Smart Radio GPS Usage and Configuration Guide

Advanced Mesh Router for Private Wireless Networks

Introduction

The purpose of this guide is to instruct the user on how to configure and view the status of the GPS receiver. GPS is an optional feature in Doodle Labs' Smart Radios and is available in -W and -J hardware variants and when ordered with the -G order code.

Further information on the GPS receiver can be found here [1]. Here are the feature highlights:

- The GPS receiver supports the concurrent reception of following satellite constellations:
    - GPS L1C/A
    - SBAS L1C/A
    - QZSS L1C/A
    - GLONASS L1OF
    - BeiDou B1
    - Galileo E1B/C
- General Specifications
    - 1.5-m accuracy
    - -163 dBm tracking sensitivity
    - 0.01 m/s velocity accuracy
    - 10 Hz max fix rate
    - SBAS, QZSS, RTCM 2.3 Differential GPS

GPS Hardware Configuration

-W variants of the Smart Radio uses an internal GPS antenna, so no hardware configuration is necessary. -J variants of the Smart Radio include a GPS RF port on the casing. Please refer to the latest Integration Guide availble in the online Technical Library for details on the RF connector.

GPS Configuration

Generally speaking, it should not be necessary to configure the internal GPS receiver. However, there is a GPS receiver configuration page in the web GUI under `network → GPS Configuration`. Figure 1 shows a screenshot of the page. If you are using your own external GPS receiver connected over USB or UART, you can use this configuration page. Be sure to select the correct GPS device. After making any changes, click `Save & Apply`. It is also possible

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to configure the GPS remotely using any of the methods discussed in our Remote Management Guide [2]. As an example, the output of `uci show gps` is shown below.

```
$ uci show gps
gps.@gps[0]=gps
gps.@gps[0].tty='/dev/GPS'
gps.@gps[0].adjust_time='0'
gps.@gps[0].disabled='1'
gps.@gps[0].baudrate='9600'
gps.@gps[0].cs='8'
gps.@gps[0].cstopb='1'
gps.@gps[0].parenb='1'
```
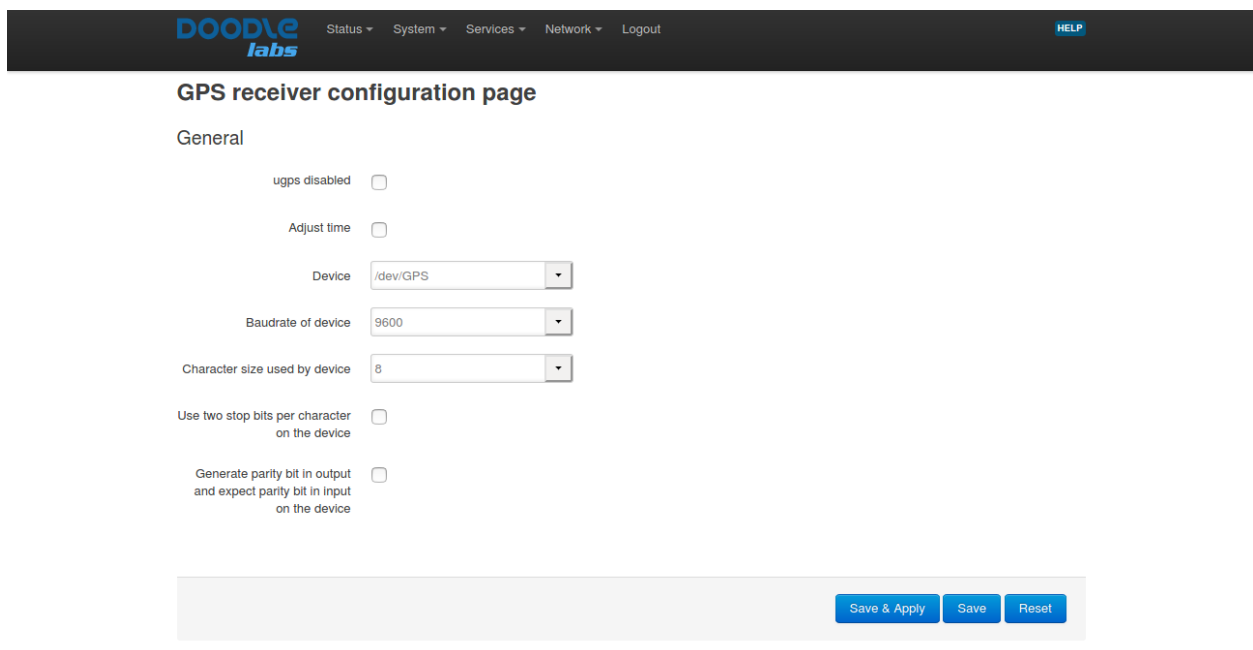

Figure 1 – Screenshot of the GPS Configuration GUI

GPS Status

The GPS receiver's status is shown in the `Status → Overview` webpage. An example output is shown in Figure 2.
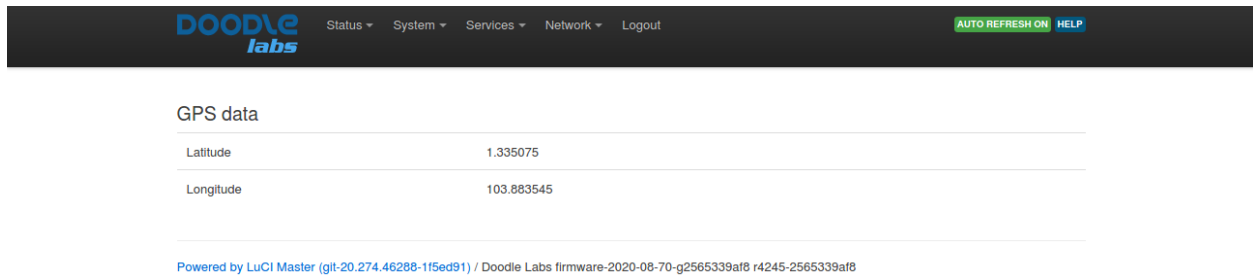
Figure 2 – GPS status

It is also possible to remotely poll the GPS status using any of the methods described in the Remote Management Guide [2]. GPS status is retrivable using ubus [3], and an example output of `ubus call gps info` is shown below.

```
$ ubus call gps info
{
        "age": 0,
        "latitude": "1.335131",
        "longitude": "103.883499",
        "elevation": "031.56",
        "course": "0.0",
        "speed": "0.3"
}
```

References

1. Teseo-LIV3f, https://www.st.com/resource/en/datasheet/teseo-liv3f.pdf, September 2019
2. Remote Management Guide for Smart Radio, https://doodlelabs.com/wp-content/uploads/Remote-Management-Guide-for-Smart-Radio-V1020.pdf, October 2020
3. Openwrt UBUS, https://openwrt.org/docs/techref/ubus, November 2020

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