Condor BreadCrumb®

Mobile Wireless Mesh Network Node

The Condor BreadCrumb is Rajant's new dual-transceiver, military-grade, high-performance BreadCrumb platform. The Condor supports a maximum combined data rate of 1.7 Gbps and up to 6X enhanced throughput performance over existing BreadCrumbs. It offers two MIMO radio interfaces, high throughput, and enhanced security performance with up to 256-QAM and 80 MHz channels.

Condor BreadCrumb Platform Key Features

- Rajant's patented[1] InstaMesh® networking software enables the network to quickly adapt to rapidly deployed and quickly (or constantly) moving network elements

- Multiple concurrent transceivers for high levels of network reliability, redundancy, and diversity, and fewer problems due to interference, congestion, and equipment outages

- Up to 1.7 Gbps of physical layer data rate combined over two transceivers

- Multiple radio frequencies – 2.4 GHz, 5 GHz. 605 — 1400 MHz, 700 MHz, 1.4 GHz, 2.2 GHz, 3.6 GHz, 4.8 GHz, 4.9 GHz as well as military, licensed, public service, and other proprietary radio frequencies

- Multiple antenna-port configurations with up to 3x3 MIMO (multiple-input, multiple-output), substantially increasing the capacity of transceivers

- Support for several strong cryptographic options used for data and MAC-address encryption and per-hop, per-packet authentication

- Rugged and environmentally sealed enclosures

- High bandwidth for data, voice, and video applications

- Scalability to hundreds of mobile, high-bandwidth nodes

- Integrated 802.11ac Wi-Fi Access Point and client mode service for compatibility with millions of commercial off-the-shelf Wi-Fi client and access point devices such as laptops, tablets, smartphones, IP cameras, sensors, and other IP devices

- Self-forming and self-healing operation for fast and easy deployments

- Reliable and fast off-loading to Ethernet via multiple, simultaneous bridge-mode links through the Automatic Protocol Tunneling (APT) feature

Utilizing the Condor Platform to Your Advantage

Rajant's innovative solution, powered by its patented InstaMesh® networking software, redefines connectivity and network resilience in dynamic environments. This cutting-edge technology allows networks to seamlessly adapt to rapidly deployed and continuously moving elements, ensuring uninterrupted communication. With the integration of multiple concurrent transceivers, Rajant ensures unparalleled network reliability, redundancy, and diversity. This design minimizes the common pitfalls of interference, congestion, and equipment outages, offering a robust solution for critical communications. Furthermore, the impressive physical layer data rate of up to 1.7 Gbps, combined over two transceivers operating on multiple radio frequencies with up to 3X3 MIMO antenna-port configurations, significantly enhances the capacity and performance of the network. This technical prowess supports high-bandwidth applications for data, voice, and video, scaling effortlessly to accommodate hundreds of mobile nodes, making it an ideal choice for demanding military, industrial and commercial applications.

The Condor BreadCrumb, a pivotal component of Rajant's offering, extends the capabilities of this network infrastructure by providing access to licensed frequencies and overcoming obstructions for improved range. It ensures seamless M2M communication, reducing the need for extensive hardware to manage expansive areas. This technology addresses and solves potential device connectivity issues, effectively closing communication gaps among field equipment, vehicles, personnel, and unmanned ground vehicles (UGV). Its compatibility with existing network infrastructure facilitates rapid, cost-effective installations and management, thereby accelerating deployment times and reducing operational costs. Condor's extended-range capabilities and seamless integration underscore Rajant's commitment to delivering comprehensive, reliable network solutions.

[1] U.S. Patent 9,001,645

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
Custom 2-Radio	Custom Condor BreadCrumb®, two transceivers, up to 3x3 MIMO per transceiver, up to 4 total antenna ports, includes licensed or restricted radio frequencies.

Wireless	2.4 GHz	4.9/5 GHz	5 GHz
Antenna Connector	(2) Type N (female)	(2) Type N (female)	(2) Type N (female)
Frequency[2]	2402 – 2482 MHz	4940 – 4990 MHz U-NII-1: 5150 – 5250 MHz U-NII-2A: 5250 – 5350 MHz U-NII-2C: 5470 – 5725 MHz U-NII-3: 5725 – 5850 MHz	U-NII-1: 5150 – 5250 MHz U-NII-2A: 5250 – 5350 MHz U-NII-2C: 5470 – 5725 MHz U-NII-3: 5725 – 5850 MHz
Modulation	DSSS, CCK, OFDM with up to 64-QAM	OFDM with up to 64-QAM	OFDM with up to 256-QAM
Max. Physical Layer Data Rate	300 Mbps (throughput varies)	300 Mbps (throughput varies)	866.7 Mbps (throughput varies)
Max. RF Transmit Power[3, 4]	30 dBm	29 dBm	30 dBm
Receive Sensitivity[5, 6]	-100 dBm (@ 1 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ 300 Mbps, 40 MHz channel bandwidth)	-96 dBm (@ 6 Mbps, 20 MHz channel bandwidth) to -69 dBm (@ 300 Mbps, 40 MHz channel bandwidth)	-94 dBm (@ 6 Mbps, 20 MHz channel bandwidth) to -68 dBm (@ 866.7 Mbps, 80 MHz channel bandwidth)

