

## User Guide

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### N32WB031\_STB Development Board Hardware User Guide

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#### Introduction

This purpose of this document is to allow users to quickly familiar with the N32WB031\_STB development board, understand the functions, usage instructions, and precautions of the development board, so as to facilitate debugging and development based on the development board.

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# 1. Hardware Development Instructions

## 1.1 Overview

The N32WB031\_STB development board is used for the development of the N32WB031 low-power Bluetooth chip from Nsing Technologies Pte. Ltd. This document describes in detail the functions, usage instructions, and precautions of N32WB031\_STB development board.

## 1.2 Development Board Functions

The development board uses the N32WB031 chip with a QFN32 package. The development board connects all functional interfaces, making it convenient for customers to develop.

## 1.3 Development Board Layout

**Figure.1-1 Development Board Layout**

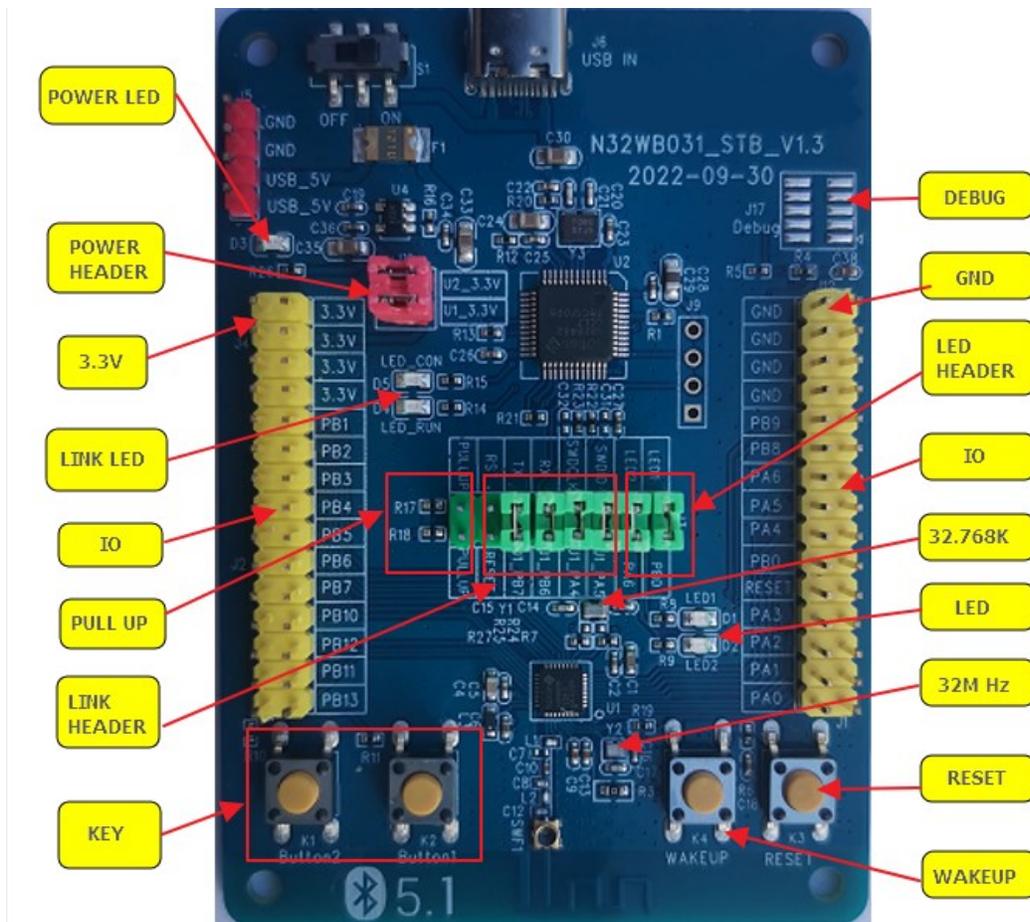
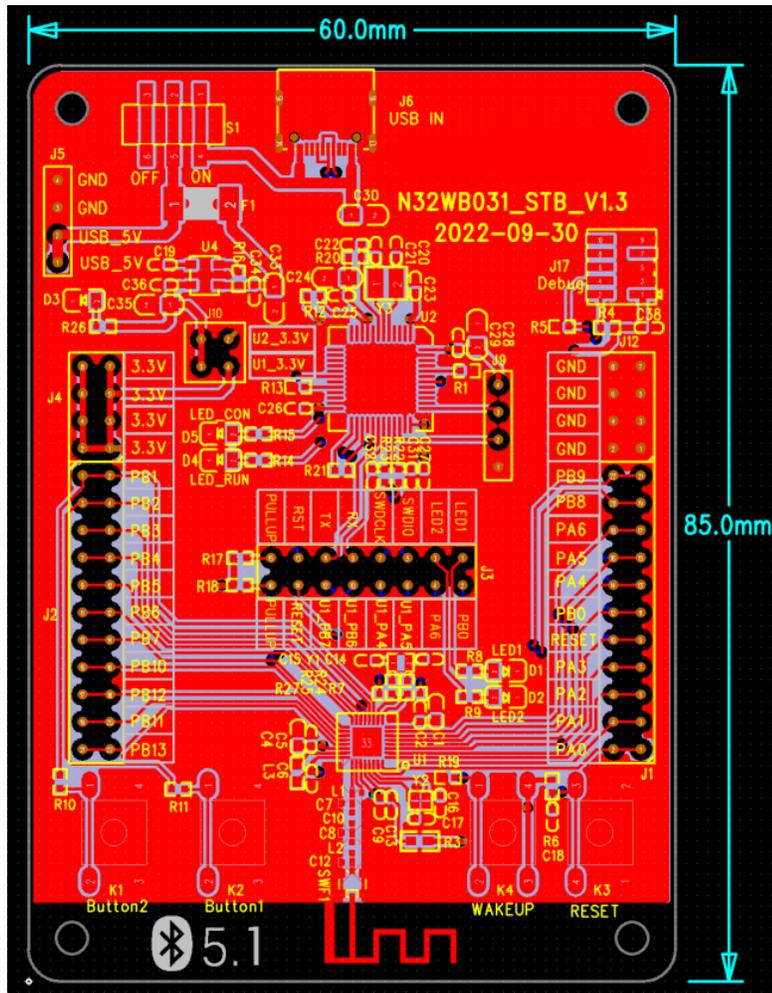


