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Development Board

USER MANUAL

DATA SHEET

bynav

Introduction

This manual introduces how to use bynav development board (V6.0), which feeds power and brings out the standard external interfaces.

CONTENT

1 OVERVIEW

The bynav development board (V6.0) provide wide power voltage 9-35V and brings out the standard external interfaces including two RS232 serial ports and one RJ45 Ethernet port.

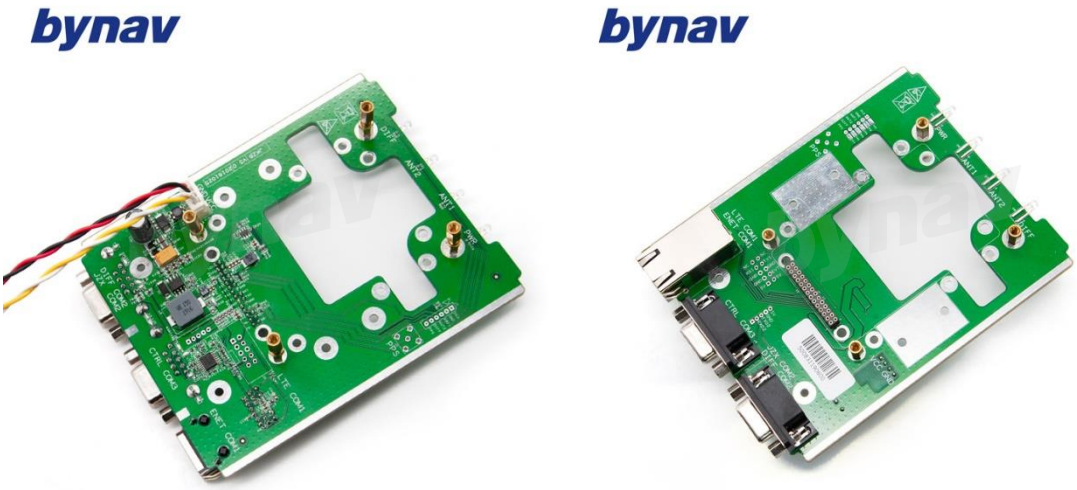

Figure1 Bynav Dev Board

2 SPECIFICATION

2.1 Dev Board Drawing

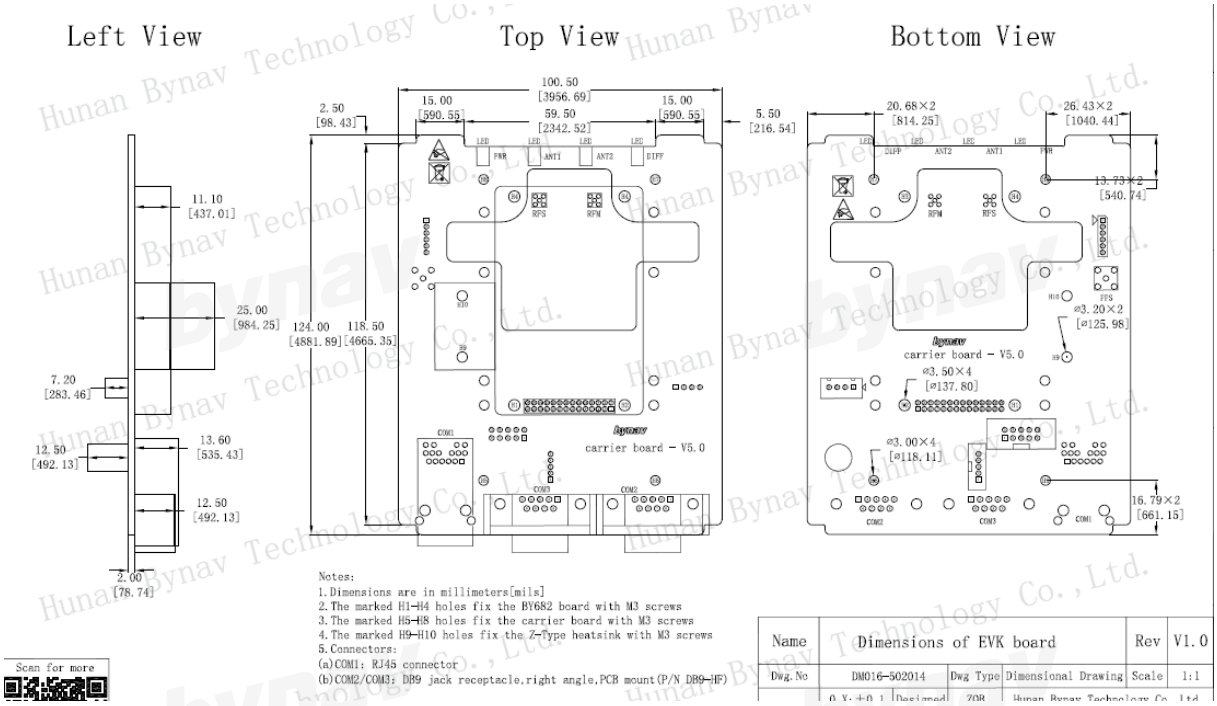

Figure2 Drawing

Dimension	100.5 x 124 x 25mm
Weight	83g

2.2 Electrical and Environmental

Item	Specs
Voltage	DC 9~35V
Power Consumption	3.8W (typical value)
Communication port	RS232 x2, RJ45 x1
Operating temperature	-40℃~ +85℃
Storage temperature	-55℃~ +95℃

3 INTERFACES

This chapter introduces the interfaces of the dev board.

