger actions such as SDXC/SDHC/SD memory recording, FTP image transfer, E-mail notification, Indication on browser, Alarm terminal output, and Panasonic alarm protocol output.
- Full duplex bi-directional audio allows interactive communication between camera site and monitoring site.
- JPEG Image compression ratio can be changed by alarm so that higher quality image can be provided.
- Prioritized stream control : One of the video streams can be prioritized when multiple recorders or client PCs are accessing the camera so that the recorder or the client PC can maintain the frame rate.
- SDXC/SDHC/SD Memory card slot for manual recording (H.264 / JPEG), alarm recording (H.264 / JPEG) and backup upon network failure (JPEG)
- H.264 max. bit rate / client and Total bit rate control allows flexible network traffic management. Frame rate priority mode controls bit rate and compression ratio to provide the specified frame rate.
- Internet mode: H.264 images can be transmitted over HTTP protocol.
- Multi-language: English / Italian / French / German / Spanish / Portuguese / Russian / Chinese / Japanese
- Supports SSL, DDNS (viewnetcam, RFC2136)
- Still images (JPEG) can be viewed on mobile phones via Internet.
- IP66 rated water and dust resistant.
Compatible with IEC60529 measurement standard, Type 4x(UL50), NEMA 4x compliant.
- Dehumidification device for use in various weather conditions
- **Rain wash coat dome cover**
- Ambient Operating Temperature : -50 °C to +55 °C (-58 °F to 131 °F)
- **Fog and Sandstorm compensation**
- AEM (Auto Eyelid Mechanism) offers images that are more natural and easy to watch reducing doubled images when direction of the lens moved above the horizontal.

Specifications Appendix C: Datasheets of Deployed Sensors and Devices

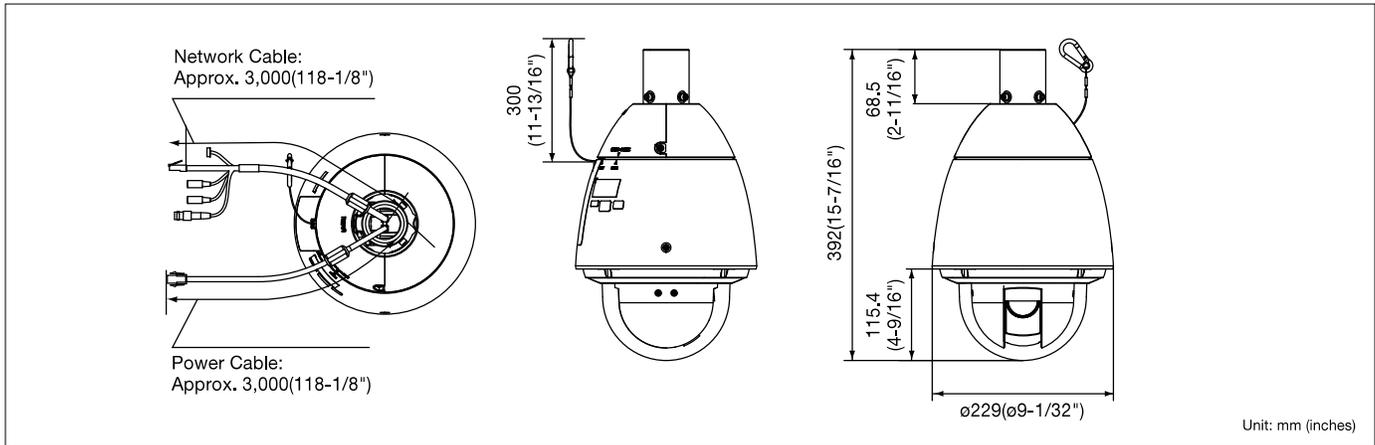
Camera	Image Sensor	Approx.1/3 type MOS image sensor	
	Scanning Mode	Progressive scan	
	Scanning Area	5.35 mm (H) x 3.34 mm (V) {7/32 inches(H) x 1/8 inches(V)}	
	Minimum Illumination	Color : 0.15 lx, BW: 0.018 lx (F1.6, Auto slow shutter : Off (1/30s), Gain: On(High)) Color : 0.009 lx, BW 0.001 lx (F1.6, Auto slow shutter : Max. 16/30s, Gain: On(High)) ^{*1}	
	White Balance	AWC (2,000 - 10,000 K), ATW1 (2,700 - 6,000 K), ATW2 (2,000 - 6,000 K)	
	Light Control Mode	Outdoor scene : Automatic integration of ALC and ELC Indoor scene [50 Hz] : Automatic integration of ALC and ELC (up to 1/100 s) Indoor scene [60 Hz] : Automatic integration of ALC and ELC (up to 1/120 s) Fix shutter	
	Shutter Speed	Fix shutter : 1/30, 3/100, 3/120, 2/100, 2/120, 1/100, 1/120, 1/250, 1/500, 1/1,000, 1/2,000, 1/4,000, 1/10,000	
	Super Dynamic	On / Off	
	Face Super Dynamic	On / Off	
	Dynamic Range	105 dB typical (Super Dynamic : On, Light Control mode : Indoor) [*] Theoretical value, Conventional measuring method : 52 dB	
	Adaptive Black Stretch	On / Off	
	Fog compensation	On / Off (Super Dynamic and Adaptive black stretch : Off)	
	Gain(AGC)	On (High) / On (Mid) / On (Low) / Off	
	Auto slow shutter	Off (1/30 s), max. 2/30 s, max. 4/30 s, max. 6/30 s, max. 10/30 s, max. 16/30 s	
	Day/Night (ICR)	Mode : AUTO1 / AUTO2 / AUTO3 / On / Off Level : High / Low, with external control	
	Digital Noise Reduction	High / Low	
	Video Motion Detection	4 areas, Sensitivity : 15 steps, Detection size : 10 steps	
	Privacy Zone	Gray / Mosaic / Off (up to 32 zones available)	
	Image Stabilizer	On / Off	
	VIQS	On / Off Up to 2 zones at preset position 1-8 and except preset	
Double Image Reduction	On / Off		
Camera Title (OSD)	On / Off Up to 20 characters (alphanumeric characters, marks)		
Focus distance	Limited(around 1.5m(4.9 ft)) / Unlimited		
Lens	Focal Length	4.3 mm - 129.0 mm {3/16 inches - 5-3/32 inches}	
	Zoom Ratio	30x / 90x with extra optical zoom (at 640 x 360)	
	Digital (Electrical) Zoom	12x (Max. 1080x combined with extra optical zoom at 640 x 360)	
	Angular Field of View	[16 : 9 mode] Horizontal : 2.6 ° (TELE) - 63 ° (WIDE) Vertical : 1.5 ° (TELE) - 37 ° (WIDE) [4 : 3 mode] Horizontal : 1.9 ° (TELE) - 46 ° (WIDE) Vertical : 1.5 ° (TELE) - 37 ° (WIDE)	
Maximum Aperture Ratio	1 : 1.6 (WIDE) - 4.7 (TELE)		
Focusing Range	2.0 m - ∞		
Aperture Range	F1.6 - Close		
Pan and Tilt	Panning Range	360° endless	
	Panning Speed	Manual : approx. 0.065°/s - 120°/s, Up to 256 steps (depending on the controller) Preset : up to approx. 300°/s	
	Tilting Range	-15° to 195° (upward-level-downward) Auto Eyelid Mechanism (Double image reduction) Selectable tilting angle : 10 ° / 5 ° 3 ° / 0 ° * 2 / -3 ° * 2 / -5 ° * 2 / -10 ° * 2 / -15 ° * 2	
	Tilting Speed	Manual : approx. 0.065°/s to 120°/s, Up to 256 steps (depending on the controller) Preset : up to approx. 300°/s	
	Proportional Pan/Tilt Control	Yes	
	Number of Preset Positions	256	
	Auto Mode	Auto track / Auto pan / Preset sequence / 360 map-shot / Patrol	
	Image Hold	On / Off	
	Camera position display	Off / Pan-Tilt degree · Zoom ratio display / Direction display	
	Self Return	10 s / 20 s / 30 s / 1 min / 2 min / 3 min / 5 min / 10 min / 20 min / 30 min / 60 min	
	Map Shot	360° map shot / preset map shot	
	Browser GUI	Camera Control	Pan/Tilt (256 steps), Zoom, Focus, Click centering, Drag zoom, Iris, Preset position call and program, Auto mode
Display Mode		Spot, Quad: Image from 16 cameras can be displayed in 4 different Quad screens or 16 split screens (JPEG only), 20 characters camera title available.	
Camera Title		Up to 20 alphanumeric characters	
Clock Display		Time : 12H/24H, Date : 5 formats on the browser, Summer time (Manual)	
Alarm Control		Reset	
One Shot Capture		A still picture will be displayed on a newly opened window.	
Audio		Mic (Line) Input : On / Off Volume adjustment : Low / Middle / High Audio Output : On / Off Volume adjustment : Low / Middle / High	
SD Memory Data Download		Still or motion Images recorded in the SDXC/SDHC/SD memory card can be downloaded.	
GUI/Setup Menu Language		English / Italian / French / German / Spanish / Portuguese / Russian / Chinese / Japanese	
System Log		Up to 100 (Internal) Up to 4,000 (SDXC/SDHC/SD memory when the recording format is set to JPEG.) error logs	
Supported OS ³		Microsoft® Windows® 10, Microsoft® Windows® 8.1 Microsoft® Windows® 8, Microsoft® Windows® 7 Microsoft® Windows Vista®	
Supported Browser		Windows® Internet Explorer® 11 (32 bit) Windows® Internet Explorer® 10 (32 bit) Windows® Internet Explorer® 9 (32 bit) Windows® Internet Explorer® 8 (32 bit) Windows® Internet Explorer® 7 (32 bit)	
Network	Network IF	10Base-T / 100Base-TX, RJ45 connector	
	Image Resolution	• 2 mega pixel [16 : 9] (30 fps mode) 1,920 x 1,080 / 640 x 360 / 320 x 180	
	H.264 JPEG (MJPEG)	• 1.3 mega pixel [16 : 9] (30 fps mode) 1,280 x 720 / 640 x 360 / 320 x 180 • 1.3 mega pixel [4 : 3] (30 fps mode) 1,280 x 960 / VGA(640 x 480) / QVGA(320 x 240)	
	H.264 ⁴	Transmission Mode	Constant bit rate / Variable bit rate / Frame rate priority / Best effort / Advanced VBR
		Frame Rate	1 / 3 / 5 / 7.5 / 10 / 12 / 15 / 20 / 30 fps
		Bit Rate/Client	64 / 128 / 256 / 384 / 512 / 768 / 1,024 / 1,536 / 2,048 / 3,072 / 4,096 / 6,144 / 8,192 / 10,240 / 12,288 / 14,336 kbps
		Image Quality	Low / Normal / Fine
		Smart Coding mode	On (Low / Mid / High) / Off (Only when "Variable bit rate" is selected.)
	JPEG	Refresh Interval	0.2 / 0.25 / 0.33 / 0.5 / 1 / 2 / 3 / 4 / 5 s
		Transmission Type	Unicast / Multicast
		Image Quality	0 SUPER FINE / 1 FINE / 2 / 3 / 4 / 5 NORMAL / 6 / 7 / 8 / 9 LOW (10 steps: 0-9)
	Audio Compression	G.726 (ADPCM) 32 kbps / 16 kbps, G.711 64 kbps, AAC ⁵	
Audio Mode	Off / Mic (Line) input / Audio output / Interactive (Half duplex) / Interactive (Full duplex)		
Authentication for Audio	Level 1 only / Level 2 higher / All users		
Total Bit Rate	64 / 128 / 256 / 384 / 512 / 768 / 1,024 / 2,048 / 4,096 / 8,192 kbps / Unlimited		

Network	Supported Protocol	IPv6: TCP/IP, UDP/IP, HTTP, HTTPS, RTP, FTP, SMTP, DNS, NTP, SNMP, DHCPv6, ICMP, ARP IPv4: TCP/IP, UDP/IP, HTTP, HTTPS, RTSP, RTP, RTP/RTCP, FTP, SMTP, DHCP, DNS, DDNS, NTP, SNMP, UPnP, IGMP, ICMP, ARP
	FTP Client	Alarm image transmission, FTP periodic transmission (When the FTP transmission is failed, backup on an optional SDXC/SDHC/SD memory card is available.)
Alarm	No. of Simultaneous Users	Up to 14 users (Depends on network conditions)
	SDXC/SDHC/SD Memory Card (Option)	H.264 recording (Audio recording is enable): Manual REC / Alarm REC(Pre/Post) / Schedule REC / Backup upon network failure JPEG recording: Manual REC / Alarm REC (Pre/Post) / Backup upon network failure Compatible SD (SDHC/SDXC) card: Panasonic 2 GB, 4 GB*, 8 GB*, 16 GB*, 32 GB*, 64 GB**, 128 GB** model *SDHC card, ** SDXC card (except miniSD card and microSD card)
Input/ Output	Cellular Phone Compatibility	JPEG image, panning / tilting / zoom / focus control, AUX control (by access level)
	Mobile Terminal Compatibility	iPad, iPhone, iPod touch (iOS 4.2.1 or later) Android™ mobile terminals
Alarm	Alarm Source	3 terminals input, VMD, Command alarm, Sound detection
	Alarm Actions	SDXC/SDHC/SD memory recording, E-mail notification, Indication on browser, FTP image transfer, Panasonic protocol output
Alarm	Alarm Log	With SDXC / SDHC / SD memory card: 5,000 logs, without SDXC / SDHC / SD memory card: 1,000 logs
	Schedule	Alarm / VMD / Access permission / H.264 recording / Sound detection
Input/ Output	Monitor Output (for adjustment)	VBS : 1.0 V(p-p) / 75 Ω, NTSC / PAL composite, BNC Jack
	Microphone/Line Input	MIC IN and Line IN are selectable. ø3.5 mm monaural mini jack (Applicable microphone: Plug-in power type) Supply voltage: 2.5 V ±0.5 V Input impedance: approx. 2 kΩ
Input/ Output	Audio Output	ø3.5 mm stereo mini jack (monaural output) Line level
	External I/O Terminals	ALARM IN 1 (DAY/NIGHT IN), ALARM IN 2 (ALARM OUT), ALARM IN 3 (AUX OUT)
General	Safety/EMC Standard	<Safety> UL (UL60950-1), C-UL (CAN/CSA C22.2 No.60950-1), CE, IEC60950-1 <EMC> FCC Part15 Class A, ICES-003 Class A, EN55022 Class B, EN55024
	Power Source and Power Consumption	AC24 V : 3.5 A, 55 W PoE+ : DC 54V 470 mA, 25 W (IEEE802.3at compliant) Tested POE Injector (60 W) : DC 54V 1.0 A, 50 W
	Ambient Operating Temperature	AC24 V and Tested PoE Injector (60 W) : -50 °C to +55 °C (-58 °F to 131 °F) * with limitations PoE+ : -30°C to +55°C (-22 °F to 131 °F)
	Ambient Operating Humidity	10 % to 90 % (no condensation)
	Shock resistance	Compliant with IK10 (IEC62262)
	Water and Dust Resistance	IP66 rated water and dust resistant. Compatible with IEC60529 measurement standard, Type 4x(UL50), NEMA 4x compliant.
	Dimensions	ø229 mm x 392 mm(H) {ø9-1/32 inches x 15-7/16 inches(H)} diameter of the dome 160 mm(6-5/16 inches)
	Mass (approx.)	Approx. 5.0 kg { 11.02 lbs}
	Finish	Main body : Aluminum die cast, Natural silver Sunshields : ASA resin coating, Natural silver Dome section : Clear polycarbonate resin

*1 Converted value
 *2 If "0 °", "-3 °", "-5 °", "-10 °", or "-15 °" is selected, the area hidden by the camera housing may increase when the tilt angle of the camera is almost level. When "-15 °" is selected for "Tilt Angle", the upper half of images will be hidden.
 *3 For further information about PC system requirements and precautions for when using Microsoft® Windows® 10, Microsoft® Windows® 8.1, Microsoft® Windows® 8, Microsoft® Windows® 7, Microsoft® Windows Vista®, or Windows® Internet Explorer®, click "Manual" - "Open" from the supplied CD-ROM and refer to "Notes on Windows® / Internet Explorer® versions".
 *4 Transmission for 2 streams can be individually set.
 *5 When recording audio on an SD memory card, only AAC-LC (Advanced Audio Coding - Low Complexity) is used.



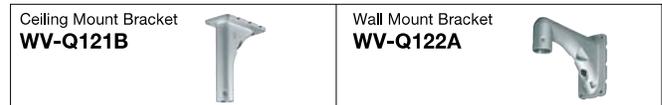
Appearance



Standard Accessories

- Installation Guide.....1 pc.
 - CD-ROM*11 pc.
 - Code Label*21 pc.
- The followings are for installation.
- Protection Cover1 pc.
 - Cable coupler (used with the network cable) 1 pc.
 - 8P Alarm Cable..... 1 pc.
 - 24 V AC power supply connector kit 1 pc.
 - Front/Rear Sun Shield..... 1 set
 - Front/Rear Sun Shield Fixing Screws..... 2 pcs. (incl. 1 spare)
- *1 The CD-ROM contains the operating instructions (PDFs) and different kinds of tool software programs.
 *2 This label may be required for network management. The network administrator shall retain the code label.

Optional Accessories



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- Microsoft, Windows, Windows Vista, Windows Media, Internet Explorer, and ActiveX are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
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Important

- Safety Precaution: Carefully read the Installation Guide and operating instructions before using this product.
- Panasonic cannot be responsible for the performance of the network and/or other manufacturers' products used on the network.

• Masses and dimensions are approximate.
 • Specifications are subject to change without notice.

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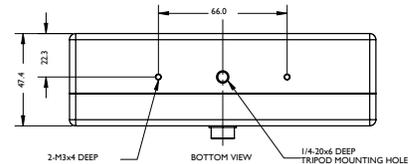
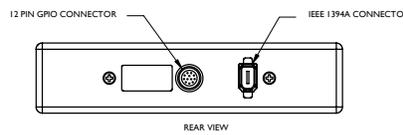
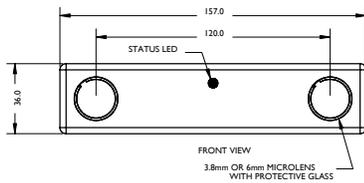
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FLIR BUMBLEBEE[®] 2 1394a



PRE-CALIBRATED AGAINST DISTORTION AND MISALIGNMENT

The Bumblebee@2 stereo vision camera provides a balance between 3D data quality, processing speed, size and price. Developed as a drop-in replacement for the original Bumblebee camera, the Bumblebee2 also features increased frame rate and a GPIO connector for external trigger and strobe functionality.

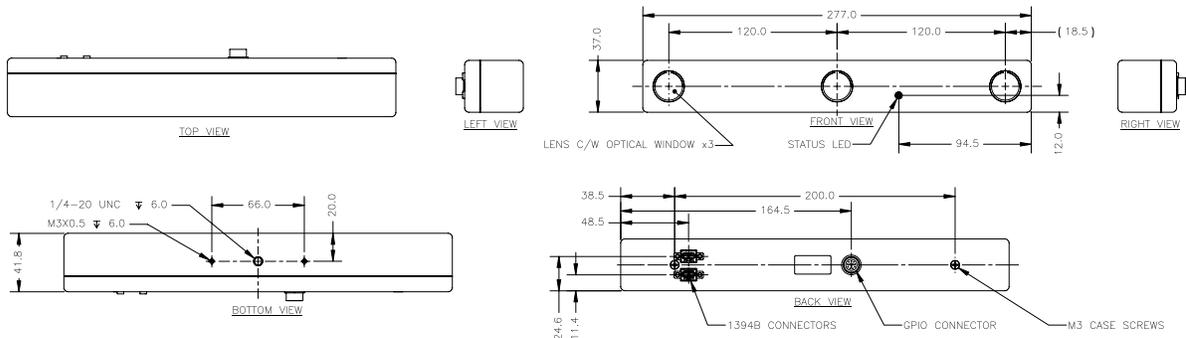


FLIR BUMBLEBEE[®] XB3 1394b



PRE-CALIBRATED + MULTI-BASLINE + 3 SENSORS

The Bumblebee® XB3 is a 3-sensor multi-baseline IEEE-1394b (800Mb/s) stereo camera designed for improved flexibility and accuracy. It features 1.3 mega-pixel sensors and has two baselines available for stereo processing. The extended baseline and high resolution provide more precision at longer ranges, while the narrow baseline improves close range matching and minimum-range limitations.



Specification	BB2-03S2	BB2-08S2	BBX3
Image Sensor Type	Sony® 1/3" progressive scan CCD		
	ICX424 (648x488 max pixels)	ICX204 (1032x776 max pixels)	ICX445 (1280x960 max pixels)
	7.4µm square pixels	4.65µm square pixels	3.75µm square pixels
Baseline	12 cm		12 cm and 24 cm
Focal Lengths	2.5mm with 97° HFOV (BB2 only) or 3.8mm with 66° HFOV or 6mm with 43° HFOV		
Aperture	f/2.0 (2.5mm and 3.8mm focal length), f/2.5 (6.0mm focal length)		
A/D Converter	12-bit analog-to-digital converter		
White Balance	Automatic / Manual (Color model)		Manual (Color model)
Frame Rates	48 FPS	20 FPS	16 FPS
Interfaces	6-pin IEEE-1394a for camera control and video data transmission 4 general-purpose digital input/output (GPIO) pins		2 x 9-pin IEEE-1394b for camera control and video data transmit 4 general-purpose digital input/output (GPIO) pins
Voltage Requirements	8-30V via IEEE-1394 interface or GPIO connector		
Power Consumption	2.5W at 12V		4W at 12V
Gain	Automatic/Manual		
Shutter	Automatic/Manual, 0.01ms to 66.63ms at 15 FPS		
Trigger Modes	DCAM v1.31 Trigger Modes 0, 1, 3, and 14		DCAM v1.31 Trigger Modes 0, 1, 3, and 14
Signal To Noise Ratio	60dB		54dB
Dimensions	157 x 36 x 47.4mm		277 x 37 x 41.8mm
Mass	342 grams		505 grams
Camera Specification	IIDC 1394-based Digital Camera Specification v1.31		
Lens mount	2 x M12 microlens mount		3 x M12 microlens mount
Emissions Compliance	Complies with CE rules and Part 15 Class A of FCC Rules		
Operating Temperature	Commercial grade electronics rated from 0° to 45°C		
Storage Temperature	-30° to 60°C		

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FLIR GRASSHOPPER[®]3 GIGE VISION

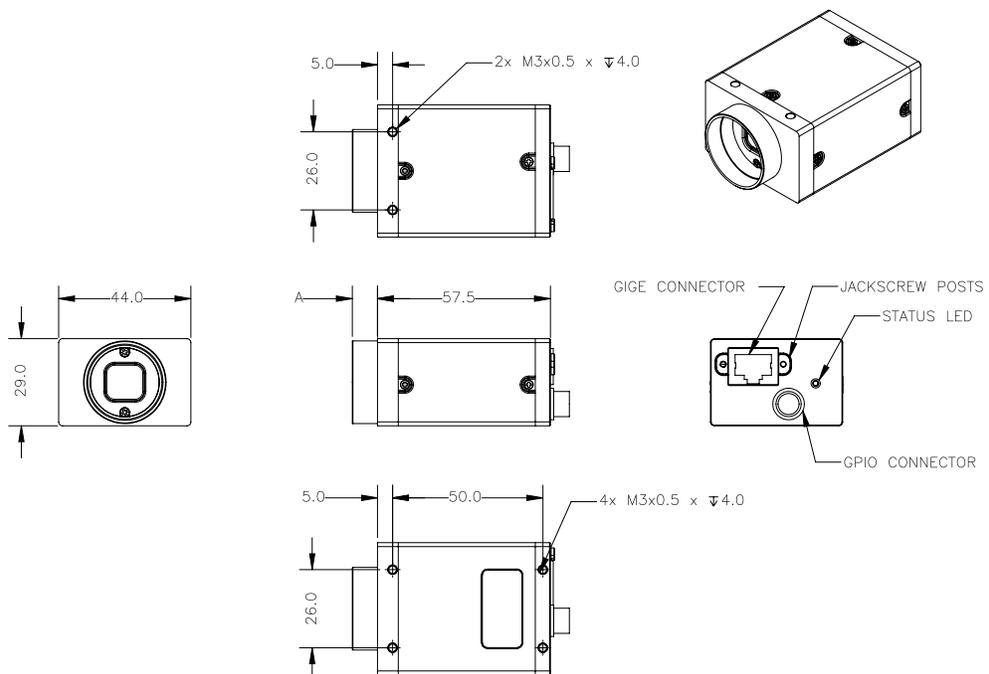


HIGH PERFORMANCE CCD + CMOS

The Grasshopper3 GIGE POE camera line combines large format, high resolution, CCD and CMOS sensors, with the flexible capabilities of GigE Vision and Power over Ethernet for optimal imaging performance and long cable length. It is ideal for a wide variety of demanding applications including flat panel inspection, 3D measurement, ophthalmology, life sciences and intelligent traffic systems.

KEY FEATURES

- Large format sensors for exceptional imaging performance
- Power Over Ethernet for simplified setup and maintenance
- FPGA and frame buffer-based architecture for optimal reliability



Model	Version	MP	Imaging Sensor
GS3-PGE-23S6C-C GS3-PGE-23S6M-C	Color Mono	2.3 MP	<ul style="list-style-type: none"> ■ Sony IMX174, 1/1.2", 5.86 μm ■ Global shutter ■ 45 FPS at 1920 x 1200
GS3-PGE-50S5C-C GS3-PGE-50S5M-C	Color Mono	5.0 MP	<ul style="list-style-type: none"> ■ Sony ICX625, 2/3", 3.45 μm ■ Global shutter ■ 15 FPS at 2448 x 2048
GS3-PGE-60S6C-C GS3-PGE-60S6M-C	Color Mono	6.0 MP	<ul style="list-style-type: none"> ■ Sony ICX694, 1", 4.54 μm ■ Global shutter ■ 13 FPS at 2736 x 2192
GS3-PGE-91S6C-C GS3-PGE-91S6M-C	Color Mono	9.1 MP	<ul style="list-style-type: none"> ■ Sony ICX814, 1", 3.69 μm ■ Global shutter ■ 9 FPS at 3376 x 2704
GS3-PGE-91QS6C-C GS3-PGE-91QS6M-C	Color Mono	9.1 MP	<ul style="list-style-type: none"> ■ Sony ICX814, 1", 3.69 μm ■ Global shutter ■ 18 FPS at 3376 x 2704

Imaging Performance (EMVA 1288)	See the Imaging Performance Specification , which includes quantum efficiency, saturation capacity (full well depth), read noise, dynamic range and signal to noise ratio.
A/D Converter	14-bit (10- and 12-bit GS3-PGE-23S6)
Video Data Output	8, 12, 16 and 24-bit digital data
Image Data Formats	Mono8, Mono12, Mono16 (all models) RGB, YUV411, YUV422, YUV444, Raw8, Raw12, Raw16 (color models)
Partial Image Modes	Pixel binning and region of interest (ROI) modes
Image Processing	Gamma, lookup table, hue, saturation, and sharpness
Shutter	Global shutter; Automatic/manual/one-push/extended shutter modes See product webpage for specific model's range
Gain	Automatic/manual/one-push modes See product webpage for specific model's range
Gamma	0.50 to 4.00, programmable lookup table
White Balance	Automatic/manual/one-push modes
High Dynamic Range	Cycle 4 gain and exposure presets
Color Processing	On-camera in YUV or RGB format, or on-PC in Raw format
Digital Interface	Gigabit Ethernet interface with screw locks for camera control, data, and power; Power over Ethernet
Transfer Rates	10/100/1000 Mbit/s
GPIO	8-pin Hirose HR25 GPIO connector for power, trigger, strobe, PWM, and serial I/O, 1 opto-isolated input, 1 opto-isolated output, 2 bi-directional I/O pins
External Trigger Modes	Standard, bulb, low smear (CCD models), overlapped, and multi shot trigger modes
Image Buffer	128 MB frame buffer
Memory Channels	2 user configuration sets for custom camera settings
Flash Memory	2 MB non-volatile memory
Dimensions	44 mm x 29 mm x 58 mm excluding lens holder, without optics (metal case)
Mass	90 grams (without optics or tripod mounting bracket)
Power Consumption	Power over Ethernet; <4.7 W
Machine Vision Standard	GigE Vision v1.2
Camera Control	Via FlyCapture SDK or third party software
Camera Updates	In-field firmware updates
Lens Mount	C-mount
Temperature	Operating: 0° to 50°C; Storage: -30° to 60°C
Humidity	Operating: 20 to 80% (no condensation); Storage: 20 to 95% (no condensation)
Compliance	CE, FCC, KCC, RoHS
Operating System	Windows, Linux (32- or 64-bit)
Warranty	3 years

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3. RFID

BlueWave Bluetooth Smart Gateway Family

Bluetooth Low Energy Cloud Gateway Reader/Observer for Beacon & iBeacon with CPU & I/O



Highlight

- ❖ Elegant, small size, easy installation, low cost & intelligent Bluetooth Smart Cloud Gateway.
- ❖ Read/Write Beacon & iBeacon Tag. On Board Web Server.
- ❖ Host Interfaces: Ethernet / Wi-Fi / Mobile GPRS quadband. RTC. CPU & I/O
- ❖ IoT & Active RFID application. Real Time Location System & Indoor Positioning System.
- ❖ Market sector: Public Utilities, Security, Sanity, Logistic, Retail, Fashion, etc...
- ❖ Inventory, track & trace for people, animals & goods, etc...

