

Rajant BreadCrumb® Cardinal

Small, Yet Powerful Mobile Wireless Network Node

The Cardinal BreadCrumb is a powerful lightweight BreadCrumb and notably the smallest. This is our first BreadCrumb 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), wearables, 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 with combined data rates up to 1.73 Gbps data rate.



Cardinal Key Features

- **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:** Ethernet - (1) 10/100/1000, auto MDI/MDIX, RJ45 and (1) USB 2.0 (used for firmware update, zeroize, GPS, Modbus, SCADA, etc.); and power consumption - 4.2W (average, idle); 14.4 W (maximum, peak) @ 24V.
- **Max RF TX Power:** 24 dBm combined.
- **Enclosure Rating:** IP40
- **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.
- **Wi-Fi Client Mode** allows seamless integration with existing Wi-Fi fixed infrastructure using the same frequencies.
- **Cyber Secure:** Configurable per-hop, per-packet authentication between BreadCrumbs; multiple cryptographic options; 256 bit AES encryption; and optional MAC address encryption.
- **Form Factor:** 50mm x 90mm (1.96" x 3.54") and 105 g (0.23 lbs).
- **Temperature:** Ambient (operating) -40°C to 60°C (-40°F to 140°F) and storage (TBA).

Utilizing the Cardinal BreadCrumb 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 BreadCrumb 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 BreadCrumb 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 BreadCrumb keeps the network moving with no single point of failure.

InstaMesh®

InstaMesh is the advanced, patented 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
AG1-5250	AG1 with (1) Dual-band 2.4/5 GHz, 2x2 MIMO transceiver, and (1) 5 GHz 2x2 MIMO 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	2.402-2.482	5.15-5.85	5.15-5.85
Modulation	DSSS, OFDM	OFDM	OFDM
Max. Data Rate	400 Mbps (TBD)	866.7 Mbps	866.7 Mbps
Max. RF Transmit Power	24 dBm (combined)	22 dBm (combined)	24 dBm (combined)

Power

Input Voltage	4.5V - 55V VDC, 24V-48V Passive POE
Power Consumption	4.2W (average, idle); 14.4 W (maximum, peak) @ 24V

Input/Output

Ethernet	(1) 10/100/1000, auto MDI/MDIX, RJ45
USB	(1) USB 2.0 (used for firmware update, zeroize, GPS, Modbus, SCADA, etc.)
LED	Status LED
DC Jack	4.5V-55V input connector
DC + 5V Out	Fan control connector (w/o enclosure, optional)

Physical

Dimensions	17.8 mm x 98.0 mm x 50.0 mm
Weight	105g
Temperature	-40C-60C
Enclosure	Max. IP40
Certification	FCC, IC, CE, Japan, South Africa, Austrailia