[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] Transmit power tolerance is ± 2 dB

[5] Receive sensitivity tolerance is ± 2 dB

[6] Receive sensitivity criteria is less than 10% packet error rate (PER)

Wireless Cont.	605 – 1400 MHz	700 MHz	1.4 GHz
Antenna Connector	(2) Type N (female)	(2) Type N (female)	(2) Type N (female)
Frequency[2]	605 – 1400 MHz	785 – 805 MHz	1425 – 1525 MHz
Modulation	OFDM with up to 256-QAM	OFDM with up to 256-QAM	OFDM with up to 256-QAM
Max. Physical Layer Data Rate	866.7 Mbps (throughput varies)	144 Mbps (throughput varies)	866.7 Mbps (throughput varies)
Max. RF Transmit Power[3, 4]	31 dBm (tentative)	31 dBm (tentative)	30 dBm
Receive Sensitivity[5, 6]	TBD	-100 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ 144 Mbps, 20 MHz channel bandwidth) (tentative)	-100 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ 144 Mbps, 20 MHz channel bandwidth)

Wireless Cont.	2.2 GHz	3.6 GHz	4.8 GHz
Antenna Connector	(2) Type N (female)	(2) Type N (female)	(3) Type N (female)
Frequency[2]	2200 – 2300 MHz	3600 – 3700 MHz	4800 – 4940 MHz
Modulation	OFDM with up to 256-QAM	OFDM with up to 256-QAM	OFDM with up to 256-QAM
Max. Physical Layer Data Rate	866.7 Mbps (throughput varies)	866.7 Mbps (throughput varies)	1300 Mbps (throughput varies)
Max. RF Transmit Power[3, 4]	31 dBm	28 dBm	32 dBm
Receive Sensitivity[5, 6]	-100 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ 144 Mbps, 20 MHz channel bandwidth)	-99 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -75 dBm (@ 144 Mbps, 20 MHz channel bandwidth)	-96 dBm (@ 6.5 Mbps, 20 MHz channel bandwidth) to -74 dBm (@ 144 Mbps, 20 MHz channel bandwidth)

[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] Transmit power tolerance is ± 2 dB
[5] Receive sensitivity tolerance is ± 2 dB
[6] Receive sensitivity criteria is less than 10% packet error rate (PER)

Network & Security

Network Functionality	VLAN and QoS support; Access Point; Bridge; Gateway; DHCP; NAT and Port Forwarding; Automatic Protocol Tunneling (APT).
Security	• Multiple cryptographic options, including NSA Suite B algorithms (implementation not certified). For information on models with full Suite B certification, contact Rajant or your authorized Rajant partner. • Separately configurable data and MAC address encryption via AES256-GCM, AES192-GCM, AES128-GCM, AES256-CTR, AES192-CTR, AES128-CTR, XSalsa20, XSalsa20/12, and XSalsa20/8. • Configurable per-hop, per-packet authentication between BreadCrumbs via AES256-GMAC, AES192-GMAC, AES128-GMAC, HMAC-SHA512, HMAC-SHA384, HMAC-SHA256, HMAC-SHA224, HMAC-SHA1, and Poly-1305-AES. • Supports IEEE 802.11i: AES-CCMP and TKIP encryption, WPA-Personal/Enterprise, WPA2-Personal/Enterprise, iPSK, 802.1x; 64/128-bit WEP; Access Control Lists; Compatible with Layer-2 and Layer-3 client/server and peer-to-peer security solutions.

Input/Output

Ethernet	(1) M12 X-Code female connector, 10/100/1000 Mbps, IEEE 802.3, auto MDI/MDIX
USB	USB 2.0 Type A female host port for firmware upgrade, USB-based zeroize and GPS device add-on
LED	(2) Status LED
Switch	LED configuration / zeroize keys and restore factory defaults (reset) switch

Power

PoE	IEEE 802.3at Type 2 / PoE+ or 38 — 60 VDC Passive PoE
Power Consumption[7]	2 transceivers: 11 W (average, idle); 25.4 W (maximum, peak) @ 48 V

Physical

Dimensions	142.5 mm x 187.3 mm x 49 mm (5.59" x 7.37" x 1.93")
Weight[8]	1548 g ± 30 g (3 lb 6.6 oz ± 1.1 oz)
Temperature	Startup: -40 °C to +70 °C (-40 °F to 158 °F) Ambient (operating): -40 °C to +70 °C (-40 °F to 158 °F) Storage: -40 °C to +80 °C (-40 °F to 176 °F)
Enclosure	Designed for IP67 (6: Dust-tight, 7: Waterproof)
Certification	TBD
Warranty	1 year

[7] Power consumption depends on transceiver configuration

[8] Weight depends on transceiver configuration

20+
OF GAME-CHANGING
WIRELESS

RAJANT
MAKING THE COMPLICATED SIMPLE
Continuous **Connectivity** Anywhere