Vcan2024 Wireless Video & Data Transceiver Module

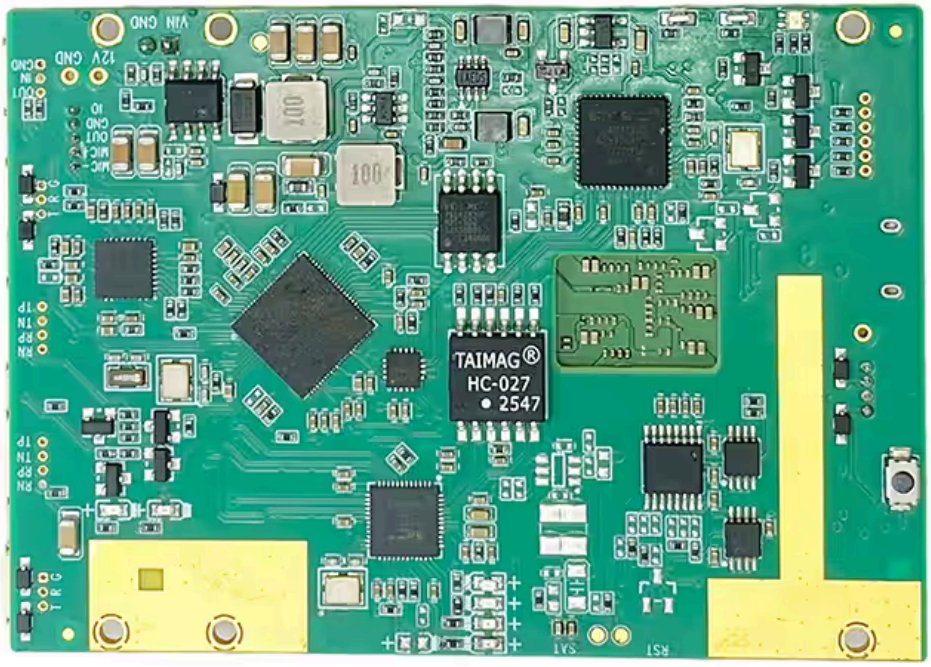
TDD-OFDM Two-Way Broadband Wireless Link (600MHz / 1.4GHz) — Technical Datasheet

1. Product Overview

The **Vcan2024** is a high-performance, two-way wireless transceiver module utilizing **TDD-OFDM** (Time Division Duplexing - Orthogonal Frequency Division Multiplexing) and **FHSS** (Frequency Hopping Spread Spectrum) technologies. Operating across the **600MHz** and **1.4GHz** bands, it provides a reliable, long-range, and low-latency wireless link for simultaneous HD video, IP data, serial telemetry, S.BUS, and two-way analog audio transmission.



