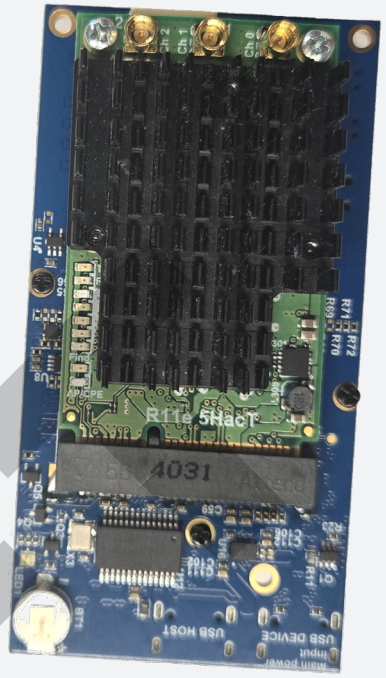
RAJANT

SPEC SHEET

BreadCrumb® DX5

Optimized for Lightweight Autonomous Vehicles & Swarm Applications (V2V)s



The **BreadCrumb DX5 52xx** series is Rajant's ultra-lightweight OEM module, engineered specifically for mobile mesh networking in compact autonomous systems. Weighing just **47g without heatsinks**, the DX5 is ideal for **UAVs under 100g total**, including mounts, antennas, and cabling. Designed for private wireless networks, it supports a variety of **RF configurations**, including **3x3 MIMO** in both **ISM and licensed bands**, making it the go-to solution for **drone swarms, mobile surveillance (CCTV), remote telematics**, and other lightweight mobile applications.

Despite its compact size, the DX5 delivers full mesh capability when integrated with other Rajant Breadcrumb nodes, offering the reliability and scalability expected of mission-critical wireless networks.

BreadCrumb DX5 Key Features

- Rajant's patented InstaMesh® [1] networking software, enabling the network to quickly adapt to rapidly-deployed and quickly- or constantly-moving network elements
- Powered by Rajant's patented InstaMesh® software, enabling instant, dynamic adaptation to rapidly moving or deployed network elements
- Operates on 2.4GHz and 5GHz radio bands for broad environmental and application compatibility
- Multiple strong cryptographic options for secure data transmission, including MAC address encryption and per-packet authentication (details on page 3)
- High-bandwidth throughput to support video, voice, and data communications
- Scales efficiently to hundreds of mobile, high-throughput nodes
- Built-in Wi-Fi Access Point for seamless integration with COTS devices (e.g., laptops, tablets, IP cameras, sensors)
- Self-configuring mesh architecture for fast, easy deployment
- Reliable Ethernet offload via simultaneous bridge-mode links using Automatic Protocol Tunneling (APT)
- Serial-over-Mesh functionality using Ser2Net protocol via the onboard USB slave port

Leveraging the DX5 Series for Lightweight Mesh Networking

The **DX5 series** is Rajant's **smallest and lightest Breadcrumb** to date, offered as a compact, board-level solution weighing just **47g**. Designed with **dual-transceiver MIMO capability**, it is perfectly suited for **UAVs**, especially in **drone swarm and lightweight autonomous vehicle applications**.

Fully compatible with Rajant's entire Breadcrumb portfolio—including the **Hawk**, **Peregrine**, and Sparrow—the DX5 series seamlessly integrates into larger mesh networks to create a cohesive, scalable wireless infrastructure.

