
APRS 438 Terminal

Ricardo Guzmán Christie, CD2RXU

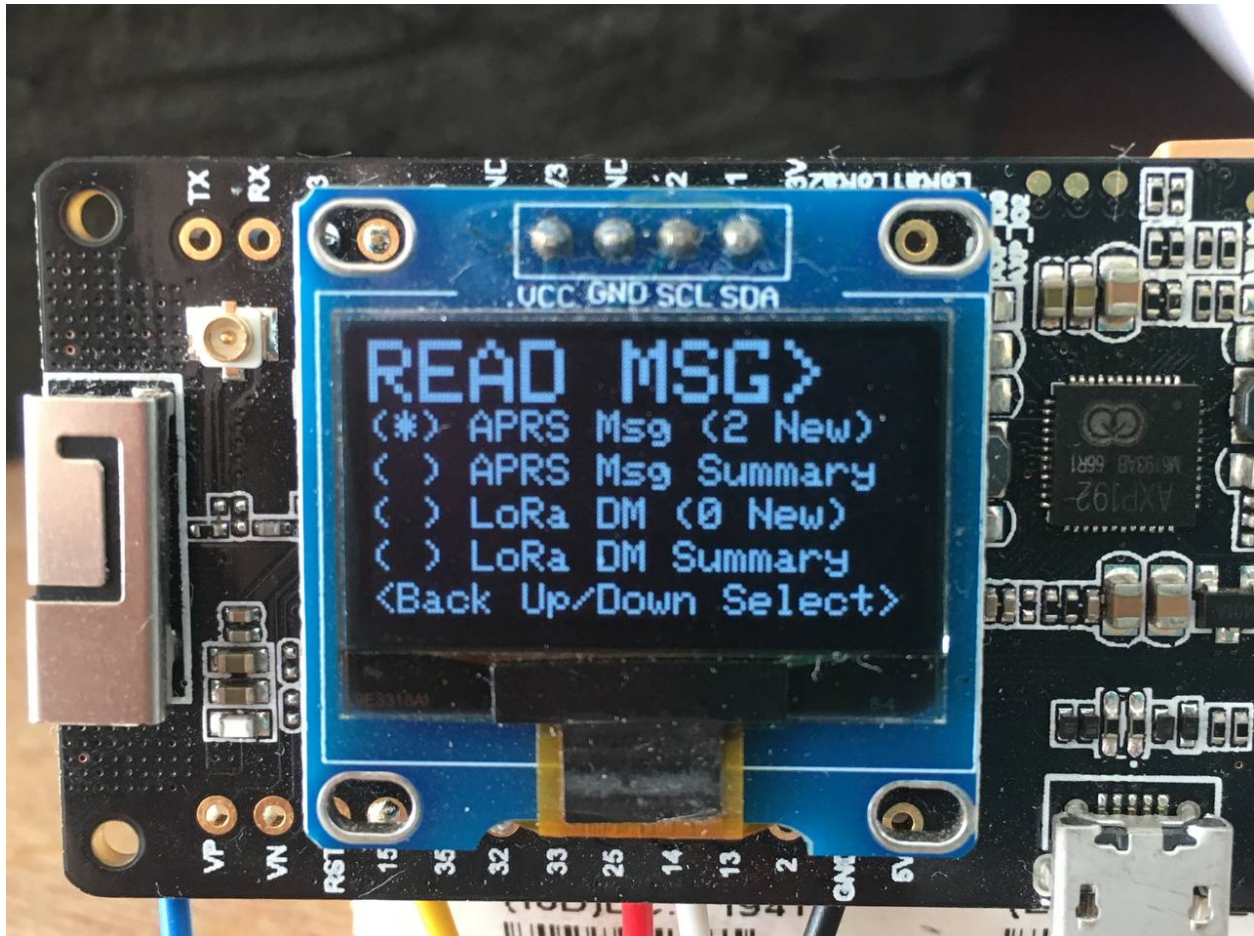
Aug 08, 2023

CONTENTS

1	Terminal User Interface	3
2	Terminal Firmware	5
3	Terminal Hardware	7
4	News, Social & Co-Development	9
5	Acknowledgements	11
5.1	Firmware	11
5.2	Codec	11
5.3	Spectrum Selection	11
5.4	Testing	12
5.5	Infrastructure	12



Welcome to the documentation of the **APRS 438 Terminal**, part of the 438 MHz amateur radio LoRa automatic packet reporting system that **extends range by saving bytes**.