3.1 2×14 2mm Double-Row in-Line Female Header

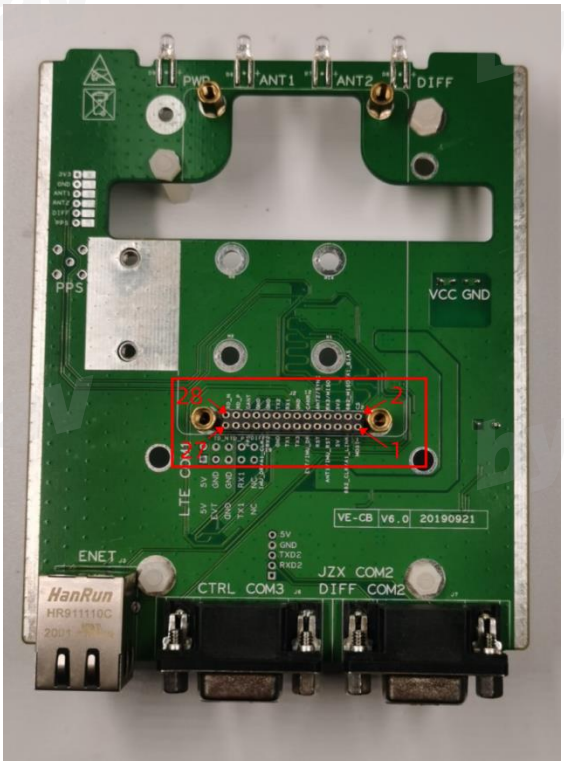

Figure 3 2×14 2mm Double-Row in-Line Female Header

3.1.1 C1/A1 Header Diagram

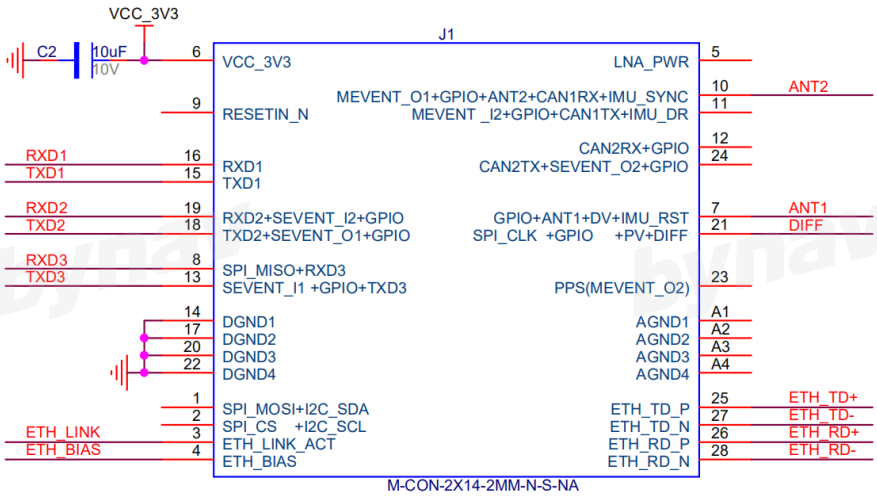

Figure 4 C1/A1 Diagram

Table1 C1/A1 Pinout

Pin	Signal	I/O	Description	Comments

1	SPI_MOSI/I2C_SDA	I/O	By default SPI_MOSI: SPI data output I2C_SDA: I2C data	3.3V LVTTL, leave unconnected if not in use
2	SPI_CS/I2C_SCL	O	By default SPI_CS: SPI chip select I2C_SCL: I2C clock	3.3V LVTTL, leave unconnected if not in use
3	ETH_LINK_ACT	O	Ethernet connection indicator	3.3V LVTTL, leave unconnected if not in use
4	ETH_BIAS	O	Ethernet signal bias voltage	3.3V LVTTL, leave unconnected if not in use
5	-	/		Not connected
6	VCC_3V3	PWR	Board power feed	+3.25V~+3.45V, ripple <50mV Vp-p
7	GPIO/ANT2/DV/IMU_RST	I/O	By default GPIO: other ANT2: ANT2 indicator DV: success in heading, active high IMU_RST: external IMU reset signal	3.3V LVTTL, leave unconnected if not in use
8	SPI_MISO/RXD3	I	By default SPI_MISO: SPI data input RXD3: COM3 serial input	3.3V LVTTL, leave unconnected if not in use
9	RESETIN_N	I	Reset input	Reset, active low, signal width >10ms, leave unconnected if not in use
10	EVENT_O_M1/GPIO/ANT1/CAN1RX/IMU_SYNC	I/O	By default EVENT_O_M1: EVENT_OUT trigger GPIO: other ANT1: ANT1 indicator CAN1RX: CAN1 input IMU_SYNC: external IMU sync signal	3.3V LVTTL, leave unconnected if not in use
11	EVENT_I_M2/GPIO/CAN1TX/IMU_DR	I/O	By default EVENT_I_M2: EVENT_IN trigger GPIO: other CAN1TX: CAN1 output IMU_DR: external IMU DR	3.3V LVTTL, leave unconnected if not in use
12	CAN2RX/GPIO	I/O	By default CAN2RX: CAN2 input GPIO: other	3.3V LVTTL, leave unconnected if not in use
13	EVENT_I_S1/GPIO/TXD3	I/O	By default EVENT_I_S1: EVENT_IN trigger GPIO: other	3.3V LVTTL, leave unconnected if not in use

			TXD3: COM3 serial output	