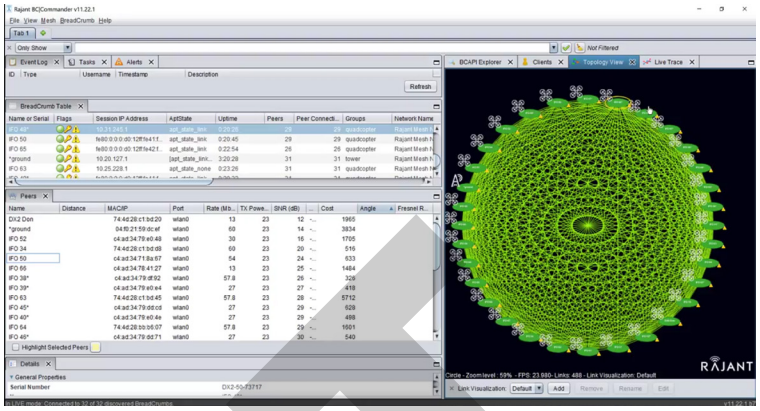
Powered via a **USB-C port or power port**, with an additional USB-C interface for **serial-over-mesh functionality** (using Ser2Net protocols), the DX5 series easily integrated with **common flight computers** and edge systems.

Thanks to its **minimal footprint and ultra-lightweight design**, the DX5 series excels not only in aerial platforms but also in **space- and weight-constrained deployments** across robotics, mobile surveillance, and **swarm communication networks**.

[1] U.S. Patent 8341289B2

BCICommander®

BCICommander is a powerful network management platform that addresses the unique demands of drone operations. From coordinating complex swarms to maintaining connectivity across large-scale fleets, it gives operators the real-time visibility and control needed to ensure mission success.



Purpose-built for Rajant's **Kinetic Mesh**® networks and **BreadCrumb**® wireless nodes, BCICommander provides an intuitive dashboard for monitoring aerial assets, configuring nodes, and managing network health across dynamic flight environments. Whether in a control room or field command center, it enables seamless oversight of individual drones or entire swarms.

BCompatible with **Microsoft**® **Windows**® and **Linux**®, the software delivers a global view of network performance through a user-friendly graphical interface. Encrypted connections to each BreadCrumb safeguard critical flight data, while advanced management features simplify deployment, troubleshooting, and optimization for complex airborne networks.

Model	Description
DX5—5224	DX5 with (1) - 2.4 GH 2x2 MIMO 300 Mbps transceiver.
DX5—5250	DX5 with (1) - 5.GH 3x3 MIMO 420 Mbps transceiver.

Wireless	2.4 GHz	5 GHz
Antenna Connector	(2) MMCX (female)	(3) MMCX (female)
Frequency[2]	2402 – 2482 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	OFDM
Max. Physical Layer Data Rate	300 Mbps (throughput varies)	420 Mbps (throughput varies)
Max. RF Transmit Power[3]	30 dBm ± 1 dB	27 dBm ± 2 dB
Receive Sensitivity	-100 dBm (@ 1 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ MCS7, 40 MHz channel bandwidth)	-96 dBm (@ 6 Mbps, 20 MHz channel bandwidth) to -76 dBm (@ MCS7, 40 MHz channel bandwidth)

[2] Channel, frequency and bandwidth options will vary based upon regional and local regulations and certifications.
[3] RF transmit power is governed by local regulations and varies by frequency. For 2x2 MIMO capable transceivers, the Max. RF Transmit Power specification is for the combined power output of the two antenna ports.

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; Compatible with Harris SecNet 54® encryption.

Power	
Input Voltage	5 VDC over USB host connector or aux input connector
Power Consumption[4]	Min 2.5watt idle up to 20W max depending on RF card at full power

Input / Output	
Ethernet	(1) - 10/100/1000 Mbps IEEE 802.3, auto MD/MDIX
USBC	USB port for firmware upgrades, and for GPS device add-on
USBC Slave	Flight computers, serial overmesh, TRoIP
LED	Tri-color status LED