Figure. 1-2 PCB Screen Printing

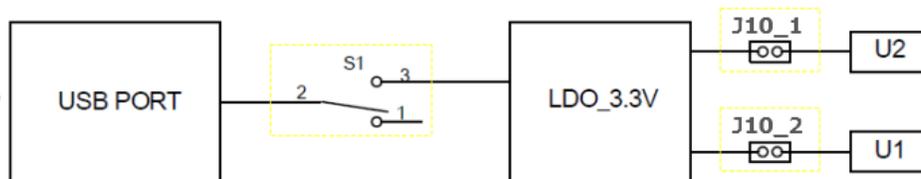


1) Power supply for development board

The development board is powered through a USB port.

The power system of the development board is shown in the figure below:

Figure. 1-3 Development Board Power System



2) USB communication interface

TYPE-C USB port (J6) is used.

3) Wakeup key (K4)

K4 is a wakeup key used to wake up the chip. Low level wakeup is used here.

4) General keys (K1, K2)

K1 and K2 are general keys that connect the pins PB1 and PB2 corresponding to the chip.

5) Reset key (K3)

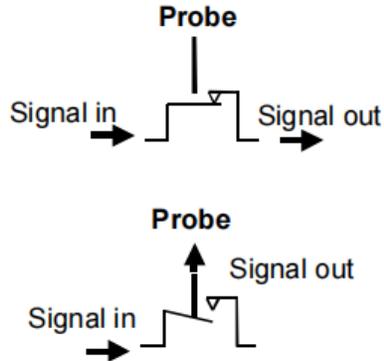
K3 is a reset key for chip reset.

6) IO port (J1, J2)

All chip IO interfaces are led out. J4 VCC voltage pin and J12 GND pin are reserved beside the pins to facilitate testing. Refer to N32WB031 Data Manual for specific definitions of interfaces.

7) External antenna connector

There is an external antenna connector on the board. When the cable is not connected, the on-board RF circuit is connected to the on-board PCB antenna; after the external cable is connected, the on-board RF circuit and the on-board PCB antenna are automatically disconnected. The onboard antenna connector is Murata MM8130-2600, and user can use the Murata MXHS83QE3000 test probe to connect antenna connector. See the figure below.