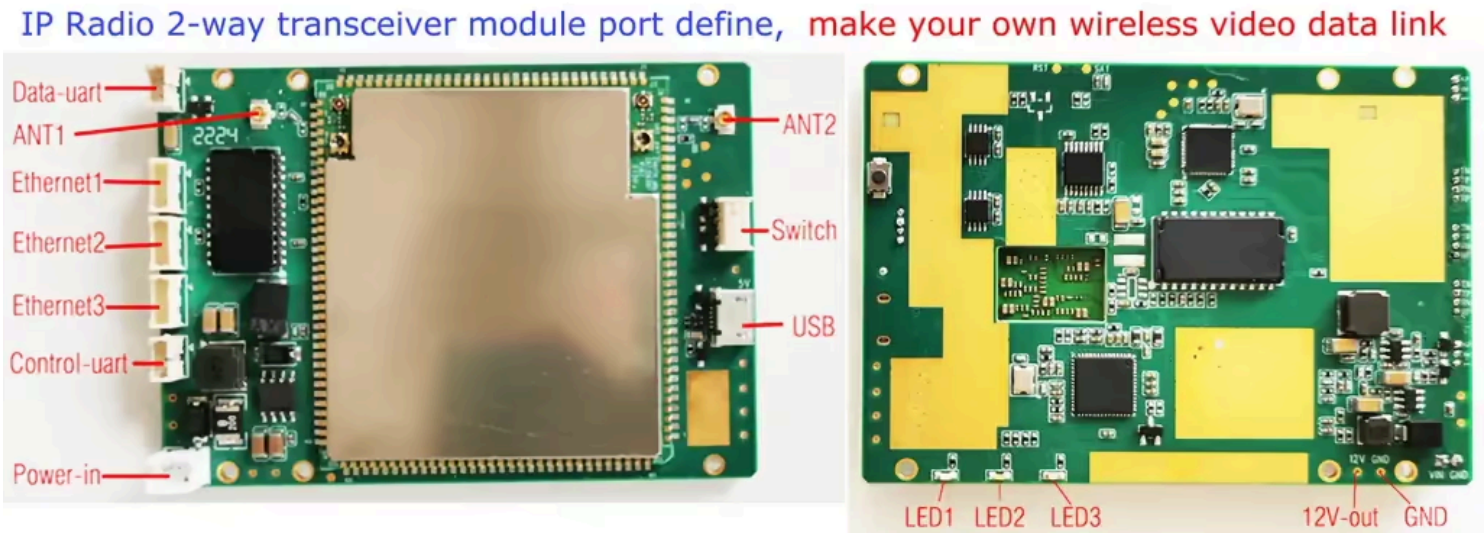
front side



back side

2. Key Highlights

- **Dual-Band & Anti-Interference:** Operates in 566–678 MHz and 1420–1530 MHz with adaptive FHSS to ensure robust communication in complex RF environments.
- **High Throughput & Long Range:** Up to **100 Mbps** data rate; achieves **5–22 km** Line-of-Sight (LOS) for UAV-to-Ground and **500–2000 m** for Ground-to-Ground applications.
- **Rich Peripheral Interfaces:** Dual Ethernet ports (internal switch), dual UART ports, bidirectional S.BUS I/O, and two-way analog audio.
- **Flexible Networking Topologies:** Supports Point-to-Point (P2P), Point-to-Multipoint (P2MP, up to 63 Access Nodes), Relay, and Mesh networking.
- **Compact & Lightweight:** Weighs only **41g** with an ultra-slim profile, ideal for UAVs, UGVs, robotics, and portable ground control stations.



3. Technical Specifications

3.1 RF & Wireless Parameters

Parameter	Specification	Notes
Modulation	TDD-OFDM	Adaptive modulation
Constellation	QPSK, 16QAM, 64QAM	Automatic link adaptation
Frequency Bands	566 – 678 MHz (600MHz Band) 1420 – 1530 MHz (1.4GHz Band)	Software selectable; supports FHSS in both bands
Channel Bandwidth	1.4 / 3 / 5 / 10 / 20 / 40 MHz	Configurable via Web UI or AT commands
RF Output Power	24 ± 1 dBm per channel (2 Channels)	2T2R MIMO architecture (Total ~27 dBm)
Receiver Sensitivity	-102 dBm	Measured at 1 Mbps @ 20 MHz

Parameter	Specification	Notes
		bandwidth
Max Data Throughput	Up to 100 Mbps	Shared across uplink and downlink
Encryption	AES-128	Hardware-level data security
Transmission Range (LOS)	**UAV-to-Ground:** 5 – 22 km **Ground-to-Ground:** 500 – 2000 m	Actual range depends on antenna gain, height, and RF environment