Other documents:

- [Protocol documentation](#)
- [Tracker documentation](#)
- [i-gate documentation](#)

Caution: Unlike the vast majority of other LoRa projects, the firmware of this project employs **licensed frequency spectrum** exclusive to the use of **amateur radio**. **You need a valid amateur radio license to be able to use APRS**

438 firmware. Contact your national government or local amateur radio club to find out how to obtain an amateur radio license.

Attention: This document is still subject to change. Check regularly for changes and added clarifications.

TERMINAL USER INTERFACE

See Figure 1.1.

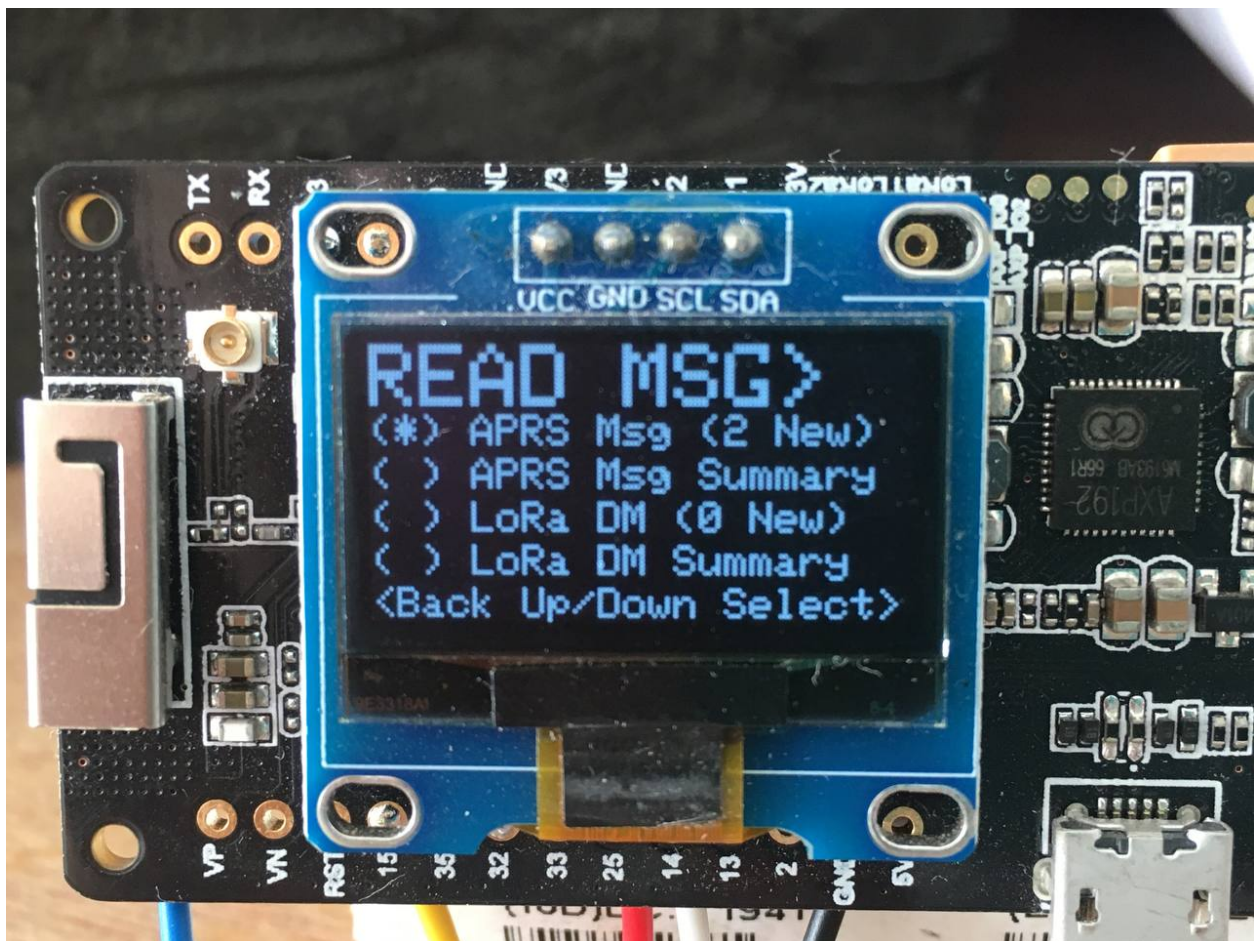


Figure 1.1: The READ MSG menu

TERMINAL FIRMWARE

Tip: If you prefer to write your own firmware, please, check out the [codec algorithms](#).

TERMINAL HARDWARE

- TTGO T-Beam 433 MHz v0.7 or v1.1
- longer 433 MHz antenna with [SMA male](#) connector
- 16.9 mm long tiger tail wire soldered to the female SMA socket
- 5 V, 3 A USB charge adapter with appropriate microUSB or USB-C cable
- Panasonic NCR18650B Li-ion cell, or quality equivalent
- glue gun to stick the GPS antenna to the cell holder
- SH1106 1.3" I²C (4-pin) OLED display (slightly larger than the usual 0.8" displays often sold with the TTGO T-Beam)
- enclosure

NEWS, SOCIAL & CO-DEVELOPMENT

Feel free to join our public [Telegram Group](#) for the latest news and cordial discussions.

You are invited to contribute code improvements to [this project on GitHub](#). Here is a lightweight [video introduction to using GitHub](#) by Andreas Spiess, HB9BLA.

ACKNOWLEDGEMENTS

5.1 Firmware

- Ricardo Guzmán Christie, CD2RXU, for developing terminal and i-gate firmware employing the compression algorithms presented in this white paper.
