

Rpi-F9PD9C

ZHT Elec

GNSS Module Board (with Michibiki L6 Correction)
u-blox ZED-F9P + NEO-D9C used



<https://github.com/zhtelec/Rpi-F9PD9C>

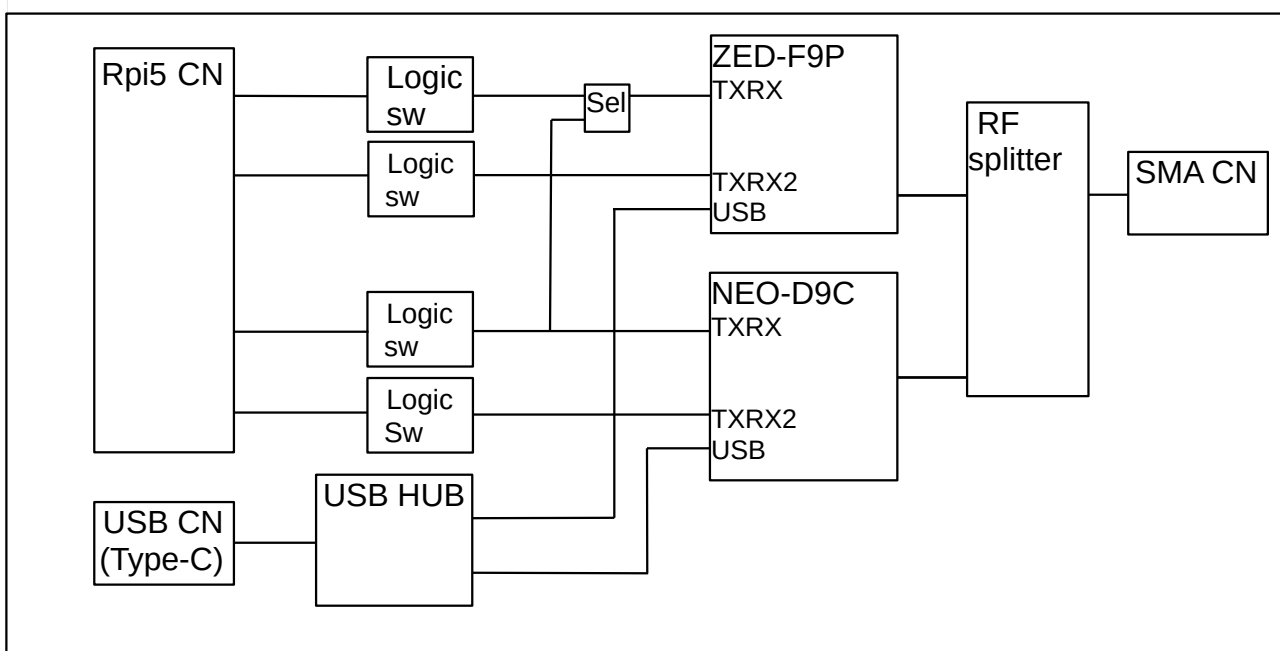
This board is equipped with the high-precision RTK-GNSS module ZED-F9P and the NEO-D9C, which supports correction data reception. When combined with a Raspberry Pi 5, it enables centimeter-level positioning accuracy. It is ideal for research and development in fields that require highly accurate location 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 possible⁴. 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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