Powered by RFID Global

Technical Data

BW-BLEG - BlueWave BLE Beacon Gateway Family

- ⌘ **BW-BLEG-D-E** BlueWave Bluetooth Smart Gateway Desktop Ethernet
- ⌘ **BW-BLEG-D-W** BlueWave Bluetooth Smart Gateway Desktop Wi-Fi
- ⌘ **BW-BLEG-D-M** BlueWave Bluetooth Smart Gateway Desktop GPRS



Models	BW-BLEG-D-E	BW-BLEG-D-W	BW-BLEG-D-M
Host Communication	Ethernet RJ45 (10/100).	Wireless Ethernet 802.11 b/g/n	Mobile GPRS quadband
Housing	Desktop Case - ABS-94HB. Protection class IP40. Dimensions (HxWxD): 121.9 x 78.7 x 33 mm. Weight: About 150 g Colour: Gray with Dark Gray Rubber Sides		
Power supply	12 VDC (+/- 5 %) external power supply - included		
CPU	Low Power 16 bits, 16 MIPS, PIC 24FJ256GB206 processor Memory: 256K Flash, 96K Ram, 16Mbit Flash (for web server), 64Kbit EEPROM.		
BLE operating frequency	2,4 GHz. IEEE Standard: 802.15.1		
Bluetooth RF Antenna	Integrated ceramic antenna or SMA connector for external antenna (2 variant).		
BLE Reading Features	Anti-collision Beacons reading. Read Performance: about 80 tags per second Read Range: up to 100 meters (depending on environment, configuration, Bluetooth antenna and beacon feature).		
Data Rate & RF Power	1 Mbit/s. Security 128-bit AES. Transmit power: +3 dBm. RX sensitivity: -85dBm to -91dBm.		
Other Features	Real Time Clock/Calendar with battery. Slot for Micro SD memory card.		
Input/Output & Signal	I/O on external RJ45 (8 wire): 3 x digital input, 4 x digital output. Internal interface: 1 x buzzer, 1 x Led bicolor, 1 x I2C Interface		
Power consumption	Typical: 400 mA - Max 2 Amp		
Temperature range	Operation: -20° C up to 65° C - Storage: -20° C up to 85° C		
Standard Firmware & Reader modes	On board BLE management protocol, anti-collision, read BLE Advertising & RSSI, Lan/Internet notification mode (TCP), read/write BLE parameter, filtering on RSSI level, filtering beacons mask. Dataset: Beacon Advertising, Time, RSSI & I/O status. Trigger wake-up (2 inputs), Tag on presence (3 Outputs). Possibility of custom applications (on request)		
Configuration mode	Low-level commands, Client Application or via On Board Web Server (Internet Browser)		Pre-set in lab or Mobile SMS

Technical Data

BW-BLEG - BlueWave BLE Beacon Gateway Family

- ⌘ **BW-BLEG-WM-E** BlueWave Bluetooth Smart Gateway Industrial Wall Mount Ethernet
- ⌘ **BW-BLEG-WM-W** BlueWave Bluetooth Smart Gateway Industrial Wall Mount Wi-Fi
- ⌘ **BW-BLEG-WM-M** BlueWave Bluetooth Smart Gateway Industrial Wall Mount GPRS



Models	BW-BLEG-WM-E	BW-BLEG-WM-W	BW-BLEG-WM-M
Host Communication	Ethernet RJ45 (10/100).	Wireless Ethernet 802.11 b/g/n	Mobile GPRS quadband
Housing	Indoor & Outdoor Case - Radome Plastic (UV rating). Protection class IP67. Dimensions (HxWxD): 185 x 185 x 56 mm. Weight: About 450 g Colour: White		
Installation	Wall, Ceiling & Pole Mount. Aluminium Mounting kit included.		
Power supply	12 VDC (+/- 5 %) external power supply (not included)		
CPU	Low Power 16 bits, 16 MIPS, PIC 24FJ256GB206 processor Memory: 256K Flash, 96K Ram, 16Mbit Flash (for web server), 64Kbit EEPROM.		
BLE operating frequency	2,4 GHz. IEEE Standard: 802.15.1		
Bluetooth RF Antenna	Integrated ceramic antenna.		
BLE Reading Features	Anti-collision Beacons reading. Read Performance: about 80 tags per second Read Range: up to 100 meters (depending on environment, configuration, Bluetooth antenna and beacon feature).		
Data Rate & RF Power	1 Mbit/s. Security 128-bit AES. Transmit power: +3 dBm. RX sensitivity: -85dBm to -91dBm.		
Other Features	Real Time Clock/Calendar with battery. Slot for Micro SD memory card.		
Input/Output & Signal	I/O on external connector: 2 x digital input, 2 x Output Relè max. 24 V DC / 1 A. Internal interface: 1 x buzzer, 1 x Led bicolor, 1 x I2C Interface.		
Power consumption	Typical: 400 mA - Max 2 Amp		
Temperature range	Operation: -25° C up to 65° C - Storage: -25° C up to 85° C		
Standard Firmware & Reader modes	On board BLE management protocol, anti-collision, read BLE Advertising & RSSI, Lan/Internet notification mode (TCP), read/write BLE parameter, filtering on RSSI level, filtering beacons mask. Dataset: Beacon Advertising, Time, RSSI & I/O status. Trigger wake-up (2 inputs), Tag on presence (3 Outputs). Possibility of custom applications (on request)		
Configuration mode	Low-level commands, Client Application or via On Board Web Server (Internet Browser)		Pre-set in lab or Mobile SMS

Beacon Family

BlueWave Beacon Tag Family

Beacon Tag Bluetooth Low Energy Active RFID & IPS (Indoor Positioning System zones method) application



- 📶 **GT-RNB-BLE** Round Beacon Tag Bluetooth Low Energy
- 📶 **GT-KFB-BLE** Keyfob Beacon Tag Bluetooth Low Energy
- 📶 **GT-KFBS-BLE** Keyfob Square Beacon Tag Bluetooth Low Energy
- 📶 **GT-CRB-BLE** Cubic-Rugged Beacon Tag Bluetooth Low Energy
- 📶 **GT-CSB-BLE** Cubic-S Beacon Tag Bluetooth Low Energy
- 📶 **GT-STK-BLE** Sticker Beacon Tag Bluetooth Low Energy
- 📶 **GT-STKC-BLE** Circular Sticker Beacon Tag Bluetooth Low Energy

Technical Data

	RNB-BLE	KFB-BLE	KFBS-BLE	CRB-BLE	CSB-BLE	STK-BLE	STKC-BLE
Common Feature	Operation Frequency: 2,4 GHz. IEEE Standard: 802.15.1 (Bluetooth 4.0 Low Energy BLE). Design to operate with iOS 7.0 and Android 4.3+ systems. Broadcasting interval: 100ms to 10000 ms. (step of 100ms). Transmission power range: -30dBm to +4dBm. Replaceable battery. Operating Temperature: -25°C to +50°C.						
Chipset	nRF51822	nRF51822	DA14580	nRF51822	nRF51822	DA14580	DA14580
Reading distance	up to 50 mtr	up to 50 mtr	up to 50 mtr	up to 150 mtr	up to 100 mtr	up to 50 mtr	up to 60 mtr
Dimension	Ø36 x 16 mm.	61x39x15 mm.	32x32x6 mm.	72x45x22 mm.	60x36x15 mm.	32x23x3,3 mm.	Ø26 x 5 mm.
Mounting System	Adhesive 3M 467	Hole. Optionally keychain	Hole. Optionally keychain	Two rivet holes & 3M adhesive	3M VHB adhesive	3M VHB adhesive	3M VHB adhesive
Class Protection	IP67	IP65	IP54	IP67	IP67	--	--
Battery / Life time (*)	CR2477 1000mAh / up to 18 months	CR2477 1000mAh / up to 18 months	CR2025 / up to 8 months	2pcs AA (not included) / up to 3 years	2 x CR2477 / up to 2 years	CR2016 / up to 6 months	CR2016 / up to 6 months
Other		Button ON/OFF. LED			Red Led low battery		

(*) depends on environment, interval and transmission power



GT-RNB-BLE



GT-KFB-BLE



GT-KFBS-BLE



GT-CRB-BLE



GT-CSB-BLE



GT-STK-BLE



GT-STKC-BLE

Scenarios

BlueWave Bluetooth Smart Family



- ❖ Access control (vehicle & person)
- ❖ Home Automation & Building Management (hospitality, company etc.)
- ❖ Process Automation & Monitoring
- ❖ Maintenance
- ❖ Safety (e.g. in hospital, construction site)
- ❖ Asset & Facility Management: traceability, positioning, monitoring, sensor management (asset & people)
- ❖ Smart City: transportation, ticketing, waste management, citizen service, parking
- ❖ Tourism and Leisure: museum, exhibition, village & resort, amusement park etc.



About us

RFID Global by Softwork is Value Added Distributor (VAD) of RFID, NFC & BLE Technologies, targeting resellers named Channel Partner. The production of its own customized devices thanks to the R&D Dept., the experience gained in such field by a team of project managers and by a network of certified resellers guarantee RFID leadership all over Italy and in the different application areas.

Bluetooth® Low-Energy Proximity Beacon

General Description

The **EMBC01** is a Bluetooth Low-Energy proximity beacon suitable for mass deployment by system integrators. The **EMBC01** advertises ID data that is compatible with common beacon standards (UUID, Major ID, and Minor ID). The **EMBC01** is part of the **coin-cell** family of beacons which come in a small, weatherproof enclosure, using a standard coin-cell battery, or as a PCB panel. A push-button with LED feedback can be used to select the right operating mode for your deployment. The EMBC01 operating modes offer tradeoffs between the best performance, range, and battery lifetime.

The push-button can be used to cycle through different beaconing modes. Modes for high performance and long battery life are available. The modes are:

- Sleep Mode with over 7 years of shelf life typical
- ID Short Range Mode offers 100ms beacon interval, 15m range line-of-sight (LOS), and 1.5 months of battery life typical
- ID Medium Range Mode offers 500ms beacon interval, 30m range, and 7.5 months of battery life typical
- ID Long Range Mode offers 1s beacon interval, 75m range, and 12.5 months of battery life typical
- Any mode can be locked for final deployment

The EMBC01 can be delivered in any quantity with guaranteed unique ID numbers. A unique serial number is printed on the label and encoded in a QR code for optical scanning.

Unlike most other beacons on the market today, the EMBC01 can't be wirelessly hacked. The beacons come pre-programmed with a uniquely defined UUID, Major ID, and Minor ID and cannot be re-programmed wirelessly.

The EMBC01 can be customized for individual deployments with the Proximity Beacon Development Kit. The DVK contains a programmer interface board, cable, and 5 proximity beacons for re-programming. The RLink and RLink-Pro programming tools are available separately.

The EMBC01 is FCC, IC, and CE certified, RoHS, Reach, and halogen free compliant.



Figure 1: The EMBC01 front and back views

Features

- **Weatherproof Enclosure**
 - IP-64 rating, -20C to +60C operating range
 - Size: 30mm x 10mm disk; Weight: 7 grams
 - Replaceable CR2032 3V Li battery
 - Integrated push-button with LED indicators
 - PCB-only format also available
- **Accessories**
 - Wall-mount
 - Key-fob
 - Wrist-band
- **Selectable ID Mode beaconing**
 - ID packet format includes:
 - UUID, Major ID, and Minor ID
 - Output power information
 - Short Range: 15m LOS, 100ms beacon interval
 - Medium Range: 30m LOS, 500ms beacon interval
 - Long Range: 75m LOS, 1 second beacon interval
- **Unique Identification**
 - UUID:
 - 699EBC80-E1F3-11E3-9A0F-0CF3EE3BC012
 - Unique Major and Minor IDs (serialized)
 - Unique Serial Number
 - Serial number, Major/Minor ID embedded in QR Code for deployment

“EMBC Finder” Smart Device App

- (Formerly called “emBeacon”)
- iOS App available on App Store
 - iPhone® 4S and above
 - iPad® 3 and above (Mini, Air, etc.)
- Android App available on Google Play™
 - 4.3 and newer devices

Applications

- Customer Experience Enhancement
 - Stores, Malls, Airports
 - Museums, Theme Parks, Sports Arenas
 - Conferences, Exhibits, Festivals
- Proximity, Electronic Leash Applications
- Push Notifications, Alerts
- Passive data collection
- Battery, sensor, push-button monitoring using the DVK



Figure 2: The EMBC01 with the wall-mount, key-fob, and wrist-band accessory options

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1. GENERAL DESCRIPTION

The EMBC01 is a 2.4 GHz RF electronic beacon with:

- Proximity capability, compatible with most common beacon standards

The EMBC01 is low-cost and designed for mass-production

The EMBC01 has selectable performance modes:

- 15m typical line-of-site range with 100ms beacon intervals and 1.5 months of battery life
- 30m typical line-of-site range with 500ms beacon intervals and 7.5 months of battery life
- 75m typical line-of-site range with 1s beacon intervals and 12.5 months of battery life

The EMBC01 achieves a long battery life:

- Replaceable CR2032 Li 3V battery
- 7 years storage life

The EMBC01 is small and lightweight:

- 30mm diameter x 10mm disk
- 7 grams

The EMBC01 includes:

- A white plastic enclosure
- A push button for mode changes
- A green and red LED for user feedback
- A permanent label with a unique serial number and QR Code

The EMBC01 is usable over most normal operating conditions:

- -20 to +60 C
- Weather proof (IP-64 rating)

The EMBC01 is certified:

- Environmental: RoHS, REACH, Halogen Free
- RF: FCC, IC, CE

The EMBC01 is compatible:

- With Bluetooth Smart Ready Devices
- With most common beacon standards

The EMBC01 has optional accessories:

- Wall-mount
- Key-fob
- Wrist-band

The EMBC01 is customizable:

- Development kit available
- Adjustable parameters (packet type and contents, UIDs, beacon interval, power level)
- Modifiable firmware
- Added sensors (requires PCB and firmware modifications using the DVK)
- Added RFID tag (NFC, UHF, etc.)

The EMBC01 comes with EMBC Finder, a free smart phone and tablet application for:

- iOS (iPhone 4S and above, iPad 3 and above)
- Android (4.3 and newer devices)

2. OPERATING AND STORAGE CONDITIONS

The operating and storage conditions are listed in Table 1.

Table 1: Operating and storage conditions

Module operating temperature and humidity range	-20°C to 60°C and 0 to 90% RH
Weatherproof	Module can be used in outdoor conditions. It is rated IP64 according to CEI 60529.
Module storage temperature and humidity range	Modules must be stored in original EM packing at Temp=25°C±10°C / RH≤70%.

3. PRODUCT OUTLINE DIMENSIONS

3.1. EMBC01 FINISHED PRODUCT

The EMBC01 finished product outline dimensions are shown in Figure 3.

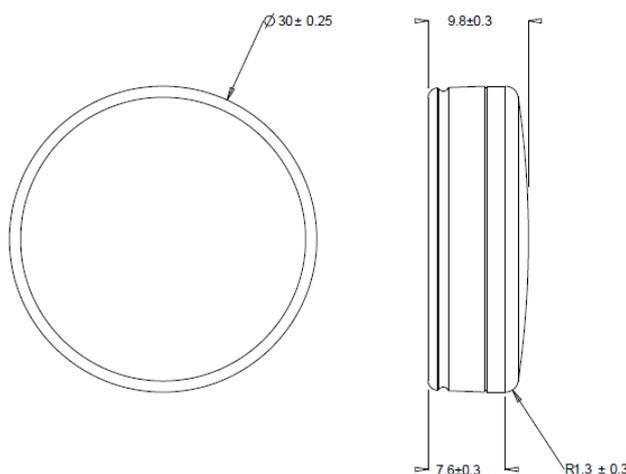


Figure 3: EMBC01 finished product outline dimensions

3.2. EMBC01 PCB PANEL

The EMBC01 is also available in PCB panel format. The PCB panel dimensions are shown in Figure 4. Single board dimension after separation from panel is Ø26mm.

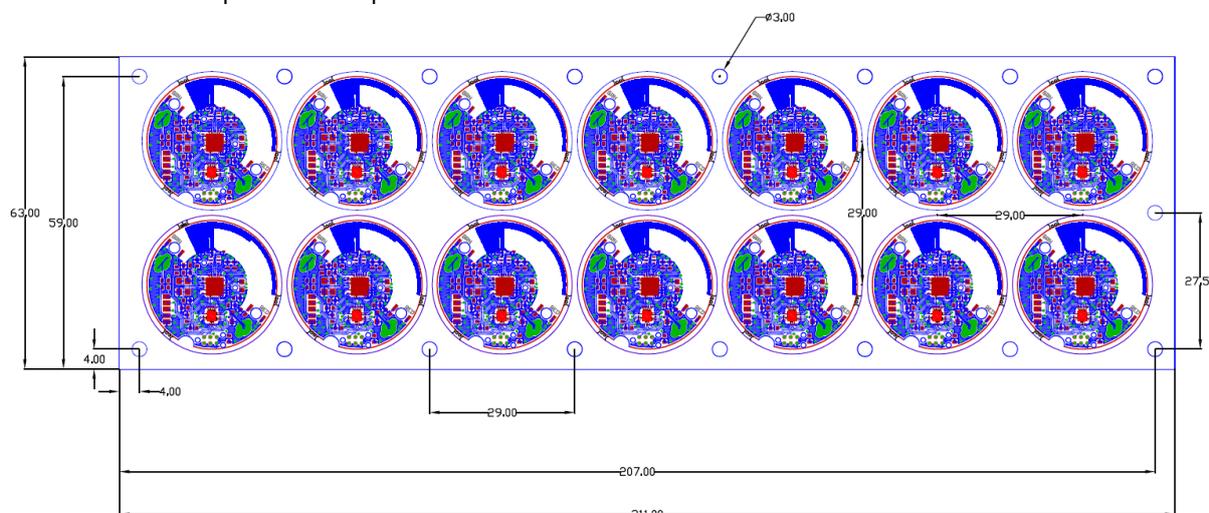


Figure 4: EMBC01 PCB Panel dimensions

The EMBC01 PCB panel is completely populated, and tested. Firmware is loaded and beacons are serialized with unique identification numbers. The good PCBs are marked with ink on the component side of the board. The PCB panel comes without battery holder, battery, or dome switch. Housings and labels are not provided.

4. MECHANICAL

4.1. PUSH BUTTON

The push button is activated with a firm press. It is designed so that it cannot be activated accidentally.

The push button is capable of short (<2 sec) and long (>2 sec) presses. Short presses are used to change modes. A long press is used to lock the present mode.

4.2. LED

The green and red LEDs are visible through the plastic enclosure under indoor lighting conditions. LEDs are used to indicate the operating mode of the beacon.

5. ELECTRICAL

Typical values are generally stated at room temperature ($T=25^{\circ}\text{C}$) with a supply voltage of $v_{\text{CC}}=3.0\text{V}$.

5.1. HANDLING PROCEDURES AND ABSOLUTE MAXIMUM RATINGS

This device has built-in protection against high static voltages or electric fields; however, anti-static precautions must be taken as with any CMOS components. Unless otherwise specified, proper operation can only occur when all terminal voltages are kept within the specified voltage range. The absolute maximum ratings of the EMBC01 are listed in

Table 2.

Table 2: Absolute maximum ratings

Parameter	Min	Max	Unit
Supply Voltage $v_{\text{CC}} - v_{\text{SS}}$	-0.3	3.8	V

Stresses above these listed maximum ratings may cause permanent damage to the device. Exposure beyond specified operating conditions may affect device reliability or cause malfunction

5.2. GENERAL OPERATING CONDITIONS

The general operating conditions of the EMBC01 are listed in Table 3.

Table 3: General Operating Conditions

Parameter	Min	Typ	Max	Unit
Supply voltage	2.0	3.0	3.6	V
Temperature range	-20		+60	$^{\circ}\text{C}$

5.3. ELECTRICAL CHARACTERISTICS

The electrical characteristics of the EMBC01 are given in Table 4. Typical specification is at room temperature (25°C).

Table 4: Battery Life-Time and Range

Operating Mode	Specification	Min	Typ	Max	Unit
Sleep Mode	Battery Lifetime		7		years
	Average Current		0.6		μA
ID Short Range Mode	Battery Lifetime		1.6		months
	Beacon Interval		100		msec
	EM9301 Power Level 1		-14		dBm
	Average Current		192.2		μA
	Distance (range)		15		m
ID Medium Range Mode	Battery Lifetime		7.5		months
	Beacon Interval		500		msec
	EM9301 Power Level 3		-8		dBm
	Average Current		41.1		μA
	Distance (range)		30		m

Operating Mode	Specification	Min	Typ	Max	Unit
Long Range Mode	Battery Lifetime		12.4		months
	Beacon Interval		1000		msec
	EM9301 Power Level 5		0		dBm
	Average Current		24.8		μ A
	Range		75		m

Note 1: Battery Lifetime is calculated based on the average current using a Renata CR2032 battery with 225mAh of battery life under typical conditions.

Note 2: Beacon interval is the Bluetooth advertising interval (advInterval) as defined in the Bluetooth Specification V4.0, Volume 6, Part B, Section 4.4.2.2.

Note 3: Range is measured outdoors, line-of-sight, with an iPhone 4S and iPad.

5.4. REGULATORY

The EMBC01 complies with the following regulatory requirements:

5.4.1. USA-FCC

- Part 15 – General emissions
- Part 15.247:2011 – Operation within the band 2.4-2.4835GHz
- Parts 15.205 and 15.209 – Spurious emissions

5.4.2. Canada-IC

- ICES-003 – General emissions
- RSS-210:2010 – Low-power License exempt Radio Communication Devices

5.4.3. CE

EM Microelectronic, as the responsible party for regulatory compliance, declares under our sole responsibility that as delivered the described product is in conformity with the R&TTE Directive 1999/5/EC1, Commission Regulation (EC) No 1275/2008 and 278/2009, following the provisions of ERP Directive 2009/125/EC, EU RoHS Directive 2011/65/EU and carries the CE-marking.

5.4.3.1. SAFETY File

1. Information on all plastics (flame rating and UL listing) model numbers
2. Battery: Specification, UL listing, and reports from vendor (Standards are UL 1642 and IEC/EN 62133)
3. PCB Board (same info as plastics)
4. Label (same info as plastics)

5.4.4. Australia/New Zealand

- AS/NZS CISPR 22:2009+A1:2010 (tested only, but not filed)

6. FIRMWARE

The following is a basic description of the EMBC01 firmware functionality.

6.1. STATE MACHINE

The state-diagram for the EMBC01-F401 is shown in Figure 5. The firmware implements the following modes:

- Self-test
- Sleep-mode
- ID Short Range Mode
- ID Medium Range Mode
- ID Long Range Mode
- Lock Mode

Upon insertion of the battery, a self-test is performed, and the EMBC01 then enters a low-power sleep mode. On subsequent short button presses (less than 2 seconds), the green LED flashes once and iterates through ID Short Range Mode, ID Medium Range Mode, and ID Long Range Mode. On the next short button press, the red LED flashes once and then the EMBC01 enters the low power sleep mode again. Subsequent short presses iterates through these four modes again. In any state, if a long button press is performed (longer than 2 seconds), the green LED will flash twice and the EMBC01 will stay in that mode until the end of battery life.

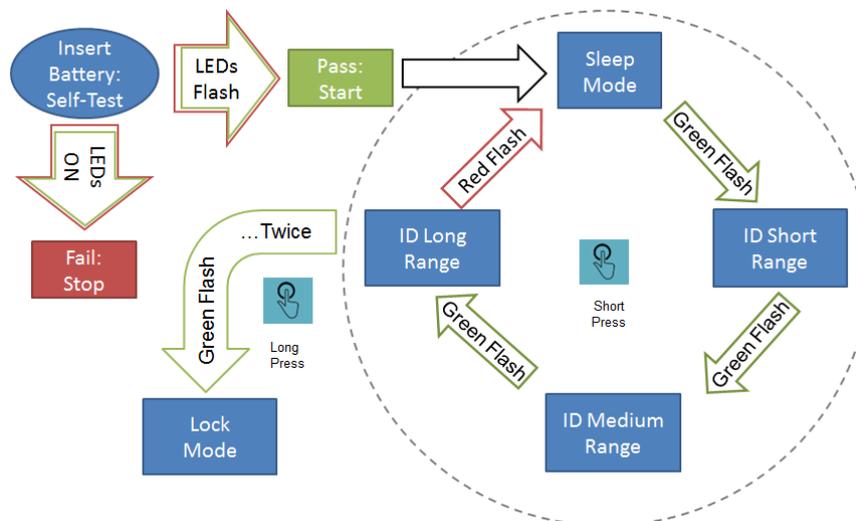


Figure 5: EMBC01 State-Diagram

6.1.1. Self-Test

The self-test function tests the following functions:

- Perform and verify a system reset
- Verify battery voltage
- Verify proper version and operation of the EM9301
- Perform calibration of the EM9301 and verify calibration results
- Transmit 10 advertising packets of Sensor Data and ID data. (Sensor Data packet formats are defined in a separate document.)

If the test passes, both LEDs will flash. If the test fails, both LEDs will turn on and remain on.

6.2. PACKET CONTENTS

The Bluetooth advertising packets are non-connectable, undirected advertising events (ADV_NONCONN_IND) which follow the GAP specification according to the Bluetooth Specification V4.0, Volume 3, Part C, Section 11.

Packets follow the definitions defined in the *EMBC Beacon Packet Specification* in the ID Data section.

6.2.1. Device Address

The first 3 octets of the device address are the EM Microelectronic OUI assigned address from the IEEE 802 committee: 0x0CF3EE.

The last 3 octets of the device address are uniquely assigned by EM Microelectronic.

6.2.2. ID Data Packet Format

The ID data packet format is described in the following specification: Proximity Beacon Specification Release R1 Draft D1, which can be obtained from Apple, Inc.

6.2.2.1. ID Data ID numbers

The following ID numbers are used:

- The UUID is: 699EBC80-E1F3-11E3-9A0F-0CF3EE3BC012
- The Major ID is a 16-bit unsigned non-zero value uniquely assigned by EM Microelectronic.
- The Minor ID is a 16-bit unsigned non-zero value uniquely assigned by EM Microelectronic.

6.2.2.2. ID Data Measured Power

Measured power as described in Proximity Beacon Specification Release R1 Draft D1 with iPhone 5S.

7. LABEL

The label has the following contents:

- Model: EMBC01
- Unique Serial Number
- FCC-ID: 2ACQR-EMBC01
- IC ID: 12155A-EMBC01
- FCC and CE Marking
- Major ID/Minor ID
- EM Microelectronic company name
- QR Code containing the unique Serial Number/Major ID/Minor ID

7.1. SERIAL NUMBER

The serial number is generated by reading the device address of the EMBC01, reversing the byte order, and printing the number in decimal form to 15 digits. For example:

- Device Address: 0x0CF3EE5A0001
- Serial Number: 001101037237004

8. ACCESSORIES

Mounting accessories are available as options and deliverable separately. Snap features allows multiple assembly and disassembly operations.

8.1. KEY-FOB

The outline dimensions of the EMBC01 product with the key-fob accessory are shown in Figure 6:

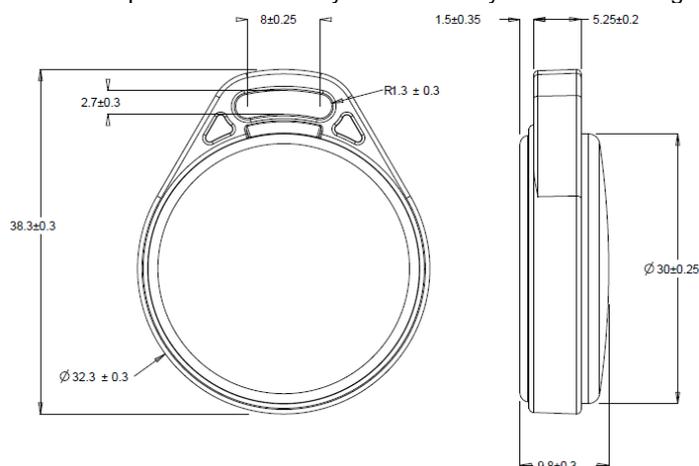


Figure 6: EMBC01 product with key-fob accessory outline dimensions

8.2. WALL-MOUNT

The outline dimensions of the EMBC01 product with the wall-mount accessory are shown in Figure 7:

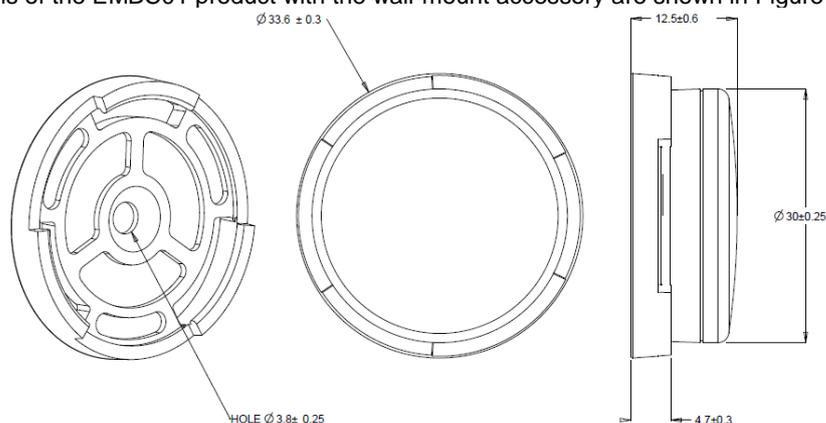


Figure 7: EMBC01 product with wall-mount accessory outline dimensions

8.3. WRIST-BAND

The outline dimensions of the EMBC01 product with the wrist-band accessory are shown in Figure 8:

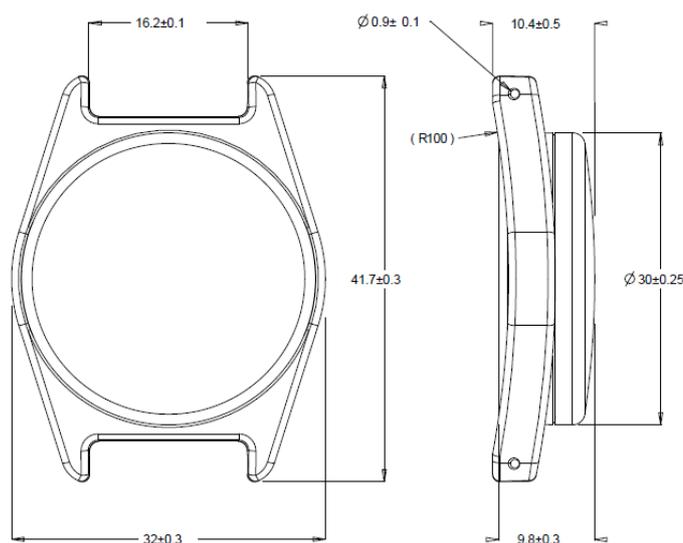


Figure 8: EMBC01 product with wrist-band accessory outline dimensions

9. RELIABILITY

9.1. PRODUCT RELIABILITY

The EMBC01 complies with reliability tests listed in Table 5.

Table 5: EMBC01 reliability tests

Test	Conditions	Acceptance criteria
High temperature and humidity test (TH)	85°C / 85%RH for 500h	Functional Test is Pass
High temperature storage (HTB)	70 ± 2°C for 500h	Functional Test is Pass
Low temperature storage (LTB)	-20 ± 2°C for 500h	Functional Test is Pass
Thermal cycling (TC)	From -20°C (15 min) to +65°C (15 min) for 100 cycles. Transfer time ≤ 5 minutes	Functional Test is Pass

9.2. PACKING RELIABILITY

The packing complies with the reliability tests listed in Table 6.