3.2 Electrical & Mechanical Parameters

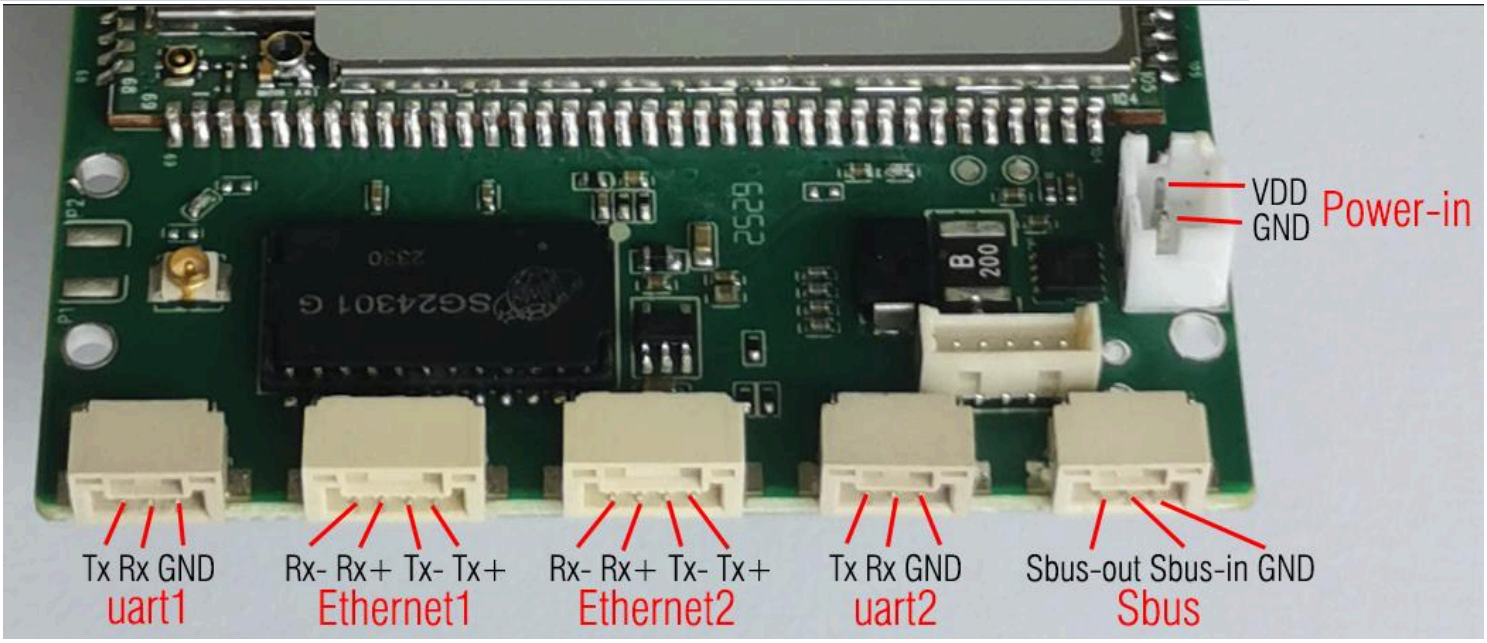
Parameter	Specification
Power Input	DC 12V – 30V
Auxiliary Power Output	12V DC (< 200 mA), dedicated for cooling fan power supply
Power Consumption	< 7 W (Typical)
Dimensions (L × W × H)	80 × 57 × 9.6 mm (PCB thickness: 1.6 mm; Front component height < 5 mm; Back < 3 mm)
Weight	41 g
Operating Temperature	-20°C to +65°C
Storage Temperature	-40°C to +80°C

4. Hardware Interfaces & Pinout Definitions

4.1 Connector Overview

Interface	Connector Type	Function & Electrical Characteristics
Power In	2-Pin PH2.0mm	Wide voltage DC input (12V–30V).
12V Out	On-board Header / Pad	Regulated 12V output (< 200 mA) for external cooling fan.
Ethernet 1 & 2	4-Pin GH1.25mm (Lockable)	10/100 Mbps Ethernet. **Internally bridged** (shares the same IP address, acting as a 2-port switch).
UART 1	3-Pin GH1.25mm	Transparent data transmission or