## 1.4 Development Board Jumper Usage Instructions

Figure. 1-4 Key Jumper of Development Board Layout

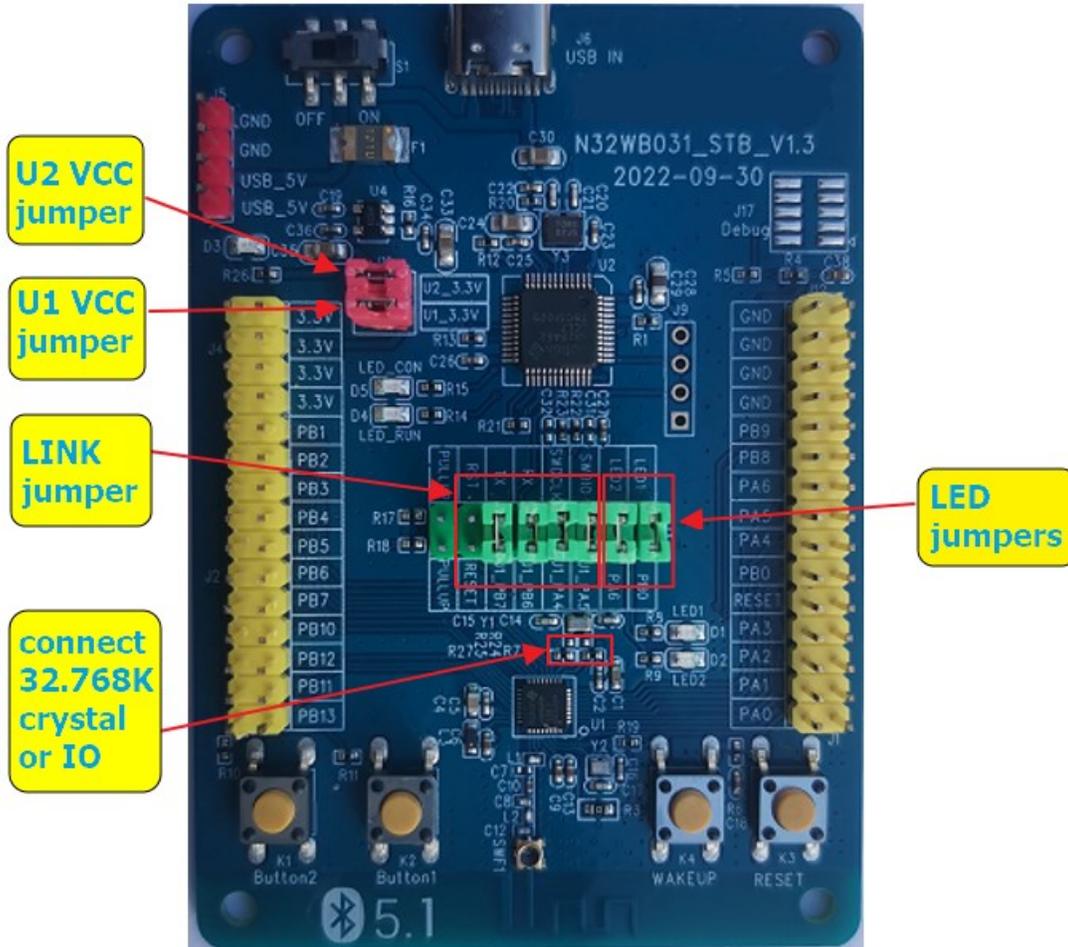


Table 1-1 Develop Board Jumper Instructions

No.	Jumper Location	Jumper Function	Usage Instructions
1	J10	U1&U2 power jumper	Short-circuit 3.3V output to U1&U2
2	J3	LINK selection jumper	Short-circuit J3 SWDIO/SWCLK for downloading programs to U1: 1) Short-circuit J3 RX/TX for serial port debugging through U2. 2) Short-circuit J3 RST and reset U1 through U2
3	/	32.768K/IO selection	Refer to the silk-screen print on the back of the board to understand the method of connecting PB8/9 to the 32.768KHz crystal or using them as regular Ios. IO is selected by default.
4	J3	LED1/LED2 selection	Short-circuit the "LED jumpers" position in the "key jumper layout on the development board " diagram to connect PB0 to LED1, and PA6 to LED2

In addition, there are two pull-up resistors connected to J3, which can be used for IOs that require external pull-ups. For details, see the position of J3 PULLUP on the development board.

## 1.5 Development Board Schematic Diagram

The schematic diagram of N32WB031\_TB development board is explained as follows:

### 1) Bluetooth chip connection

- Refer to Figure 1-5 for the schematic diagram of Bluetooth chip connection. All IOs are connected to pins J1 and J2 pin headers for easy debugging.
- The chip is externally connected to 32.768K and 32M crystal. The pins for the 32.768KHZ crystal can be reused as general-purpose IO, so half-pad jumper connections are added for crystal connections. These two jumpers are connected to IO by default, When crystal connection is required, sold the half-pad to the other side.