Table 6: Packing reliability tests

Test	Conditions	Acceptance criteria
Drop test with modules	Drop the outer box from 0.8m on concrete: - 6 sides - 8 corners	Modules Visual Inspection and Functional Test are Pass

10. PACKING AND LABELING

10.1. EMBC01 FINISHED PRODUCT

10.1.1. Inner Packing

The EMBC01 beacons are packed in custom antistatic trays.

- Only one tray per box can have parts from 2 different product lots.
- Tray size is 300 x 261 x 38 mm.
- Number of parts per tray is 100pcs.
- There are 5 trays per stack, excluding cover tray.

A label is applied on each stack. The minimum information on the label is specified in Figure 9.

EM P/N:
Mfg date:
Module Lot Nr:
Qty:

Figure 9: EMBC01 packing label information

10.1.2. External Packing

Tray stacks are packed in cardboard box.

- Quantity of parts per box is 1000 pcs (2 tray stacks).
- Box dimensions are 37 x 55 x 43 cm.

A label is applied on each box. The minimum information on the label is specified in Figure 10.

EM P/N:
Mfg date:
Module Lot Nr:
Qty:
Weight:

Figure 10: Panel packing label information

10.2. EMBC01 PCB PANELS

10.2.1. Inner Packing

The EMBC01 PCB panels are packed in suitable anti-static material.

10.2.2. External Packing

The EMBC01 are packaged in suitable external packaging.

11. THE EMBC01 BEACONS ARE ENVIRONMENTALLY SAFETY

The EMBC01 is:

- RoHS compliant according to EU Directive 2011/65/EU.
- Halogen Free according to IEC 61249-2-21:2003.
- REACH compliant according to EU Regulation 1907/2006

12. ORDERING INFORMATION

The EMBC01 is available as a finished product in a plastic housing with full FCC, IC, and CE certification. It is also available in PCB form as a panel which requires country certification (ie FCC, CE, etc.) of final product performed by the customer. The EMBC01 wall-mount, key-fob, and wrist-band accessories are available separately. Pre-certification beacons are available for evaluation and development. The Proximity Beacon Development Kit is available with 5 pre-certification beacons, an interface board, and cable to the RLink programmer for custom programming. The RLink and RLink Pro can be ordered separately. The EMBC01 ordering information is shown in Figure 11 and the order numbers are shown in Table 7

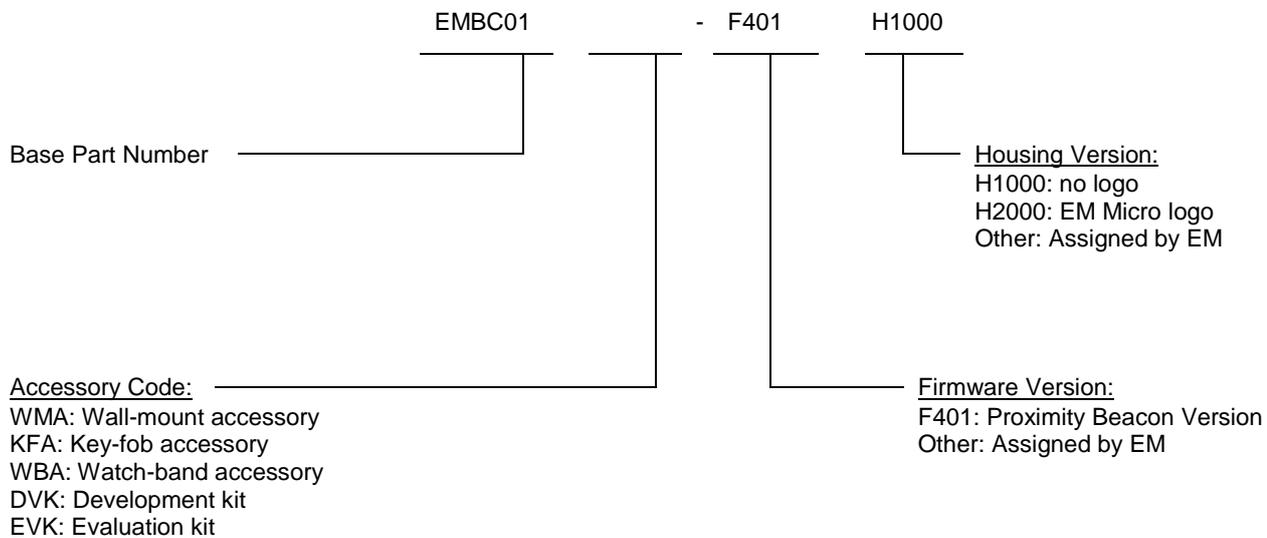


Figure 11: EMBC01 Ordering Information

Table 7: EMBC01 Related Order Numbers

Order Number	Description	Container	Units per Container	Minimum Order Quantity
EMBC01EVK	Proximity beacon, natural, evaluation samples	Individual	1	1
EMBC01-F401-H1000	Proximity beacon, natural, no logo	Tray	100	100
EMBC01-F401-H2000	Proximity beacon, natural, EM Micro logo	Tray	100	100
EMBC01-F401	Proximity beacon, PCB panel, no battery, holder, switch	Panel	14	280
EMBC01WMA-H0	Wall Mount accessory, natural	Bag	100	100
EMBC01KFA-H2	Key Fob accessory, blue	Bag	100	100
EMBC01WBA-H2	Watch Band Accessory, blue	Bag	100	100
EMBC01DVK	EMBC01 Development Kit, includes 5 beacons	Box	1	1
EMRLK6819	RLink	Box	1	1
EMRLKP6819	RLink Pro	Box	1	1

13. CONTACT INFORMATION

Inquiries for lead-times, quotes, orders:

EMDirect@emmicroelectronic.com

14. REFERENCE DOCUMENTS

EM9301 Device specification
EM6819 Device specification
Bluetooth Specification V4.0
Proximity Beacon Specification Release R1 Draft D

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OBID i-scan[®] UHF

UHF Long Range Reader ID ISC.LRU1002



SPECIAL FEATURES

- Robust metal housing for use in industrial environment
- 2 Watt Output Power
- High Receive Sensitivity
- Read Range up to 8 m (26 ft)
- 4 Antenna ports (internal Multiplexer)
- 4 Inputs / Outputs suit industrial needs
- Output of RSSI values
- 16 LEDs for easy diagnostic and analysis of the operating state
- Low price



OBID[®] – RFID by FEIG ELECTRONIC



Description

The UHF Long Range Reader ID ISC.LRU1002 can be used in different kind of applications and is a cost effective alternative to powerful high performance readers. The ID ISC.LRU1002 is licensed according to ETSI, FCC and IC and presents itself with its general features as a future trend development towards the ID ISC.MRU200. The reader is characterized by the following features:

- High receiver sensitivity cares for an enlarged and at the same time homogeneous tag detection range
- Possible read range of up to 8 m *
- Support of Transponders according to EPC Class1 Gen2 and ISO 18000-6-C
- Reader protection against fault conditions like antenna shortcut, antenna mismatching and electrostatic discharge
- Robust aluminum die cast housing for usage in rough and industrial environments
- Increase of enclosure rating to IP 64 due to optional available connector sealing cap for the connector block
- Quick installation due to easy access to interfaces and antenna ports
- 1 Input and 3 outputs suit industrial needs and allow control of external components and signalization of different events
- Antenna Port Indication: Display of active antennas (green), read events (blue) and possible antenna mismatching (red) via 4 separate LED's
- Various configuration options for software and hardware
- 3 hardware interface ports: Ethernet, RS232, and USB
- Support of EPCglobal™ Low Level Reader Protocol with special LLRP Library
- Readout of RSSI data for localization of identified transponders
- High Read Rate for fast and reliable identification of transponders in Dense Reader Mode

* The maximum Read Range is depending on the used antenna, the antenna cable, the used transponder and the environmental conditions.

Typical Application

- Vehicle Access Control
- Logistics
- Installation on a forklift
- Industry
- Automotive
- Traffic Monitoring
- Traffic management systems
- Parking slot management
- Laundry services
- Waste management



Note:
FEIG ELECTRONIC reserves the right to change specification without notice at any time.
Stand of information: October 2013



Technical Data

Mechanical Data

Housing	Aluminum, powder coated
Dimensions	260 mm x 157 mm x 65 mm (10.23 x 6.18 x 2.56 inch)
Weight	1.800 g
Protection Class	IP 53, IP 64 (with protection cap)*
Color	RAL9003 Signal-White

Electrical Data

Power Supply	24 V DC ($\pm 10\%$)
Power Consumption	max. 18 VA
Operating Frequencies	
- Version EU:	865 MHz to 868 MHz
- Version FCC:	902 MHz to 928 MHz
Output Power	100 mW to max. 2 W configurable in steps of 100 mW Tolerance: ± 3 dB
Antenna Connector	4 x SMA-Female (50 Ohm); integrated Multiplexer
RF-Diagnosis	RF-channel monitoring Antenna SWR control internal overheating control
Outputs	
- 2 Optocoupler	max. 24 V DC / 30 mA
- 1 Relay	max. 24 V DC / 1 A switching current, 2 A permanent current
Inputs	
- 1 Optocoupler	max. 24 V DC / 20 mA
Interfaces	RS232, Ethernet, USB, Wiegand (Scan Mode Interface)
Protocol-Modes	ISO Host Mode, Scan Mode (HID), Notification Mode, Buffered Read Mode

Features

Supported transponder types	EPC Class1 Gen2 ISO 18000-6-C (Upgrade Code)
Signaler	16 LEDs for diagnosis of reader operation and antenna status
Other Features	Anti- Collision RSSI

Environmental Conditions

Temperature	
- Operation	-25 °C to 55 °C
- Storage	-25 °C to 85 °C
Humidity	5 % to 95 % (non-condensing)
Vibration	EN 60068-2-6 10 Hz to 150 Hz: 0,075 mm / 1 g
Shock	EN 60068-2-27 Acceleration: 30 g

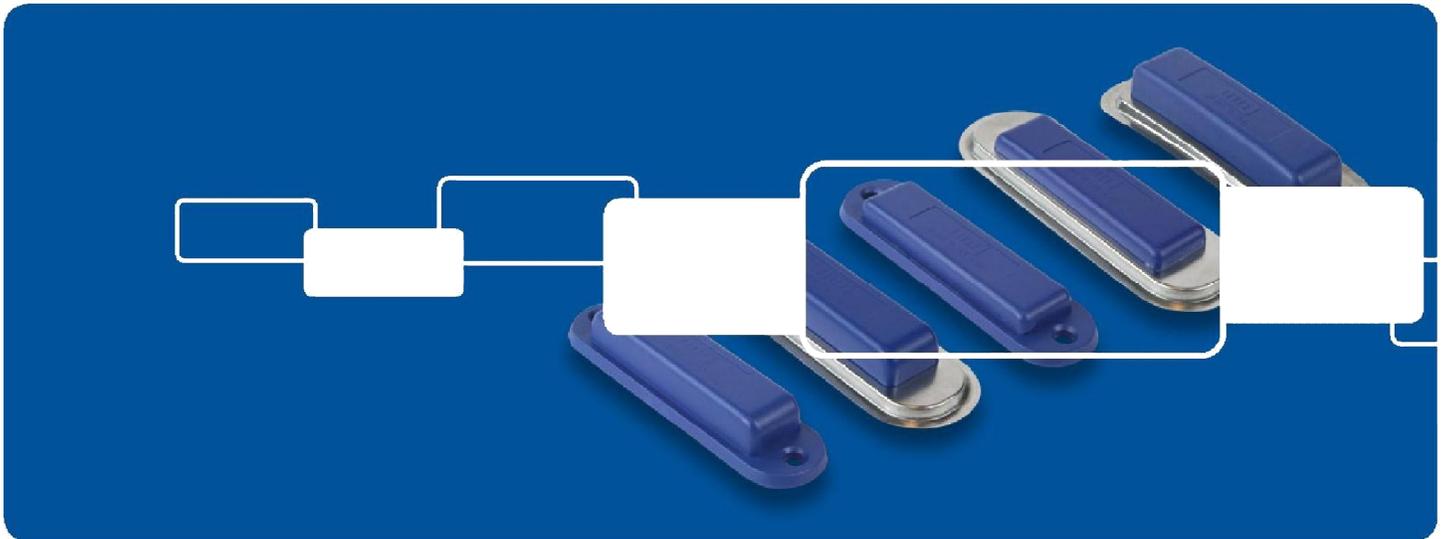
Applicable Standards

Radio Regulation	
- Europe	EN 302 208
- USA	FCC 47 CFR Part 15
- Canada	IC RSS-GEN, RSS-210
EMC	EN 301 489
Safety	
- Low Voltage	EN 60950
- Human Exposure	EN 50364

* Optionally a connector sealing cap is available which covers the connectors, offers a pull relief for the connected cables and guarantees enclosure rate IP 64.

Note:
FEIG ELECTRONIC reserves the right to change specification without notice at any time.
Stand of information: October 2013

INDUSTRY AND LOGISTICS



ROBUST, ALL-PURPOSE UHF RFID TAGS MOUNT TO ANY SURFACE MATERIAL AND DELIVER LONG READ RANGES

Extreme durability . resistant to outdoor elements as well as blunt and sharp impact

Multiple mounting options . glue, screw or weld

Enhanced reliability . read-write on any material, up to 26 ft (8 m)

Broadband frequency . for worldwide use, including Europe, the United States and Japan

HID Global's InLine Tag[®] Ultra passive contactless transponders are the most advanced general-purpose UHF tags available in the market. Choose from options that mount on any material while enabling read ranges of up to a 26 ft (8 m), with no line-of-sight.

InLine Tag devices improve data collection speed and accuracy for logistics applications, while making tracking more cost-effective. These tags enable complete accuracy of asset identification. For example, it is possible to track hundreds of metal kegs containing liquid loaded

on a truck as it moves slowly through RFID reader enabled gates placed at points of distribution and delivery.

UHF technology enables anti-collision functionality, fast data-rate communication and password data protection for precise, reliable reading and updating of each tag's 512-bit read-write memory. All

InLine Tag RFID tags are compliant with EPC global-certified UHF Class 1 Gen 2 readers and modules, with broadband capability for international operations.

The tough and versatile InLine Tag transponders are available for mounting on metal, plastic or wood using standard M5 screws, industrial adhesives or welding. The tags are lightweight, waterproof and resist high-pressure/ high temperature washing conditions according to the highest standard (IP69K).

InLine Tag Ultra RFID tags include HID Global's patented 3D antenna, enabling omnidirectional read range performance independent of mounting material. The tags also enable maintenance of separate public and private profiles for added data security.

The InLine Tag Ultra Curve version is arched to hug metallic kegs or gas cylinders, and durably withstands typical washing and disinfection cycles. Slim versions of the tags enable UHF performance for space-restricted applications, and are configured for attachment via screw or weld.

TECHNOLOGY HIGHLIGHTS:

Worldwide operating frequencies from 860 to 960 MHz

Fully interoperable; standards compliant

Reliable performance on both metal and non-metal surfaces

Waterproof under high pressure / high temperature conditions; chemical and impact resistant

Mounting options include nails, screws, welding and glues

Large memory of up to 512-bit user memory and 128-bit EPC number



APPLICATION AREAS:

Asset tracking and logistics

- Postal and road toll management: truck, wagon and train tracking
- Supply chain management: pallet and goods tracking

Returnable transport items

- Shipping container tracking
- Metal keg and gas cylinder identification

Waste management

- Commercial and industrial bin identification



HID Global can create a custom tag solution to fit your application requirements for chip type, dimensions, programming and materials.

North America: +1 949 732 2000
Toll Free: 1 800 237 7769
Europe, Middle East, Africa: +41 21 908 01 00
Asia Pacific: +852 3160 9800
Latin America: +52 (55) 5081 1650

ASSA ABLOY

An ASSA ABLOY Group brand

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SPECIFICATIONS

InLine Tag™ Ultra					
		Weld	Slim	Slim Weld	Curve
Base Model Number	6A7980	6A7981	6A7983	6A7984	6A7982
ELECTRONIC					
Operating Frequency	865-956 MHz (EU, US, JP)				
Chip Type	Monza 4QT				
Memory	128 bit EPC + 96 bit TID + 512 bit user memory				
Anti-Collision	Yes				
Reading Distance (2W reader ERP, free space)	Up to 26.2 ft (8 m)	Up to 16.4 ft (5 m)		Up to 26.2 ft (8 m)	
PHYSICAL					
Dimensions	3.8 x 1.1 x 0.6 in (97 x 27 x 15 mm)	4.1 x 1.4 x 0.6 in (105 x 35 x 15 mm)	3.8 x 1.1 x 0.4 in (97 x 27 x 10 mm)	4.1 x 1.4 x 0.4 in (105 x 35 x 10 mm)	3.5 x 1.5 x 0.6 in (88 x 37 x 14.5 mm); 17.7 in (450 mm) curve radius
Mounting Method	Screw	Weld	Screw	Weld	
Screw Mounting Hole	Ø 0.2 in (5.2 mm)		Ø 0.2 in (5.2 mm)		
Affixes To	All surfaces, including metal, plastic, wood				Curved metal
Housing Material	PC/ABS high impact	PC/ABS high impact, stainless steel ring	PC/ABS high impact	PC/ABS high impact, stainless steel ring	
Color	Pantone blue 287C (custom colors available)				
Weight	0.5 oz (16 g)	0.6 oz (18 g)	0.4 oz (12 g)	0.5 oz (14 g)	0.5 oz (15 g)
CHEMICAL AND MECHANICAL					
Water	IP69K, 176° F (80° C), 100 bar, 30 sek. 16 l/min				
Withstands Exposure To	Mineral oil, petroleum, salt mist, vegetable oil; up to 80% humidity at 158° F (70° C)				
Environmental Test Conditions	68° F (20° C), 100 h				
Vibration	IEC 68.2.6 [10 g, 10 to 2000 Hz, 3 axis, 2.5 h]				
Shock	IEC 68.2.29 [40 g, 18 ms, 6 axis, 2000 times]				
Impact	IEC 62262-IK09				IEC 62262-IK08
Axial/Radial Force	1000 N, 10 sec				
THERMAL					
Storage	-40° to +176° F (-40° to +80° C), 1x1000 h				
Operating Temperature	-40° to +185° F (-40° to +80° C)				
Shock/Fatigue	-40° to +194° F (-40° to +85° C), 100 x 5 min with 20 sec transition				
OTHER					
Standards	UHF EPC Class 1 Gen 2, ISO 18000-6C, ISO 17364, DIN 40050-9				
Options	Custom embossed logo or tag color				
Warranty	2 Years				



For more information, visit: www.rfidcanada.com

Email: info@rfidcanada.com

+1 905-513-8919



PRODUCT DATASHEET

Confidex Survivor™



All-purpose tag for logistics, transportation and yard management applications with top performance

ELECTRICAL SPECIFICATION

Device type

Class 1 Generation 2 passive UHF RFID transponder

Air interface protocol

EPCGlobal Class1 Gen2 ISO 18000-6C

Operational frequency

EU 865 - 869 MHz

US 902 - 928 MHz

IC type

Impinj Monza4QT

Impinj Monza4E (upon special request)

Memory configuration

With Monza 4QT: EPC 128 bit; User 512 bit; TID 96 bit

With Monza 4E: EPC 496 bit; User 128 bit; TID 96 bit

EPC memory content

Unique number encoded as a default

Read range (2W ERP)*

On metal up to 18m / 60ft

Other materials up to 16m / 52 ft

Applicable surface materials*

All surfaces

* Read ranges are theoretical values that are calculated for non-reflective environment, in where antennas with optimum directivity are used with maximum allowed operating power according to ETSI EN 302 208 (2W ERP). Different surface materials may have an effect on performance. In real environment the read range may also be much longer.

PERSONALIZATION OPTIONS

Pre-encoding

- Customer specific encoding of EPC or user memory. Locking permanently or with password

Customized data label

- Customer specific layout including logo, text, numbers, barcodes etc.

Customized laser engraving

- Customer specific layout including logo, text, numbers, barcodes etc.

MECHANICAL SPECIFICATION

Tag materials

High quality engineering plastics.

Weight

31 g

Delivery format

Single

Amount in box

100 pcs

Dimensions

155mm x 26mm x 14,5mm / 6.1" x 1.02" x 0.57"



ENVIRONMENTAL RESISTANCE

Operating temperature

-35°C to +65°C / -31°F to +149°F

Ambient temperature

-35°C to +65°C / -31°F to +149°F

IP classification

IP68

Weather ability

Good, including UV-resistance and sea water

Chemical resistance

No physical or performance changes in:

- 168h Motor oil exposure
- 48h Salt water (salinity 10%) exposure
- 48h Sulfuric acid (10%, pH 2) exposure
- 48h NaOH (10%, pH 13) exposure

Generally good resistance with moderate concentrations of acids, alcohols, alkalis, detergents and cleaners.

Acetone should be avoided

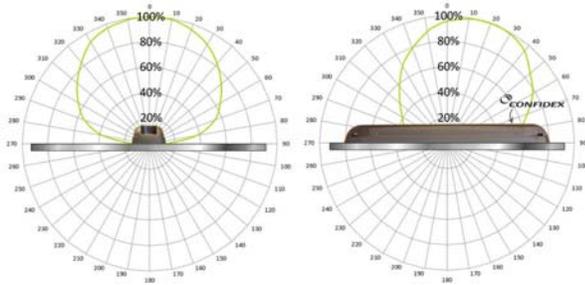
Expected lifetime

Years in normal operating conditions

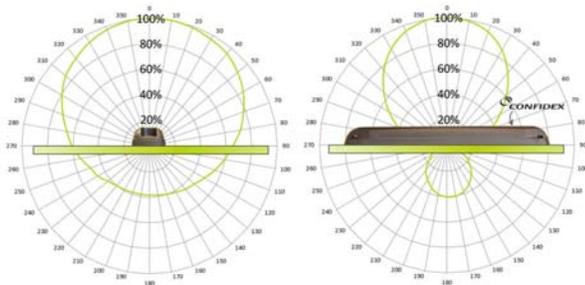
Values in the table are the best recommendations; resistance against environmental conditions depends on the combination of all influencing factors, exposure duration and chemical concentrations. Thus, product's final suitability for certain environmental conditions is recommended to be tested. Contact Confidex for more specific information.

RADIATION PATTERNS

On metal



On plastic



INSTALLATION INSTRUCTIONS

Confidex Survivor™ can be attached with several fixing methods:

1. High performance acrylic adhesive (not included by default)

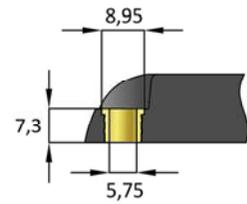
When background adhesive is ordered the tag is delivered with adhesive attached. Clean and dry the surface for obtaining the maximum bond strength. Ideal application temperature is from +21°C to +38°C (+70°F to +100°F), bond strength can be improved with firm application pressure and moderate heating from +38°C to +54°C (+100°F to +130°F). Installation at temperatures below 10°C (50°F) is not recommended.

2. Other adhesive fixings
 - Polyurethane adhesives
 - Epoxies
 - Silicone sealants

Structural adhesives like 3M DP410 provide very high bond strength and resistance against mechanical stress. When tag is attached with sealant adhesive, insert a layer of sealant under the tag and press the tag on the surface. Increase the bond by adding extra sealant from the tag holes. Insert maximum 2mm layer of adhesive under the tag. Please refer to adhesive supplier for exact fixing instructions.

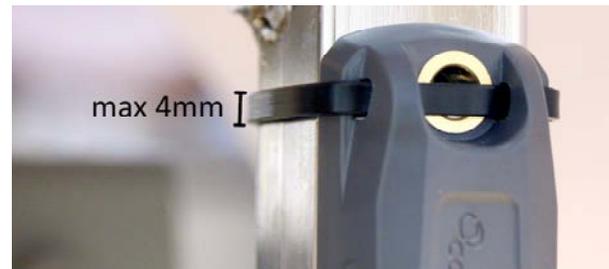
3. Screw or pop rivet

Mechanical fixing is recommended to be used in every application that includes risk for high mechanical stress or low temperature during tag fixing. Refer the dimensional picture for selecting the best size for screw or pop rivet.



4. Cable tie

Confidex Survivor™ has specific design that allows also plastic or metallic cable ties to be used for fixing. Maximum width of tie is 4mm. Please see picture below for an example.



Polarization of Confidex Survivor™ is according to its longest dimension.

ORDER INFORMATION

Product number: 3000855

Product name: Confidex Survivor™ M4QT ETSI

Product number: 3000856

Product name: Confidex Survivor™ M4QT FCC

For other versions, additional information and technical support contact Confidex Ltd.

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4. Traffic Radar

Geolux RSS-2-300 T Speed Sensor

RADAR SENSOR FOR TRAFFIC MONITORING AND LAW ENFORCEMENT



HIGHLIGHTS

- Detects vehicles up to 400 meters
- Reports vehicle speed and counts
- Advanced phyTrack object tracking algorithm
- Wide measurement range from 5 km/h to 336 km/h
- Measurement precision ± 1 km/h
- Compact, low-power design (as low as 55 mA @ 12V)
- Wide input voltage range, suitable for solar applications
- Easy pole, wall or enclosure mounting
- Supports variety of communication interfaces (RS-232, RS-485, CAN, Alarm open-drain outputs)
- IP66-rated enclosure (for outdoor applications and harsh environments)
- K-band 24.125 GHz or 24.200 GHz option
- Configurable approaching, receding or both directions
- PC application for radar setup and live monitoring
- Optional camera integration

PRODUCT DESCRIPTION

Geolux RSS-2-300 T is a Doppler radar speed sensor operating in K-band, enhanced with advanced phyTrack™ vehicle detection and tracking algorithm.

Designed for traffic applications, RSS-2-300 T radar sensor reports a list of all currently detected vehicles up to 20 times per second over serial (RS-232, RS-485) or CAN interface. RSS-2-300 T sensor supports ASCII-S and GLX-NMEA serial interface data protocols, and support for more protocols can be added on customer request. Two programmable alarm outputs (signals) can directly be connected to relays.

The radar can operate in low-power mode which is suitable for battery-operation. In low power mode the radar consumes as low as 660 mW of power.

Field-proven Geolux RSS-2-300 T radar sensor is certified according to both European and American standards, which makes it an ideal solution for our partners that operate globally.

Advanced phyTrack™ vehicle detection and tracking algorithm analyzes detected vehicle speeds in real time, and extracts precise target statistics data such as total vehicle count, average speed and road utilization.

Geolux RSS-2-300 T radar sensor is available both in IP66 enclosure ready for on-site setup, and as OEM module ready for integration in your product.



Geolux is a company based in the European Union that develops and manufactures radar sensors for use in traffic, security and hydrology applications.