14	GND	PWR	Signal and power ground	
15	TXD1	O	COM1 output	3.3V LVTTL, leave unconnected if not in use
16	RXD1	I	COM1 input	3.3V LVTTL, leave unconnected if not in use
17	GND	PWR	Signal and power ground	
18	TXD2/EVENT_O_S1/GPIO	I/O	By default TXD2: COM2 output EVENT_O_S1: EVENT_OUT trigger GPIO: other	3.3V LVTTL, leave unconnected if not in use
19	RXD2/EVENT_I_S2/GPIO	I/O	By default RXD2: COM2 input EVENT_I_S2: EVENT_IN trigger GPIO: other	3.3V LVTTL, leave unconnected if not in use
20	GND	PWR	Signal and power ground	
21	SPI_CLK/GPIO/PV/DIFF	I/O	By default SPI_CLK: SPI clock GPIO: other PV: success in positioning, active high DIFF: correction data indicator	3.3V LVTTL, leave unconnected if not in use
22	GND	PWR	Signal and power ground	
23	PPS	O	1pps output	3.3V LVTTL, default width 1ms, leave unconnected if not in use
24	CAN2TX/EVENT_O_S2/GPIO	I/O	By default CAN2TX: CAN output EVENT_O_S2: EVENT_OUT trigger GPIO: other	3.3V LVTTL, leave unconnected if not in use
25	ETH_TD+	I/O	10M/100M Ethernet TX+	analog, connect to TD+, leave unconnected if not in use
26	ETH_RD+	I/O	10M/100M Ethernet RX+	analog, connect to RD+, leave unconnected if not in use
27	ETH_TD-	I/O	10M/100M Ethernet TX-	analog, connect to TD-, leave unconnected if not in use
28	ETH_RD-	I/O	10M/100M Ethernet RX-	Analog, connect to RD-, leave unconnected if not in use

Note 1：IO pin level is 3.3V LVTTL, drive capacity is 12mA, leave unconnected if not in use.

Note 2：TXD and RXD are defined for the board.

Note 3: "-"is reserved pin.

Note 4: "EVENT_I_M2", "EVENT_I_S1" and "EVENT_I_S2" are EVENT_IN trigger, rising edge trigger, high level hold time must be more than 500ns, recommend to use "EVENT_I_M2" with priority.

Note 5: "EVENT_O_M1", "EVENT_O_S1" and "EVENT_O_S2" are EVENT_OUT trigger, recommend to use "EVENT_O_M1" with priority.