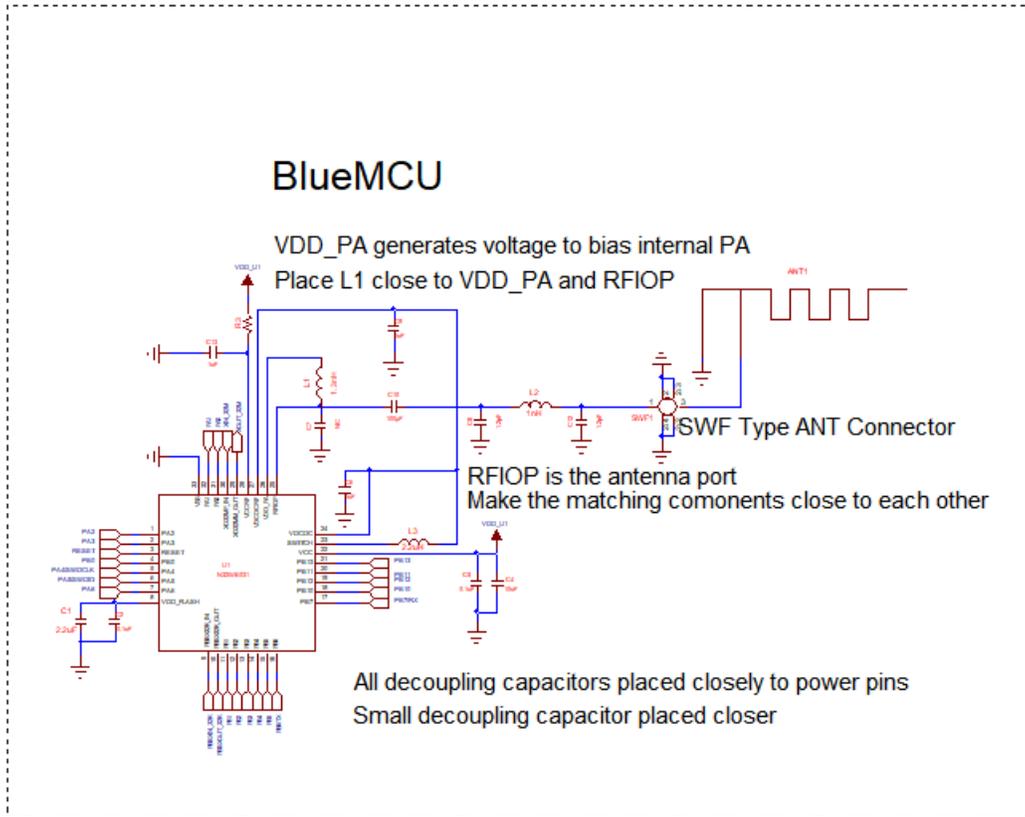
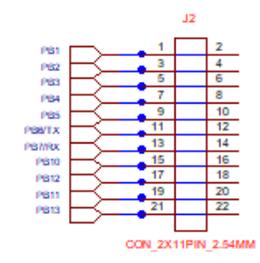
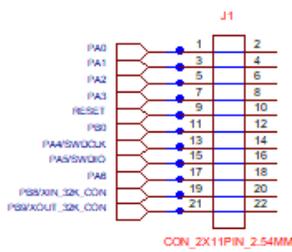
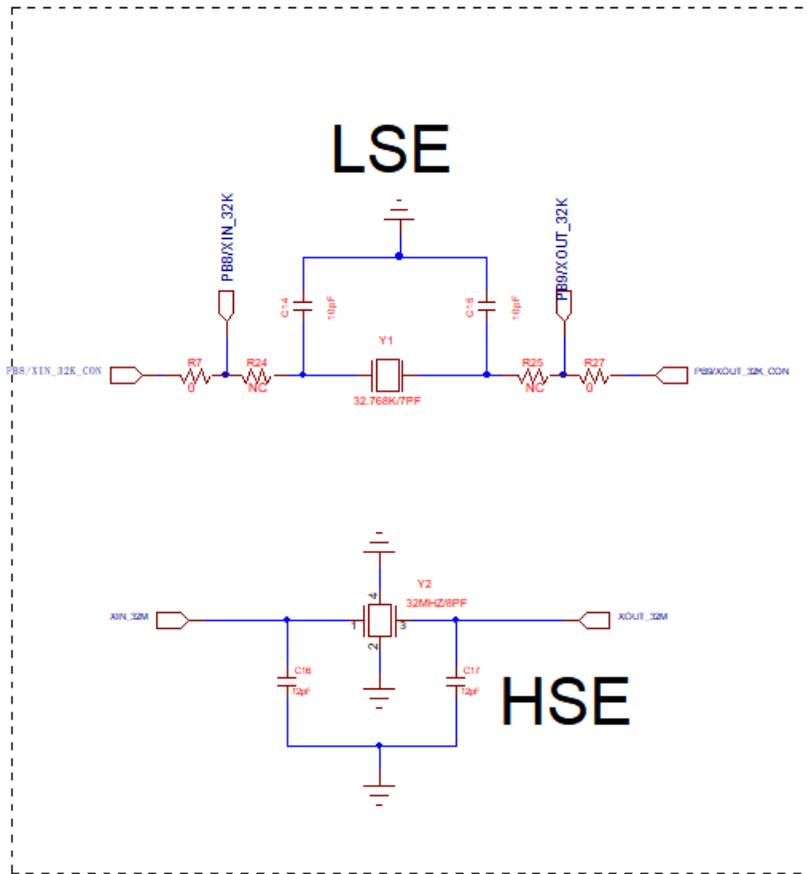
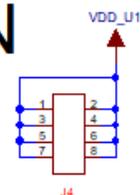
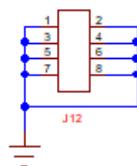


