RFDESIGN

RFD900X2 Firmware V4 Beta

Release Notes

Release Date	Supported HW	Version	Release Type
17/10/2024	RFD900X2	4.00b	Beta

1. Overview

The V4 Beta firmware marks the first public release for the RFD900X modem, offering significant enhancements across multiple fronts. The new firmware introduces advanced network topologies and increased data rates, features not available in any of the previous versions. It is designed to meet the demands of more complex applications, enabling capabilities such as mesh-like networking and extended range comms links.

2. Features

2.1. Network & Bandwidth

- Support to one-to-one networks
- Out-of-the box automatic binding for one-to-one networks
- Ability to allocate a different number of slots to different nodes allowing for asymmetric bandwidth allocation
- Support to forwarding up to 2 nodes
- Support to multiple networks using a single master unit: the master unit transmits to all networks within the same BIND ID.
- Slot sharing between nodes within the same network allows for dynamic priority-based bandwidth allocation.
- Configurable transmission priority: slot sharing uses the priority to determine which node gets access to free slots

2.2. Radio, Spectrum and RF

- Support to 12, 56, 64, 72, 100, 125, 188, 200, 430 and 1000 kbps air data rates

- RF TX and RF signals available to GPIOs
- Long-range mode which increases slot guard times
- Listen-only mode – master always talks, slaves may be completely quiet
- AES128 and AES256-based encryption modes
- Selectable antenna modes: antenna 1, antenna 2 or both (antenna diversity)

2.3. Interfaces

2.3.1. Serial Ports

- Both UARTS support 9600, 57600, 115200, 230400, 460800, 1000000, 1200000 baud rates
- Flow control supported on main and auxiliary serial ports
- Ability to limit serial ports bandwidth via AT commands
- Ability to route traffic between serial ports, and loopback the alternate port

2.3.2. Remote Control (RC)

- Supports PPM (1-16ch) and SBUS (10 and 18 channels) input and output
- Ability to limit the amount of RC frames at the input to minimise band usage
- Remote Control packets are prioritised by default leading to a smoother vehicle response

2.3.3. GPIO & Data Types

- SAS encapsulation support
  Ability to prevent MAVLink packet fragmentation – MAVLink parsing
- RSSI and noise, local and remote averages reported via MAVLink to local serial
- Pin mirroring to selective outputs
- Highly flexible GPIO configuration

2.4. Configuration

- Configurable using AT command interface
- Ability to set a permanent AT port on Auxiliary port
- Expanded AT command set enables advanced debugging and reporting:
  - Perform loopback RC test

- o Set TX MODE (selective transmission on slot ownership)
- o ATI10:X command displays advanced parameter information
- o ATI6 displays real-time packet counter via RF and UART, and buffer usage statistics
- o ATI7 displays system information (stack usage, slot timing information, RC times, execution times)
- o ATI11 provides RC statistics
- o AT12 displays priority lists of nodes seen

3. Known Issues

- An issue with encryption levels 1 and 2 (AES-256) causes marginal loss of data.
- Antenna diversity hinders throughput performance when using 430 and 1000 Kbps air data rates. For these rates, configure the modem to use a single antenna to avoid the issue.
- Rarely, the modem will fail to re-synchronise until its power cycled
- The modem will drop a single MAVLink packet rarely.
- A modem configured as slave may take longer to synchronise with the master unit on reset via.