



Adafruit Feather RP2040 with RFM95 LoRa Radio – 915MHz – RadioFruit and STEMMA QT

Product ID: 5714



Description

This is the Adafruit Feather RP2040 RF95 LoRa Radio. We call these *RadioFruits*, our take on a microcontroller with a "Long Range (LoRa)" packet radio transceiver with built-in USB and battery charging. It's an Adafruit Feather RP2040 with a 900MHz radio module cooked in! Great for making wireless networks that are more flexible than Bluetooth LE and without the high power requirements of WiFi.

Feather is the development board specification from Adafruit, and like its namesake, it is thin, light, and lets you fly! We designed Feather to be a new

standard for portable microcontroller cores. We have other boards in the Feather family.

It's kinda like we took our RP2040 Feather and RFM95 900MHz breakout board and glued them together. You get all the pins for use on the Feather, the Lipoly battery support, USB C power / data, onboard NeoPixel, 8MB of FLASH for storing code and files, and then with the 8 unused pins, we wired up all the DIO pins on the RFM module. There's even room left over for a STEMMA QT connector and a uFL connector for connecting larger antennas.

This is the 900 MHz LoRa radio version, which can be used for either 868MHz or 915MHz transmission/reception – the exact radio frequency is determined when you load the software since it can be tuned around dynamically.

At the Feather's heart is an RP2040 chip, clocked at 133 MHz and at 3.3V logic, the same one used in the Raspberry Pi Pico. This chip has a whopping 8MB of onboard QSPI FLASH and 264K of RAM! This makes it great for running LoRa and LoRaWAN stacks that need a fairly strong processor to manage packets.

To make it easy to use for portable projects, we added a connector for any of our 3.7V Lithium polymer batteries and built-in battery charging. You don't need a battery, it will run just fine straight from the USB Type C connector. But, if you do have a battery, you can take it on the go, then plug in the USB to recharge. The Feather will automatically switch over to USB power when it's available.

Here're some handy specs! You get:

- Measures 2.0" x 0.9" x 0.28" (50.8mm x 22.8mm x 7mm) without headers soldered in
- Light as a (large?) feather – 6.3 grams
- RP2040 32-bit Cortex M0+ dual core running at ~133 MHz @ 3.3V logic and power
- 264 KB RAM
- 8 MB SPI FLASH chip for storing files and CircuitPython/MicroPython code storage. No EEPROM
- Tons of GPIO! 21 x GPIO pins with following capabilities:
 - Four 12-bit ADCs (one more than Pico)

- Two I2C, Two SPI, and two UART peripherals, we label one for the 'main' interface in standard Feather locations
- 16 x PWM outputs – for servos, LEDs, etc.
- Built-in 200mA+ lipoly charger with charging status indicator LED
- Pin #13 red LED for general purpose blinking
- RGB NeoPixel for full-color indication.
- On-board STEMMA QT connector that lets you quickly connect any Qwiic, STEMMA QT or Grove I2C devices with no soldering!
- Both Reset button and Bootloader select button for quick restarts (no unplugging-replugging to relaunch code)
- USB Type C connector lets you access built-in ROM USB bootloader and serial port debugging
- 3.3V Power/enable pin
- 4 mounting holes
- 12 MHz crystal for perfect timing.
- 3.3V regulator with 500mA peak current output

We squished all the parts on our Feather RP2040 over towards the USB port to make some room on the end. This Feather RP2040 LoRa Radio uses the extra space left over to add an RFM9x LoRa 868/915 MHz radio module. These radios are not good for transmitting audio or video, but they do work quite well for small data packet transmission when you need more range than 2.4 GHz (BT, BLE, WiFi, ZigBee).

Radio module specifications:

- SX127x LoRa® based module with SPI interface
- Packet radio with ready-to-go Arduino libraries
- Uses the license-free ISM bands (ITU "Europe" @ 433MHz and ITU "Americas" @ 900MHz)
- +5 to +20 dBm up to 100 mW Power Output Capability (power output selectable in software)
- ~300uA during full sleep, ~120mA peak during +20dBm transmit, ~40mA during active radio listening.
- Simple wire antenna can be soldered into a solder pad, there's also a uFL connector that can be used with uFL-to-SMA adapters for attaching bigger antennas.

Our initial tests with default library settings: over 1.2mi/2Km line-of-sight with wire quarter-wave antennas. (With setting tweaking and directional antennas, 20Km is possible).

Comes fully assembled and tested, we also toss in some headers so you can solder it in and plug into a solderless breadboard. You will need to cut and solder on a small piece of wire (any solid or stranded core is fine) in order to create your antenna. or use a uFL connector and SMA 900MHz antenna. Lipoly battery and USB cable are not included, but we do have lots of options in the shop if you'd like!

YouTube link:

https://www.youtube.com/watch?t=404&v=E0_pR_ordNo&embeds_euri=https%3A%2F%2Fwww.adafruit.com%2F&feature=emb_imp_woyt

Technical Details

Product Dimensions: 52.0mm x 23.0mm x 7.2mm / 2.0" x 0.9" x 0.3"

Product Weight: 6.3g / 0.2oz

- [Authorization Report](#)
- [SX1276/77/78 Datasheet](#)
- [Module Datasheet](#)
- [Test Report](#)