Fig. 1-5 Connection Diagram of Bluetooth Chip



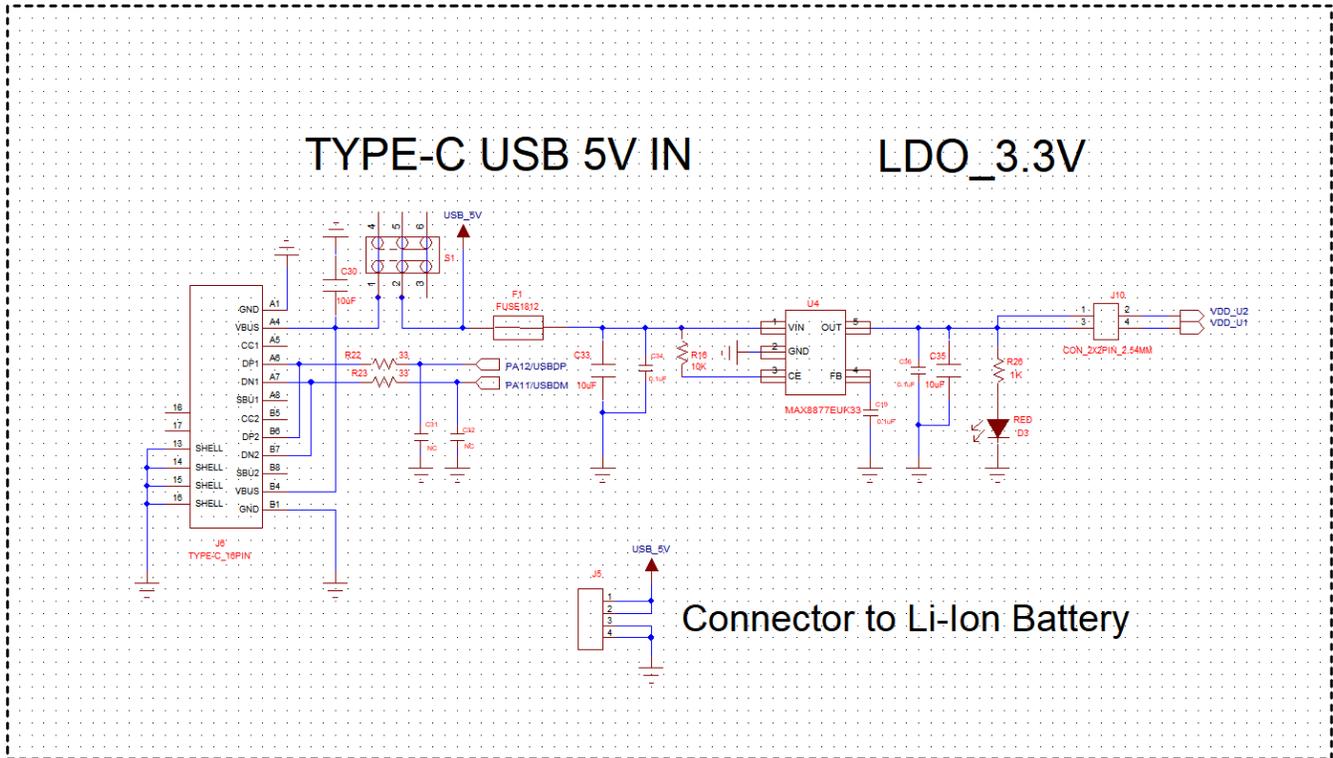
## Connector PIN



**2) Power supply design**

The schematic diagram for the power supply is shown in Figure 106, The entire board can be powered by a 5V voltage input through the USB interface of J6, which is then converted to 3.3V via an LDO. It can input to U1/U2 via jumper (J10).