DETAILED SPECIFICATIONS

GENERAL

Radar Type	K-band 24.125GHz/24.200GHz Doppler radar, 27 dBm EIRP
Beam Angle	12° Azimuth, 24° Elevation
Detection Distance	400 m
Speed Range	5 km/h to 336 km/h
IP Rating	IP66

INTERFACE

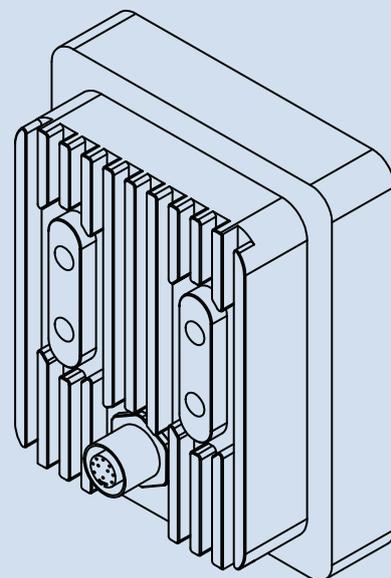
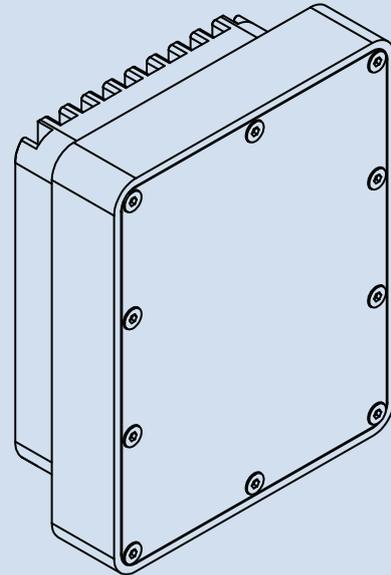
Serial Interface	1 x serial RS-485 half-duplex 1 x serial RS-232 (two wire interface)
Serial Baud Rate	1200 bps to 115200 bps
Serial Protocols	ASCII-S, GLX-NMEA
CAN Interface	Up to 1Mbps CAN2.0
Alarm Outputs	2 x open collector, max 50V 200mA
Connector	M12 circular 12-pin

ELECTRICAL & MECHANICAL

Power Input	9 to 27 VDC
Power Consumption	< 1,35 W (typical 0,9 W)
- in low-power mode	0,66 W
Maximal Current	< 250 mA
Temperature Range	-40°C to +85°C (without heating or coolers)
Enclosure Dimensions	110 mm x 90 mm x 50 mm

FCC & CE APPROVED

EN 50293:2000
 EN 61000-6-2, EN 61000-6-4:2007
 EN 61000-3-2:2006+A1:2009+A2:2009
 EN 61000-3-3:2008
 EN 300 440-1, EN 300 440-2
 FCC Part 15 Subpart C

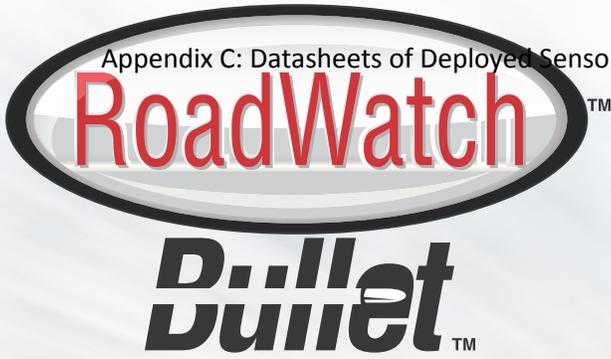


For more information, please visit our web page:

www.geolux-radars.com/traffic-monitoring or contact us at: geolux@geolux.hr

5. Road Temperature Sensor

NEW



NEW SENSOR

Introducing RoadWatch® Bullet™

- Unmatched Reliability
- Improved Performance
- Affordably Priced
- Backwards Capability
- Constant Feedback on Road Surface Conditions
- Easy to Install and Service
- Can Operate as Standalone or Integrated with Other Vehicle Controls



RoadWatch® System Kits
849-1262-002 (°C)
849-1262-003 (°F)

System Kits include sensor head, extension cable and temperature display

To order call 1-800-548-1191 or visit www.partdeal.com

UNPRECEDENTED RELIABILITY

- ✓ Fully-sealed sensor
- ✓ Connector mating inside sleeve
- ✓ No screws or openings in sensor face
- ✓ Environmentally tested

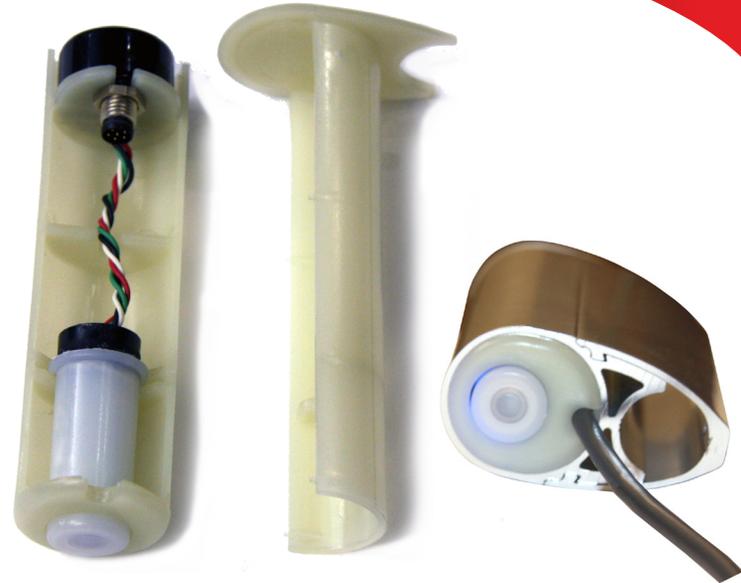
IMPROVED PERFORMANCE

- ✓ Faster acclimation time
- ✓ Improved accuracy
- ✓ More durable, with low total lifetime cost

BACKWARDS COMPATIBILITY

Use with existing:

- ✓ Cables and connectors
- ✓ Displays
- ✓ RS-232 Convertors

**Technical Specifications**

RoadWatch® technology is protected under US patents 5796344, 6166657 & 6206299 with additional US and foreign patents pending

Environmental

- System Operating Range: -40 to +150 °F
- Thermal Shock: ISO 16750-4 (2010) Section 5.3.1.3
- Water Immersion: ISO 20653 Section 6 IPX7
- Salt Fog: ISO 16750-4 (2010) Section 5.5.2.1
- Storage Range: -40 to 75 °C or -40 to 167 °F
- Relative Humidity: 98% non-condensing
- Vibration: 4g, sensor & display
- Shock: 100g sensor element

Performance

- Road Accuracy: ± 2 °F (15 to 100 °F under ambient stable)
- Air Accuracy: ± 2 °F (-40 to 131 °F) while moving > 5 MPH
- Field Calibration: accuracy ± 1 °F (0 to 100 °F)
- Repeatability: ± 1 °F under stable ambient conditions
- Emissivity: factory calibrated at 0.96
- Field of View Angle: 5° typical
- Weight: 11oz sensor, 3oz display

Electrical

- Operating Voltage: 9-28Vdc
- Current Requirement: 0.1A
- Sensor Data Rate: 4 readings per second
- J1708 Data Format

RoadWatch® Bullet™ Product Part Numbers

Part Number	Description
849-1262-002	Roadwatch® System Kit °C (sensor, display, cable, and mounting hardware)
849-1262-003	Roadwatch® System Kit °F (sensor, display, cable, and mounting hardware)
849-1243-001	Roadwatch® Sensor with mounting hardware only °C
849-1243-000	Roadwatch® Sensor with mounting hardware only °F



To order call 1-800-548-1191 or visit www.partdeal.com

6. Ultrasound Level Sensor



SonAire® M3 Series Sensors

Wireless | Non-Contact | Reliable | Intrinsically Safe

The MassaSonic™ SonAire Series Sensors are ruggedly designed ultrasonic transmitter modules incorporating state-of-the-art ultrasonic technology and processing algorithms. All models are made of chemically resistant PVDF, support application ranges from 4 inches (100mm) to 35 feet (10.7m), and are RoHs and CE compliant. Two models are available and may be mixed on the same network:

SonAire M3 (Standard)

*Reliable Unwired Monitoring,
Low Cost, Easy Set-Up*

The M3 standard model is a general use sensor ideal for non-hazardous environments, where infrastructure may not be readily available, or quick set-up monitoring is desired. Ideal and cost efficient for C1D2 or lesser areas, the sensor is effective for monitoring a variety of fluids or solid materials, portable chemical tanks or collection points in factories, remote locations, flood zones and wastewater basins. The standard version offers an excellent performance value.

All SonAire models are user friendly and easily installed. The sensors come with field replaceable batteries that typically operate for four (4) years in the field over an operating temperature range of -30C to 65C. All models measure and store information such as range, temperature, battery voltage, and other sensor parameters at user-set time intervals. SonAire employs a field proven ZigBee radio that enables reliable site communication within $\frac{3}{4}$ of a mile and is easily expanded with an inexpensive router/gateway network design. An internal pushbutton switch is used to commission the sensor onto the ZigBee network, and an LED identifies the operating mode. The sensor package is rated for immersion and high pressure washing in accordance with IP67.

Standard with all models is an advanced diagnostic feature that, when using the supplied Python code and software, will display the receiver ultrasonic waveform on a computer screen for analysis. This feature is very useful for troubleshooting and optimizing challenging installations remotely and without the need for diagnostic equipment like an oscilloscope.

MassaSonic™ SonAire sensors include an internal temperature probe for speed of sound compensation to ensure optimal range accuracy and stand above other intrinsically safe offerings for their excellent performance value, control versatility and field proven reliability.

SonAire M3is (Intrinsically Safe)

*C1D1 (zone 0) Compliant,
Long Battery Life, Privacy*

The M3is design is very well suited for monitoring combustible fluids or solid materials and fixed/portable chemical tanks in factories or remote locations where environmental risks may be an operational consideration. Designed with site privacy in mind, like cloud based inventory breaches, the IS model is particularly effective for oil patch, mining, waste storage, and hazardous chemical operations. Since the intrinsically safe version carries the highest FM certification for all groups (C1D1), it is readily usable in lesser rated areas.



SonAire M3 Series Sensor

FEATURES

- Wireless, 10 Sensors/Gateway
- Many Sensing Range Options
- Low Power
- Easily Replaceable Long-Life Batteries
- Chemically Resistant PVDF Construction
- Built-In Temperature/Sound Speed Compensation
- Cost Efficient

APPLICATIONS

- Liquid & Solid Level Monitoring
- Drums, Totes, and Tanks
- Outdoor Stockpiles
- Waste Basins and Flood Zone Monitoring
- Oil Patch, Mine, and Chemical Operations
- Remote, Quick Set-Up Sites
- Hazard Zones



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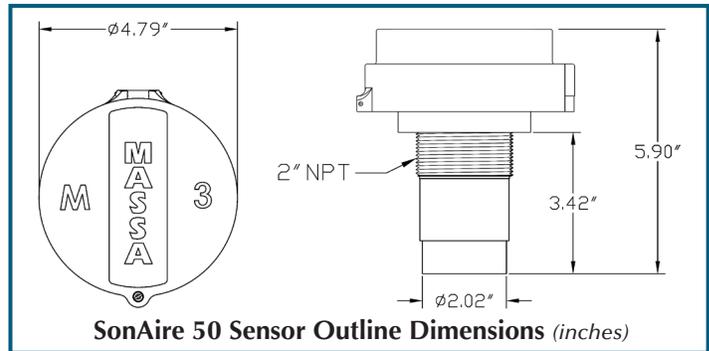
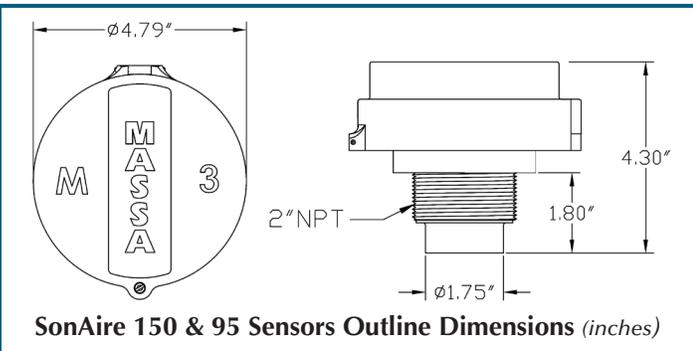




SonAire® Series Performance Specifications

(Typical 24VDC, 22°C, and 50% RH Air)

Performance			
	Short Range (150 kHz)	Medium Range (95 kHz)	Long Range (50 kHz)
Target Detection Distances	4 inches (100 mm) to 7 feet (2.1 m)	12 inches (300 mm) to 13 feet (4 m)	14 inches (356 mm) to 35 feet (10.7 m)
Measurement Resolution	0.01 inches (0.25 mm)		0.02 inches (0.5 mm)
Measurement Accuracy	± 0.1% of Target Range		
Echo Detection Sensitivity	User Selectable		
System Beam Angle	8° Conical		
Data Acquisition Interval	Programmable from 1 event every 10 seconds to 1 event every 194 days		
Saved Data Events	Up to 111 events of sensor data saved in memory, includes target range, temperature, battery voltage, sensor status, and an event number		
Battery Life	4 years typical @ 4-12 data reports/day <i>(may be affected by temp. and reporting rate)</i>		
Temperature Compensation	Internal Probe		
Radio/Power			
LED	Red and Green Status Indication		
Switch for Provisioning	Internal Pushbutton for commissioning sensor onto the network		
Radio Onboard	North America / Australia version, 63mW; Europe version, 10mW		
Gateway Networking	Connectivity by Digi International ConnectPort X2 or X4 (Zigbee)		
Power	3 Lithium Energizer Model L91 AA size 1.5V batteries (included) <i>(Note: only use Li batteries)</i>		
Minimum Battery Pack Voltage	3.1V <i>(Note: Once battery pack decreases to 3.7V, its capacity diminishes at accelerated rate)</i>		
Mechanical/Environmental			
Operational Temperature	-30°C to 70°C		
Storage Temperature	-40°C to 85°C		
Relative Humidity	0 to 95%, non-condensing		
Enclosure Rating	IP67		



SonAire Series Ordering Information

M3 (Standard)

M3is (Class 1, Div 1 (C1D1), All Groups)

Order Code	Sensing Range	Radio
SonAire M3/150	Short	North America
SonAire M3/150E	Short	Europe
SonAire M3/95	Medium	North America
SonAire M3/95E	Medium	Europe
SonAire M3/50	Long	North America
SonAire M3/50E	Long	Europe

Order Code	Sensing Range	Radio
SonAire M3is/150	Short	North America
SonAire M3is/150E	Short	Europe
SonAire M3is/95	Medium	North America
SonAire M3is/95E	Medium	Europe

7. VMS



Milestone Systems XProtect® Video Management Software Product Comparison Chart

XProtect 2017 R3

October 5, 2017



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Introduction

As the world's leading provider of open platform IP video management software (VMS), Milestone Systems offers a wider range of VMS products optimized for different types of deployment and usage. This document provides an in-depth comparable outline of Milestone's XProtect® VMS products and the associated clients.

The document is intended as a technical sales tool with two primary purposes:

- Provide an overview of the features that each XProtect product provides
- Support the selection of the optimal product by offering a visible comparison between the various products in the XProtect product range

The document presents separate comparison charts for the XProtect VMS platform products and the XProtect clients, where each product category has an overview comparison chart, followed by a more detailed and comprehensive chart.

The following XProtect VMS platform products are covered:

- XProtect® Corporate
- XProtect® Expert
- XProtect® Professional+
- XProtect® Professional
- XProtect® Express+
- XProtect® Express
- XProtect® Essential+

The following XProtect clients are covered:

- XProtect® Smart Client
- XProtect® Web Client
- Milestone Mobile

The document does not cover XProtect add-on products or Milestone Utilities.

The information in this document only provides basic information. Refer to the individual product specification sheets for a complete listing of all features for a given XProtect product.

Milestone reserves the right to change the product specifications without prior notice.

High-level XProtect VMS product comparison

The table below gives an overview of Milestone's XProtect VMS products and their key capabilities.

XProtect VMS Products	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Key Features							
Type of deployment	Single-server	Single-server	Single-server	Multi-server	Centrally managed, multi-server	Centrally managed, multi-server	Centrally managed, distributed sites
Licensing	Free	Perpetual	Perpetual	Perpetual	Perpetual	Perpetual	Perpetual
Number of hardware devices ⁽¹⁾ per software license	8	48	48	Unrestricted ⁽²⁾	Unrestricted	Unrestricted	Unrestricted
Number of cameras ⁽³⁾ per recording server	8	48	48	320	Unrestricted	Unrestricted	Unrestricted
Number of recording servers per system	1	1	1	Unrestricted	Unrestricted	Unrestricted	Unrestricted
Maximum numbers of users	Unrestricted	5	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted
Customer Dashboard and Connected Services ⁽⁴⁾	-	Supported	Supported	Supported	Supported	Supported	Supported
Alarm Manager	-	Yes ⁽⁵⁾	Yes	Yes	Yes	Yes	Yes
Video out via Milestone ONVIF Bridge	-	Yes	Yes	Yes	Yes	Yes	Yes
Dual authorization (Smart Client users)	-	Yes	Yes	Yes	Yes	Yes	Yes
Supports XProtect Smart Client, XProtect Web Client and Milestone Mobile	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Secure HTTPS camera connectivity (on supported devices)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Map function	Yes	Yes ⁽⁶⁾	Yes	Yes	Yes	Yes	Yes
Third-party application integration and support for video analytics ⁽⁷⁾	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Built-in Video Motion Detection (VMD) with Auto adjustable VMD sensitivity	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H.264, MJPEG, MPEG-4, MPEG-4 ASP & MxPEG	Yes	Yes	Yes	Yes	Yes	Yes	Yes
H.265	Yes	-	Yes	-	Yes	Yes	Yes
Microsoft Active Directory support	Yes	-	Yes	Yes	Yes	Yes	Yes
Kerberos authentication	Yes	-	Yes	-	Yes	Yes	Yes
Metadata support	Yes	-	Yes	-	Yes	Yes	Yes
Centralized management	Yes	-	Yes	-	Yes	Yes	Yes
Flexible event rule engine	Yes	-	Yes	-	Yes	Yes	Yes
Hardware accelerated video decoding for Video Motion Detection (VMD)	Yes	-	Yes	-	Yes	Yes	Yes
Edge Storage and Scalable Video Quality Recording™	-	-	-	-	Yes	Yes	Yes
Smart Map function	-	-	-	-	-	Yes	Yes
Media database encryption and digital signing	-	-	-	-	-	Yes	Yes
Hot- & cold-failover recording server	-	-	-	-	-	Yes	Yes
Evidence Lock	-	-	-	-	-	-	Yes
Supports XProtect Smart Wall	-	-	-	-	-	Option	Included
Milestone Federated Architecture™	-	-	-	-	-	Remote site	Central/Remote site
Milestone Interconnect™	-	Remote site	Remote site	Remote site	Remote site	Remote site	Central/Remote site

Notes:

- (1) A hardware device is the physical unit, server or system connected to the VMS' recording server
- (2) For most installations larger than 250 cameras, Milestone recommends using XProtect Professional+, XProtect Expert or XProtect Corporate
- (3) A camera is the actual camera or video source on the hardware device connected to the VMS' recording server
- (4) Requires active Milestone Care Plus coverage
- (5) Limited alarm management functionality
- (6) Supports a single-layer, interactive map, without alarm integration
- (7) Using Milestone Integration Platform (MIP)

Detailed XProtect VMS products comparison chart

The table below gives a detailed listing of all major features in the different XProtect VMS products. The features are organized into categories for increased readability.

XProtect VMS Products	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Features							
System components (software modules)							
Recording server	✓	✓	✓	✓	✓	✓	✓
Hot- & cold-failover recording server	-	-	-	-	-	✓	✓
Maximum number of hardware devices ⁽¹⁾ or cameras ⁽²⁾ per recording server	8	48	48	320 ⁽³⁾	Unrestricted	Unrestricted	Unrestricted
Maximum number of recording servers per system	1	1	1	Unrestricted	Unrestricted	Unrestricted	Unrestricted
Recording server manager	✓	✓	✓	✓	✓	✓	✓
Management server	✓	-	✓	-	✓	✓	✓
Management failover server (redundant cluster)	✓	-	✓	-	✓	✓	✓
Management application (local management)	-	✓	-	✓	-	-	-
Management client (dedicated client application for local or remote management)	✓	-	✓	-	✓	✓	✓
Event server (for handling of events and alarms)	✓	✓	✓	✓	✓	✓	✓
Failover event server (redundant cluster)	✓	-	✓	-	✓	✓	✓
Milestone Mobile (server and client)	✓	✓	✓	✓	✓	✓	✓
DLNA (Digital Living Network Alliance) server			✓		✓	✓	✓
XProtect Smart Client	✓	✓	✓	✓	✓	✓	✓
XProtect Web Client	✓	✓	✓	✓	✓	✓	✓
XProtect Smart Client - Player (local playback/export)	✓	✓	✓	✓	✓	✓	✓
Run servers as Windows Services	✓	✓	✓	✓	✓	✓	✓
Licensing							
Licensing	8 devices free	Perpetual	Perpetual	Perpetual	Perpetual	Perpetual	Perpetual
Distributed operation							
Milestone Interconnect™	-	Remote site	Remote site	Remote site	Remote site	Remote site	Central/Remote site
Milestone Federated Architecture™	-	-	-	-	-	Remote site	Central/Remote site
Remote camera connection via Remote Connection Service	-	-	-	-	-	-	✓
Device support							
Support for ONVIF™ & PSIA compliant devices	✓	✓	✓	✓	✓	✓	✓
Generic device support via Milestone universal driver	✓	✓	✓	✓	✓	✓	✓
Metadata from camera embedded analytics	✓	-	✓	-	✓	✓	✓
Number of supported IP devices ⁽⁴⁾	5800+	6000+	5800+	6000+	5800+	5800+	5800+
Secure HTTPS camera connectivity (on supported devices)	✓	✓	✓	✓	✓	✓	✓
Video processing							
H.264, MJPEG, MPEG-4, MPEG-4 ASP and MxPEG	✓	✓	✓	✓	✓	✓	✓
H.265	✓	-	✓	-	✓	✓	✓
Metadata support	✓	-	✓	-	✓	✓	✓
Dual stream (live and recording) per camera	✓	✓	✓	✓	✓	✓	✓
Multi-live streaming	-	-	-	-	-	✓	✓
Client video stream down sampling (resolution and FPS) option	✓	✓	✓	✓	✓	✓	✓
Adjustable GOP size (MPEG4/H.264/H.265)	✓	-	✓	-	✓	✓	✓
Send camera pre-alarm images (pre-recording buffer) to recording server	✓	✓	✓	✓	✓	✓	✓
Video recording speed up on <i>motion, event or time schedule</i>	✓	✓	✓	✓	✓	✓	✓
Built-in Video Motion Detection (VMD)	✓	✓	✓	✓	✓	✓	✓
Auto adjustable VMD sensitivity	✓	✓	✓	✓	✓	✓	✓
Hardware accelerated video decoding for VMD	✓	-	✓	-	✓	✓	✓
Motion metadata generated during VMD analysis	✓	-	✓	-	✓	✓	✓

XProtect VMS Products	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Features							
Archiving of recordings with network drive support	✓	✓	✓	✓	✓	✓	✓
Dynamic archiving (disk spanning)	-	✓	-	✓	-	-	-
Online access to archives	✓	✓	✓	✓	✓	✓	✓
Archiving schedules	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
Automatic storage distribution	-	✓	-	✓	-	-	-
Storage definition and retention time per device	✓	✓	✓	✓	✓	✓	✓
Storage definition and retention time that can be applied to individual cameras or common for multiple devices	✓	-	✓	-	✓	✓	✓
Multi-stage video storage and data grooming	-	-	-	-	-	✓	✓
Storage overview (used vs. available space) of available storage drives	✓	✓	✓	✓	✓	✓	✓
Event on premature deletion of video due to insufficient physical storage	✓	-	✓	-	✓	✓	✓
Edge Storage support with flexible retrieval	-	-	-	-	✓	✓	✓
Scalable Video Quality Recording™	-	-	-	-	✓	✓	✓
Evidence Lock	-	-	-	-	-	-	✓
Media database encryption and digital signing	-	-	-	-	-	✓	✓
Multicast support	-	-	-	-	-	✓	✓
Integration							
Plug-in, Protocol, Component integration via MIP SDK	✓	✓	✓	✓	✓	✓	✓
System Configuration via MIP SDK	✓	-	✓	-	✓	✓	✓
Metadata integration	✓	-	✓	-	✓	✓	✓
Event integration	✓	✓	✓	✓	✓	✓	✓
Event and action rule engine integration via MIP SDK	✓	-	✓	-	✓	✓	✓
Support for XProtect Add-on products							
XProtect Access	-	✓	✓	✓	✓	✓	✓
XProtect LPR	-	✓	✓	✓	✓	✓	✓
XProtect Smart Wall	-	-	-	-	-	Option	Included
XProtect Transact	-	✓	✓	✓	✓	✓	✓
XProtect Retail	-	✓	✓	✓	✓	✓	✓
XProtect Screen Recorder	✓	✓	✓	✓	✓	✓	✓
Milestone ONVIF Bridge	-	✓	✓	✓	✓	✓	✓
DLNA server	-	-	✓	-	✓	✓	✓
Management							
Maximum number of clients	Unrestricted	5	Unrestricted	Unrestricted	Unrestricted	Unrestricted	Unrestricted
Automatic initial configuration wizard	-	✓	-	✓	-	-	-
Configuration wizards for aided system setup	✓	✓	✓	✓	✓	✓	✓
Automatic camera discovery	-	✓	-	✓	-	-	-
Device scanning with device model detection	✓	✓	✓	✓	✓	✓	✓
Automatic camera IP address assignment ⁽⁶⁾	-	✓	-	✓	-	-	-
Automatic camera time synchronization	-	✓	-	✓	-	-	-
Device replacement wizard	✓	✓	✓	✓	✓	✓	✓
Move device wizard for moving hardware devices (e.g. cameras) between recording servers	-	-	-	-	✓	✓	✓
Centralized recording server & device management	✓	-	✓	-	✓	✓	✓
Device group support	✓	-	✓	-	✓	✓	✓
Management Client profiles	-	-	-	-	-	-	✓
Centralized management of XProtect Smart Client application options (Number of supported XProtect Smart Client profiles)	-	-	-	-	3	3	Unrestricted
Day length time profile	-	-	-	-	-	✓	✓
On-the-fly configuration changes	✓	-	✓	-	✓	✓	✓
Scheduled start/stop of devices	✓	✓	✓	✓	✓	✓	✓
Configuration reporting	✓	-	✓	-	✓	✓	✓
System configuration restore points	-	✓	-	✓	-	-	-
Export and import of configuration data	-	✓	-	✓	-	-	-

XProtect VMS Products	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Features							
Built-in backup-restore support	✓	-	✓	-	✓	✓	✓
Automatic license activation of online systems	✓	✓	✓	✓	✓	✓	✓
Offline license activation	✓	✓	✓	✓	✓	✓	✓
Add/replace devices without reactivation in offline systems ⁽⁷⁾	✓	✓	✓	✓	✓	✓	✓
Customizable access port with NAT support	✓	✓	✓	✓	✓	✓	✓
System Monitoring							
Customizable dashboard for task or component specific live monitoring	-	-	-	-	-	✓	✓
Customizable event trigger thresholds for Normal, Warning and Critical levels	-	-	-	-	-	✓	✓
Real-time and historical system status of management server, event server, recording servers and other XProtect servers	-	-	-	-	-	✓	✓
Real-time and historical system status of individual cameras	-	-	-	-	-	✓	✓
Dedicated System Monitor tab that can be displayed as floating window	-	-	-	-	-	✓	✓
XProtect Smart Wall							
Supports XProtect Smart Wall video wall add-on	-	-	-	-	-	Option	Included
Number of XProtect Smart Walls and XProtect Smart Wall displays	-	-	-	-	-	Unrestricted	Unrestricted
Number of concurrent video streams	-	-	-	-	-	Unrestricted	Unrestricted
Maximum number of content positions per display	-	-	-	-	-	100	100
Presets for display layouts and camera content	-	-	-	-	-	✓	✓
Live video stream content	-	-	-	-	-	✓	✓
XProtect Smart Client controlled playback of video	-	-	-	-	-	✓	✓
Support for rich video wall content, including: maps, still images, http pages, alarms, texts, bookmarks, system monitor, etc.	-	-	-	-	-	✓	✓
Rule-based control of layout and content (including text messages)	-	-	-	-	-	✓	✓
System alarms and notification							
Email notification	✓	✓	✓	✓	✓	✓	✓
SMS notification	-	✓	-	✓	-	-	-
Multiple notification profiles	✓	-	✓	-	✓	✓	✓
SNMP trap	-	-	-	-	-	✓	✓
System Watch support	-	✓	-	✓	-	-	-
Customer Dashboard ⁽⁵⁾	✓	✓	✓	✓	✓	✓	✓
User authentication and rights management							
Centralized user management	✓	-	✓	-	✓	✓	✓
Tiered management rights	-	-	-	-	-	-	✓
Inheritance of user rights	-	-	-	-	-	-	✓
Time schedule controlled user access to devices and functions	-	-	-	-	-	-	✓
Restrict user access by client type (Web Client, Milestone Mobile and Smart Client)	✓	-	✓	-	✓	✓	✓
Basic User (XProtect application accounts)	✓	✓	✓	✓	✓	✓	✓
Windows User (local Windows accounts)	✓	✓	✓	✓	✓	✓	✓
Microsoft Active Directory User (central Active Directory accounts)	✓	-	✓	✓	✓	✓	✓
Dual authorization (Smart Client users)	-	✓	✓	✓	✓	✓	✓
Dual authorization (Management Client users)	-	-	✓	-	✓	✓	✓
Two-step verification (Web and Mobile Client users)	-	-	-	-	-	-	✓
Windows NTLM (NT LAN Manager) authentication	✓	-	✓	✓	✓	✓	✓
Kerberos authentication	✓	-	✓	-	✓	✓	✓
Logging							
System and audit logging	✓	✓	✓	✓	✓	✓	✓
Event logging	- (8)	✓	- (8)	✓	- (8)	- (8)	- (8)
Rule logging	✓	-	✓	-	✓	✓	✓

XProtect VMS Products	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Features							
Languages (Management Interface)							
Chinese (Simplified)	✓	✓	✓	✓	✓	✓	✓
Chinese (Traditional)	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
Danish	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
English	✓	✓	✓	✓	✓	✓	✓
French	✓	✓	✓	✓	✓	✓	✓
German	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
Italian	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
Japanese	✓	✓	✓	✓	✓	✓	✓
Korean	✓	✓	✓	✓	✓	✓	✓
Portuguese (Brazilian)	✓	✓	✓	✓	✓	✓	✓
Russian	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
Spanish	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
Swedish	✓ ⁽⁹⁾	-	✓ ⁽⁹⁾	-	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾
Turkish	✓ ⁽⁹⁾	-	✓ ⁽⁹⁾	-	✓ ⁽⁹⁾	✓ ⁽⁹⁾	✓ ⁽⁹⁾

Notes:

- (1) A hardware devices is the physical unit, server or system connected to the VMS' recording server.
- (2) A camera is the actual camera or video source on the hardware device connected to the VMS' recording server
- (3) For most installations larger than 250 cameras, Milestone recommends using XProtect Professional+, XProtect Expert or XProtect Corporate
- (4) For an overview of supported devices please refer to:
<https://www.milestonesys.com/solution-partners/supported-hardware/>
- (5) Requires Milestone Care Plus service coverage
- (6) On supported devices only, please refer to:
<https://www.milestonesys.com/solution-partners/supported-hardware/>
- (7) For details on actual allowed number of device changes without activation, please refer to:
<https://www.milestonesys.com/device-change-calculation/>
- (8) It is possible to create a rule log entry for specific events that shall be logged
- (9) Installation and user interface localized. Help system and manuals in English only

High-level XProtect client comparison

The table below gives an overview of the different XProtect clients that can be used together with Milestone's XProtect VMS products.

XProtect client	Milestone Mobile	XProtect Web Client	XProtect Smart Client
Key Features			
User platform	Smartphones and tablets	Web browsers	Windows PC
User mobility	High	Medium	Low
Installation required	Yes	No	Yes
User authentication	Yes	Yes	Yes
Dual authorization	-	-	Yes
Two-step verification	Yes	Yes	-
Secure (HTTPS) client-server connection	Yes	Yes	-
Camera search	Yes	Yes	Yes
View live video	Yes	Yes	Yes
Control PTZ cameras	Yes	Yes	Yes
Advanced PTZ camera control	-	-	Yes
Alarm handling	Yes	Yes	Yes
Push Notification ⁽¹⁾	Yes	-	-
Interactive maps	-	-	Yes
Smart Map	-	-	Yes
Trigger I/O events	Yes	Yes	Yes
Playback	Single camera	Multi camera	Multi camera
Sequence Explorer	-	-	Yes
Advanced video search (Smart Search)	-	-	Yes
Evidence Lock	-	-	Yes
Export/share video from one camera	Yes	Yes	Yes
Export video from multiple cameras	-	Yes	Yes
Storyboard function in export	-	-	Yes
Include XProtect Smart Client – Player in export	-	-	Yes
Video Push	Yes	-	-
Dynamic bandwidth adaptation	Yes	Yes	-
Hardware accelerated video decoding	-	-	Yes
Manage access control	Yes	-	Yes

Detailed XProtect client comparison

This section provides a detailed comparison between the different XProtect clients, both in relation to each other, and the particular XProtect VMS platforms. The latter is important because some functionality and support of the clients are determined by the specific XProtect product or product version. The features are organized into categories for increased readability.