- Bernd Gasser, OE1ACM, for the earliest LoRa APRS experiments and code
- Christian Johann Bauer, OE3CJB, for the Base91 geolocation compression algorithm
- Peter Buchegger, OE5BPA, for providing a tracker and i-gate firmware as open source code, in a handy [PlatformIO](#) environment, with [over-the-air \(OTA\)](#) i-gate updates. This was the ideal starting point for running LoRa frame compression experiments.

5.2 Codec

- Serge Y. Stroobandt, ON4AA, for devising the protocol and Python codec algorithms, as well as initiating this project by writing the protocol white paper.
- Folkert Tijdens, PA0FOT, for contributing [codec.cpp](#) and asking the right questions, rendering this document more scholarly
- Matthias Brändli, HB9EGM, for contributing the Arduino C implementation of the `ttt` codec algorithm.
- Pascal Schiks, PA3FKM, for providing insights about microcontroller stacks

5.3 Spectrum Selection

- Wolfgang Hallmann, DF7PN, for informing that, in a number of European countries, the ISM-band extends from 433.05 to 434.79 MHz.
- Gerhard Hickl, OE3GHB, for pointing out that, in Austria, the spectrum above 439.1 MHz is receive only.

5.4 Testing

- Erwin Fiten, ON8AR, for testing firmware and reporting on long distance car approaches to the LoRa i-gate
- Jan Engelen, DL6ZG, for testing firmware and providing feedback
- Greg Stroobandt, ON3GR, for cycling around the city with a privacy invading tracker

5.5 Infrastructure

- ReadTheDocs.org for hosting the documentation of this project, free of charge
- Github.com for hosting the project source files, free of charge
- The [Sphinx](#) documentation generator and its [extensions](#)
- `executable{books}` for the Markedly Structured Text MyST Python parser (cheat sheet, syntax extensions)