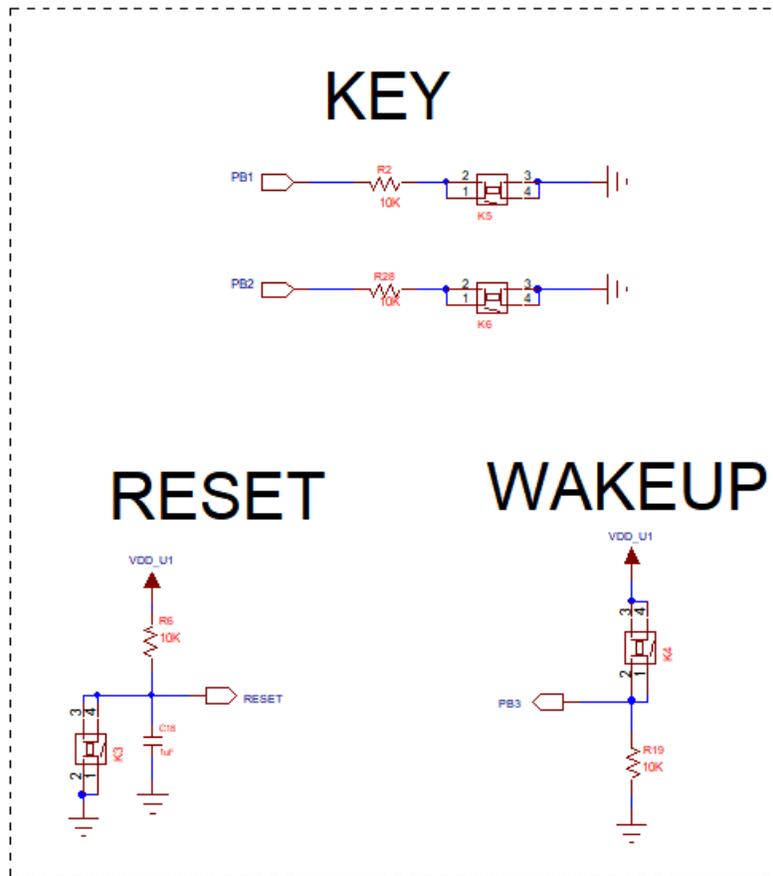
**Figure. 1-6 Power Supply Design**



**3) Button Design**

The schematic diagram of button design IS DEPICTED Figure 1-7. There are 4 keys in total, including 2 general keys, a reset button, and a wakeup button.