XProtect Client	Milestone Mobile						XProtect Web Client						XProtect Smart Client								
	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Feature set when used with specific XProtect VMS platform																					
General view handling																					
Number of view layouts				2							2										41
Maximum view items per view				100							100										100
Optimized view layouts for 4:3 and 16:9 display ratios				-							-										✓
Corridor optimized view layouts				-							-										✓
Optimized view layouts for landscape and portrait displays				✓							-										✓
Cameras from multiple XProtect servers	-				✓		-				✓			-							✓
Support for <i>Shared Views</i> and <i>Private Views</i>				✓							✓										✓
XProtect Smart Wall views				-							-										✓
Images and active HTML pages in views				-							-										✓
Hotspot and Carousel in views				-							-										✓
Virtual Matrix in views				-							-										✓
Display bounding boxes based on metadata				-							-			✓	-	✓	-				✓
Full screen mode				✓							✓										✓
Multi-window functionality with support for full screen or floating windows with synchronized or independent operation				-							-										✓
Switch to view by number				-							-										✓
Initial default view				✓ ⁽²⁾							✓ ⁽²⁾										✓ ⁽²⁾
Camera Navigator				-							-			✓	-						✓
Camera search				✓							✓										✓
Automatic restore views and windows at login				✓							✓										✓
Live view																					
Update on motion only				-							-										✓
One-way audio support				-							-										✓
Two-way audio support				-							-			✓	-						✓
Two-way AAC Audio support				-							-			-		✓	-				✓

XProtect Client	Milestone Mobile							XProtect Web Client							XProtect Smart Client						
Feature set when used with specific XProtect VMS platform	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Start recording in view				-											-	✓	-	✓		-	
Start/stop recording in view				-											✓	-	✓	-		✓	
Independent playback in live mode				-															✓		
Replace cameras in view without changing view setup				-															✓		
Send camera to Virtual Matrix				-											-				✓		
Share video image	Via locally using installed communication applications (such as email)														Print, copy to clip-board and save to file						
Switch to camera by number				-															✓		
PTZ support																					
Define presets in the client application				-															✓		
Define and control patrolling schemes in the client application				-														-			✓
View who has PTZ control and time to automatic release				-											✓	-	✓	-		✓	
Lock PTZ control				-														-			✓
Go to preset positions				✓								✓							✓		
Pause patrolling at manual operation				✓								✓							✓		
Immervision Enables® panomorph lens support				-															✓		
Joystick support				-															✓		
Assign commands to keyboard shortcuts and joystick buttons				-															✓		
Auxiliary commands (wash and wipe)				-															✓		
I/O and events control																					
Camera overlay buttons				-															✓		
Manually activate events and trigger outputs				✓								✓							✓		
Playback																					
Maximum view items per view	1							Dynamic, 4-18 depending on screen resolution							100						
Playback mode	Single camera							Multi camera							Multi camera						
Recording search	✓							✓							✓						
Recent history of recording sequences per camera	✓							-							✓						
Time/date search	✓							✓							✓						
Independent playback in playback mode	-							-							✓						
Event/alert list in recording	-							-							✓						
Graphical timeline	-							✓							✓						
Adjust playback speed	✓							✓							✓						
Single frame step (forward/backward)	✓							✓							✓						
One-way audio support	-							-							✓						

XProtect Client	Milestone Mobile							XProtect Web Client							XProtect Smart Client						
Feature set when used with specific XProtect VMS platform	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Two-way audio support				-							-				✓	-	✓	-		✓	
Two-way AAC support				-							-						✓	-		✓	
Digital zoom				✓							✓							✓			
Share video image	Via locally installed communication applications (such as email)							Single JPG image export							Print, copy to clip-board and save to file						
Print report with comments				-							-								✓		
Privacy masking				✓							✓								✓		
Smart Search																					
Smart Search based on VMD analysis				-							-				-	✓	-	✓		-	
Smart Search based on VMD metadata				-							-				✓	-	✓	-		✓	
Sequence Explorer																					
Dedicated Sequence Explorer tab				-							-								✓		
Search on sequences and time intervals				-							-								✓		
Search on bookmarks				-							-						-			✓	
Smart Search integrated with Sequence Explorer				-							-				✓	-	✓	-		✓	
Bookmark function																					
Manual bookmarking (quick bookmarking and bookmarking with details)				-							-						-			✓	
Instant preview of bookmarks in timeline				-							-						-			✓	
Listing and previewing of bookmarks in recording search				-							-						-			✓	
Print bookmark report				-							-						-			✓	
Direct video export of bookmark				-							-						-			✓	
Alarm Manager																					
Dedicated Alarm Manager tab that can be displayed as floating window				-							-				-				✓		
Alarm list and alarm preview view items in normal camera views				-							-								✓		
Sort and filtering functions				✓							-								✓		
Instant preview of primary and related cameras				-							-								✓		
Manage alarms (reassign & change status)	-			✓				-			✓				-				✓		
Manage alarms (comment)	-			✓				-			-				-				✓		
Integration with map function				-							-								✓		
Alarm description/work instructions	-			✓				-			✓				-				✓		
Escalation and forwarding handling				-							-				-				✓		
Alarm handling reports with print function				-							-				-				✓		
Alarm location maps in alarm list				-							-				-				✓		

XProtect Client	Milestone Mobile							XProtect Web Client							XProtect Smart Client						
Feature set when used with specific XProtect VMS platform	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Server side export				✓																	
Storyboard function in export				-																	
Encrypted export with password protection and digital signing ⁽³⁾				-																	
Verification of digital video signatures in XProtect Smart Client – Player ⁽³⁾				-																	
Re-export prevention option ⁽³⁾				-																	
Auto-export of XProtect Smart Client – Player ⁽³⁾				-																	
Preserve system defined privacy masks				✓																	
Additional export specific privacy masks				-																	
Direct export to optical media				-																	
Flexible camera selection for export				-																	
Bulk export to multiple media formats				-																	
General and camera specific export comments ⁽³⁾				-																	
Pre/post comment slides (media player format only)				-																	
Video Push																					
Video Push				✓																	
Include location metadata with Video Push	✓	-	✓	-		✓															
System Monitoring																					
Access real-time and historical system performance information (refer to System Monitor section for the VMS for details)				-																	✓
Installation																					
Run without installation				-								✓									-
Optional browser plug-ins for enhance viewing performance				-								✓									-
Single step installer (installs client together with server)				-								-									✓
Initial and update installations from management Server ⁽⁴⁾				-								-									✓
Notify about new updates				✓								-			-	✓	-	✓			-
Smart Connect (Automatic server setup)				✓								-									-
System access																					
Auto-login				✓								-									✓
Dual authorization				-								-			-						✓
Two-step verification				-			✓					-		✓							-
Secure (HTTPS) client-server connection				✓								✓									-
Dynamic bandwidth adaptation with threshold setting				✓								✓									-

XProtect Client	Milestone Mobile							XProtect Web Client							XProtect Smart Client						
Feature set when used with specific XProtect VMS platform	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Authorization																					
Restrict user access by client type (Web Client, Milestone Mobile and Smart Client)	✓	-	✓	-		✓		✓	-	✓	-		✓		✓	-	✓	-		✓	
Time schedule controlled user access to devices and functions				-			✓				-			✓				-			✓
Restrict user access by devices (cameras, microphones, I/O devices, etc.)				✓							✓							✓			
Restrict access to live, PTZ control, playback and export				✓							✓							✓			
Restrict access to setup				-							-							✓			
Personalization																					
Toggle between Advanced mode and Simplified mode				-							-							✓			
Application options				✓							-							✓			
Centralized management of application options				-							-						-			✓	
Application theme support				-							-							✓			
Task-oriented tabs				-							✓							✓			
System																					
Hardware accelerated video decoding				-							-							✓			
Languages (Installation, UI and help function)																					
Arabic				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
Bulgarian				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Croatian				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Chinese (Simplified)				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
Chinese (Traditional)				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
Czech				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
Danish				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
Dutch				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
English				✓							✓							✓			
Farsi				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Finnish				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
French				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
German				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			
Hebrew				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Hindi				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Hungarian				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Icelandic				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓ ⁽⁶⁾			
Italian				✓ ⁽⁵⁾							✓ ⁽⁵⁾							✓			

XProtect Client	Milestone Mobile							XProtect Web Client							XProtect Smart Client						
Feature set when used with specific XProtect VMS platform	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate	XProtect Essential+	XProtect Express	XProtect Express+	XProtect Professional	XProtect Professional+	XProtect Expert	XProtect Corporate
Japanese				√ ⁽⁵⁾																	
Korean				√ ⁽⁵⁾																	
Norwegian (Bokmål)				√ ⁽⁵⁾																	
Polish				√ ⁽⁵⁾																	
Portuguese (Brazilian)				√ ⁽⁵⁾																	
Russian				√ ⁽⁵⁾																	
Serbian				√ ⁽⁵⁾																	
Slovak				√ ⁽⁵⁾																	
Spanish				√ ⁽⁵⁾																	
Swedish				√ ⁽⁵⁾																	
Thai				√ ⁽⁵⁾																	
Turkish				√ ⁽⁵⁾																	

Notes:

- (1) Requires Milestone Care Plus service coverage
- (2) Initial views created when using the "single computer" installation option
- (3) Feature only applicable to exports in XProtect format
- (4) Image server in XProtect Express and XProtect Professional
- (5) Milestone mobile server localized to same languages as the management interface and documentation is only available in English
- (6) Only the user interface is localized; user's manual and online help is not localized

8. Other Devices

IOLAN SDS W Serial Device Servers

 perle.com/products/iolan-sds-wireless-device-server.shtml

Wireless LAN Serial to Ethernet

- High performance WLAN (Wi-Fi ®) : Dual band radio supporting IEEE 802.11 a,b,g,n
- Wireless speeds up to 150Mbps
- 1, 2 or 4 software selectable RS232/422/485 serial port interfaces
- High-Speed Gigabit Ethernet (10/100/1000 Base-T)
- Advanced security features for data encryption, user authentication and event management
- Wireless Infrastructure and peer to peer connectivity modes



For secure, High-Speed serial to Ethernet connectivity over wireless LAN applications, the IOLAN SDS W Device Server is the most advanced compact product available on the market today. Delivering high performance in a compact size, an IOLAN SDS W offers a support for a broad range of high performance Wireless LAN technology, extensive security, flexibility and next generation IPv6 technology making it ideal for applications that require remote serial device/console management, data capture or monitoring.

Why IOLAN SDS Wireless Device Servers are the preferred choice:

- Broad range support of Wireless LAN Technology : IEEE 802.11 a,b,g,n @ 2.4Ghz/5Ghz
- Fast wireless – speeds up to 150Mbps
- High-Speed Gigabit Ethernet 1000base-T interface including support for 100base-TX and 10base-T
- As a wireless client proxy, provides wireless connectivity to central access points for serial and ethernet devices
- Can provide a direct serial to serial peer connection over wireless
- Software Access Point ([SoftAP](#)) for up to 6 wireless clients.
- Fast Wireless Roaming capability is ideal for mobile applications where the IOLAN can transparently roam between APs (Access Points) that share the same ESS (Extended Service Set)
- Redundant dual power inputs (barrel and terminal block)
- [TrueSerial®](#) packet technology delivers the most authentic serial connections across Ethernet for serial protocol integrity
- Indicators for network and serial interfaces for easy troubleshooting
- Plug & Play installation utility eliminates configuration hassles for all IOLAN's on your IP network
- [TruePort](#) – Perle's com/tty redirector for serial based applications operates on Windows, Vista, Linux, Solaris, SCO and Unix
- Next Generation IP support (IPv6) for investment protection and network compatibility
- Compact and protective solid steel enclosure for tabletop, wall mount or DIN rail mounting
- Java-free browser access to remote serial console ports via Telnet and SSH

- [Ping watchdog probes](#) enable customers to power cycle equipment with attached Perle RPS power switches in the event of an unresponsive networking gear

Secure Serial to Ethernet Connectivity

The **IOLAN SDS Wireless Device Server** enables administrators to securely access remote serial console ports on equipment such as PBX, servers, routers, network storage equipment and security appliances through an IP network. Sensitive data such as credit card holder information is protected through standard encryption tools such as Secure Shell (SSH) and Secure Sockets Layer (SSL). Access by authorized users is assured via authentication schemes such as RADIUS, TACACS+, LDAP, Kerberos, NIS and RSA Security's SecurID tokens.

By using encryption technologies, an IOLAN can protect sensitive and confidential data from a serial device such as a credit card reader before being sent across a corporate Intranet or public Internet. For compatibility with peer encryption devices, all of the major encryption ciphers such as AES, 3DES, RC4, RC2 and CAST128 are fully supported.

Recognized as the most secure method for communicating to remote private networks over the Internet, the IPSec standard provides robust authentication and encryption of IP packets at the network layer of the OSI model. As a standard it is ideal for multi-vendor interoperability within a network providing flexibility and the ability to match the right solution for a particular application.

IOLAN Plug-ins

By choosing a Perle IOLAN Device Server you can rest assured that virtually any device with a serial COM port will operate in conjunction with your desired application exactly as it did when you had it directly connected. In the unlikely event that the Perle IOLAN Device Server does not enable this out of the box, *Perle will make it work.*

Perle IOLAN Device Servers utilize customer installable "[Device Plug-ins](#)" to successfully network devices where other solutions have failed. [Request a free engineering consultation now.](#)

Advanced IP Technology

With support for Next Generation IP (IPv6) the **IOLAN Serial to Ethernet Device Server** range provides organizations with investment protection to meet this rapidly growing standard.

Demand for IPv6, which is compatible with IPv4 addressing schemes, is driven by the need for more IP address. With the implementation and rollout of advanced cellular networks, a robust method is needed to handle the huge influx of new IP addressable devices on the Internet. In fact, the US Department of Defense has mandated that all equipment purchased be IPv6 compatible. In addition, all major Operating Systems such as Windows, Linux, Unix and Solaris, as well as routers, have built-in support for IPv6.

It is therefore important for end users and integrators to select networking equipment that incorporates the IPv6 standard. The IOLAN line with support for IPv6 already built in, is the best choice in serial to Ethernet technology.

Flexible and Reliable Serial to Ethernet Connections

An **IOLAN SDS W Device Server** is ideal for wirelessly connecting serial based COM port, UDP or TCP socket based applications to remote devices. Perle's [TruePort re-director](#) provides fixed TTY or COM ports to serial based applications enabling communication with remote devices connected to Perle IOLAN's either in encrypted or clear text modes. You can also tunnel serial data between devices across an IP network.

Perle's Device Management software provides better centralized control of multiple units resulting in maximum

uptime for your remote equipment.

All IOLAN SDS W models have added protection against electrostatic discharges and power surges with robust 15Kv ESD protection circuitry enabling organizations to utilize this solution in the field with confidence.

Lifetime Warranty

All **Perle IOLAN SDS Serial to Ethernet Device Servers** are backed by the best service and support in the industry including Perle's unique lifetime warranty. Since 1976 Perle has been providing its customers with networking products that have the highest levels of performance, flexibility and quality.

Wi-Fi is a registered trademark of Wi-Fi Alliance Corporation

Topology Support

Serial to WLAN

Serial to ethernet

Ethernet to WLAN

Infrastructure (to Access Point) and secure peer to peer using [SoftAP \(vs legacy "Ad-Hoc" \)](#)

Serial Port Access

Connect directly using Telnet / SSH by port and IP address

[Connect with EasyPort menu by Telnet / SSH](#)

[Use an internet browser to access with HTTP or secure HTTPS via EasyPort Web menu](#)

Java-free browser access to remote serial console ports via Telnet and SSH

[Ports can be assigned a specific IP address \(aliasing \)](#)

Multisession capability enables multiple users to access ports simultaneously on 2 and 4 port models

[Multihost access enables multiple hosts/servers to share serial ports](#)

Accessibility

In-band (Ethernet) and out-of-band (dial-up modem) support

[Dynamic DNS enables users to find a console server from anywhere on the Internet](#)

[Domain name control through DHCP option 81](#)

IPV6 and IPV4 addressing support

Availability

Primary/Backup host functionality enables automatic connections to alternate host(s)

Security

SSH v1 and v2

SSL V3.0/TLS V1.0, SSL V2.0

SSL Server and SSL client mode capability

SSL Peer authentication

[IPSec VPN : NAT Traversal, ESP authentication protocol](#)

Encryption: AES (256/192/128), 3DES, DES, Blowfish, CAST128, ARCFOUR(RC4), ARCTWO(RC2)

Hashing Algorithms: MD5, SHA-1, RIPEMD160, SHA1-96, and MD5-96

Key exchange: RSA, EDH-RSA, EDH-DSS, ADH

X.509 Certificate verification: RSA, DSA

Certificate authority (CA) list

Wireless LAN : WPA-PSK, WPA2-PSK & Enterprise (EAP, PEAP, LEAP), WEP, IEEE 802.11i, IEEE 802.1x supplicant

Local database

RADIUS Authentication, Authorization and Accounting

TACACS+ Authentication, Authorization and Accounting

LDAP, NIS, Kerberos Authentication

RSA SecureID-agent or via RADIUS Authentication

SNMP v3 Authentication and Encryption support

IP Address filtering

Disable unused daemons

Active Directory via LDAP

Terminal Server

Telnet

SSH v1 and v2

Rlogin

Auto session login

LPD, RCP printer

MOTD - Message of the day

Serial machine to Ethernet

[Tunnel raw serial data across Ethernet - clear or encrypted](#)

Raw serial data over TCP/IP

Raw serial data over UDP

[Serial data control of packetized data](#)

[Share serial ports with multiple hosts/servers](#)

Virtual modem simulates a modem connection - assign IP address by AT phone number

Virtual modem data can be sent over the Ethernet link with or without SSL encryption

[TruePort com/tty redirector](#) for serial based applications on Windows, Linux, Solaris, SCO, HP UX, NCR UNIX and AIX. For a complete list of all the latest drivers click [here](#)

[TrueSerial](#) packet technology provides the most authentic serial connections across Ethernet ensuring serial protocol integrity

RFC 2217 standard for transport of serial data and RS232 control signals

Customizable or fixed serial baud rates

[Plug-ins allow customer or Perle provided plug-ins for special applications](#)

[Software Development Kit \(SDK \) available](#)

[Serial encapsulation of industrial protocols such as ModBus, DNP3 and IEC-870-5-101](#)

[ModBus TCP gateway enables serial Modbus ASCII/RTU device connection to ModBus TCP](#)

[Data logging will store serial data received when no active TCP session and forward to network peer once session re-established - 32K bytes circular per port](#)

Console Management

[Sun / Oracle Solaris Break Safe](#)

Local port buffer viewing - 256K bytes per port

External port buffering via NFS, encrypted NFS and Syslog

Event notification

[Manage AC power of external equipment using Perle RPS power management products](#)

[Clustering - central console server enables access ports across multiple console servers](#)

[Windows Server 2003/2008 EMS - SAC support GUI access to text-based Special Administrative Console](#)

[Ping watchdog probes](#) enable customers to power cycle equipment with attached Perle RPS power switches in the event of an unresponsive networking gear

Remote Access

Dial, direct serial PPP, PAP/CHAP, SLIP

[HTTP tunneling](#) enables firewall-safe access to remote serial devices across the internet

Automatic DNS Update Utilize DHCP Opt 81 to set IOLAN domain name for easy name management and with Dynamic DNS support , users on the Internet can access the device server by name without having to know its IP address. See [Automatic DNS update](#) support for details

[IPSEC VPN client/servers](#) Microsoft L2TP/IPSEC VPN client (native to Windows XP)

Microsoft IPSEC VPN Client (native to Windows Vista)

Cisco routers with IPSEC VPN feature set

Perle IOLAN SDS/STS and SCS models

OA&M (Operations, Administration and Management)

WiFi Protected Setup (WPS)

SNMP V3 - read and write, Perle MIB

Syslog

Perle Device Manager - Windows based utility for large scale deployments

Configurable default configuration

[Installation Wizard](#)

Set a Personalized Factory Default for your IOLANs

Protocols

IPv6, IPv4, TCP/IP, Reverse SSH, SSH, SSL, IPSec/IPv4, IPSec/IPv6, L2TP/IPSec, CIDR, RIPv2/MD5, ARP, RARP, UDP, UDP Multicast, ICMP, BOOTP, DHCP, TFTP, SFTP, SNTP, Telnet, raw, reverse Telnet, LPD, RCP, DNS, Dynamic DNS, WINS, HTTP, HTTPS, SMTP, SNMPV3, PPP, PAP/CHAP, SLIP, CSLIP, RFC2217, MSCHAP

Hardware Specifications - IOLAN SDS W- 1, 2 and 4 port Wireless LAN Serial Device Servers

	IOLAN SDS1 W, SDS2 W	IOLAN SDS4 W
Processor	600Mhz ARM Processor	
Memory		
RAM MB	512M	512M
Flash MB	4G	4G
Interface Ports		
Number of Serial Ports	1, 2 (DB9M)	4 (RJ45)
Serial Port Interface	Software selectable EIA232/422/485	Software selectable EIA-232/422/485
Back of product		
Sun / Solaris	Sun / Oracle 'Solaris' Safe - no "break signal" sent during power cycle causing costly server re-boots or downtime	
Serial Port Speeds	300bps to 230Kbps with customizable baud rate support	
Data Bits	5,6,7,8, 9-bit protocol support	
Parity	Odd, Even, Mark, Space, None	
Flow Control	Hardware, Software, Both, None	
Serial Port Protection	15Kv Electrostatic Discharge Protection (ESD)	
Local Console Port	RS232 on Serial Port	
Ethernet Network	Autosensing 1000-base-T / 100-base TX / 10-base T Auto-MDIX	
	Software selectable Ethernet speed 1000/100/10	
	Software selectable Half/Full/Auto duplex	

Ethernet Isolation	1.5Kv Magnetic Isolation	
Wireless LAN standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11i	
Wireless Topology	Infrastructure (AP) and Peer to Peer- (<u>SoftAP</u>) modes	
Wireless Radio	Dual-Band Radio ; 2.4GHz and 5GHz 20, 40Mhz SISO 2.4-GHz	Dual-Band Radio ; 2.4GHz and 5GHz 20, 40Mhz SISO 2.4GHz
Rx Diversity, Maximal Ratio Combining (MRC)	<p>Dual antenna provides optimal wireless performance, signal reliability, and extended range</p> <ul style="list-style-type: none"> • Rx Diversity on 5GHz band • Maximal Ratio Combining - MRC @ 2.4GHz provides 1.4 times extended range 	
Wireless Data Rates	802.11n: 15, 30, 45, 60, 90, 120, 135, 150 Mbps (40Mhz channel @ 400ns Short GI) 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps	
Operational Frequency Range (MHz)	2412 to 2484 MHz 4910 to 5825 MHz	
Modulation	DSSS, CCK, OFDM, BPSK, QPSK, 16-QAM, 64-QAM	

Wireless Receiver
Sensitivity in dBm
(2.4Ghz SISO)

802.11b/g (20 MHz channel)

1 Mbps: -95.0
2 Mbps: -92.0
5.5 Mbps: -89.2
6 Mbps: -91.0
9 Mbps: -89.0
11 Mbps: -86.3
12 Mbps: -88.0
18 Mbps: -85.5
24 Mbps: -82.5
36 Mbps: -79.0
48 Mbps: -74.0
54 Mbps: -72.7

802.11n (20 MHz channel) @ 400ns GI

7.2 Mbps (MCS0): -89.3
14.4 Mbps (MCS1): -86.5
21.7 Mbps (MCS2): -84.5
28.9 Mbps (MCS3): -81.5
43.3 Mbps (MCS4): -78.0
57.8 Mbps (MCS5): -73.5
65.0 Mbps (MCS6): - 71.5
72.2 Mbps (MCS7): -70.0

802.11n (40 MHz channel) @ 400ns GI

15.0 Mbps (MCS0): -89.3
30.0 Mbps (MCS1): -86.5
45.0 Mbps (MCS2): -84.5
60.0 Mbps (MCS3): -81.5
90.0 Mbps (MCS4): -78.0
120.0 Mbps (MCS5): -73.5
135.0 Mbps (MCS6): - 71.5
150.0 Mbps (MCS7): -70.0

Wireless Transmit
Power in dBm
(2.4Ghz SISO)

(20 MHz channel)
1 Mbps: 16.0
2 Mbps: 16.0
5.5 Mbps: 16.0
6 Mbps: 16.5
9 Mbps: 16.5
11 Mbps: 16.0
12 Mbps: 16.5
18 Mbps: 16.5
24 Mbps: 16.5
36 Mbps: 15.2
48 Mbps: 14.3
54 Mbps: 13.5
MCS0 : 16.0
MCS1 : 16.0
MCS2 : 16.0
MCS3 : 16.0
MCS4 : 15.2
MCS5 : 14.3
MCS6 : 13.5
MCS7 : 12.6

(40 MHz channel)
MCS0 : 14.0

MCS7 : 11.8

Wireless Receiver
Sensitivity in dBm
(5Ghz SISO)

802.11a
6 Mbps: -92.5
9 Mbps: -90.5
12 Mbps: -90.0
18 Mbps: -87.5
24 Mbps: -84.5
36 Mbps: -81.0
48 Mbps: -76.5
54 Mbps: -74.6

802.11n (20MHz channel) @ 400ns GI
7.2 Mbps (MCS0): -91.4
14.4 Mbps (MCS1): -88.0
21.7 Mbps (MCS2): -86.0
28.9 Mbps (MCS3): -83.0
43.3 Mbps (MCS4): -79.8
57.8 Mbps (MCS5): -75.5
65.0 Mbps (MCS6): - 74.0
72.2 Mbps (MCS7): -72.4

802.11n (40MHz channel) @ 400ns GI
15.0 Mbps (MCS0): -88.5

150.0 Mbps (MCS7): -69.3

Wireless Transmit Power in dBm (5Ghz SISO)	<u>802.11a</u> 6 Mbps: 18.0 9 Mbps: 18.0 12 Mbps: 18.0 18 Mbps: 18.0 24 Mbps: 17.4 36 Mbps: 16.5 48 Mbps: 15.8 54 Mbps: 14.5 <u>802.11n (HT20) @ 400ns GI</u> 7.2 Mbps (MCS0): 18.0 14.4 Mbps (MCS1): 18.0 21.7 Mbps (MCS2): 18.0 28.9 Mbps (MCS3): 18.0 43.3 Mbps (MCS4): 16.5 57.8 Mbps (MCS5): 15.8 65.0 Mbps (MCS6): 14.5 72.2 Mbps (MCS7): 12.0 <u>802.11n (HT40) @ 400ns GI</u> 15.0 Mbps (MCS0): 16.5 150.0 Mbps (MCS7): 12.0
--	--

Short Guard Interval (SGI)	800ns and 400ns (Short Guard Interval)
------------------------------	--

Wireless Antenna	Single 2.15 dBi, Dipole, SMA connector	Dual 2.15 dBi, Dipole, SMA Connectors for Rx diversity/MRC
------------------	--	--

Wireless Security	WEP, WPA-PSK, WPA2-PSK & Enterprise (EAP, PEAP, LEAP), 802.11i (includes hardware-accelerated Advanced Encryption Standard [AES]), 802.1x supplicant
-------------------	---

Fast Wireless Roaming	Ideal for mobile applications , the IOLAN can transparently roam between APs (Access Points) that share the same ESS (Extended Service Set)
-----------------------	---

WiFi Protected Setup(WPS V2)	A plug and play set up feature where the IOLAN can easily connect to <ul style="list-style-type: none"> • a WPS capable central access point or <ul style="list-style-type: none"> • SoftAP compliant device supporting WPS
--------------------------------	---

Power

Power Supply	120 V / 230V AC to 12vDC Wall Power Adaptor included. (Barrel connector, commercial-grade temperature – 0 to 60C)
--------------	---

2 x Power Supply Selection	Use external power 9-30v DC on standard 5.5mm x 9.5mm x 2.1mm barrel socket or 2-pin terminal block
----------------------------	---

Nominal Input Voltage	12/24v DC
-----------------------	-----------

Input Voltage Range	9-30v DC	
Typical Power Consumption @ 24v DC (Watts)	1 port : 3.96 2 port: 4.23	4.44

Indicators

LEDs	Power/Ready
	Network Link
	Network Link activity
	Serial: Transmit and Receive data per port
	Wireless Link
	Wireless Strength

Environmental Specifications

Heat Output (BTU/HR)	1 port: 13.5 2 port: 14.4	15.1
MTBF (Hours)*	1 port : 222,675 2 port : 206,430	170,530
Operating Temperature	-40° C to 75° C (-40 F to 167° F)	
Storage Temperature	-40 C to 85 C (-40 F to 185 F)	
Humidity	5 to 95% (non-condensing) for both storage and operation.	
Case	SECC Zinc plated sheet metal (1 mm)	
Ingress Protection Rating	IP40	
Mounting	Wall or Panel mounting, DIN Rail mounting kit optional	

Product Weight and Dimensions

Weight	0.25 kg (0.55 lbs)	0.4 kg (0.88 lbs)
Dimensions	90 x 76 x 24 mm (3.5 x 3.0 x 0.9 in)	110 x 111 x 24 mm (4.3 x 4.4 x 0.9 in)

Packaging

Shipping Dimensions	26 x 17 x7 cm (10.2 x 6.7 x 2.8 in)	26 x 17 x7 cm (10.2 x 6.7 x 2.8 in)
Shipping weight	0.55 kg (1.21 lbs)	0.71 kg (1.6 lbs)

Regulatory Approvals

Emissions	FCC Part 15, Subpart B, Class B
	CFR47:2003, Chapter 1, Part 15 Subpart B,(USA) Class B
	ICES-003, Issue 4, February 2004 (Canada)
	EN55022:1998 + A1:2000 + A2:2003 Class A
	EN61000-3-2 : 1995, Limits for Harmonic Current Emissions
	EN61000-3-3 : 1995, Limits of Voltage Fluctuations and Flicker
Immunity	EN55024:1998 + A1:2001 + A2:2003
	EN61000-4-2: Electrostatic Discharge
	EN61000-4-3: RF Electromagnetic Field Modulated
	EN61000-4-4: Fast Transients
	EN61000-4-5: Surge
	EN61000-4-6: RF Continuous Conducted
	EN61000-4-8: Power-Frequency Magnetic Field
	EN61000-4-11: Voltage Dips and Voltage Interruptions
Safety	IEC 60950-1 : 2005 (2nd Edition) + A1 : 2009 and EN 60950-1 : 2006 + A11 : 2009
	CAN/CSA-C22.2 No. 60950-1-03 and ANSI/UL 60950-1, First Edition April 1st 2003 (Recognized Component)
Wireless Regulatory Domain	<p>IOLAN SDS W is certified for the following regulatory domains</p> <ul style="list-style-type: none"> • FCC/ICES • ETSI • TELEC <p><i>Users are responsible for verifying approval for use in their individual countries.</i></p>

Radio Approvals FCC Part 15.247 Subpart C (2.4 Ghz)
FCC Part 15.407 Subpart E (5 Ghz)

RSS-210 (Canada), RSS-Gen Issue 2 (Canada), ICES-003 Issue 4

ETSI EN 301 489-1 (V1.9.2)
ETSI EN 301 489-17 (V2.2.1)
ETSI EN 300 328 (V1.8.1)

ETSI EN 301 893 (V1.7.1)

Frequency Bands FCC / ICES
2.412 to 2.462 GHz; 11 channels
5.180 to 5.320 GHz; 8 channels
5.500 to 5.700 GHz; 8 channels (excluding 5.600 to 5.640 GHz)
5.745 to 5.825 GHz; 5 channels

ETSI
2.412 to 2.472 GHz; 13 channels
5.180 to 5.320 GHz; 8 channels
5.500 to 5.700 GHz; 8 channels (excluding 5.600 to 5.640 GHz)