3.1.2 BY682 Header Diagram

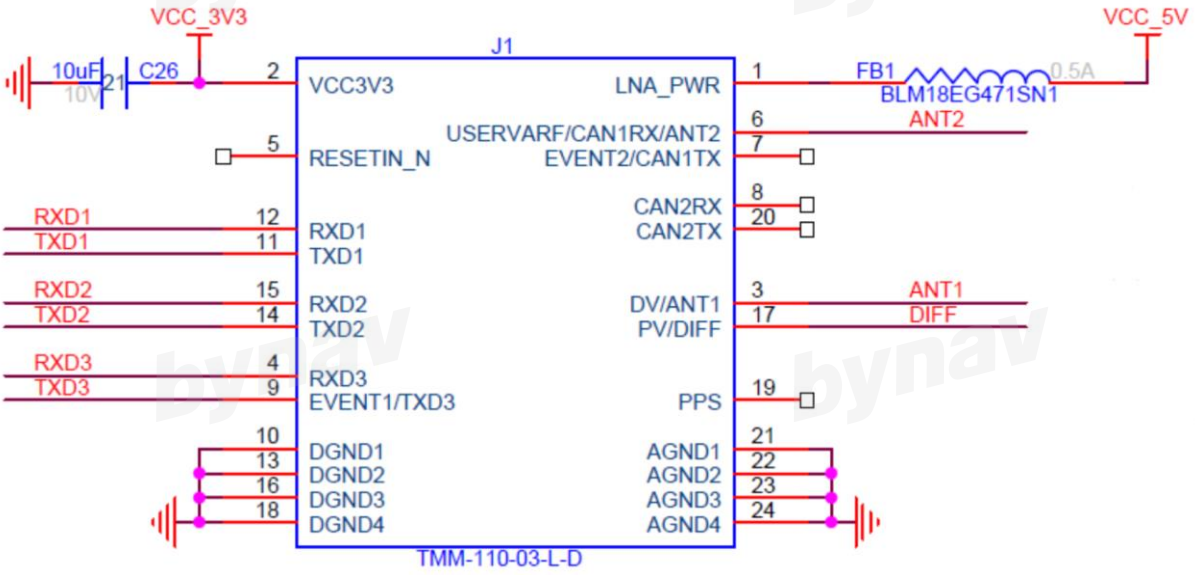

Figure 5 BY682 Diagram

Table2 BY682 Pinout

Pin	Signal	I/O	Description	Comments
1	SPI_MOSI	O	SPI data output	3.3V LVTTL, leave unconnected if not in use
2	SPI_CS	O	SPI chip select	3.3V LVTTL, leave unconnected if not in use
3	SPI_CLK	O	SPI clock	3.3V LVTTL, leave unconnected if not in use
4	SPI_MISO	I	SPI data input	3.3V LVTTL, leave unconnected if not in use
5	LNA_PWR	PWR	Antenna Power feed	+3.3V~+6V: directly output to active antenna, power voltage

				based on active antenna power input requirement
6	VCC_3V3	PWR	Power input	+3.25V~+3.45V Ripple<50mV Vp-p
7	DV/ANT1/EVENTO0	O	DV: success in heading, active high ANT1: ANT1 (RFS) secondary antenna indicator EVENTO0: output level signal	3.3V LVTTL, leave unconnected if not in use
8	RXD3	I	COM3	3.3V LVTTL level, leave unconnected if not in use
9	RESETIN_N	I	Reset input	Reset software, low active, reset signal width>10ms, interior pulled up, leave unconnected if not in use.
10	ANT2/ EVENTO1	O	ANT2: ANT2(RFM) primary antenna indicator EVENTO1: output level signal	3.3V LVTTL, leave unconnected if not in use
11	EVENTI0	I	EVENTI0: external input trigger signal	3.3V LVTTL, leave unconnected if not in use, triggered by a rising edge, the high-level hold time must be longer than 340ns.
12	CAN2RX	I	-	3.3V LVTTL, leave unconnected if not in use
13	TXD3	O	COM3	3.3V LVTTL, leave unconnected if not in use
14	GND	PWR	Signal and power ground	
15	TXD1	O	COM1	3.3V LVTTL, leave unconnected if not in use
16	RXD1	I	COM1	3.3V LVTTL level, leave unconnected if not in use
17	GND	PWR	Signal and power ground	
18	TXD2	O	COM2	3.3V LVTTL, leave unconnected if not in use
19	RXD2	I	COM2	3.3V LVTTL, leave unconnected if not in use
20	GND	PWR	Signal and power ground	
21	PV/DIFF/EVENTI1	IO	PV: success in positioning, active high	3.3V LVTTL, leave unconnected if not in use