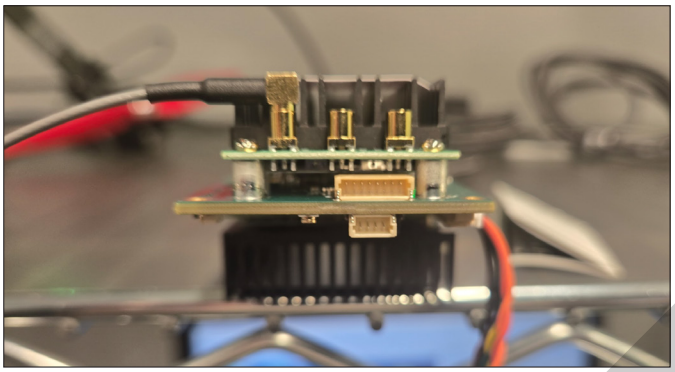
Physical	
Dimensions	40 mm x 78 mm x 10 mm (1.575” x 3.071” x 0.394”)
Weight	72 g with both heat sinks
Temperature	Operating: -40° C to +60° C (-40° F to +140° F) Storage: -40° C to +60° C (-40° F to +140° F)
Enclosure[5]	Unsealed
Certifications	TBD

Warranty	1 Year

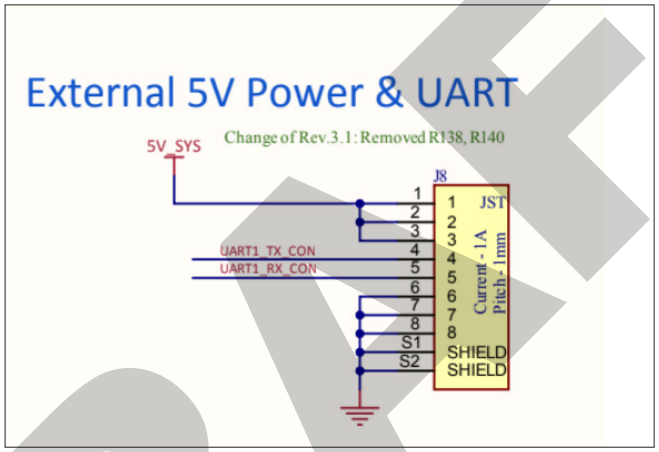
[4] Power consumption depends on transceiver configuration.
[5] Exposure to water, particulates, excessive humidity, excessive shock and vibration, and/or temperature extremes or fluctuations may void the manufacturer’s warranty.

Power

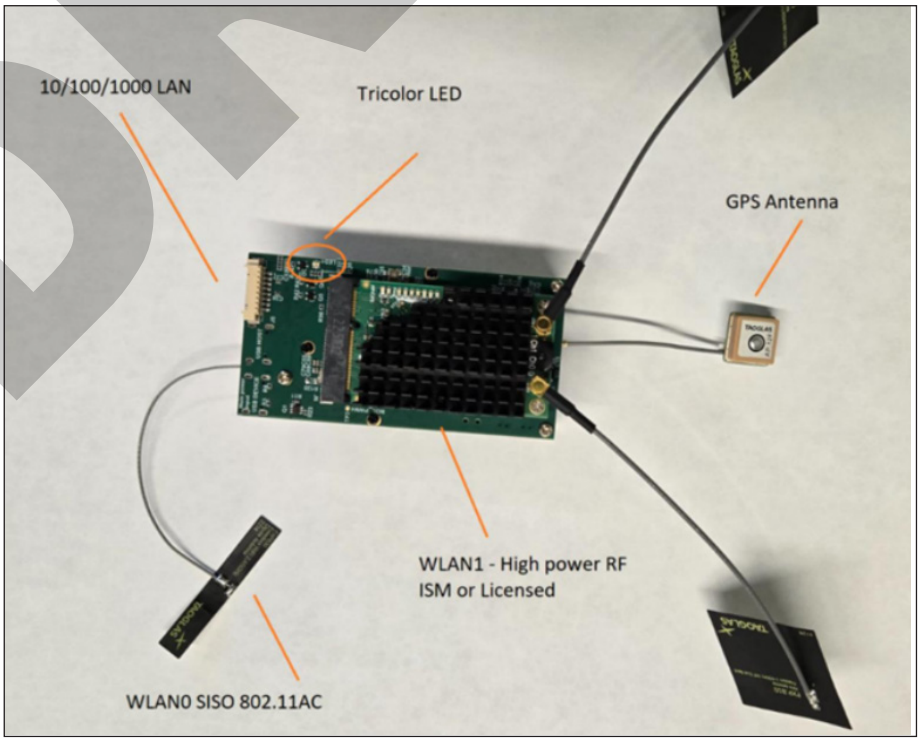
USB Host can also be a source of 5V - but the 10 pin connector is more desirable for UAV size constraints