Interface	Connector Type	Function & Electrical Characteristics
	(Lockable)	UART-to-Ethernet (TCP/UDP). Default: **3.3V TTL** (RS232 optional before shipment).
UART 2	3-Pin GH1.25mm (Lockable)	Configurable as **Data UART** (default, supports TCP/UDP) or **Control UART** (AT commands). Default: **3.3V TTL** (RS232 optional before shipment).
S.BUS In/Out	3-Pin GH1.25mm (Lockable)	Bidirectional S.BUS signal pass-through for RC controllers and flight controllers.
Audio In/Out	5-Pin PH1.25mm	Two-way analog audio with onboard codec. Differential Mic/Line-in, single-ended Line-out (drives headphones directly), plus Audio-Enable control pin.
PA Switch	Multi-Pin Header	Tx/Rx timing control signals for external Power Amplifiers (2W / 5W / 10W).
Ext. LEDs	Multi-Pin Header	Breakout pins to route status LEDs to an external device chassis panel.
USB	Micro-USB	Software/firmware upgrading and factory diagnostics.
Main / Second Antenna	IPEX (U.FL) × 2	50Ω RF ports for 2T2R MIMO Tx/Rx. *(Important: Always connect antennas before powering on).*





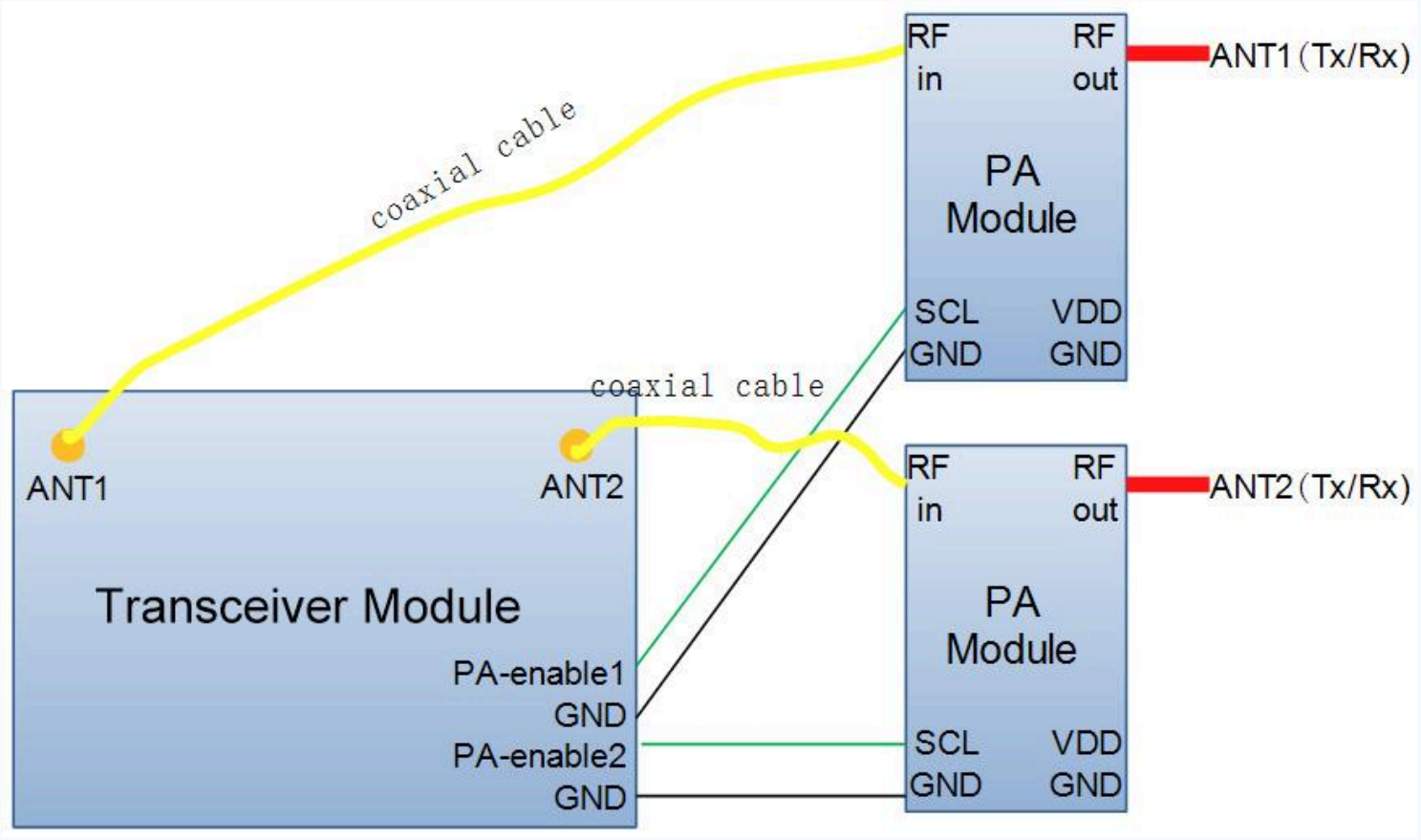
4.2 UART Baud Rate Support

- **UART 1 Supported Baud Rates:** 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600, 76800, 100000, 115200, 230400, 460800, 921600, 1152000, 2304000, 3750000, 4000000 bps.
- **UART 2 Supported Baud Rates:** 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 bps.