			DIFF: differential data indicator EVENTI1: external input trigger signal	EVENT_IN is triggered by a rising edge, the high-level hold time must be longer than340ns.
22	GND	PWR	Signal and power ground	
23	PPS	O	1pps output	3.3V LVTTL level, default width 1ms
24	CAN2TX	I	-	-
25	ETH_TD+	I/O	10M/100M Ethernet port TX+	analog, connect to TD+
26	ETH_RD+	I/O	10M/100M Ethernet port RX+	analog, connect to RD+
27	ETH_TD-	I/O	10M/100M Ethernet port TX-	analog, connect to TD-
28	ETH_RD-	I/O	10M/100M Ethernet port RX-	analog, connect to RD-

Note 1：IO pin level is 3.3V LVTTL, drive capacity is 12mA, leave unconnected if not in use.

Note 2：TXD and RXD are defined for the board.

Note 3: "-"is reserved pin

Note 4: EVENTI0 and EVENTI1 are triggered by rising edge, the high-level hold time must be longer than 340ns.

3.2 Power Connector

The power connector is 1×4 2.5mm pin header.

Note:

1. Wide voltage input 9-35V DC.
2. Overcurrent protection: the protection chip determines whether there is overcurrent according to the voltage drop between the output voltage and the input voltage, and can automatically cut off the power link if the overcurrent happens, and then automatically reconnect the power supply.
3. No self-recovery fuse.
4. Reverse polarity protection.
5. Input power (take C1 for example): direct current, 12V@0.5A, 35V@0.2A.

Figure 6 Power port

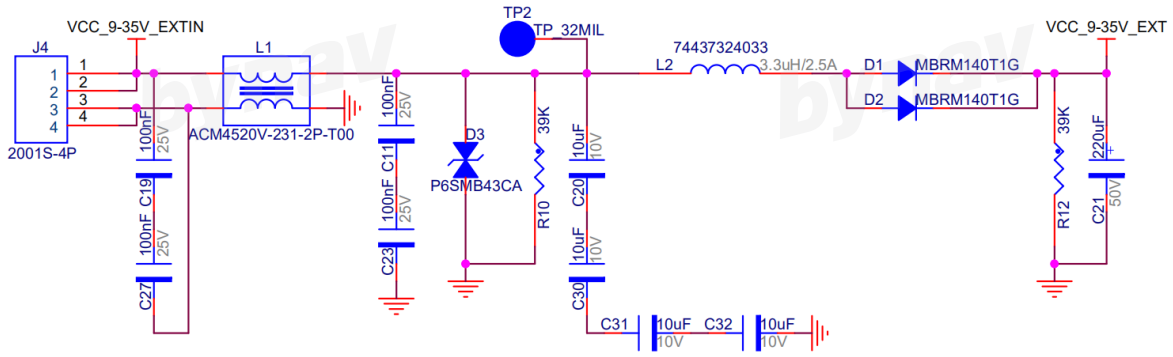

Figure 7 Power port diagram

Table3 Pin

Pin	Signal	Type	Description	Comments
1, 2	VCC	Power	External power feed	9~35V DC
3, 4	GND	GND	GROUND	

3.3 RS232 Serial Port

The dev board brings out two RS232 serial ports—COM2 and COM3. They use the standard DB9 jack socket with the same pinout, see below:

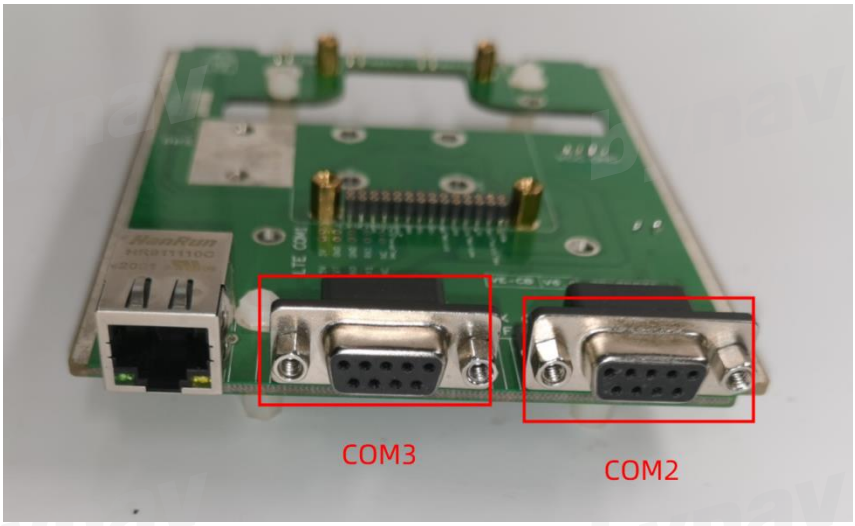

Figure 8 RS232

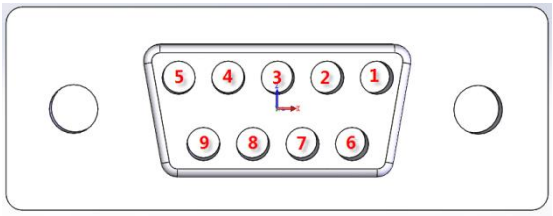

Figure2 PINOUT

Table4 Pinout

Pin	Signal	Type	Description	Comments
1	NC	——	Not defined	
2	TXD	Output	Serial port sending	RS232 level
3	RXD	Input	Serial port receiving	RS232 level
4	NC	——	Not defined	
5	GND	GND	Signal loop	
6	NC	——	Not defined	
7	NC	——	Not defined	
8	NC	——	Not defined	
9	NC	——	Not defined	RTCM port with 5V power, can feed external radio

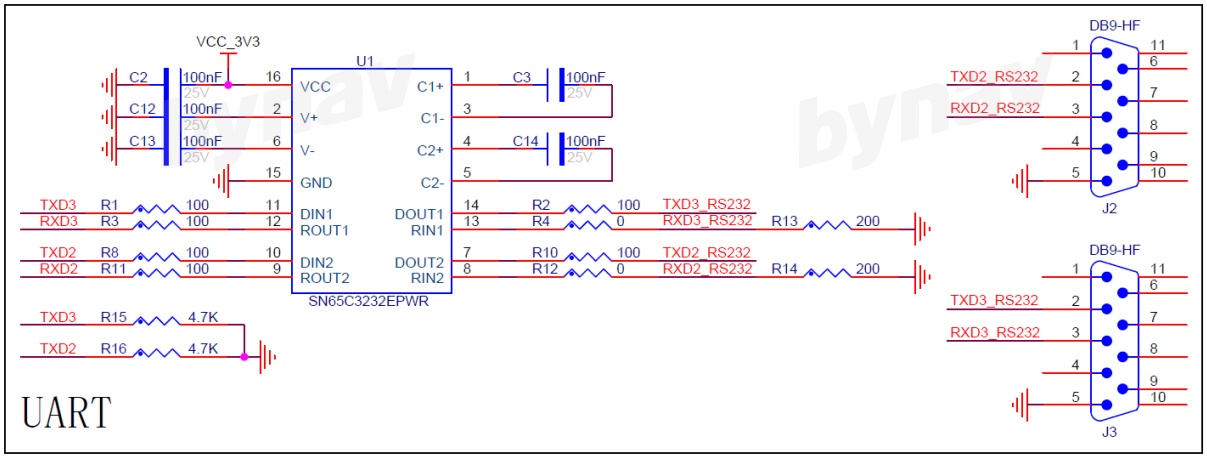

Figure 9 **RS232 diagram**

3.4 RJ45 Ethernet port

The dev board provide standard RJ45 interface, supporting 10Base-T/100Base-Tx adaptive Ethernet, which can be used to communicate with external devices, such as computer. The Ethernet port supports IPv4 network layer and TCP/IP transmission. The user can use it to remote debug, receive correction data, output position and attitude, or upgrade firmware, etc.