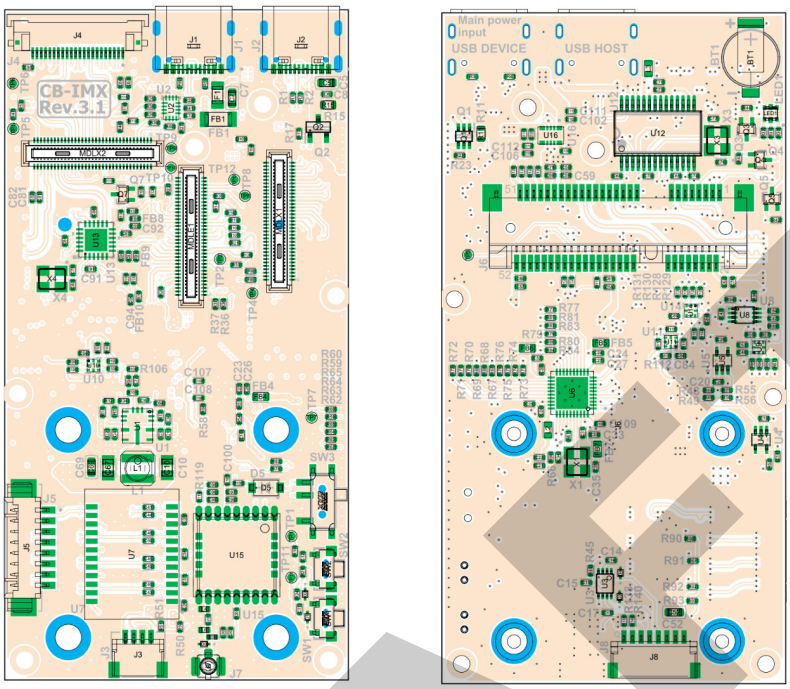
The small connector is a factory port (console) and may go away at some point. The 10 pin JST connector for 5V and ground input and TTL (3V) serial. (possible use flight computers or TTL serial -- Ser2Net)



