

# BreadCrumb® LX4

## Portable Wireless Mesh Network Node

### APPLICATIONS

#### ► MINING

For open pit and underground mines, BreadCrumb devices form a resilient network for mine monitoring and control. Typical applications include Miner Tracking, Emergency Rescue, Voice communications (VoIP), Dispatch, Routing, Health Monitoring and Video.

#### ► MILITARY

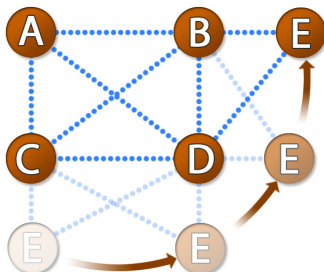
With battery power, rugged enclosures, single-switch operation and robust security, BreadCrumb devices are perfect for military applications such as Perimeter Security, Sensor Data Collection, Video Surveillance, Convoy Security, RFID Tracking and more. Depending on BreadCrumb model, security options range from WEP, WPA2, SecNet 54® to FIPS 140-2.

#### ► FIRST RESPONDERS

BreadCrumb devices form an instant secure network for emergency response, disaster relief, RFID tagging, voice communications (VoIP), PDAs, laptops, video and sensor applications. The included Ethernet port can provide Internet access through satellite or microwave links.

### InstaMesh®

InstaMesh® is an advanced protocol developed by Rajant that allows for continuous and instantaneous routing of wireless and wired connections. It enables complete network mobility, robust fault tolerance, high throughput and low latency, with zero maintenance and administration. The BreadCrumbs combine InstaMesh® with support for standards in wireless access, security, network monitoring, QoS and much more

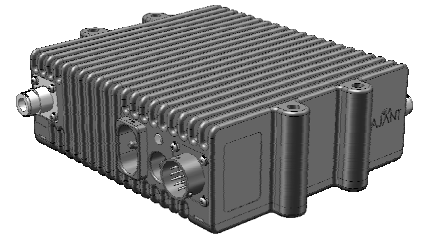


In this diagram, the Rajant mesh network adapts to the changes caused by the movement of Node E. New links are established in real-time keeping the network available, intact and secure.

Because Rajant uses primarily Layer-2 and does not use a root node or LAN Controller, mobility and bandwidth are maximized. Multiple gateways and secure mesh-to-mesh authentication are also supported.

### Rajant BreadCrumb® LX4

The Rajant BreadCrumb LX4 is a rugged, multi-radio, wireless transceiver that forms a mesh network when used in conjunction with other BreadCrumb devices. This portable, wireless mesh network node contains between two and four radios, and supports open-standard IEEE 802.11a/b/g protocols to enable data, voice, and video applications. This full featured device can operate in extreme conditions and has several mounting options.



### BreadCrumb® LX4 Benefits

- Multiple radio configurations support comprehensive applications and deployment environments—900 MHz, 2.4 GHz, 4.9 GHz, 5 GHz, and others.
- Rugged and portable for applications in extreme situations.
- Offers high-bandwidth for data, voice, and video applications.
- Ability to scale to hundreds of mobile, high-bandwidth nodes.
- Runs InstaMesh®, so the network quickly adapts to moving network elements.
- Open-system IEEE 802.11a/b/g standards for compatibility with millions of commercial off-the-shelf (COTS) client devices such as laptops, PDAs, IP cameras, sensors, VoIP phones and other IP devices.
- Self-configuring operation for fast and easy deployments.
- Data encryption to ensure privacy.
- Mesh-to-mesh authentication provides secure networking.
- Multiple simultaneous bridge-mode links to the same Ethernet network through Automatic Protocol Tunneling (APT) feature.

### BC|Commander® Management Tool

BC|Commander and BC|Commander Enterprise software tools are used to configure, manage, and monitor your Rajant network.

- Topology view shows BreadCrumb and client device connections and parameters.
- BreadCrumb/client device channel, frequency, MAC address, IP address, nickname assignment, signal and noise levels and time-since-last-update.
- Channel and link speed of connections.
- Manual radio, SSID, DHCP, gateway and port forwarding, access control, security, and encryption settings.

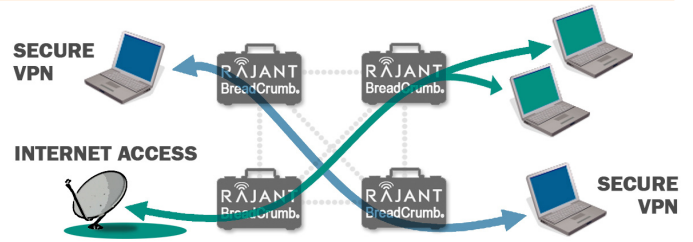


Rajant BreadCrumb® LX4

MODELS

<b>LX4-2495</b> 2.4 GHz/900 MHz/5 GHz	<b>LX4-2954</b> 2.4 GHz/900 MHz/5 GHz/4.9 GHz
<b>LX4-2250</b> 2.4 GHz/2.4 GHz/5 GHz	<b>LX4-2255</b> 2.4 GHz/2.4 GHz/5 GHz/5 GHz
	<b>LX4-2295</b> 2.4 GHz/2.4 GHz/900 MHz/5 GHz

Custom radio configurations available upon request. May include a mix of licensed, military or unlicensed frequencies.