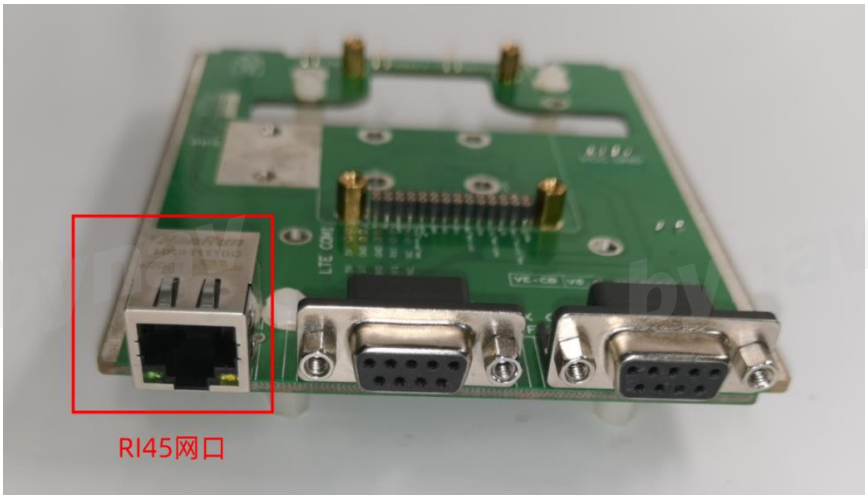

Figure 10 **RJ45**

3.4.1 C1/A1 RJ45 Diagram

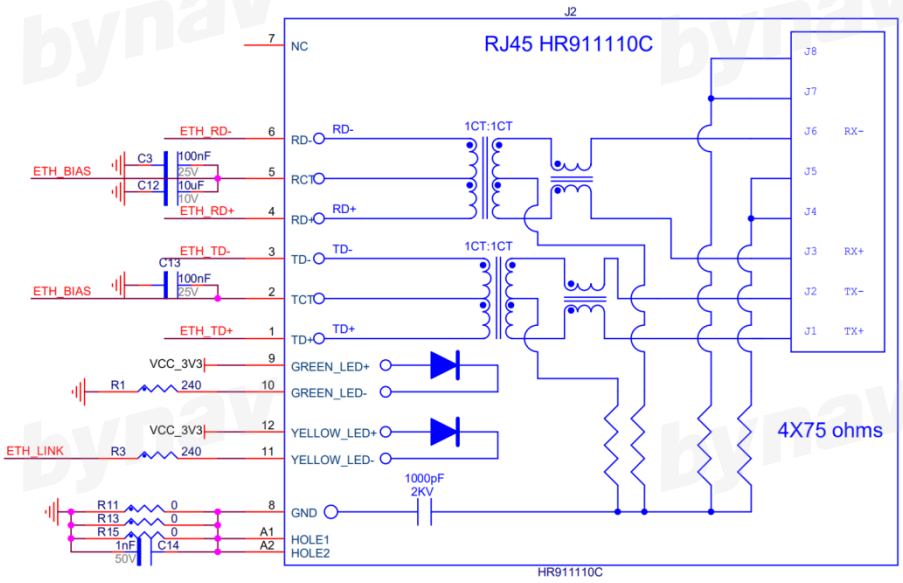

Figure 11**C1/A1 RJ45 Diagram**

3.4.2 BY682 RJ45 Diagram

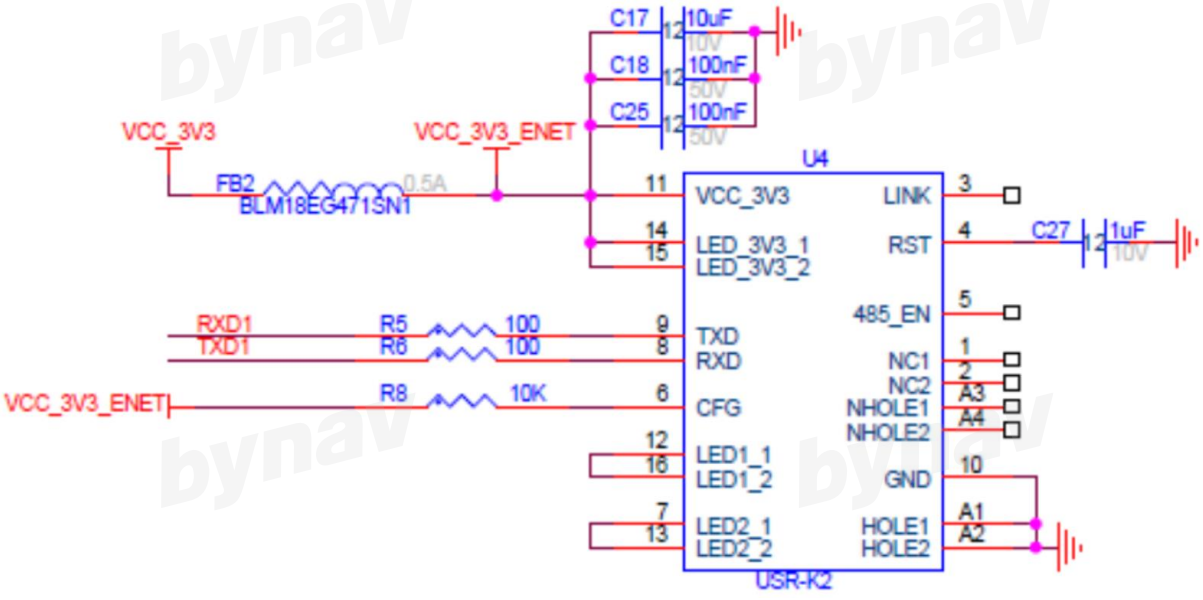

Figure 12 **BY682 RJ45 Diagram**

4 INDICATOR

The dev board has 4 LED indicators, indicating the status of power, ant1, ant2 and differential

correction data.