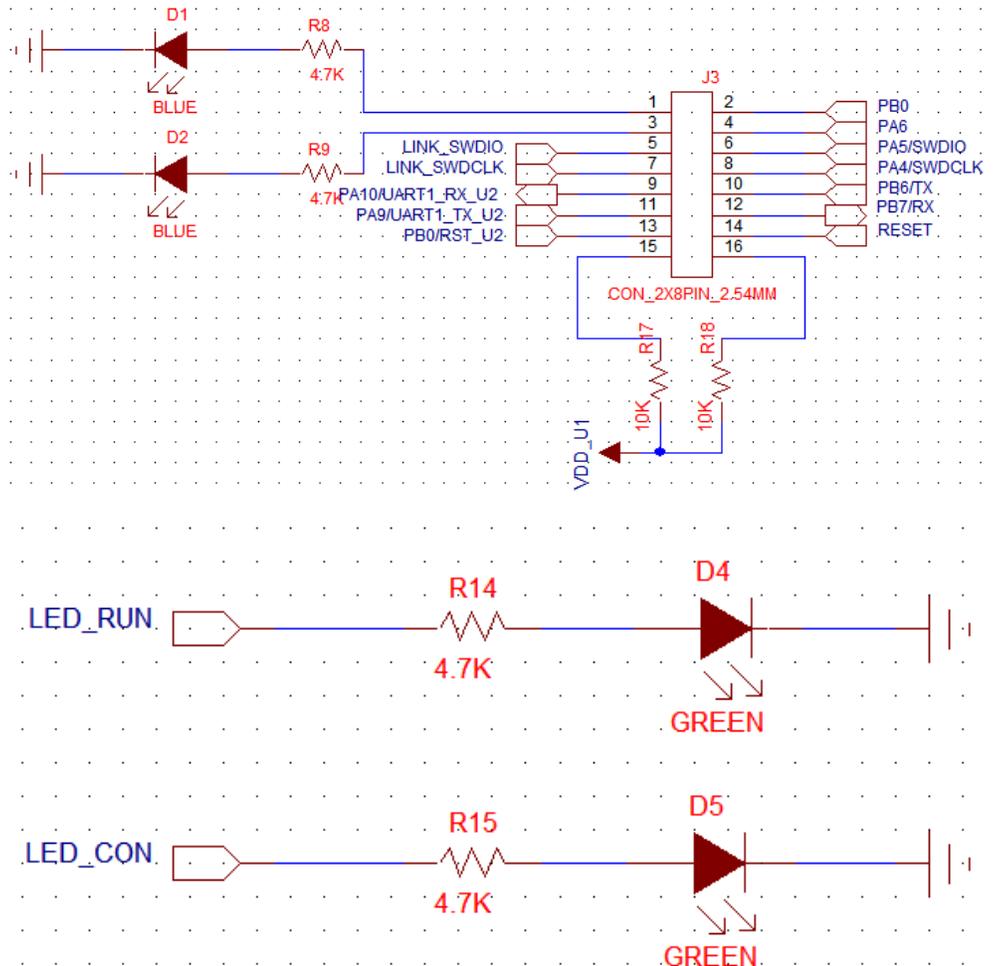
**Fig. 1-7 Button Design**



4) LED Design

Referencing Figure 1-8 is the schematic diagram for LED light design. There are a total of 5 LED lights. D1 and D2 are connected to PB0 and PA6 of N32WB031 through jumper J3 respectively and can be used for debugging. D4 and D5 are status indicator lights, as shown in the power supply design in Figure 1-6.

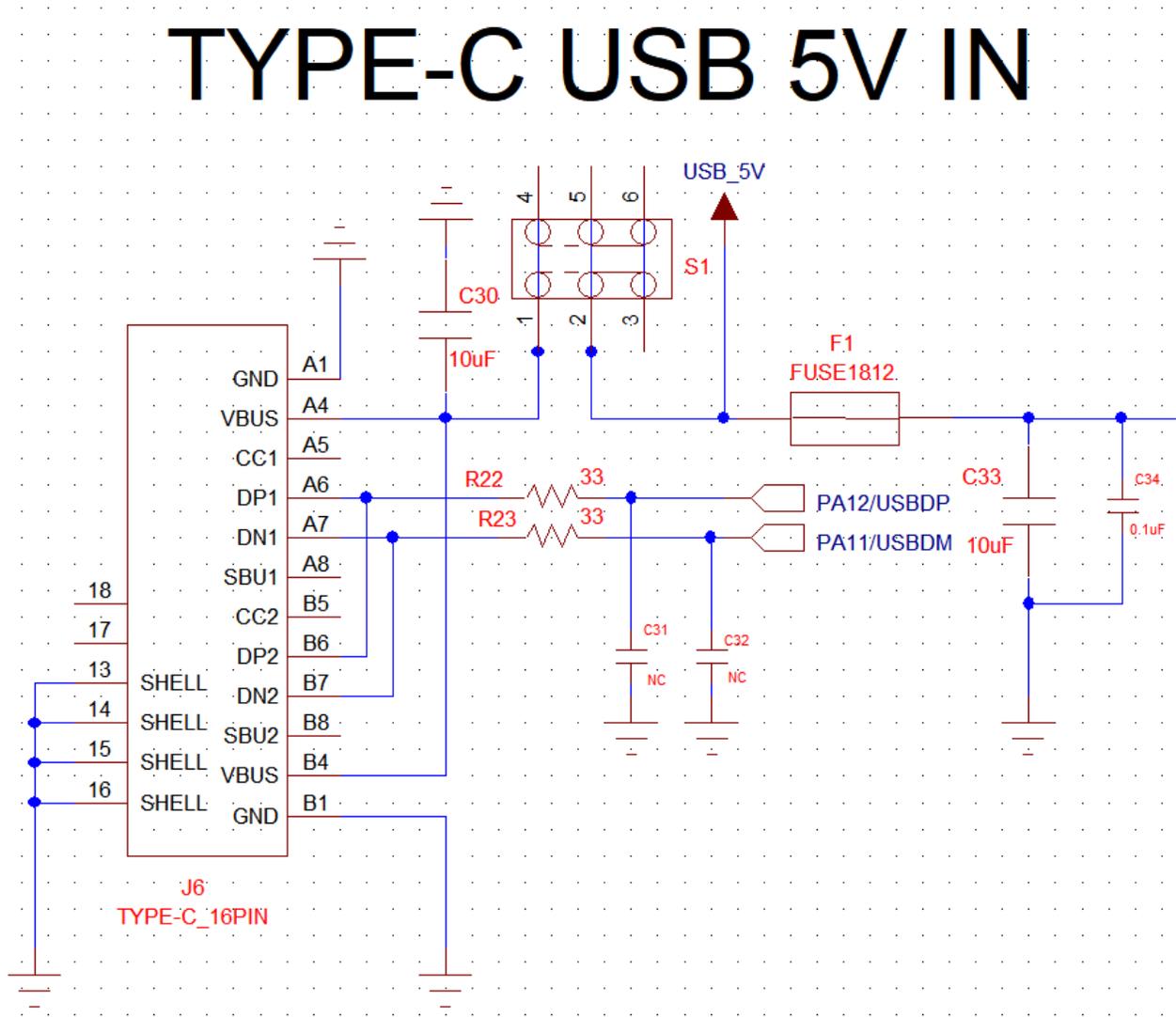
Fig. 1-8 Design of LED



5) USB Interface

Reference to Figure 1-9 shows the schematic design of USB interface. Users can perform USB debugging through the J6 TYPE-C USB port.