MIC (formally TELEC)
2.412 to 2.472 GHz; 13 channels
4.920 to 4.980 GHz; 4 channels
5.030 to 5.091 GHz; 3 channels
5.180 to 5.240 GHz; 8 channels

5.500 to 5.700 GHz; 11 channels

Other [Reach, RoHS and WEEE Compliant](#)

CCATS - G168387

ECCN - 5A992

HTSUS Number: 8471.80.1000

Perle Limited Lifetime Warranty

Serial Connector Pinout

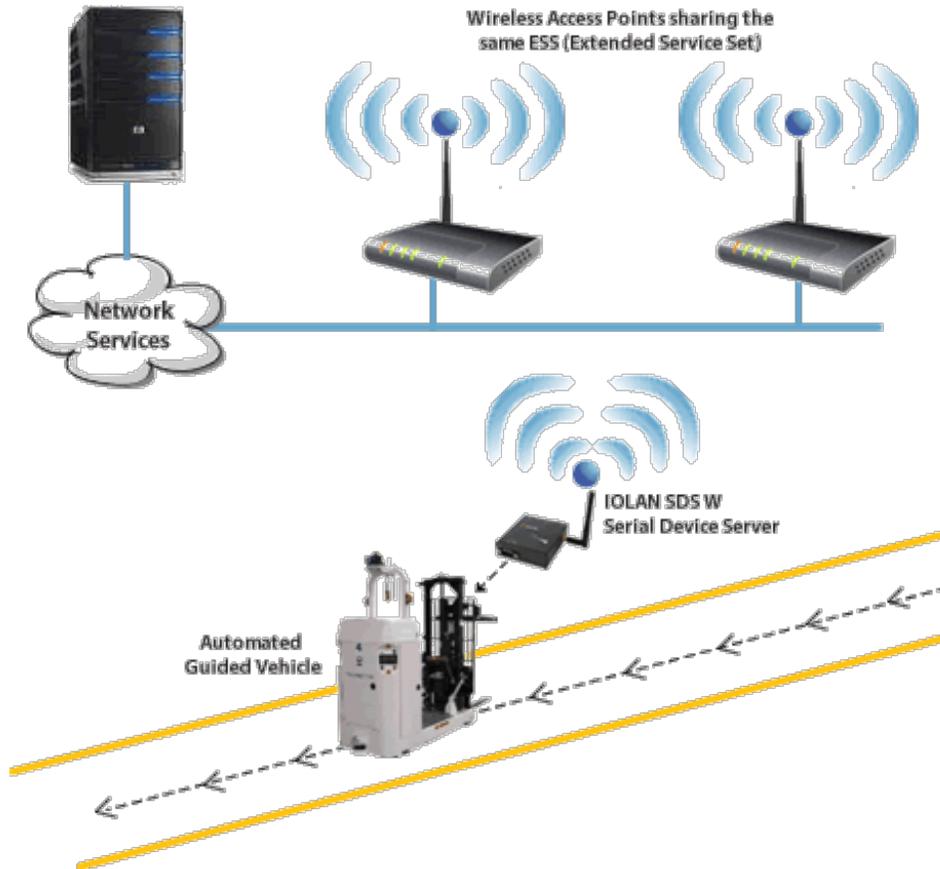
IOLAN DB9M Socket	Direction	RS232	RS485 Full Duplex	RS485 Half Duplex	RS422
1	←	DCD	-	-	-
2	←	RxD	RxD+	-	RxD+
3	→	TxD	TxD+	DATA+	TxD+
4	→	DTR	-	-	-
5	—	GND	GND	GND	GND
6	←	DSR	RxD-	-	RxD-
7	—	RTS	-	-	-
8	←	CTS	-	-	-
9	—	-	TxD-	DATA-	TxD-
IOLAN RJ45 Socket	Direction	RS232	RS485 Full Duplex	RS485 Half Duplex	RS422
1	←	DCD	-	-	-
2	→	RTS	TxD+	DATA+	TxD+
3	←	DSR	-	-	-
4	→	TxD	TxD-	DATA-	TxD-
5	←	RxD	RxD+	-	RxD+
6	—	GND	GND	GND	GND
7	←	CTS	RxD-	-	RxD-
8	→	DTR	-	-	-

[Optional Perle adapters for use with straight thru CAT5 cabling](#)

Seamless Wireless Roaming

Serial devices can roam

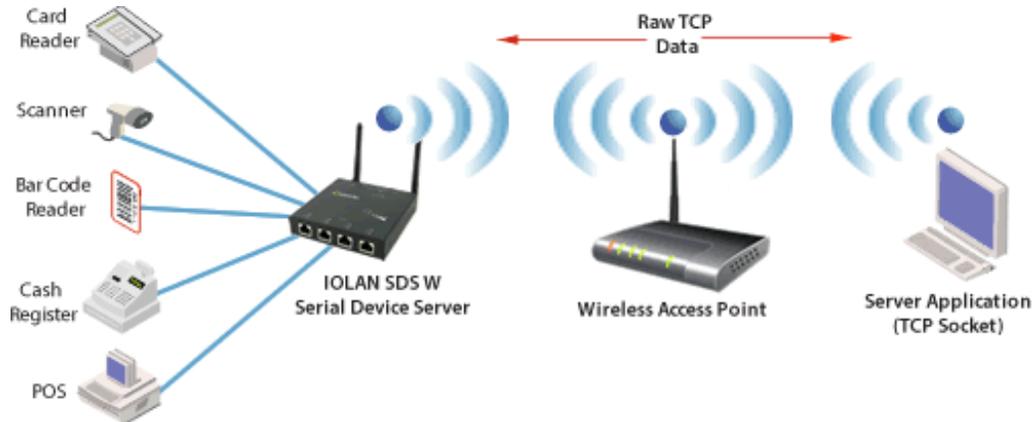
IOLAN SDS W units installed on mobile devices, such as fork lifts with a serial interface, can maintain a continuous connection to network services that are part of Wireless Access Point infrastructure that shares the same ESS (Extended Service Set).



TCP

Using RAW TCP Sockets over Wireless LAN

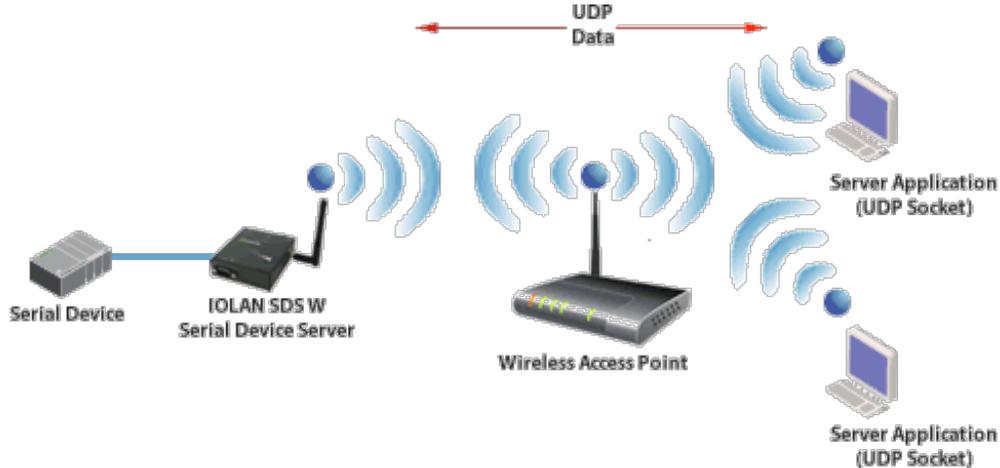
A raw TCP socket connection which can be initiated from the serial-Ethernet device or from the remote host/server. This can either be on a point to point or shared basis where a serial device can be shared amongst multiple devices. TCP sessions can be initiated either from the TCP server application or from the Perle IOLAN W **serial-Ethernet** adapter.



UDP

Using Raw UDP Sockets over Wireless LAN

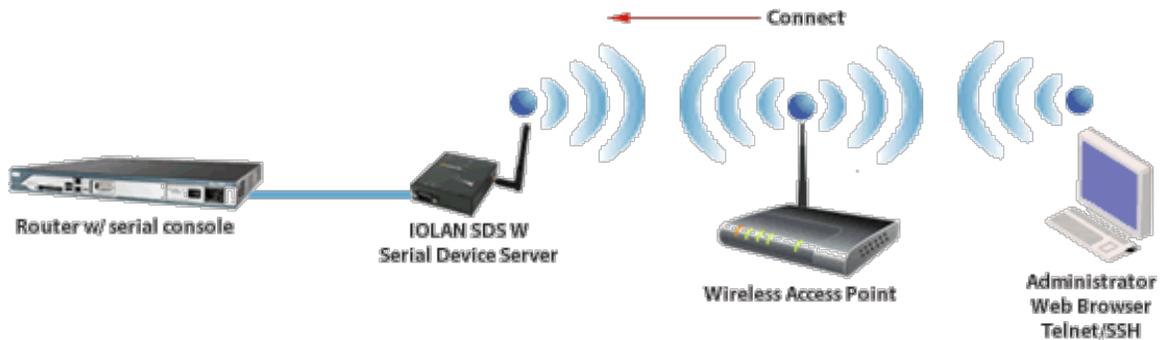
For use with UDP based applications, Perle IOLANs can convert serial equipment data for transport across UDP packets either on a point to point basis or shared across multiple devices.



Console Server

Console Management over Wireless LAN

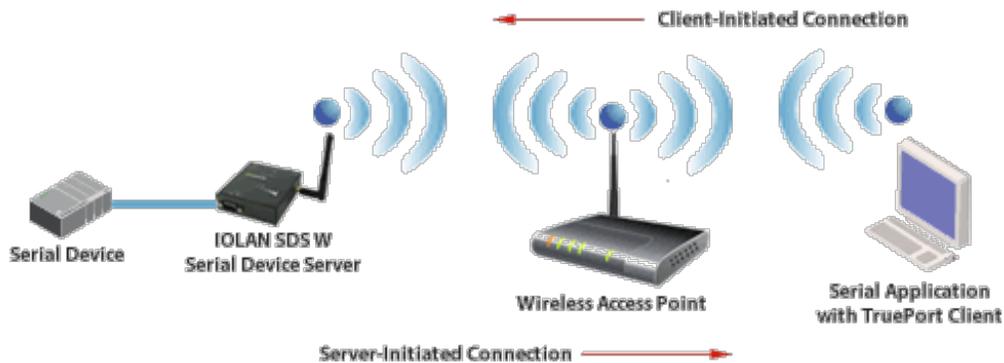
For access to remote console ports on routers, switches, etc. Perle IOLAN's enable administrators secure access to these RS232 ports via in-band Reverse Telnet / SSH over wireless LANs.



COM/TTY

Connect Serial-based Applications over Wireless LAN with a COM/TTY Port Driver

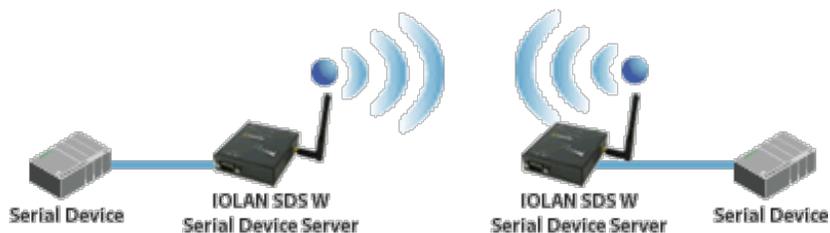
Serial ports can be connected to network servers or workstations running Perle's TruePort software operating as a virtual COM port. Sessions can be initiated either from the Perle IOLAN or from TruePort.



Serial Tunneling over Wireless

Serial Tunneling between two Serial Devices over Wireless Peer to Peer

Serial Tunneling enables you to establish a link across Ethernet to a serial port on another IOLAN. Both IOLAN serial ports must be configured for Serial Tunneling. Typically one serial port is configured as a Tunnel Server and the other serial port as a Tunnel Client.



EDS1100 & EDS2100

Hybrid Ethernet Terminal & MultiPort Device Servers

REMOTELY MONITOR, MANAGE AND CONTROL YOUR DEVICES

The EDS1100 and EDS2100 are unique, hybrid Ethernet terminal/multiport device servers which allow remote access to and management of virtually any IT/networking equipment or edge device such as medical equipment, POS terminals or security equipment.

The EDS provides bullet-proof security by offering a variety of robust data encryption and authentication options. Featuring Lantronix' powerful Evolution OS™ with AES, SSH and SSL built in, the EDS provides enterprise-level security allowing safe remote access and management from practically anywhere. What's more, the option to run Linux, with IPv6 built in, enables you to deploy custom applications and take advantage of large feature-libraries available for Linux developers.

With no special software required, setup is a breeze with the included Windows-based DeviceInstaller™. The EDS can also be set up locally via a serial port, or remotely over a network using Telnet, SSH, or a web browser (HTTP and HTTPS) or SNMP.

The EDS also includes Lantronix' patent pending VIP (virtual IP) Access™ technology, which allows for seamless integration with the AccessMyDevice™ remote services enablement platform.

Included, Lantronix' proprietary Com Port Redirector™ virtualization software, allows existing serial port applications to work with the EDS with no code modifications.



- + Quickly connect any device with a serial port to the network using robust SSH or SSL enterprise-level security
- + Run Linux or Lantronix Evolution OS for the ultimate in application development flexibility
- + Simple device set-up, configuration and monitoring with powerful, industry-standard management tools (Web, CLI, XML, SNMP)
- + VIP Access technology seamlessly integrates with Lantronix' AccessMyDevice remote services enablement platform

LANTRONIX[®]
CONNECT SMART. DO MORE.

EDS1100 & EDS2100

FEATURES

- + **High performance 32-bit processor**
- + **On-board memory**
 - 8MB SDRAM/8MB Flash
- + **Serial Interface**
 - Modes: Software selectable RS232, RS422 or RS485 (2- and 4-wire configurations supported)
 - Software selectable RS485/422 termination and biasing
 - Standard and customizable serial data rates from 300 to 921kbps
 - Characters: 7 or 8 data bits
 - Parity: Odd, Even, None
 - Stop Bits: 1 or 2
 - Modem Control Signals: CTS, RTS, DTR/DCD
 - Flow Control: XON/XOFF (software), CTS/RTS (hardware)
- + **Serial Connectors**
 - EDS1100 (Single-port): 1 x DM25F (DCE)
 - EDS2100 (Dual-port): 2 x DB9M (DTE)
- + **Network Interface**
 - 10BaseT and 100Base-TX Link
 - Protocols: HTTP, HTTPS, FTP, TFTP, Telnet, TCP/IP, UDP/IP, LPD, DHCP, SSHv2, SSLv3, SNMP v2, Auto IP, RSS, ARP, ICMP, SYSLOG, AES, SMTP, DNS, BOOTP, PPP, RFC2217
- + **Security**
 - SSL v3, SSH v2 Client & Server, Selectable 128/256/512/1024 Bit certificates
 - Encryption: AES, 3DES, RC4
 - Authentication: SHA-1, MD5, Base-64 User Access Lists
- + **VIP Access™ Enabled**
 - Seamless integration with AccessMyDevice™ remote service enablement platform
- + **Software**
 - Windows 98/NT/2000/XP/Vista-Based DeviceInstaller™
 - ComPort Redirector™
 - Secure ComPort Redirector
- + **Management**
 - Internal Web Manager (SSL Option for secure login)
 - CLI (over Serial Ports, Telnet or SSH)
 - XML Configuration Records via CLI or FTP
 - DeviceInstaller software
 - Firmware: Upgradeable via FTP, TFTP, Web, and Serial Port
 - Flash wear leveling and erase cycle statistics
- + **Internal Web Server**
 - Customizable with CGI
 - Web content on local file system and updatable through ftp

- + **Environmental**
 - Extended Temp: -40° to 85° C (-40° to 185° F)
 - Storage: -40° to 85° C (-40° to 185° F)
 - Relative Humidity: 5 to 95%, non-condensing
 - IP Rating: 30
- + **Power**
 - Input supply: 9-30 VDC
 - Power Consumption: 1.8 Watts maximum
- + **Dimensions**
 - EDS1100**
 - Size: 9.0 cm (3.5 in) L x 6.4 cm (2.5 in) W x 2.3 cm (0.9 in) H
 - Weight: 0.20 kg (0.45 lb)
 - EDS2100**
 - Size: 9.5 cm (3.7 in) L x 7.2 cm (2.8 in) W x 2.3 cm (0.9 in) H
 - Weight: 0.4 kg (0.9 lb)
- + **Regulatory Approvals**
 - FCC Part 15, Subpart B, Class A
 - EN55022, Class A
 - EN55022 and EN55024
 - EN61000-4-2, EN6100-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-6, EN61000-4-11, EN61000-4-11
 - ICES-003 Issue 4
 - AS/NZS CISPR22, VCCI
 - CSA C22.2 No. 60950-1-3
 - UL 60950-1, EN60950-1 (Eu)
 - CE, C-Tick
- + **2-year limited Warranty**

ORDERING INFORMATION

+ Part Number	+ Description
ED1100002-01	EDS1100 One-port, secure device server, 100-240 VAC International power supply with regional, RoHS, w/Evolution OS
ED1100002-LNX-01	EDS1100 One-port, secure device server, 100-240 VAC International power supply with regional, RoHS, w/Linux OS
ED2100002-01	EDS2100 Two-port, secure device server, 100-240 VAC International power supply with regional, RoHS, w/Evolution OS
ED2100002-LNX-01	EDS2100 Two-port, secure device server, 100-240 VAC International power supply with regional, RoHS, w/ Linux OS
+ Accessories	
500-163-R	DB25M to DB9F serial cable
500-164-R	DB9F to DB9F Null modem cable
500-171-R	DB25M to RS485 and 9-30 VDC power input screw terminal adapter
ACDIN1001-01	Optional DIN-rail mount



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Serial to Ethernet Converter

■ ■ ■ USR-N520

Serial-Ethernet converter access to Network

USR-N520 is an ultimate serial converter connect to RS232/RS485/RS422 based equipment across an ethernet network enable you to replace serial dial-up modem connection.

To realize two-way transparent transmission between COM and TCP/IP,manage COM on remote device over network. To communicate to multiple serial devices at the same time across a LAN or WAN network.

■ ■ ■ RS232&RS485&RS422 to Ethernet

- Modbus Gateway function,support modbus TCP to Modbus RTU in bi-direction, work as master/slave
- Virtual COM ports connect PC/servers to remote serial devices over Ethernet
- Up to 8 simultaneous clients when act as TCP Server
- Support network printing via IP address
- HTTPD Client and Websocket function available
- Two serial port,each port can be work as RS232/RS485/RS422 and can be used individually.
- Reload button, a key restore default Settings
- Unique global MAC address,defined MAC address is available
- Support DNS & DHCP, automatically access IP
- One port corresponding to two socket
- Modbus TCP to Modbus ASCII, Modbus Polling



Specifications

System Information

Processor	Cortex-M4
Basic Frequency	120MHz
Flash	512K byte

Ethernet

Port Number	1
Interface Standard	8 pin RJ45
Rate	10/100 Mbps auto-detection, MDI/MDIX
Receive Buffer	Max 16k bytes buffer
Network Protocol	IP, TCP, UDP, DHCP, DNS, HTTP, ARP, ICMP, Web socket, HTTPD Client
Protection	2KV electromagnetism isolation shell insulation blocking
Auto MDI/MDIX	Yes

Serial

Ports	2-ports
Interface	RS-232*1, 9-pin D-sub RS-485*1, 2 wire (A+, B-) RS422*1, (A,B,Y,Z)
Baud Rate	RS-232: 600 bps ~ 230.4K bps RS-485: 600 bps ~ 1024K bps
Data Bits	5, 6, 7, 8
Stop Bit	1, 2
Check Bit	None, Even, Odd, Space, Mark
Buffer	Send and receive 2k bytes respectively
Protection	RS-485: 2KV ESD, lightning protection
Resistor	RS-485 Pull-up and Pull-Down: 2.2 KΩ

Software

Virtual Serial	Windows 2000 or higher (32 bit/64 bit)
Configuration	Webpage/ Set-up software/ Serial command

Basic Parameter

Dimensions	150 x 79 x 30 mm (including shell and terminals)
Operating Temp.	-40 ~ 85°C
Storage Temp.	-40 ~ 85°C, 5 ~ 95% RH

Power

Input	DC 5 ~ 36V adapter or terminal pin
Working Current	90mA @5V
Consumption	<1W

Accessories

Power Adapter	5V1A power supply
Adapter	RS232 to RS485/RS422 convertor

More

Certificate	CE, FCC, ROHS
Warranty	2 years

Jinan USR IOT Technology Limited

Tel: 86-531-88826739

Email: sales@usr.cn





Perle IDS-105F (XT)

Unmanaged 10/100
Ethernet Switches



Installation Guide

P/N 5500338-10 (Rev B)

Overview

This document contains instructions necessary for the installation and operation of the Perle IDS-105F Ethernet switch. This Ethernet switch can be ordered as a 5-port RJ-45 switch or with 4 RJ-45 ports and one SC or ST fiber port. The fiber port can be either single mode (SM) or multimode (MM) depending on the model selected and they can operate over different wavelengths and distances. Visit the Perle website for the most up to date installation guides, models and specifications.

<http://www.perle.com/>

Model	Port 1 - 4	Port 5
IDS-105F	TP (RJ-45)	TP (RJ-45)
IDS-105F-xxxxxxx	TP (RJ-45)	Fiber port
IDS-105F-XT (Industrial Temperature)	TP (RJ-45)	TP (RJ-45)
IDS-105F-xxxxxxx-XT (Industrial Temperature)	TP (RJ-45)	Fiber port

Note: xxxxxxxx indicates models numbers for this product line.
TP = twisted pair

Features

- 10/100Base-TX with one SC/ST fiber port, multi/single mode
- IEEE 802.3/802.3u/802.3x
- 10/100, Full/Half duplex, MDI/MDIX with auto-sensing
- Auto-negotiation on copper ports
- Redundant DC power inputs
- Rugged high-strength case
- Industrial temperature models
- Din-rail or wall/panel mounting

Note – In this guide the various models will be referred to as the IDS-105F

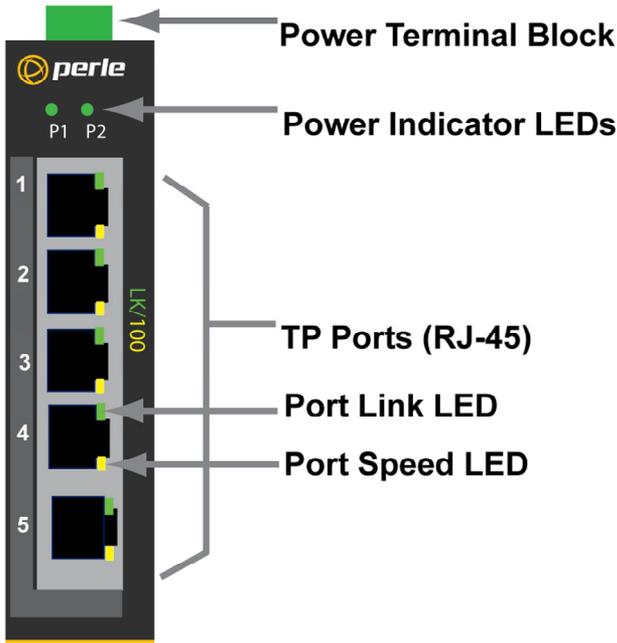
Getting to know your IDS-105F Switch

Package Contents:

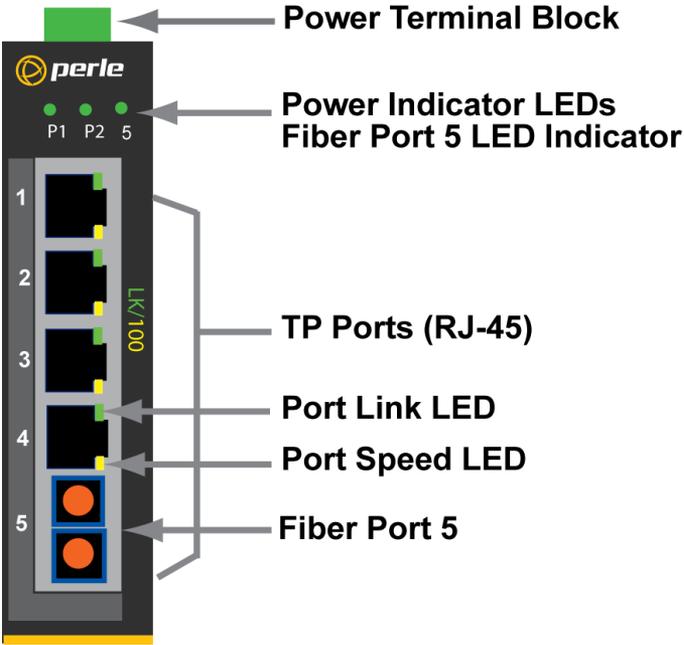
- IDS-105F
- DIN-rail mounting clip (pre-installed on the unit)
- This guide

Note – Optional panel/wall mounting kits may be ordered

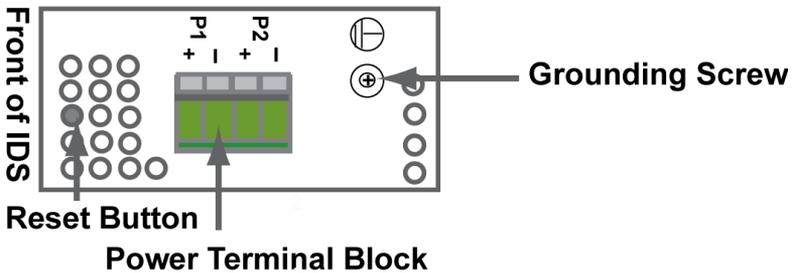
Front View of IDS-105F (5 port RJ-45)



Front View of IDS-105F (with one fiber port)



Top view of the IDS-105F



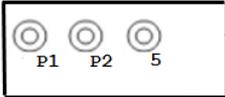
Power

The IDS-105F switch has two power inputs that can be connected simultaneously to DC or AC power sources. See [Top view of the IDS-105F](#) for location. If one power source fails, the other acts as a backup, and automatically powers the switch. See [Connecting Power to the IDS-105F](#) for information on how to connect power.

Reset Button

To reset the IDS-105F insert a paper clip into the air hole vent (see [Top view of the IDS-105F](#) for location) and gently press the reset button. The LEDs on the IDS-105F will go On and then momentarily Off when released to show that the unit has been reset. All links will be dropped and the MAC tables will be cleared.

LED Status



P1 / P2– Power (Green LED)

On: Power present

Off: No Power present

Fiber Port 5 (Green LED)

On: Link up

Flashing: Link up and Ethernet activity detected

Off: Link down

Port Link (Green LED)

On: Link Up

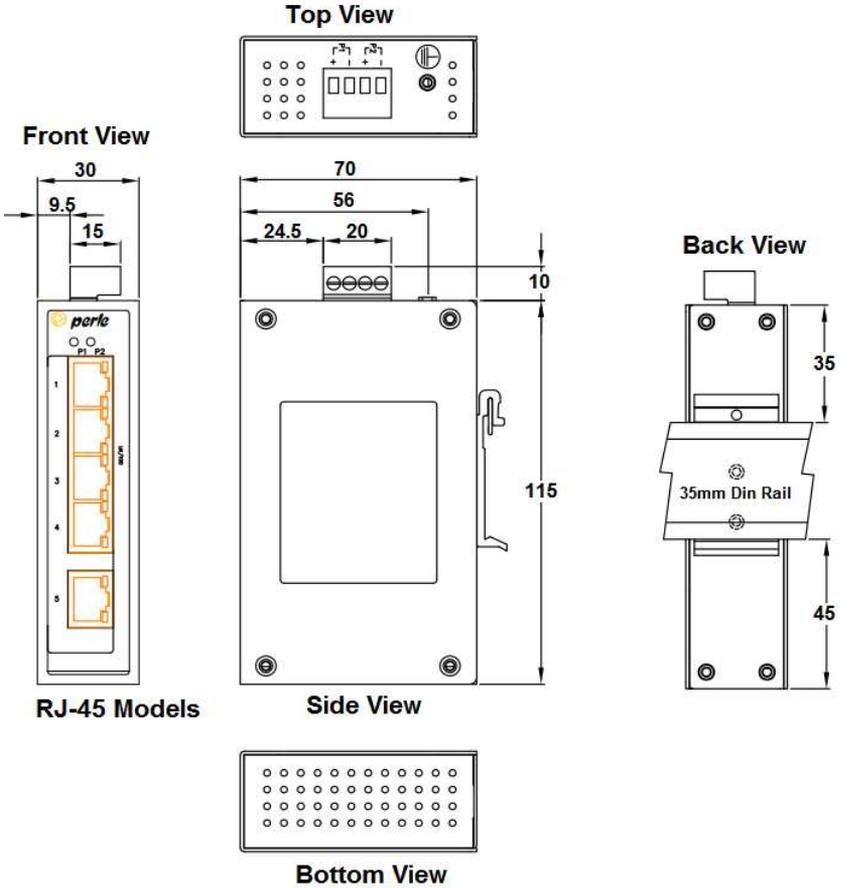
Flashing: Link up and Ethernet activity detected

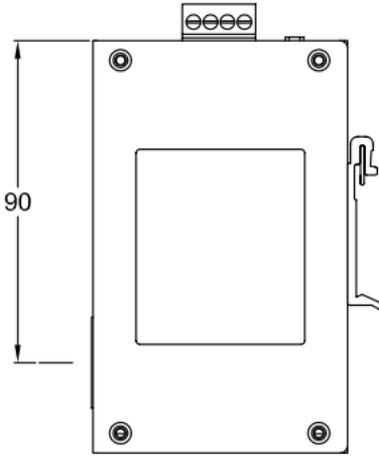
Port Speed (Solid Yellow LED)

On: Communicating at 100 Mbps

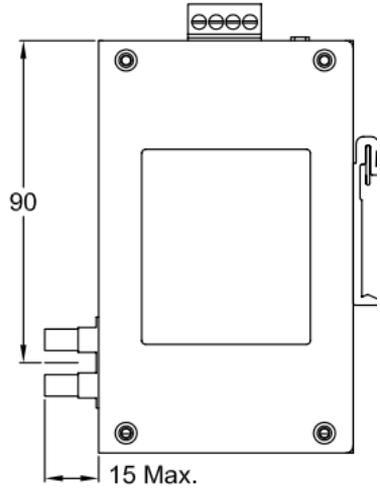
Off: Communicating at 10 Mbps

Dimensions for the IDS-105F

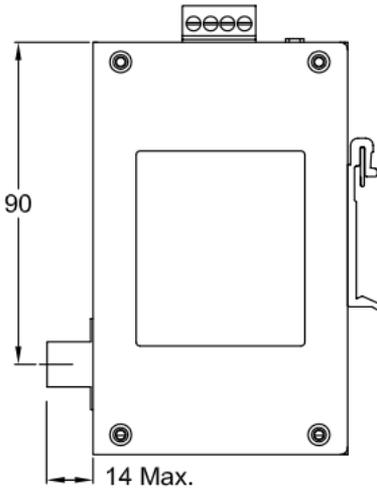




SC Fiber Models



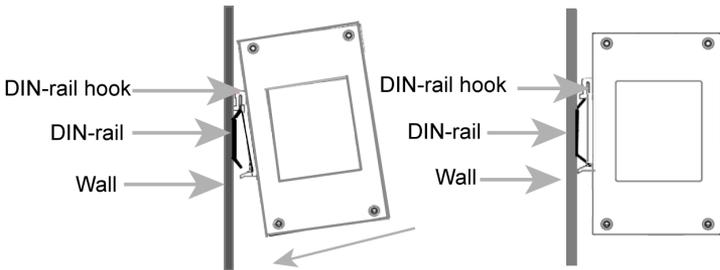
ST Fiber Models



Single Fiber Models

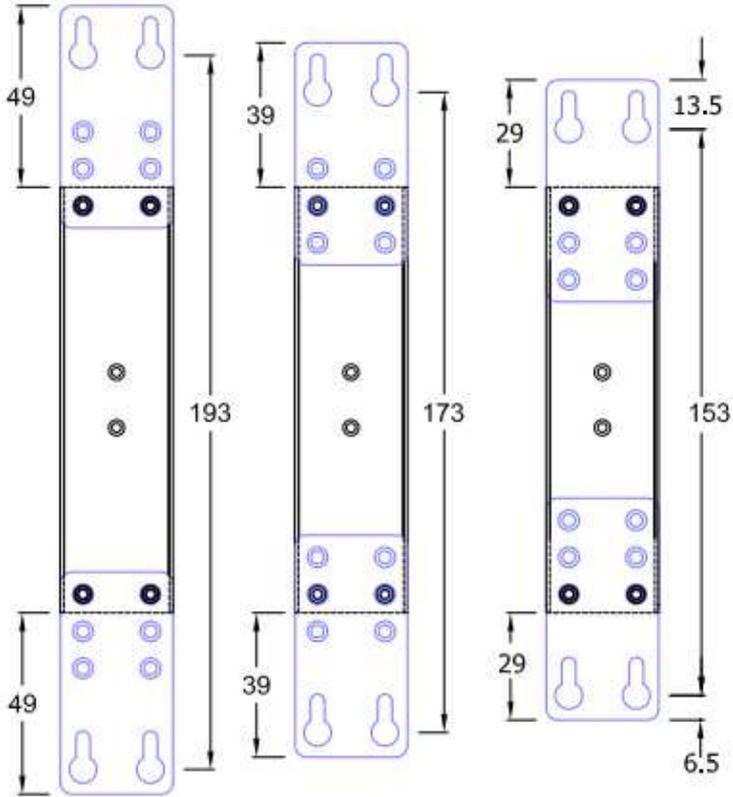
Mounting the IDS-105F on a DIN-rail

1. The DIN-rail clip will be fixed to the back panel of the IDS-105F switch when you receive the product.
2. Position the IDS-105F such that the top of the DIN-rail fits into the slot on the top of the DIN-rail clip, just below the hook and behind the spring.
3. While pushing down on the unit to compress the spring rotate the bottom of the IDS-105F toward the rail. This will snap the bottom of the rail into the bottom of the clip. See diagram below



Note: To remove the IDS-105F from the DIN-rail, push down slightly on the IDS-105F unit while pulling the bottom out.

