RAJANT

SPEC SHEET

Rajant Cardinal

Small, Yet Powerful Mobile Wireless Network Node

ASTORS AMERICAN SECURITY TODAY 2023 PLATINUM AWARD WINNER HOMELAND SECURITY AWARDS

The Cardinal is a powerful lightweight module and notably the smallest. This is our first module specifically tailored to the needs of the warehouse automation market and Industry 4.0. Designed with automation robots in mind, including collaborative robots, automated storage/retrieval systems, autonomous mobile robots (AMRs), unmanned guided vehicles (UGVs), and more, the Cardinal can enhance your on-the-move connectivity in the most challenging environments. The Cardinal extends the range of traditional Wi-Fi past the limitations of fixed infrastructure with no line-of-sight requirements using two transceivers having a combined data rate of 1.73 Gbps.

Cardinal Key Features

- **Small and Lightweight Form Factor:** 17.8 mm x 98.0 mm x 60.68 mm (0.70" x 3.86" x 2.39") and 90 g ± 3 g (3.2 oz ± 0.1 oz).
- **2x2 MIMO 802.11 AC Wave2 radios:** (1) Dual-band 2.4/5 GHz, 2x2 MIMO transceiver, and (1) 5 GHz 2x2 MIMO transceiver.
- **Interfaces:** Four SMA (female) antenna ports, Gigabit Ethernet with passive PoE, USB 2.0, status LED, DC power, fan power/control.
- **Max RF TX Power:** 25 dBm combined.
- **Wi-Fi Access Point** mode for compatibility with millions of commercial off-the-shelf Wi-Fi client and IoT devices such as laptops, tablets, smartphones, IP cameras, sensors, and other IP devices.
- **Cyber Secure:** Configurable per-hop, per-packet authentication between Modules; multiple cryptographic options; 256 bit AES encryption; and optional MAC address encryption.
- **Temperature:** Included magnesium heatsink and RF shield feature allows operation at higher ambient temperature, and avoids receiver desensitization due to external RF interference. Fan recommended for maximum temperature operation in static environments or areas of restricted airflow.

Utilizing the Cardinal to Your Advantage

At Rajant, we solve your Wi-Fi and LTE problems by extending the range of standard Wi-Fi and LTE, enabling machine-to-machine communications to see around obstructions, and providing sitewide ubiquitous Wi-Fi coverage. Rajant Kinetic Mesh® enables supply chain operations to become smarter, more autonomous, and more mobile. Designed for industrial use, the Cardinal is intelligent, self-optimizing, and uniquely able to support M2M connectivity between equipment and people with full operational mobility.

The Cardinal is versatile in the marketplace. In addition to robotics and infrastructure in warehouse automation, this wireless node has applications as part of irrigation in agriculture, reclosers in energy, PLC controls in energy, drone and UAV in the military, and process automation in the manufacturing industry.

This module is also a problem solver. The Cardinal works around obstructions, remedying Wi-Fi and 5G range challenges. Our Kinetic Mesh coverage solves potential IoT device connectivity issues and eliminates communication gaps for autonomous mobile robots (AMR) and unmanned ground vehicles (UGV).

The Cardinal module offers extended-range M2M communication to reduce the overhead for hardware needed to cover and manage an area. The Cardinal works seamlessly with existing network infrastructure, allowing faster and cost-effective installation and management. The Rajant Cardinal module keeps the network moving with no single point of failure.

InstaMesh®

InstaMesh is the advanced, patented[1] protocol developed by Rajant that directs the continuous and instantaneous forwarding of packets from wireless and wired connections. It enables complete network mobility, high throughput, and low latency with very low maintenance and administrative requirements. Operating at Layer 2 and not requiring a root node or LAN Controller, InstaMesh provides robust fault tolerance even if there is a connection or node outage. No matter how you configure your network, InstaMesh networking software always determines the most efficient pathway between any two points, even when those points are in motion.

Model	Description
AG1–5250M	AG1 with (1) dual-band 2.4/5 GHz, 2x2 MIMO, 300/866.7 Mbps transceiver, and (1) 5 GHz, 2x2 MIMO, 866.7 Mbps transceiver.

Wireless	Dual-band 2.4 GHz	Dual-band 5 GHz	5 GHz
Antenna Connector	(2) SMA (female)	(2) SMA (female)	(2) SMA (female)
Frequency[2]	2402 – 2482 MHz	5150 – 5850 MHz	5150 – 5850 MHz
Modulation	DSSS, CCK, OFDM	OFDM	OFDM
Max. Data Rate	300 Mbps	866.7 Mbps	866.7 Mbps
Max. RF Transmit Power[3]	25 dBm ± 2 dB	22 dBm ± 2 dB	23 dBm ± 2 dB

Power	
DC Power	10 — 53 VDC (absolute), 12/24/48 VDC (nominal)
PoE	24/48 VDC (nominal) passive PoE
Power Consumption[4]	4.2W (average, idle); 14.4 W (maximum, peak) @ 24V

Input/Output	
Ethernet	(1) 10/100/1000, auto MDI/MDIX, RJ45, 24/48 VDC passive PoE
USB	(1) USB 2.0 (used for firmware update, zeroize, GPS, Modbus, SCADA, etc.)
LED	Status LED
DC Input PWR	3-pin connector for DC power
Fan	Fan power/control connector, +5VDC (fan optional)

1 U.S. Patent 9,001,645
2 Channel, frequency and bandwidth options vary based upon regional and local regulations and certifications.
3 RF transmit power is governed by local regulations and varies by frequency.
4 Power consumption depends on transceiver configuration.

Physical	
Dimensions	17.8 mm x 98.0 mm x 60.68 mm (0.70” x 3.86” x 2.39”)
Weight	90 g ± 3 g (3.2 oz ± 0.1 oz)
Temperature	Ambient/surrounding (operating) -40°C to 60°C (-40°F to 140°F) Ambient/surrounding storage (non-operating) -40°C to 85°C (-40°F to 185°F) Fan recommended for maximum temperature operation in static environments or areas of restricted air-flow.
Certification	FCC (US) IC (Canada) CE mark (European Economic Area, Switzerland, and Turkey) Japan Thailand Malaysia South Africa Australia New Zealand Indonesia Singapore
Warranty	1 year