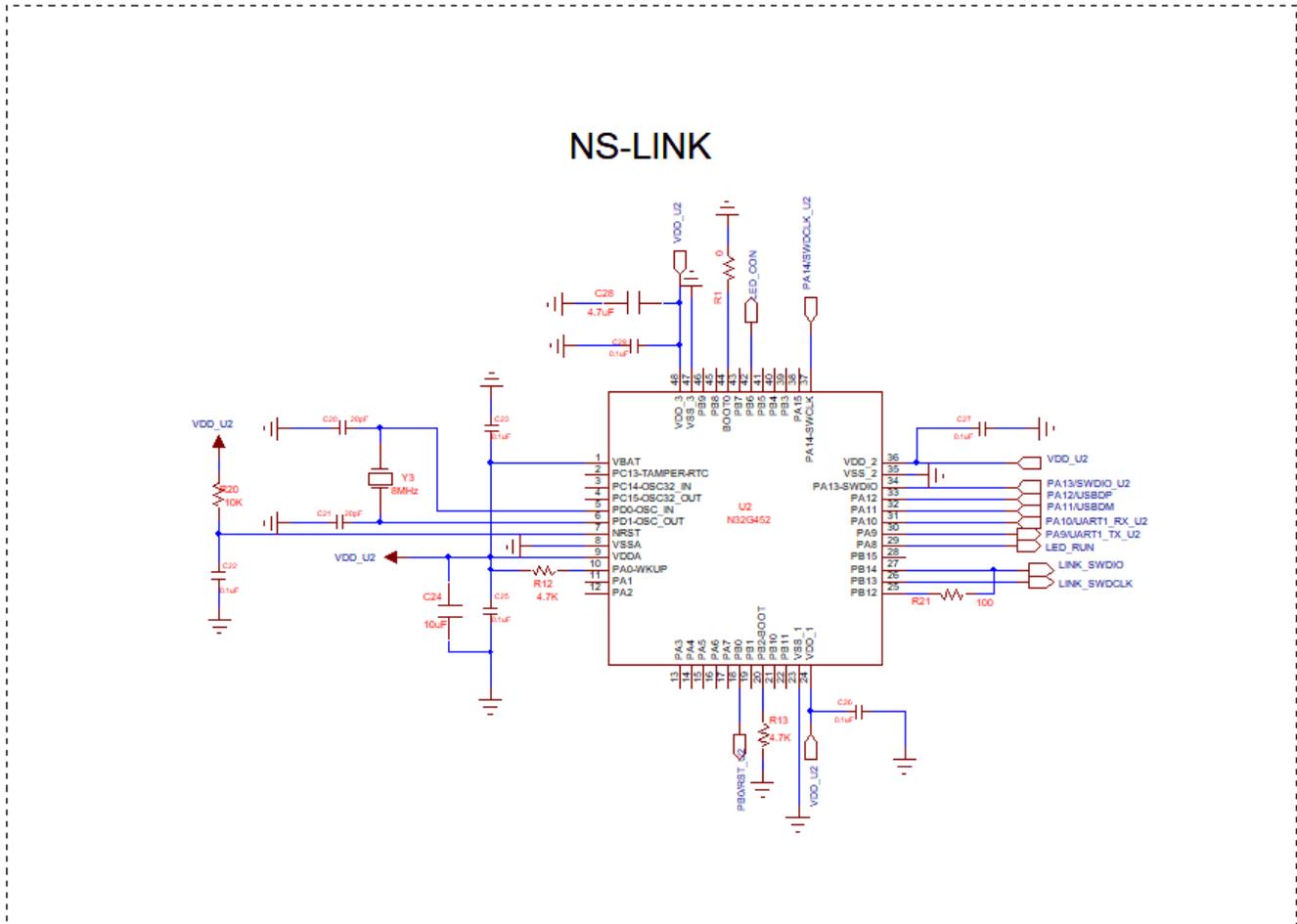
Fig. 1-9 USB Interface



**6) NS-LINK Design**

Reference to Figure 1-10 presents the schematic design of NS-LINK. Users can directly download programs to U1 via USB, perform serial debugging through USB, and issue commands to reset U1 via USB.

**Fig. 1-10 Schematic Design of NS-LINK**



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## 2. Version History

Version	Date	Changes
V1.2	2022.12.10	Initial release
V1.3	2024.04.04	Error correction

### 3. Disclaimer

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