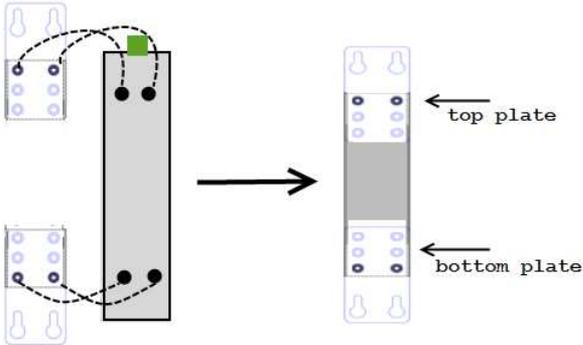
Wall/Panel Mounting



Note: the dimensions are in mm

Wall Mounting the IDS-105F

1. Remove the DIN-rail clip from the rear panel on the IDS-105F.
2. Attach the wall mount plates to the IDS-105F as shown below using the screws provided in the kit.



3. Use the wall mount plates as a guide to mark the spots where the screws will be.
4. Drive the screws into the wall leaving about 2 mm of the screw protruding from the wall to allow room for sliding the wall mount panel between the wall and the screws.
5. Once the screws are fixed to the wall, insert the four screw heads through the large part of the keyhole shaped screw openings.
6. Pull the IDS-105F down to lock the IDS-105F to the wall mount.
7. Tighten the four screws securely to the wall.

Note: For the best results use screws that have the following attributes:
Head diameter .5 - .6 mm
Shaft diameter 3 - 3.5 mm

Wiring up the IDS-105F



Power sources must be off prior to beginning the power connection steps.



Ensure that the voltage and current ratings of the intended power source are appropriate for the IDS-105F as indicated on the product label.



Ensure that the installation and electrical wiring of the equipment is performed by trained and qualified personnel and that the installation complies with all local and national electrical codes.

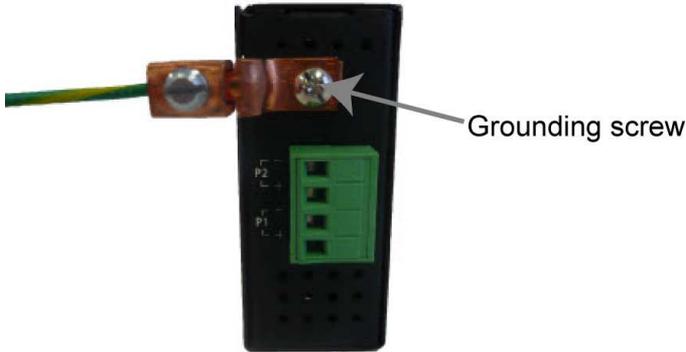


If this unit is to be installed in a location where the ambient temperature exceeds 50C, the case temperature may exceed safe levels. For this reason, this unit should be installed in a restricted access location where access can only be gained by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Connecting the IDS-105F to ground

If your installation requires additional grounding follow this procedure.

1. Select and obtain an appropriate grounding lug that can be affixed to the ground screw on the top of the IDS-105F.
2. Follow the grounding lug manufacturer's instructions for attaching it to the ground wire.
3. Attach the grounding lug to the chassis and secure with the grounding screw provided.



Grounding the chassis requires the following items:

- One grounding lug (not provided)
- One 18-12 AWG wire (not provided)

Connecting Power to the IDS-105F

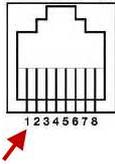
1. Ensure the power source is off prior to connection.
2. Strip both wires 5mm (3/16th inch).
3. Loosen the terminal block screws for P1 and connect positive (+) and negative (-) wires into the -/+ terminals.
4. Tighten terminal screws (0.22Nm-0.25Nm torque).
5. Ensure the wires are securely fastened.
6. Re-insert the Terminal block connector if removed.
7. Turn on power source.
8. Check that the P1 LED is On.
9. If desired connect P2 (power source 2, beginning at Step 1).

Ethernet Copper Cabling Requirements

- Category 5 UTP or STP
- 24-22 AWG
- Straight through or Ethernet crossover cable

Connect the copper cables from each TP port (RJ-45) on the IDS-105F switch to Ethernet-enabled devices. See below for pinouts.

8-pin RJ-45



MDI Port Pinouts

Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-

MDI-X Port Pinouts

Pin	Signal
1	Rx+
2	Rx-
3	Tx+
6	Tx-

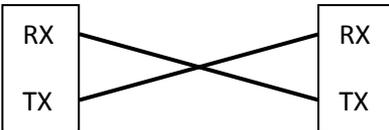
Remaining pins not used.

Fiber Port Cabling Requirements

MM: 50/125 microns or 62.5/125 microns

SM: 9/125 microns

Connect the fiber cable to Port 5 on the IDS-105F and the other end to a compliant fiber device. If you are making your own fiber cables, remember that the RX on one side needs to go to TX on the other side and vice versa. See diagram below.



Technical Specifications

Connection	
Dual input terminal block power	Power Input/Consumption 9.6 to 60 VDC, 0.37A max 18 to 30 VAC, 0.3A max
Reverse Polarity Protection	Yes
Interface	
RJ-45	10/100Base-TX, auto negotiation speed, F/H duplex mode and auto MDI/MDI-X
Fiber Port	1 SC or ST fiber port
LED Indicators	P1 – power 1 P2 – power 2 Ports 5 – port status (Fiber models only)
Environmental	
Operating Temperature Commercial Models Industrial Models	0°C to 60°C (32°F to 140°F) -40°C to 75°C (-40°F to 167°F)
Storage Temperature Commercial Models Industrial Models	-25°C to 70°C (-13°F to 158°F) -40°C to 85°C (-40°F to 185°F)
Operating Humidity	5% to 90% non-condensing
Storage Humidity	5% to 95% non-condensing
Operating Altitude	Up to 3,048 m (10,000 ft)
Regulatory Approvals	
Safety	cUL 60950-1, EN 60950-1
Industrial	UL 508
Hazardous Locations	ANSI/ISA 12.12.01-20xx Class I Division 2 Groups A-D - Pending ATEX Class I Zone 2 - Pending
Laser Safety	Transmitters: EN60825-1:2007 FDA/CDRH 21 CFR1040.11/CFR1040.11
EMI/EMC	FCC Part 15 – Class B CISPR22 / EN55022 Class B EN55024 Class B

Fiber Specifications

IDS-105F models	Fiber Connector	Mode	Distance	Wavelength (nm)	TX Power (dB)	RX Power (dB)	Budget
IDS-105F (XT)	None	n/a	n/a	n/a	n/a	n/a	n/a
IDS-105F-M2SC2 (XT)	SC	MM duplex	2 km 1.2 miles	TX: 1310 RX:1310	Min:-6 Max:-0	Min:-17 Max:-0	11
IDS-105F-M2ST2 (XT)	ST	MM duplex	2 km 1.2 miles	TX: 1310 RX:1310	Min:-6 Max:-0	Min:-17 Max:-0	11
IDS-105F-M1SC2U	SC	MM duplex	2 km 1.2 miles	TX: 1310 RX:1550	Min:-15 Max:-8	Min:-28 Max:-3	13
IDS-105F--M1SC2D	SC	MM duplex	2 km 1.2 miles	TX: 1550 RX:1310	Min:-15 Max:-8	Min:-28 Max:-3	13
IDS-105F-S2SC20 (XT)	SC	SM duplex	20 km 12.4 miles	TX: 1310 RX:1310	Min:-15 Max:-8	Min:-34 Max:3	19
IDS-105F-S2ST20 (XT)	ST	SM duplex	20 km 12.4 miles	TX: 1310 RX:1310	Min:-15 Max:-8	Min:-32 Max:-3	17
IDS-105F-S1SC20U (XT)	SC	SM duplex	20 km 12.4 miles	TX: 1310 RX:1490	Min:-8 Max:-3	Min:-22 Max:-3	14
IDS-105F--S1SC20D (XT)	SC	SM duplex	20 km 12.4 miles	TX: 1490 RX:1310	Min:-8 Max:-3	Min:-22 Max:-3	14
IDS-105F-S2SC40 (XT)	SC	SM duplex	40 km 24.9 miles	TX: 1310 RX:1310	Min:-3 Max:-5	Min:-23 Max:-3	20
IDS-105F-S2ST40 (XT)	ST	SM duplex	40 km 24.9 miles	TX: 1310 RX:1310	Min:-3 Max:-5	Min:-23 Max:-3	20
IDS-105F-S1SC40U	SC	SM duplex	40 km 24.9 miles	TX: 1310 RX:1490	Min:-3 Max:-5	Min:-23 Max:-3	20
IDS-105F--S1SC40D	SC	SM duplex	40 km 24.9 miles	TX: 1490 RX:1310	Min:-3 Max:-5	Min:-23 Max:-3	20
IDS-105F-S2SC80	SC	SM duplex	80 km 49.7 miles	TX: 1550 RX:1550	Min: -5 Max: 0	Min:-34 Max: -3	29
IDS-105F-S2ST80	ST	SM duplex	80 km 49.7 miles	TX: 1550 RX:1550	Min: -5 Max: 0	Min:-34 Max: -3	29
IDS-105F-S2SC120	SC	SM duplex	120 km 74.6 miles	TX: 1550 RX:1550	Min:0 Max:5	Min:-32 Max:-9	32
IDS-105F-S2ST120	ST	SM duplex	120 km 74.6 miles	TX: 1550 RX:1550	Min:0 Max:5	Min:-32 Max:-9	32

Contacting Technical Support

Contact information for the Perle Technical Assistance Center (PTAC) can be found at the link below. A Technical Support Query may be made via this web page.

www.perle.com/support_services/support_request.shtml

Warranty / Registration

http://www.perle.com/support_services/warranty.shtml

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Unmanaged Industrial Ethernet Switches

5 & 8 port switches
Models SE205, SE205-T, SE208, SE208-T, SE205-MMSC, SE205-SMSC

Powered by

ADVANTECH



Features & Benefits

- IP30 rated metal enclosure
- Slim design with DIN rail and wall mounting (included)
- 10/100 Mbps auto-negotiation
- Full/half duplex flow control to ensure compatibility with legacy devices
- MDI/MDI-X auto crossover
- Broadcast storm protection
- Store and Forward switching
- Redundant power inputs 12 - 48 VDC (10.8 - 52.8 VDC) with power fail relay
- Wide operating temperature support -40 ~ 75°C (-T models)

Copper Models

- 5 or 8 Fast Ethernet ports with Auto MDI/MDI-X

Fiber Models

- (4) 10/100 Mbps RJ45 with either (1) Multi-mode (SE205-MMSC) or (1) Single-mode (SE205-SMSC)

With no setup required, Advantech B+B SmartWorx Unmanaged Industrial Ethernet Switches are cost-effective, best-in-class, UL Certified plug-and-play devices. These switches are designed for use in demanding industrial environments, offering unmatched performance, reliability, and value. Robust IP30 rated metal enclosure is designed to meet challenging industrial applications to provide efficient heat dissipation.

Models are available in standard 10/100Mbps speed for twisted pair ports and 100Mbps for fiber optic connections (on some models) while supporting full data transmission. The SE205 and SE208 series switches offer store and forward technology, as well as MDI/MDIX auto sensing to ensure connectivity on the copper ports. Status LEDs indicate active link, speed and collision status.

Power is a 12-48 VDC redundant input design and is secured with a double protection mechanism: Polarity Reverse and Overload Protection. Polarity Reverse prevents damage to the switch in the event of incorrect power wiring. Overload Protection is a resettable fuse that prevents power overloads causing damage to the switch - once normal power is resumed the switch will restart automatically. Power-fail LEDs will activate to notify administrators of a failed condition as well as a power fault relay, to provide easy troubleshooting.

Specifications

COMMUNICATIONS

Standards	IEEE 802.3, 802.3u, 802.3x
LAN	10/100Base-T(X) (all models) 10/100Base-T(X), 100Base-FX (SE205-MMSC, SE205-SMSC)
Transmission Distance	Ethernet: Up to 100 meters Multi-mode Fiber: Up to 2km (SE205-MMSC) Single-mode Fiber: Up to 30km (SE205-SMSC)
Transmission Speed	10/100 Mbps Auto-Negotiation
Optical Fiber (SE205-MMSC)	Multi-mode Wavelength: 1300 nm Parameters: 50/125 µm, 62.5/125 µm
Optical Fiber (SE205-SMSC)	Single-mode Wavelength: 1310 nm Parameters: 9/125 µm

SWITCH PROPERTIES	
MAC Table Size	2k
Packet Buffer Size	448 Kbits
Switching Technique	Store and Forward
INTERFACE	
Connectors	5 x RJ45 (SE205, SE205-T) 8 x RJ45 (SE208, SE208-T) 4 x RJ45 ports, 1 x SC type fiber connector (SE205-MMSC, SE205-SMSC) 6-pin removable screw terminal - power & relay (all models)
Ethernet	Auto Sensing, 10/100BaseTX, Duplex and MDIX.
LED Indicators	P1, P2, P-Fail 10/100T (X): Link/Activity, Duplex/Collision
POWER	
Power Consumption	2.88W (SE205, SE205-T) 4.71W (SE208, SE208-T) 4.2W (SE205-MMSC, SE205-SMSC)
Power Input	12-48 VDC (10.8 - 52.8 VDC) redundant dual inputs
Fault Output	1 Relay Output
Reverse Polarity Protection	Present
Overload Current	Present
PHYSICAL	
Dimensions (WxHxD)	SE205, SE205-T: 30 x 120 x 95 mm (1.18 x 4.72 x 3.74 in) SE208, SE208-T: 30 x 140 x 95 mm (1.18 x 5.51 x 3.74 in) SE205-MMSC, SE205-SMSC: 30 x 140 x 95 mm (1.18 x 5.51 x 3.74 in)
Enclosure	IP30, metal shell with solid mounting kits
Mounting	DIN-Rail, Wall Mount
Weight	Net 1.83 lb (0.83 kg)
ENVIRONMENT	
Operating Temperature	SE205, SE208: -10 ~ +60°C (-14 ~ +140°F) SE205-MMSC, SE205-SMSC: -10 ~ +60°C (-14 ~ +140°F) SE205-T, SE208-T: -40 ~ +75°C (-40 ~ +167°F)
Storage Temperature	-40 ~ +85°C (-40 ~ +185°F)
Operating Humidity	10 ~ 95% (non-condensing)
Storage Humidity	10 ~ 95% (non-condensing)
MTBF	SE205, SE205-T: 412,590 hours SE208, SE208-T: 388,566 hours SE205-MMSC, SE205-SMSC: 674,572 hours
CERTIFICATIONS	
Safety	UL/cUL 60950
EMI	FCC Part 15 Subpart B Class A, EN 55022, Class A
EMS	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Unmanaged Industrial Ethernet Switches

5 & 8 port switches

Models SE205, SE205-T, SE208, SE208-T, SE205-MMSC, SE205-SMSC

Product Ordering Information

MODEL	DESCRIPTION	OPERATING TEMPERATURE	RJ45		FIBER	
			10/100 MBPS	100FX	TYPE	CONNECTOR
SE205	5-port 10/100 Unmanaged Ethernet Switch	-10 ~ 60°C	5	-	-	-
SE205-T	5-port 10/100 Unmanaged Ethernet Switch, Wide Temperature	-40 ~ 75°C	5	-	-	-
SE208	8-port 10/100 Unmanaged Ethernet Switch	-10 ~ 60°C	8	-	-	-
SE208-T	8-port 10/100 Unmanaged Ethernet Switch, Wide Temperature	-40 ~ 75°C	8	-	-	-
SE205-MMSC	5-port Unmanaged Ethernet Switch, w/ 1-port 100FX Multi-mode	-10 ~ 60°C	4	1	Multi-mode	SC
SE205-SMSC	5-port Unmanaged Ethernet Switch, w/ 1-port 100FX Single-mode	-10 ~ 60°C	4	1	Single-mode	SC

Accessories - optional

MODEL	DESCRIPTION
MDR-10-12	DIN Rail Power Supply, 12VDC, 10 Watt
CSUMB3FBG	3 ft. (1 M), Gray, Category 5e UTP Patch Cord
CSUMB7FBG	7 ft. (2 M), Gray, Category 5e UTP Patch Cord

Package Checklist

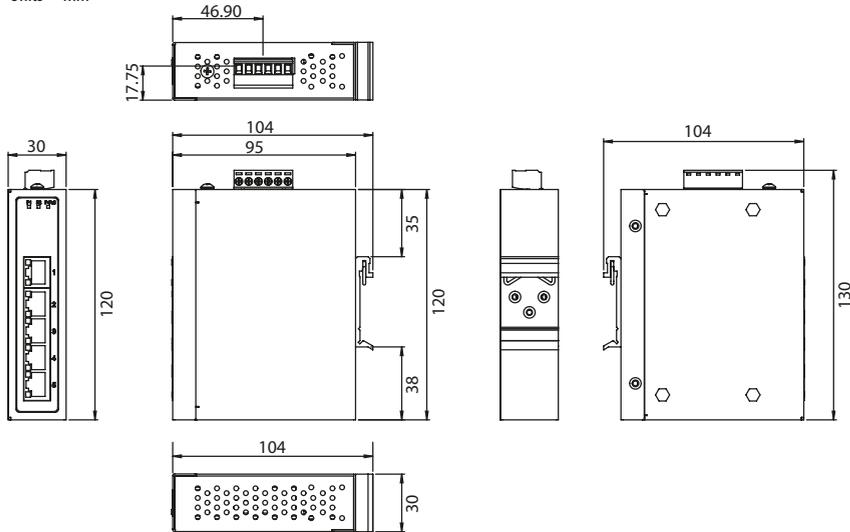
Ethernet Switch, Quick Start Guide, DIN-Rail mount bracket (installed), Wall mount bracket.

Warranty

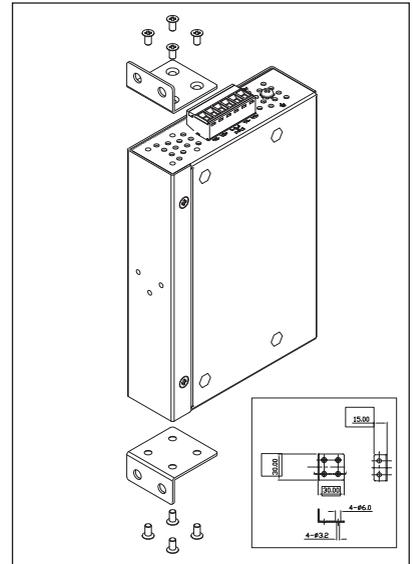
Limited lifetime warranty for Advantech B+B designed and/or manufactured products.

Mechanical Diagram - SE205x Copper

Units = mm

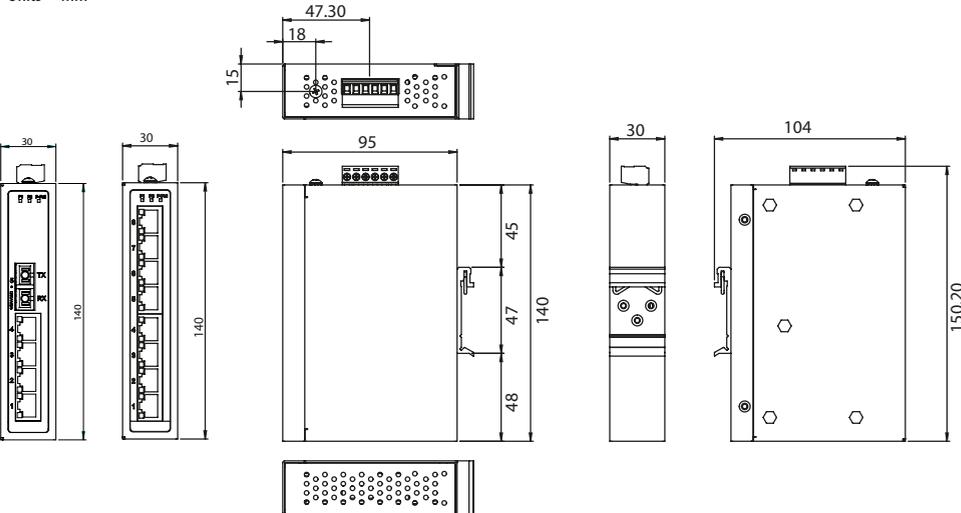


Wall Mount Kit Option Detail



Mechanical Diagram - SE205x Fiber / SE208x Copper

Units = mm



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Apple Mac mini "Core i5" 2.5 (Late 2012) Specs

Identifiers: Late 2012 - MD387LL/A - [Macmini6.1](#) - [A1347](#) - [2570](#)

[All Mac mini Models](#) | [All 2012 Models](#) | [Dynamically Compare This Mac to Others](#)

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The Apple Mac mini "Core i5" 2.5 (Late 2012/Aluminum Unibody) features a 22-nm "Ivy Bridge" 2.5 GHz Intel "Core i5" (3210M) processor with two independent processor "cores" on a single chip, a 3 MB shared level 3 cache, 4 GB of 1600 MHz DDR3

SDRAM (PC3-12800) memory, a 500 GB hard drive, and Intel HD Graphics 4000 which shares system memory. *It does not have an internal optical drive*, although an external one was offered for US\$79.

Connectivity includes a Firewire "800" port, four USB 3.0 ports, HDMI, Thunderbolt, combined "audio line in (digital/analog)" and combined "audio line out/headphone (digital/analog)" minijacks, a 10/100/1000Base-T Gigabit Ethernet port, 802.11a/b/g/n Wi-Fi, Bluetooth 4.0, and an SDXC card slot.

Compared to its [predecessor](#), this model looks identical, but it has a faster internal architecture with a faster processor, faster graphics, faster RAM, and USB 3.0 ports.

All Mac mini systems are configured by default without a display, keyboard, or mouse, but numerous Apple and third-party options are available.

Also see:

- [What](#) are all the differences between the "Late 2012" Aluminum Mac mini models? Which is best for my needs?

- [What](#) are all the differences between the "Late 2012" Aluminum Mac mini models and the models replaced?



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[Buy This Mac](#) or [Trade-in Yours](#) at site sponsor [PowerMax](#). No sales tax.

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[Upgrade This Mac](#) at site sponsor [MacSales.com](#). Memory, drives & more.

Tech Specs	Ports	Global Original Prices	Popular Q&As
<p><i>Click on the category for related details. The most commonly needed info is "open" by default, but all info is important.</i></p> <p align="center"> Expand All Details Contract All Details </p>			
Introduction Date:	October 23, 2012	Discontinued Date:	October 16, 2014
Processors:	1 (2 Cores)	Architecture:	64-Bit
Geekbench 2 (32):	6643	Geekbench 2 (64):	7469
Geekbench 3 (32):	2502	Geekbench 3 (32):	5070
Geekbench 3 (64):	2757	Geekbench 3 (64):	5666
Processor Speed:	2.5 GHz	Processor Type:	Core i5 (I5-3210M)
Details:	<p>This model is powered by a 22 nm, 64-bit Intel Mobile Core i5 "Ivy Bridge" (I5-3210M) processor which includes two independent processor "cores" on a single silicon chip. Each core has a dedicated 256k level 2 cache, shares 3 MB of level 3 cache, and has an integrated memory controller (dual channel).</p> <p>This system also supports "Turbo Boost 2.0" -- which "automatically increases the speed of the active cores" to improve performance when needed (up to 3.1 GHz for this model) -- and "Hyper Threading" -- which allows the system to recognize four total "cores" or "threads" (two real and two virtual).</p> <p>Also see: How fast are the "Late 2012" Aluminum "Unibody" Mac mini models compared to the "Mid-2011" models replaced?</p>		
Turbo Boost:	3.1 GHz	Custom Speeds:	N/A
Processor Upgrade:	Soldered	FPU:	Integrated

System Bus Speed:	5 GT/s*	Cache Bus Speed:	2.5 GHz (Built-in)
ROM/Firmware Type:	EFI	EFI Architecture:	64-Bit
L1 Cache:	32k/32k x2	L2/L3 Cache:	256k x2, 3 MB
RAM Type:	PC3-12800 DDR3	Min. RAM Speed:	1600 MHz
Details:	Supports 1600 MHz PC3-12800 DDR3 SO-DIMMs. Also see: How do you upgrade the RAM in the Aluminum "Unibody" Mac mini models? What type of RAM do they use? How much RAM do they actually support?		
Standard RAM:	4 GB	Maximum RAM:	16 GB
Details:	<p>By default, 4 GB is installed as two 2 GB modules.</p> <p>This model supports 16 GB of RAM using two 8 GB modules.</p> <p>In the US (and many other countries), site sponsor Other World Computing sells memory -- as well as other upgrades -- for this Mac mini.</p> <p>In the UK, site sponsor Flexx sells memory and other upgrades for this Mac mini.</p> <p>In Australia, site sponsor RamCity sells memory and other upgrades for this Mac mini.</p> <p>In Southeast Asia, site sponsor SimplyMac.sg sells memory and other upgrades for this Mac mini.</p> <p>Also see: Actual Max RAM of All G3 & Later Macs.</p>		
Motherboard RAM:	None	RAM Slots:	2
Video Card:	HD Graphics 4000	VRAM Type:	Integrated
Details:	<p>This model has an Intel HD Graphics 4000 graphics processor that shares memory with the system.</p> <p>Also see: What type of video system is provided by the Aluminum Mac mini models? Which are integrated and which are dedicated? Can the video be upgraded?</p>		
Standard VRAM:	512 MB*	Maximum VRAM:	768 MB*
Display Support:	Dual Displays	Resolution Support:	1920x1200*
Details:	*This model simultaneously supports 1920x1200 on an HDMI display or a DVI display using the included HDMI-to-DVI adapter <i>and</i> 2560x1600 on a Thunderbolt or Mini DisplayPort display or even a VGA display (with an optional Mini DisplayPort-to-VGA adapter, which is compatible with the Thunderbolt port).		
2nd Display Support:	Dual/Mirroring*	2nd Max. Resolution:	2560x1600*

Details: *This model simultaneously supports 1920x1200 on an HDMI or a DVI display (using the included HDMI-to-DVI adapter) and 2560x1600 on a Thunderbolt or Mini DisplayPort display or even a VGA display (with an optional Mini DisplayPort-to-VGA adapter, which is compatible with the Thunderbolt port).