Figure 13 **Indicators**

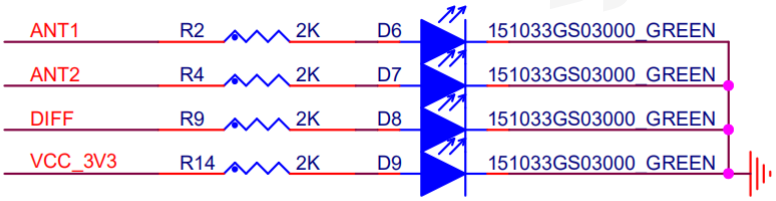

Figure 14 **Indicator Diagram**

4.1 C1/BY682 Indicator

During the working process, the power indicator is solid green, and the ANT1 and ANT2 blink when receiving satellite signal, and blink again every 5 seconds, the number of blinks is the number of satellites tracked.

Table5 C1/BY682 Indicator

Indicator	Status	Comment
Power	Green Solid	Green solid after power on
ANT1	Green Blinking	Blinking when receiving satellite signal, blinking times represents number of satellites
ANT2	Green Blinking	Blinking when receiving satellite signal, blinking times represents number of satellites
Differential	Green Blinking	Blinking when receiving or transmitting differential correction data, once per second

4.2 A1 Indicator

When connecting to A1, as there is an additional IMU, the indicator definition has been changed.

Table6 A1 Indicator

Indicator	Status	Comment
Power	Green	Solid green after power on
ANT1	——	——
ANT2	Green	IMU power feed works correctly
Differential	——	——

5 SET-UP

5.1 Connection

Figure15 Dev board connection

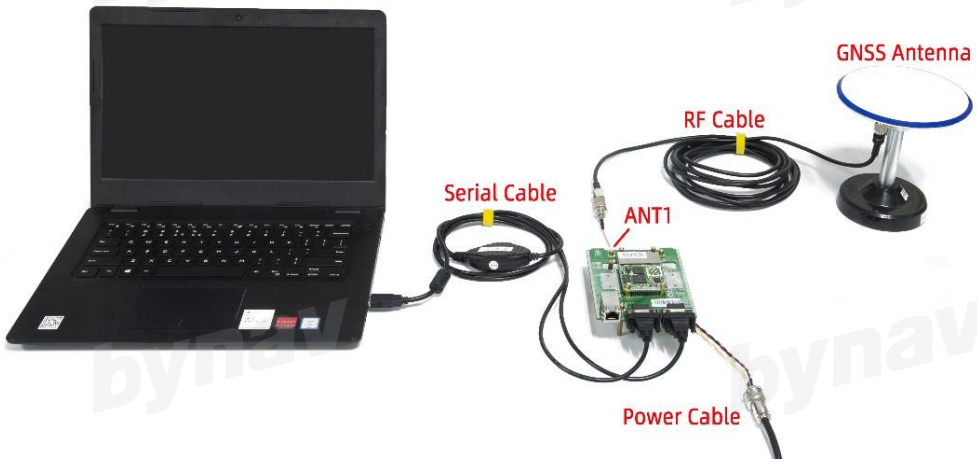

Figure16 System set-up

Place the GNSS antenna in a stable and unobstructed area, connect the antenna to the board via RF cable. When connecting, the ANT1 should be connected to the positioning antenna, and the ANT2 connected to the heading antenna.

5.2 GNSS Antenna

The dev board ANT1 and ANT2 MMCX interfaces feed +5V@0.2A power to the antenna. An active antenna with typical gain 40±2 dB is required, with the operation frequency supporting GPS(L1/L2/L5), GLONASS(G1/G2), BDS(B1/B2), Galileo(E1/E5b), and it's recommended to have noise coefficient≤2dB and output impedance 50Ω. The dev board provides 5VDC feed to antenna, which maximum supports 200mA current.

Figure17 GNSS Antenna

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