Rajant Wireless Mesh—Sample Application

WIRELESS	900 MHz	2.4 GHz	4.9 GHz	5 GHz
Antenna Connector	(Up to 2) Type N (f)	(1) Type N (f)	(1) Type N (f)	(1) Type N (f)
Frequency	902 – 928 MHz	2.402 – 2.472 GHz	4.942 – 4.987GHz	5.735 – 5.835 GHz
Modulation	DSSS, CCK, OFDM	DSSS, CCK, OFDM	OFDM	OFDM
Max. RF Transmit Power*	30 dBm ± 1 dB	28 dBm ± 1 dB	26 dBm ± 1.5 dB	28 dBm ± 1.5 dB

\* RF transmit power is governed by local regulations and varies by frequency.

Receive Sensitivity	900 MHz	2.4 GHz	4.9 GHz	5 GHz
1 Mbps:	-97 dBm ± 1dB	1 Mbps: -97 dBm ± 1dB	6 Mbps: -94 dBm ± 1.5dB	6 Mbps: -94 dBm ± 1.5dB
2 Mbps:	-95 dBm ± 1dB	2 Mbps: -96 dBm ± 1dB	9 Mbps: -93 dBm ± 1.5dB	9 Mbps: -93 dBm ± 1.5dB
5.5 Mbps:	-92 dBm ± 1dB	5.5 Mbps: -95 dBm ± 1dB	12 Mbps: -91 dBm ± 1.5dB	12 Mbps: -91 dBm ± 1.5dB
11 Mbps:	-90 dBm ± 1dB	11 Mbps: -92 dBm ± 1dB	18 Mbps: -90 dBm ± 1.5dB	18 Mbps: -90 dBm ± 1.5dB
6 Mbps:	-93 dBm ± 1dB	6 Mbps: -94 dBm ± 1dB	24 Mbps: -86 dBm ± 1.5dB	24 Mbps: -86 dBm ± 1.5dB
9 Mbps:	-93 dBm ± 1dB	9 Mbps: -93 dBm ± 1dB	36 Mbps: -83 dBm ± 1.5dB	36 Mbps: -83 dBm ± 1.5dB
12 Mbps:	-91 dBm ± 1dB	12 Mbps: -91 dBm ± 1dB	48 Mbps: -77 dBm ± 1.5dB	48 Mbps: -77 dBm ± 1.5dB
18 Mbps:	-89 dBm ± 1dB	18 Mbps: -90 dBm ± 1dB	54 Mbps: -74 dBm ± 1dB	54 Mbps: -74 dBm ± 1.5dB
24 Mbps:	-86 dBm ± 1dB	24 Mbps: -86 dBm ± 1dB		
36 Mbps:	-82 dBm ± 1dB	36 Mbps: -83 dBm ± 1dB		
48 Mbps:	-77 dBm ± 1dB	48 Mbps: -77 dBm ± 1dB		
54 Mbps:	-74 dBm ± 1dB	54 Mbps: -74 dBm ± 1dB		

NETWORK & SECURITY

Network	VLAN and QoS Support; Access Point; Bridge; Gateway; DHCP; NAT and Port Forwarding; Automatic Protocol Tunneling (APT).
Security	Supports IEEE 802.11i: AES-CCMP and TKIP encryption, WPA-Personal/Enterprise, WPA2-Personal/Enterprise, 802.1x; 64/128-bit WEP; AES-256 encryption and HMAC-SHA1 authentication between BreadCrumbs; Access Control Lists; Compatible with Layer-2 and Layer-3 client/server and peer-to-peer security solutions; Compatible with Harris SecNet 54® encryption.

POWER

Input Voltage	24 – 48 VDC
Power	23 W (2 radios), 30 W (3 radios), 37 W (4 radios) @ 24 V (peak)

INPUT / OUTPUT

Ethernet	(2) IEEE 802.3, RJ-45 10/100 Mbps, auto MDI/MDIX
USB	Built-in USB port for firmware upgrades, and for GPS device add-on
LED	Status LED
Switch	LED Configuration / Zeroize Keys and Restore Factory Defaults Switch

PHYSICAL

Dimensions	195 mm x 187 mm x 61 mm (7.683" x 7.352" x 2.400")
Weight	2000 g ± 150 g (4 lbs 6.5 oz ± 5.3 oz) (weight depends on radio configuration)
Temperature	Storage: -40 °C to 80 °C (-40 °F to 176 °F)    Operating: -40 °C to 80 °C (-40 °F to 176 °F)
Humidity	95% (non-condensing)
Enclosure	Designed for IP67 (6: Dust-tight, 7: Waterproof)
Certification	FCC Part 15 (USA), ICES-003 and RSS-210 (Canada)
Warranty	1 Year



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