Standard Storage:	500 GB HDD	Std. Storage Speed:	5400 RPM
	A second hard drive or SSD also can be installed, although it is not formally supported.		
	Also see: How do you upgrade the hard drive(s) in the Aluminum "Unibody" Mac mini models? What type of storage do they support?		
	In the US (and many other countries), site sponsor Other World Computing sells storage upgrades for this Mac mini .		
Details:	In the UK, site sponsor Flexx sells storage upgrades for this Mac mini .		
	In Australia, site sponsor RamCity sells storage upgrades for this Mac mini .		
	In Southeast Asia, site sponsor SimplyMac.sg sells storage upgrades for this Mac mini .		
	Also see: SSD Compatibility Guide for All G3 & Later Macs .		
Storage Dimensions:	2.5" (9.5 mm) x2	Storage Interface:	Serial ATA (6 Gb/s) x2
Standard Optical:	None*	Standard Disk:	None
Standard Modem:	None	Standard Ethernet:	10/100/1000Base-T
Details:	N/A		
Standard AirPort:	802.11a/b/g/n (450 Mbit*)	Standard Bluetooth:	4.0
USB Ports:	4 (3.0)	Firewire Ports:	1 (800)
Expansion Slots:	SD Card (SDXC)	Expansion Bays:	None
	This model has an SDXC Card slot.		
Details:	In the US (and many other countries), site sponsor Other World Computing sells a wide variety of external expansion options and hand-picked accessories like external storage, stands, keyboards, cables, adapters, speakers, and more for this Mac mini .		
	In Australia, site sponsor Macfixit offers an extensive selection of external expansion options and accessories like docks, stands, chargers, keyboards, security products, and more for this Mac mini .		
Incl. Keyboard:	None	Incl. Input:	None
Case Type:	Cuboid	Form Factor:	Mac mini Unibody

Appendix C: Datasheets of Deployed Sensors and Devices

Apple Model No:	A1347 (SMC 2.7)	Model ID:	Macmini6,1
Details:	<p>Please note that these identifiers refer to more than one model.</p> <p>Also see: All Macs with the A1347 Model Number, the 2570 EMC Number, and the Macmini6,1 Model Identifier.</p> <p>For more about these identifiers and how to locate them on each Mac, please refer to EveryMac.com's Mac Identification section.</p>		
Battery Type:	N/A	Battery Life:	N/A
Pre-Installed MacOS:	X 10.8.1 (12B2080)	Maximum MacOS:	Current
Minimum Windows:	7 (32-Bit)*	Maximum Windows:	10 (64-Bit)*
MacOS 9 Support:	None	Windows Support:	Boot/Virtualization
Details:	<p>Also see: Are there any third-party programs to run Mac OS 9/Classic applications on Intel Macs?</p> <p>Site sponsor OHS specializes in heavily upgraded Macs capable of running both Mac OS X and Mac OS 9 applications.</p> <p>For more on running Windows on Intel Macs, please refer to the exhaustive Windows on Mac Q&A.</p>		
Dimensions:	1.4 x 7.7 x 7.7	Avg. Weight:	2.7 lbs. (1.22 kg)
Original Price (US):	US\$599	Est. Current Retail:	US\$500-US\$600
Details:	<p>Please note that on average the estimated current <i>retail</i> pricing of used systems is updated twice a year (please refer to the date on the bottom of the page for the date last updated).</p> <p>Photo Credit: Apple Computer.</p>		

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Appendix C: Datasheets of Deployed Sensors and Devices

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MX Cloud Managed Security Appliance Series



Overview

Cisco Meraki MX Security Appliances are ideal for organizations with large numbers of distributed sites. Since the MX is 100% cloud managed, installation and remote management is simple. The MX has a comprehensive suite of network services, eliminating the need for multiple appliances. These services include Layer 7 application firewall, content filtering, web search filtering, SNORT® based intrusion prevention, web caching, Intelligent WAN with multiple uplinks and 4G failover.

FEATURE-RICH UNIFIED THREAT MANAGEMENT (UTM) CAPABILITIES

- Application-aware traffic control: set bandwidth policies based on Layer 7 application type (e.g., YouTube, Skype, P2P).
- Content filtering: CIPA-compliant content filter, safe-search enforcement (Google/Bing), and YouTube for Schools.
- Intrusion prevention: PCI-compliant IPS sensor using industry-leading SNORT® signature database from Cisco Sourcefire.
- Anti-virus and anti-phishing: flow-based protection engine powered by Kaspersky.
- Identity-based security policies and application management.

INDUSTRY-LEADING CLOUD MANAGEMENT

- Unified firewall, switching, wireless LAN, and mobile device management through an intuitive web-based dashboard.
- Template based settings scale easily from small deployments to tens of thousands of devices.
- Role-based administration, configurable email alerts for a variety of important events, and easily auditable change logs.
- Summary reports with user, device, and application usage details archived in the cloud.

INTELLIGENT SITE-TO-SITE VPN WITH CISCO IWAN

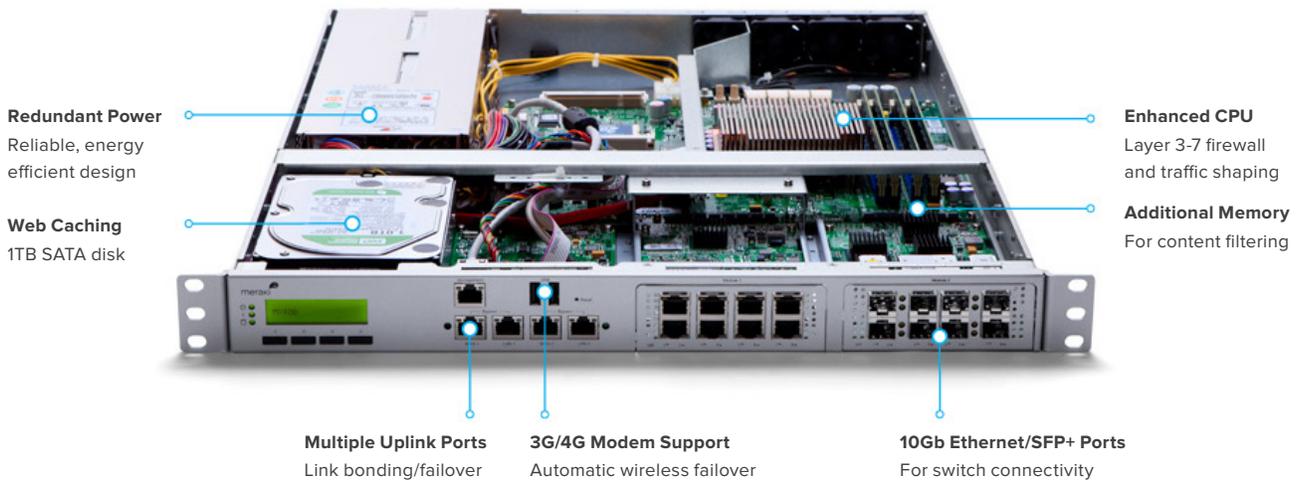
- Auto VPN: automatic vpn route generation, IKE/IPsec setup and key exchange via Cisco Meraki's secure cloud.
- Intelligent WAN with active / active VPN, policy-based-routing, and dynamic VPN path selection.
- Interoperates with standards-based IPsec VPNs.
- Automated MPLS to VPN failover.
- Client VPN: L2TP IPsec support for native Windows, Mac OS X, iPad and Android clients with no per-user licensing fees.

BRANCH GATEWAY SERVICES

- Built-in DHCP, NAT, QoS, and VLAN management services.
- Web caching: accelerates frequently accessed content.
- Load balancing: combines multiple WAN links into a single high-speed interface, with policies for QoS, traffic shaping, and failover.
- Smart connection monitoring: automatic detection of layer 2 and layer 3 outages and fast failover, including 3G/4G USB modems.

INSIDE THE CISCO MERAKI MX

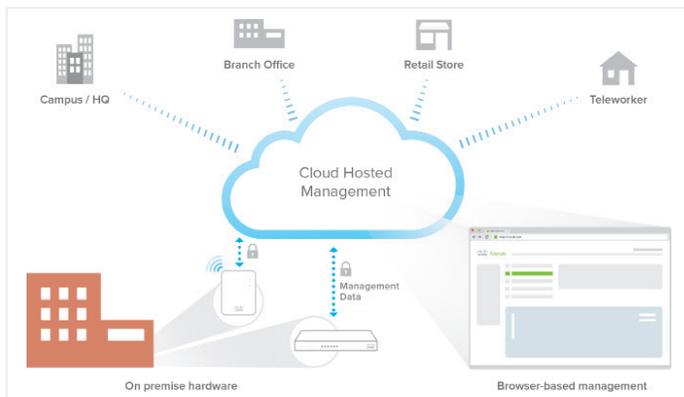
MX400 shown, features vary by model



Cloud Managed Architecture

Built on Cisco Meraki's award-winning cloud-managed architecture, the MX is the industry's only 100% cloud-managed Unified Threat Management appliance. MX appliances self-provision, automatically pulling policies and configuration settings from the cloud. Powerful remote management tools provide network-wide visibility and control, and enable administration without the need for on-site networking expertise.

Cloud services deliver seamless firmware and security signature updates, automatically establish site-to-site VPN tunnels, and provide 24x7 network monitoring. Moreover, the MX's intuitive browser-based management interface removes the need for expensive and time-consuming training.



Cisco Meraki Cloud Management Architecture

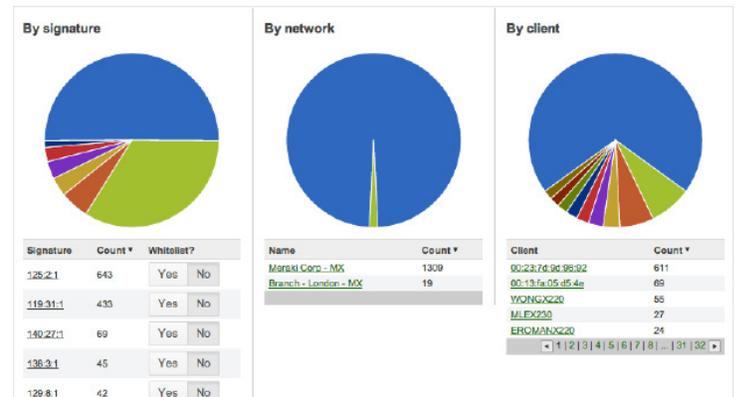
Ironclad Security

The MX platform has an extensive suite of security features including IPS, content filtering, web search filtering, anti-virus / anti-phishing, geo-IP based firewalling and IPsec VPN connectivity, while providing the performance required for modern, bandwidth-intensive networks.

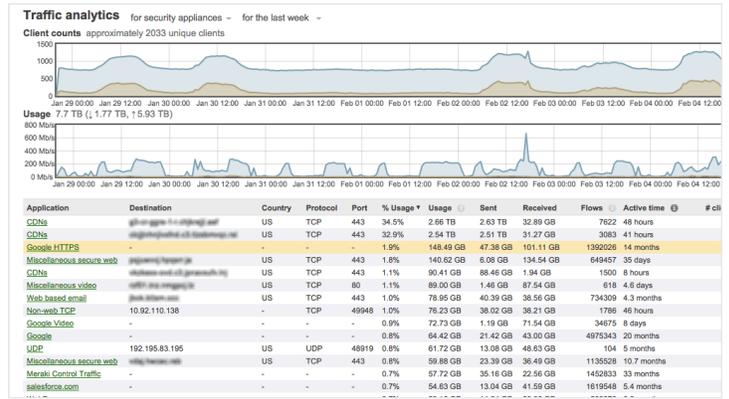
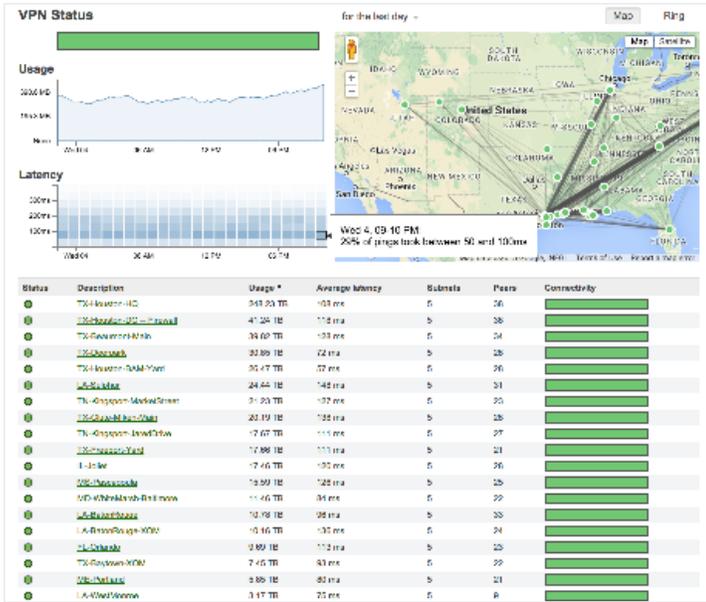
Layer 7 fingerprinting technology lets administrators identify unwanted content and applications and prevent recreational apps like BitTorrent from wasting precious bandwidth.

The integrated Sourcefire SNORT® engine delivers superior intrusion prevention coverage, a key requirement for PCI 3.0 compliance. The MX also uses the Webroot BrightCloud® URL categorization database for CIPA / IWF compliant content-filtering, Kaspersky Safestream II® engine for anti-virus / anti-phishing, and MaxMind for geo-IP based security rules.

Best of all, these industry-leading Layer 7 security engines and signatures are always kept up-to-date via the cloud, simplifying network security management and providing peace of mind to IT administrators.

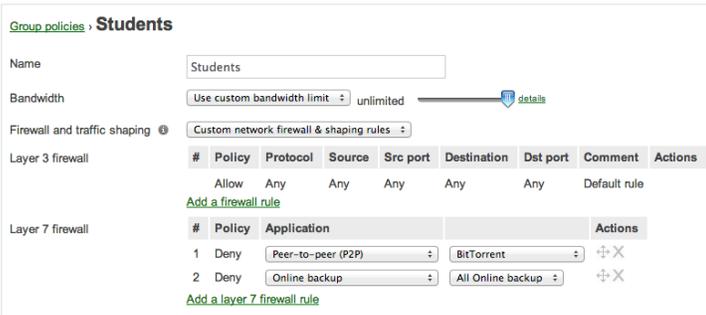


Organization Level Threat Assessment

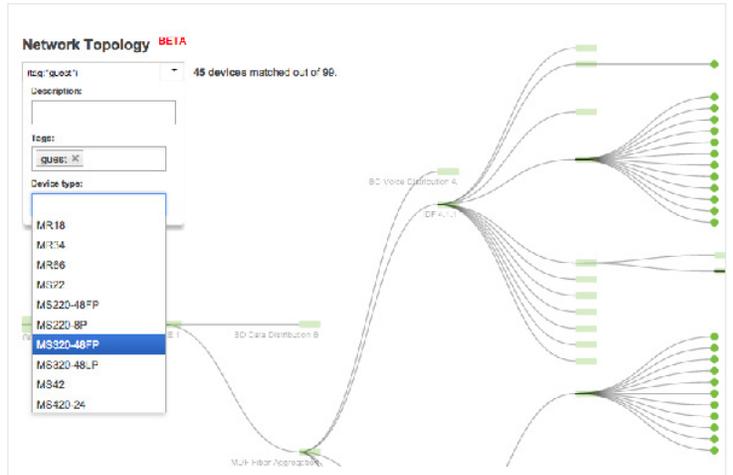


Next Gen Application Firewall and Traffic Visibility

Auto Configuring Site-to-Site VPN



Identity Based Policy Management



End-to-End Network Visibility and Troubleshooting

Intelligent WAN Made Simple

Transport independence

Dual WAN ports with load balancing and failover enable the use of MPLS and redundant, commodity Internet connections, providing additional bandwidth and higher reliability.

3G / 4G failover

The Cisco Meraki MX supports 3G/4G service providers globally for WAN connection failover. Web caching temporarily stores video, media, and web documents, lowering bandwidth usage and accelerating the download speed of Internet content.

Application optimization

Layer 7 traffic shaping, application prioritization optimize the traffic for mission-critical applications and user experience.

Intelligent path control

Use dynamic VPN path selection to choose the best VPN uplink based on packet loss, latency, and jitter. Define policies for sending the right traffic through the appropriate path (e.g., send voice via MPLS, http via VPN over broadband).

Secure connectivity

Cisco Meraki's unique auto provisioning site-to-site VPN (Auto VPN) connects branches securely with unmatched simplicity. MX Security Appliances automatically learn VPN parameters needed to establish and maintain VPN sessions using a 128-bit AES encryption. A unique cloud-enabled discovery mechanism enables automatic interconnection of VPN peers and routes across the WAN, and keeps them updated in dynamic IP environments.

Integrated 802.11ac Wireless

The MX64W and MX65W integrate Cisco Meraki's award-winning wireless technology with the powerful MX network security features in a compact form factor ideal for branch offices or small enterprises.

- Dual-band 802.11n/ac, 2x2 MIMO with 2 spatial streams
- Unified management of network security and wireless
- Integrated enterprise security and guest access



MX65W Security Appliance

Built-in PoE+

The MX65 and MX65W include two ports with 802.3at (PoE+). This built-in power capability removes the need for additional hardware to power critical branch devices.

- 2 802.3at (PoE+) ports capable of providing a total of 60W
- Power APs, phones, cameras, and other PoE enabled devices without the need for AC adapters, PoE converters, or unmanaged PoE switches.



MX65 Port Configuration

Z1 Telecommuter Gateway

The Z1 Telecommuter Gateway extends the power of the Cisco Meraki dashboard and cloud-based centralized management to employees, IT staff and executives working from home.

Using the patent-pending Cisco Meraki Auto VPN, Administrators can extend network services including VoIP and remote desktop (RDP) to remote employees with a single-click, provide wired and wireless access, and increase end-user productivity through Layer 7 traffic shaping and prioritization.

- 1 x 802.11b/g/n radio, 1 x 802.11a/n radio, 2x2 MIMO with 2 spatial streams
- Site-to-site (IPsec) VPN using Cisco Meraki Auto VPN
- Layer 7 application visibility and traffic shaping



Z1 Telecommuter Gateway

Lifetime Warranty with Next-day Advanced Replacement

Cisco Meraki MX appliances include a limited lifetime hardware warranty that provides next-day advance hardware replacement. Cisco Meraki's simplified software and support licensing model also combines all software upgrades, centralized systems management, and phone support under a single, easy-to-understand model. For complete details, please visit meraki.cisco.com/support.

Product Options

	MX64(W) 	MX65(W) 	MX84 	MX100 	MX400 	MX600 
Recommended Use Cases	Small retail branch, small clinic	Small retail branch, small clinic	Medium sized branch	Large branch	K-12 firewall / VPN concentrator	Large K-12 firewall, VPN concentrator
Recommended Max Clients	50	50	200	500	2,000	10,000
Stateful Firewall Throughput	250 Mbps	250 Mbps	500 Mbps	750 Mbps	1 Gbps	1 Gbps
Advanced Security Throughput	200 Mbps	200 Mbps	300 Mbps	650 Mbps	1 Gbps	1 Gbps
Maximum VPN sessions	25	25	100	250	1,000	5,000
Interfaces	5 x GbE	12 x GbE (2 PoE+)	10 x GbE 2 x GbE (SFP)	9 x GbE 2 x GbE (SFP)	4 x GbE	4 x GbE
Additional Interface Modules	N/A	N/A	N/A	N/A	8 x GbE (RJ45) 8 x GbE (SFP) 2 x 10GbE (SFP+) (2 modules max)	8 x GbE (RJ45) 8 x GbE (SFP) 2 x 10GbE (SFP+) (2 modules max)
Web Caching	N/A	N/A	Yes	Yes	Yes	Yes
Hard Drive*	N/A	N/A	1 TB	1 TB	1 TB	4 x 1 TB (RAID)
USB for 3G/4G Failover	Yes	Yes	Yes	Yes	Yes	Yes
Mounting	Desk / Wall	Desk / Wall	1U rack	1U rack	1U rack	2U rack
Dimensions	9.5" x 5.2" x 1" (239mm x 132mm x 25mm)	10.0" x 5.2" x 1" (256mm x 132mm x 25mm)	19.0" x 10.0" x 1.75" (483 mm x 254 mm x 44 mm)	19.0" x 10.0" x 1.75" (483 mm x 254 mm x 44 mm)	19.0" x 22.0" x 1.75" (483 mm x 559 mm x 44 mm)	19.0" x 22.0" x 3.5" (483 mm x 559 mm x 89 mm)
Weight	3.04 lb (1.4 kg)	3.37 lb (1.53 kg)	9 lb (4.1kg)	9 lb (4.1kg)	33 lb (15.0 kg)	53 lb (24.0 kg)
Power Supply	18W DC (included)	90W DC (included)	100-220V 50/60Hz AC	100-220V 50/60Hz AC	100-220V 50/60Hz AC (dual)	100-220V 50/60Hz AC (dual)
Power Load (idle/max)	4W / 10W (MX64) 6W / 13W (MX64W)	6W / 72W (MX65) 9W / 79W (MX65W)	26W / 32W	30W / 55W	123W / 215W	132W / 226W
Operating Temperature	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)	32°F to 104°F (0°C to 40°C)
Humidity	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%	5% to 95%

*Note: Hard drive is used for web caching.

Specifications

Management

Managed via the web using the Cisco Meraki dashboard

Single pane-of-glass into managing wired and wireless networks

Zero-touch remote deployment (no staging needed)

Automatic firmware upgrades and security patches

Templates based multi-network management

Org-level two-factor authentication and single sign-on

Role based administration with change logging and alerts

Monitoring and Reporting

Throughput, connectivity monitoring and email alerts

Detailed historical per-port and per-client usage statistics

Application usage statistics

Org-level change logs for compliance and change management

VPN tunnel and latency monitoring

Network asset discovery and user identification

Periodic emails with key utilization metrics

Syslog integration

Remote Diagnostics

Live remote packet capture

Real-time diagnostic and troubleshooting tools

Aggregated event logs with instant search

Network and Security Services

Stateful firewall, 1:1 NAT, DMZ

Identity-based policies

Auto VPN: Automated site-to-site (IPsec) VPN, for hub-and-spoke or mesh topologies

Client (IPsec L2TP) VPN

Multiple WAN IP, PPPoE, NAT

VLAN support and DHCP services

Static routing

User and device quarantine

WAN Performance Management

Web caching (not available on the MX64/MX64W and MX65/MX65W)

WAN link aggregation

Automatic Layer 3 failover (including VPN connections)

3G / 4G USB modem failover

Application level (Layer 7) traffic analysis and shaping

Ability to choose WAN uplink based on traffic type

iWAN: Dual active VPN with policy based routing and dynamic path selection

Advanced Security Services

Content filtering (Webroot BrightCloud CIPA compliant URL database)

Web search filtering (including Google / Bing SafeSearch)

YouTube for Schools

Intrusion-prevention sensor (Sourcefire SNORT® based)

Anti-virus engine and anti-phishing filtering (Kaspersky SafeStream II engine)

Geography based firewall rules (MaxMind Geo-IP database)

Note: Advanced security services require Advanced Security license.

Integrated Wireless (MX64W and MX65W only)

1 x 802.11a/n/ac (5 GHz) radio

1 x 802.11b/g/n (2.4 GHz) radio

Max data rate 1.2 Gbit/s (aggregate)

2 x 2 MIMO with two spatial streams

2 external dual-band dipole antennas (connector type: RP-SMA)

Antenna gain: 3.0 dBi @ 2.4 GHz, 3.5 dBi @ 5 GHz

WEP, WPA, WPA2-PSK, WPA2-Enterprise with 802.1X authentication

FCC (US): 2.412-2.462 GHz, 5.150-5.250 GHz (UNII-1), 5.250-5.350 GHz (UNII-2), 5.470-5.725 GHz (UNII-2e), 5.725 -5.825 GHz (UNII-3)

CE (Europe): 2.412-2.484 GHz, 5.150-5.250 GHz (UNII-1), 5.250-5.350 GHz (UNII-2) 5.470-5.600 GHz, 5.660-5.725 GHz (UNII-2e)

Additional regulatory information: IC (Canada), C-Tick (Australia/New Zealand), RoHS

Power over Ethernet (MX65 and MX65W only)

2 x PoE+ (802.3at) LAN ports

30W maximum per port

Regulatory

FCC (US)

CB (IEC)

CISPR (Australia/New Zealand)

Warranty

Full lifetime hardware warranty with next-day advanced replacement included.

Ordering Guide

To place an order for an MX appliance, pair a specific hardware model with a single license (which includes cloud services, software upgrades and support). For example, to order an MX64 with 3 years of Advanced Security license, order an MX64-HW with LIC-MX64-SEC-3YR. Lifetime warranty with advanced replacement is included on all hardware at no additional cost.

MODEL	LICENSE	DESCRIPTION
MX64-HW	LIC-MX64-ENT-1YR LIC-MX64-ENT-3YR LIC-MX64-ENT-5YR LIC-MX64-SEC-1YR LIC-MX64-SEC-3YR LIC-MX64-SEC-5YR	Cisco Meraki MX64, 1 year Enterprise License and Support Cisco Meraki MX64, 3 year Enterprise License and Support Cisco Meraki MX64, 5 year Enterprise License and Support Cisco Meraki MX64, 1 year Advanced Security License and Support Cisco Meraki MX64, 3 year Advanced Security License and Support Cisco Meraki MX64, 5 year Advanced Security License and Support
MX64W-HW	LIC-MX64W-ENT-1YR LIC-MX64W-ENT-3YR LIC-MX64W-ENT-5YR LIC-MX64W-SEC-1YR LIC-MX64W-SEC-3YR LIC-MX64W-SEC-5YR	Cisco Meraki MX64W, 1 year Enterprise License and Support Cisco Meraki MX64W, 3 year Enterprise License and Support Cisco Meraki MX64W, 5 year Enterprise License and Support Cisco Meraki MX64W, 1 year Advanced Security License and Support Cisco Meraki MX64W, 3 year Advanced Security License and Support Cisco Meraki MX64W, 5 year Advanced Security License and Support
MX65-HW	LIC-MX65-ENT-1YR LIC-MX65-ENT-3YR LIC-MX65-ENT-5YR LIC-MX65-SEC-1YR LIC-MX65-SEC-3YR LIC-MX65-SEC-5YR	Cisco Meraki MX65, 1 year Enterprise License and Support Cisco Meraki MX65, 3 year Enterprise License and Support Cisco Meraki MX65, 5 year Enterprise License and Support Cisco Meraki MX65, 1 year Advanced Security License and Support Cisco Meraki MX65, 3 year Advanced Security License and Support Cisco Meraki MX65, 5 year Advanced Security License and Support
MX65W-HW	LIC-MX65W-ENT-1YR LIC-MX65W-ENT-3YR LIC-MX65W-ENT-5YR LIC-MX65W-SEC-1YR LIC-MX65W-SEC-3YR LIC-MX65W-SEC-5YR	Cisco Meraki MX65W, 1 year Enterprise License and Support Cisco Meraki MX65W, 3 year Enterprise License and Support Cisco Meraki MX65W, 5 year Enterprise License and Support Cisco Meraki MX65W, 1 year Advanced Security License and Support Cisco Meraki MX65W, 3 year Advanced Security License and Support Cisco Meraki MX65W, 5 year Advanced Security License and Support
MX84-HW	LIC-MX84-ENT-1YR LIC-MX84-ENT-3YR LIC-MX84-ENT-5YR LIC-MX84-SEC-1YR LIC-MX84-SEC-3YR LIC-MX84-SEC-5YR	Cisco Meraki MX84, 1 year Enterprise License and Support Cisco Meraki MX84, 3 year Enterprise License and Support Cisco Meraki MX84, 5 year Enterprise License and Support Cisco Meraki MX84, 1 year Advanced Security License and Support Cisco Meraki MX84, 3 year Advanced Security License and Support Cisco Meraki MX84, 5 year Advanced Security License and Support
MX100-HW	LIC-MX100-ENT-1YR LIC-MX100-ENT-3YR LIC-MX100-ENT-5YR LIC-MX100-SEC-1YR LIC-MX100-SEC-3YR LIC-MX100-SEC-5YR	Cisco Meraki MX100, 1 year Enterprise License and Support Cisco Meraki MX100, 3 year Enterprise License and Support Cisco Meraki MX100, 5 year Enterprise License and Support Cisco Meraki MX100, 1 year Advanced Security License and Support Cisco Meraki MX100, 3 year Advanced Security License and Support Cisco Meraki MX100, 5 year Advanced Security License and Support
MX400-HW	LIC-MX400-ENT-1YR LIC-MX400-ENT-3YR LIC-MX400-ENT-5YR LIC-MX400-SEC-1YR LIC-MX400-SEC-3YR LIC-MX400-SEC-5YR	Cisco Meraki MX400, 1 year Enterprise License and Support Cisco Meraki MX400, 3 year Enterprise License and Support Cisco Meraki MX400, 5 year Enterprise License and Support Cisco Meraki MX400, 1 year Advanced Security License and Support Cisco Meraki MX400, 3 year Advanced Security License and Support Cisco Meraki MX400, 5 year Advanced Security License and Support
MX600-HW	LIC-MX600-ENT-1YR LIC-MX600-ENT-3YR LIC-MX600-ENT-5YR LIC-MX600-SEC-1YR LIC-MX600-SEC-3YR LIC-MX600-SEC-5YR	Cisco Meraki MX600, 1 year Enterprise License and Support Cisco Meraki MX600, 3 year Enterprise License and Support Cisco Meraki MX600, 5 year Enterprise License and Support Cisco Meraki MX600, 1 year Advanced Security License and Support Cisco Meraki MX600, 3 year Advanced Security License and Support Cisco Meraki MX600, 5 year Advanced Security License and Support

*Note: For each MX product, additional 7 or 10 year Enterprise or Advanced Security licensing options are also available (ex: LIC-MX100-SEC-7YR).

Accessories

The Cisco Meraki MX84, MX100, MX400, and MX600 models support pluggable optics for high-speed backbone connections between wiring closets or to aggregation switches. Cisco Meraki offers several standards-based Gigabit and 10 Gigabit pluggable modules. Each appliance has also been tested for compatibility with several third-party modules.



Interface Modules for MX400 and MX600



Pluggable (SFP) Optics for MX84, MX100, MX400, and MX600

ACCESSORIES / OPTICS

Supported Cisco Meraki accessory modules for MX100, MX400 and MX600.

MODEL	DESCRIPTION
IM-8-CU-1GB	Cisco Meraki 8 x 1 GbE Copper Interface Module for MX400 and MX600
IM-8-SFP-1GB	Cisco Meraki 8 x 1 GbE SFP Interface Module for MX400 and MX600
IM-2-SFP-10GB	Cisco Meraki 2 x 10 GbE SFP+ Interface Module for MX400 and MX600
MA-SFP-1GB-SX	Cisco Meraki 1 GbE SFP SX Fiber Module (1000BASE-SX, range: 550m)
MA-SFP-10GB-SR	Cisco Meraki 10 GbE Short Range SFP+ Module (10GBASE-SR, range: 400m)
MA-CBL-TA-1M	Cisco Meraki 10 GbE Twinax Cable with SFP+ Connectors (10GSFP+Cu, range: 1m)
MA-CBL-TA-3M	Cisco Meraki 10 GbE Twinax Cable with SFP+ Connectors (10GSFP+Cu, range: 3m)

Note: Please refer to meraki.com for additional single-mode and multi-mode fiber transceiver modules