4.3 External Power Amplifier (PA) Control Timing (Switch Port)

The native RF output power of the Vcan2024 module is 24 ± 1 dBm per channel. To extend transmission power up to 2W, 5W, or 10W using an external PA, the module provides high-speed TDD switching control signals:

Signal Name	Logic Level	I/O	Timing & Functional Description
PA-Enable 1	3.3V TTL	Output	**High (3.3V) = Transmit (Tx); Low (0V) = Receive (Rx).** Switches High **3.19 µs** prior to RF transmission and returns Low **0.26 µs** after transmission ends.
PA-Enable 2	3.3V TTL	Output	Synchronized Tx/Rx switching control for Channel 2 RF chain (identical timing to PA-Enable 1).



5. Status LED Indicators & External Panel Breakout

The Vcan2024 features three onboard LEDs, which can also be extended to an external device chassis via the **LEDs Header**. *(Note: Add a 330Ω–1kΩ current-limiting resistor in series when connecting external LEDs to the 3.3V rail).*

Indicator	Color	Behavior	Status Meaning	External Breakout Pins
Power LED	Red	Solid On	Module is powered normally	Power-Red & LEDs-3.3V
Node LED	Blue	Solid On Blinking	Operating as **Central Node** Operating as **Access Node**	Node-Blue & LEDs-3.3V
Link LED	Off Red Amber/Yellow Green	Off Solid On Solid On Solid On	Not linked to wireless network Linked — **Weak** signal Linked — **Moderate** signal Linked — **Strong** signal	— Link-Red & LEDs-3.3V Link-Yellow & LEDs-3.3V Link-Green & LEDs-3.3V