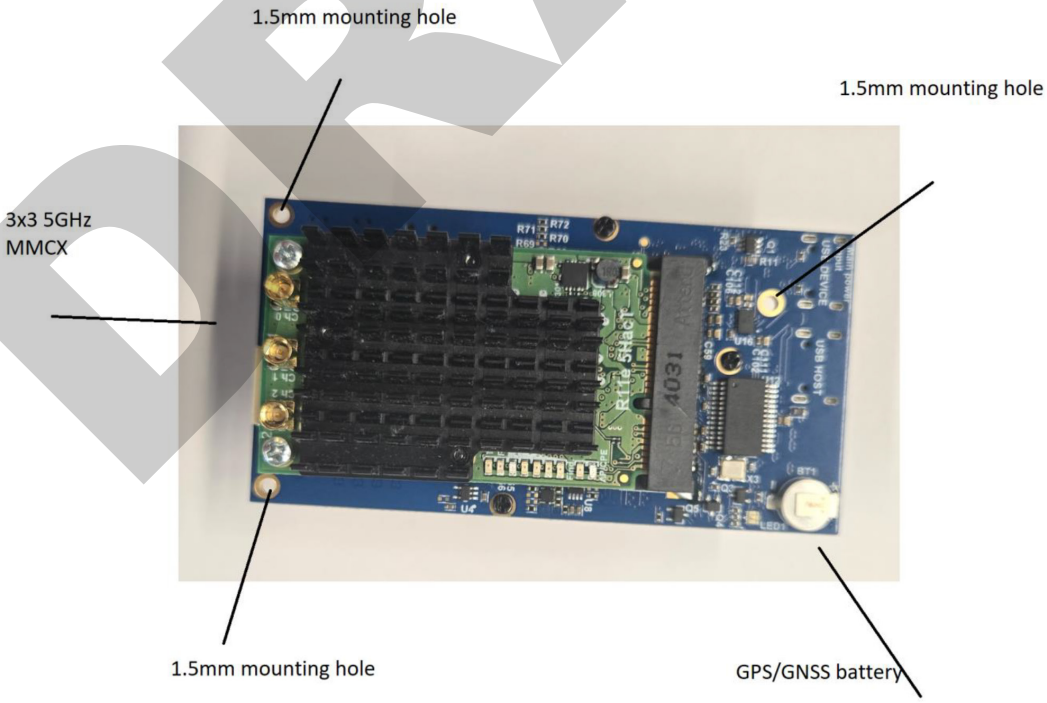
Wiring Overview Diagram



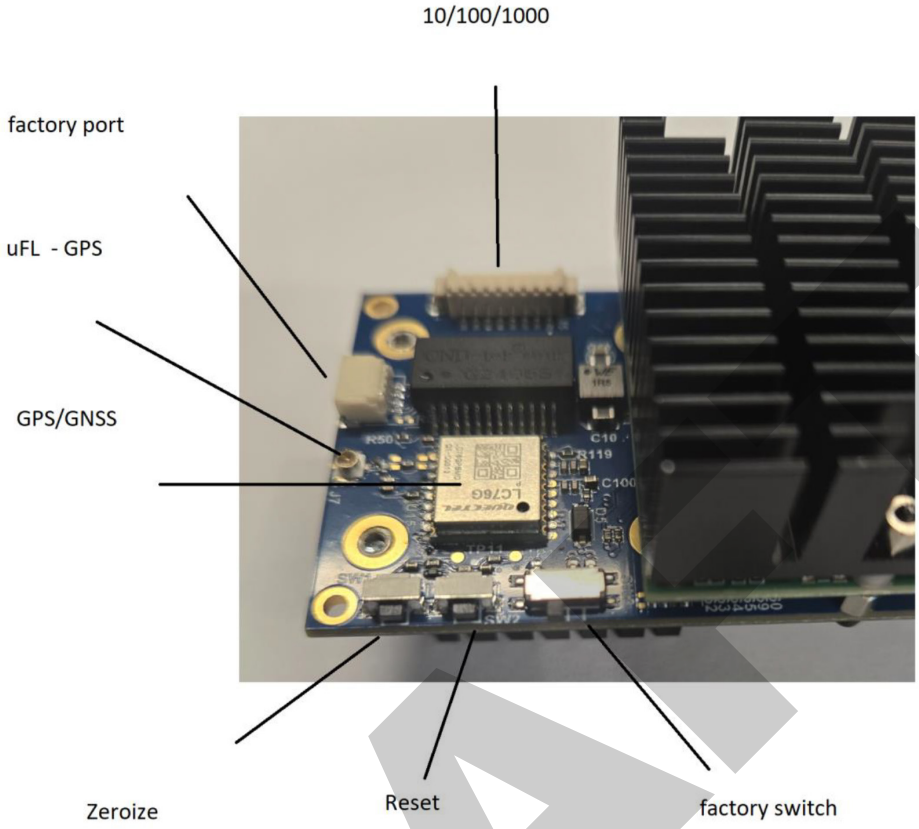
40 x 78mm Circuit Board



DX5 52XX Top View



DX5 52XX Side View



DX5 52XX Front View