Rpi_F9PD9C

zhtelec

GNSS Module Board (with Michibiki L6 Correction)

u-blox ZED-F9P + NEO-D9C used

https://github.com/zhtelec/Rpi_F9PD9C

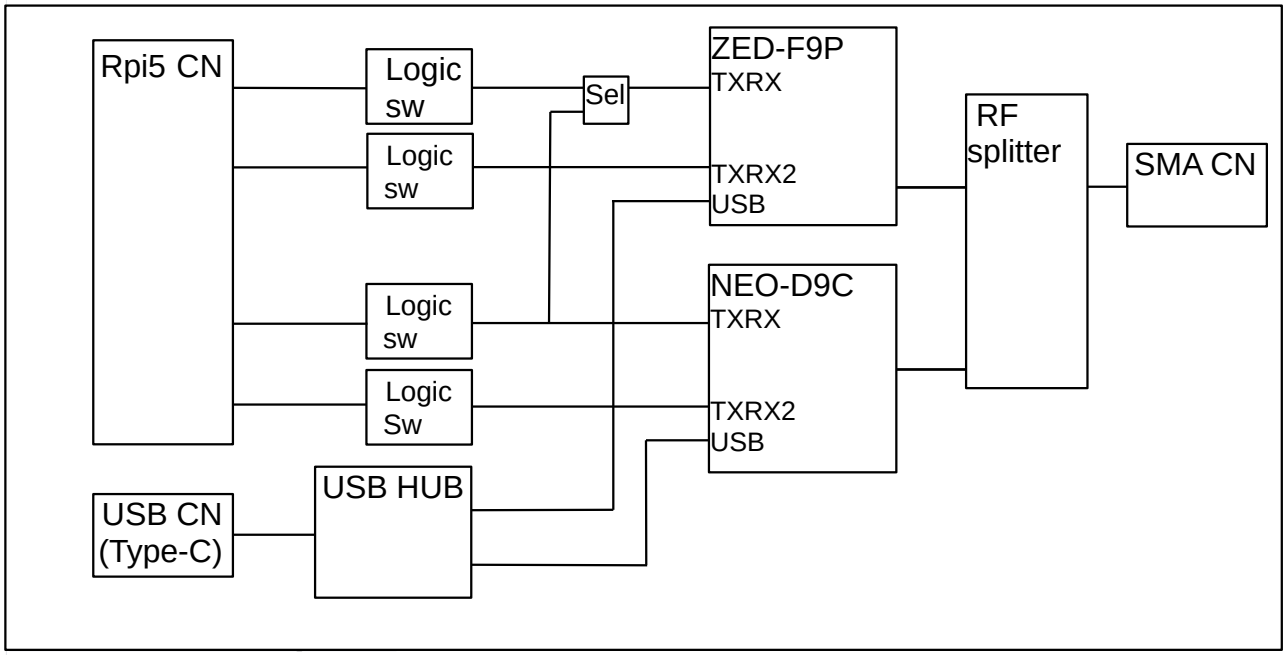
This board is equipped with the high-precision RTK-GNSS module ZED-F9P and the NEO-D9C, which supports correction data reception. When combined with a Raspberry Pi 5, it enables centimeter-level positioning accuracy. It is ideal for research and development in fields that require highly accurate location information, such as robotics, drones, and surveying.

Main Specifications

- GNSS Module: ZED-F9P (RTK compatible)
- L-band Correction Signal Receiver Module: NEO-D9C (CLAS compatible)
- Interface: Raspberry Pi 5 GPIO pins (UART), USB Type-C
- Power Supply: Powered via Raspberry Pi 5 GPIO pins or USB Type-C port

Function Description

1. blockdiagram



2. SMA CN, RF splitter

Connect a multi-band (L1, L2, L6) antenna to the SMA connector. Since the ZED-F9P can supply power, it is recommended to use an active antenna.

3. ZED-F9P, NEO-D9C

These are GNSS receiver modules.
The ZED-F9P can receive L1 and L2 bands and achieves high stability. This module supports RTK, so centimeter-level positioning is possible either by providing RTCM3 data from an external base station or by supplying QZSS L6 data from the onboard NEO-D9C module.
The NEO-D9C receives the QZSS L6 correction signal (CLAS). By inputting this signal to the ZED-F9P, high-precision positioning is possible[4]. At this time, you can choose (using JP1) whether to receive the signal with the Raspberry Pi 5 and then input it to the ZED-F9P, or to input it directly on the board.

4. Sel

This is a CLAS Selector

This allows you to select whether to input the QZSS L6 correction signal (CLAS) to the ZED-F9P either via the Raspberry Pi 5 or directly on the board.
If you select the direct input on the board, data from the Raspberry Pi 5 will no longer be transferred to the ZED-F9P. However, data from the ZED-F9P will still be transferred to the Raspberry Pi 5. (The receiver side for the ZED-F9P is selectable.)

5. Logic sw

This is a logic switch.

When operating the board while the Raspberry Pi 5 is powered off, this prevents voltage from being applied to the Raspberry Pi 5 from the board.

6. USB hub, USB CN

This is a USB hub and USB connector.

You can use a single USB cable to configure and transfer GNSS data for both the ZED-F9P and NEO-D9C modules. The connector is USB Type-C.

7. Raspberry Pi 5 CN

GNSS data and settings (NMEA, UBX) for the ZED-F9P and NEO-D9C are communicated via the UART on this connector. Additionally, it is used as one of the power sources for this board.

Usage Instructions

1. **Attaching the Raspberry Pi 5 GPIO Connector**
   To connect this board to the Raspberry Pi 5, you need to attach the connector. This board is the same size as the Raspberry Pi 5 main board. Therefore, a standard 11mm thick connector cannot be used as it will interfere with the LAN connector. Please use a long-type 17mm thick connector and connect it using a 17mm spacer. However, if another board is already connected to the Raspberry Pi 5 and there is no interference with the LAN connector or the other board, this restriction does not apply.
2. **Powering on the GNSS Module**
   The GNSS module is powered on by setting GPIO22 (PIN 15) to High. Be sure to set the corresponding GPIO to output and High before use.
3. **Setting the CLAS Transfer Method (JP1)**
   By default, the transfer method for CLAS data from the NEO-D9C is set to transfer via the Raspberry Pi 5 (JP1: 1-2). If you want to transfer directly to the ZED-F9P on this board, disconnect the current 1-2 connection and solder to 2-3.

JP1	**CLAS Data Transfer Method**	**Special Notes**
1-2	Via Raspberry Pi 5	
2-3	Direct transfer on the board	Data from the Raspberry Pi 5 is ignored.

4. Raspberry Pi 5 UART port

UART	GPIO(TX,RX)	pin	Device file	GNSS port
0	14, 15	8, 10	ttyAMA0	ZED F9P TXRX for recv data
1	0, 1	27, 28	ttyAMA1	NEO D9C TXRX for recv data
2	4, 5	7, 29	ttyAMA2	
3	8, 9	24, 21	ttyAMA3	NEO D9C TX2RX2 for config
4	12, 14	32, 33	ttyAMA4	ZED F9P TX2RX2 for config

Caution

- For RTK positioning, you may need either reference station data or a subscription to an L-band correction service.
- The antenna is sold separately (a multi-band GNSS-compatible antenna is recommended).

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