6. Wireless Networking & Management

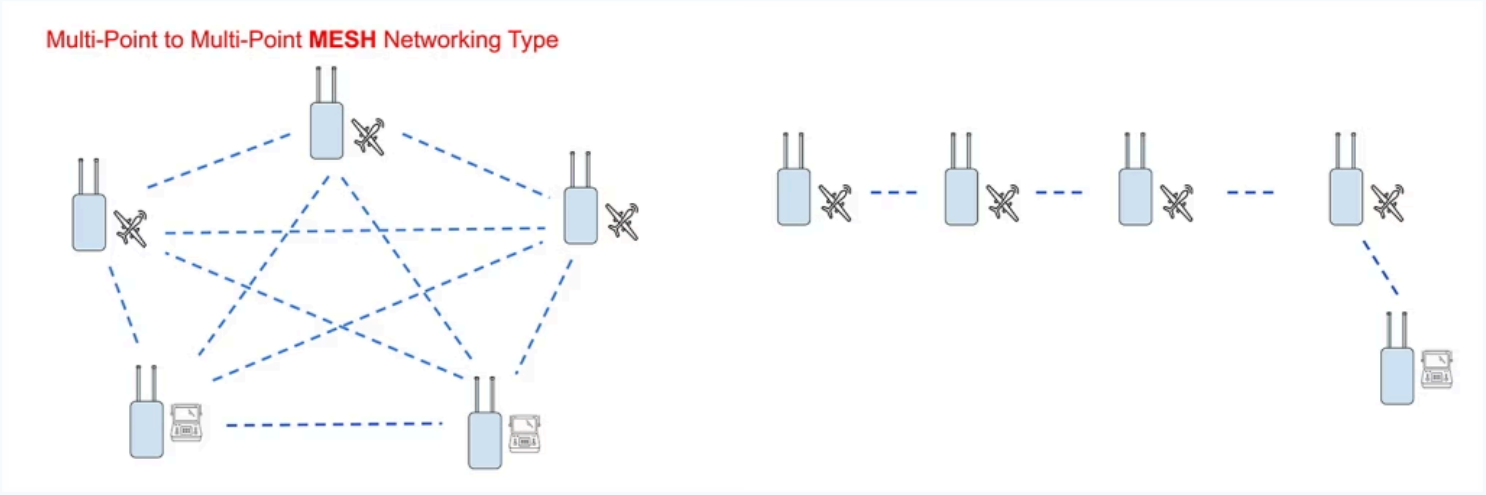
6.1 Management & Configuration

- **Web UI:** Built-in web server accessible via Ethernet for intuitive configuration of frequency, bandwidth, encryption, IP settings, and real-time link monitoring (SNR, RSSI, throughput).
- **AT Commands:** Supported via UART 2 (when configured as Control UART) for automated host-controller management.
- **Traffic Shaping:** Uplink (Access-to-Central) and Downlink (Central-to-Access) bandwidth ratios can be dynamically adjusted to prioritize video or telemetry streams.

6.2 Supported Network Topologies

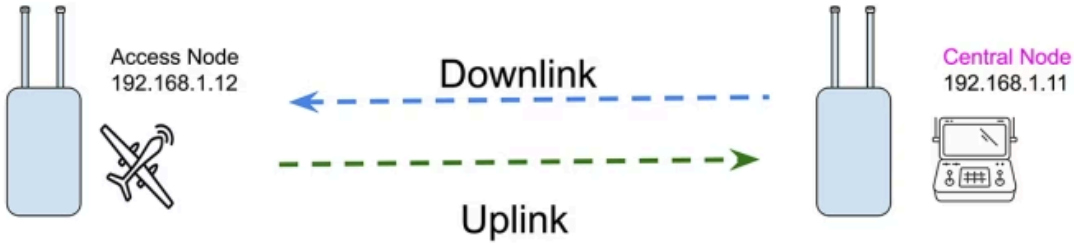
All nodes within the same network operate in a unified Wireless LAN and share the total 100 Mbps bandwidth capacity.

1. **Point-to-Point (P2P):** 1 Central Node paired with 1 Access Node for dedicated high-bandwidth links.
2. **Point-to-Multipoint (P2MP):** 1 Central Node connected simultaneously to up to **63 Access Nodes**.
3. **Relay Mode:** Extends wireless coverage by using an intermediate node to forward data beyond Line-of-Sight obstacles.
4. **Mesh Networking (Factory Option):** Self-forming, self-healing multi-hop network without a fixed central node. *(Must be specified at the time of ordering to load dedicated Mesh firmware).*

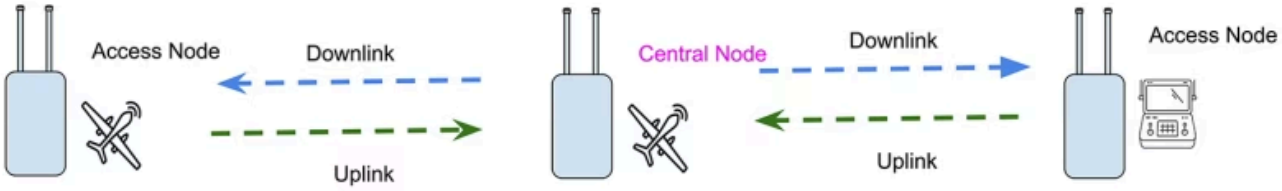


Star Networking (Has a Central Node)

1. P2P: Point to Point Networking Type



2. P2P via Relay / Repeater Networking Type



3. Multi-Point to Point Networking Type

