

## **User Guide**

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### **N32G003F5Q7-STB Development Board Hardware User Guide**

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#### **Introduction**

The purpose of this document is to allow users to quickly familiarize themselves with the N32G003F5Q7-STB development board, understand the functions, instructions and precautions of the development board, so as to conduct MCU debugging and development based on the development board.

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# **1 Hardware Development Instructions**

## **1.1 Briefly**

The N32G003F5Q7-STB development board is used for sample development of 32-bit N32G003F5Q7 chips of National Technology Co., Ltd. This document describes the functions, usage instructions and precautions of the N32G003F5Q7-STB development board in detail.

## **1.2 Development board function**

The main MCU chip of the development board is N32G003F5Q7, and it is packaged with QFN20 pins.

The development board connects all functional interfaces to facilitate customer development.

### 1.3 Development board layout

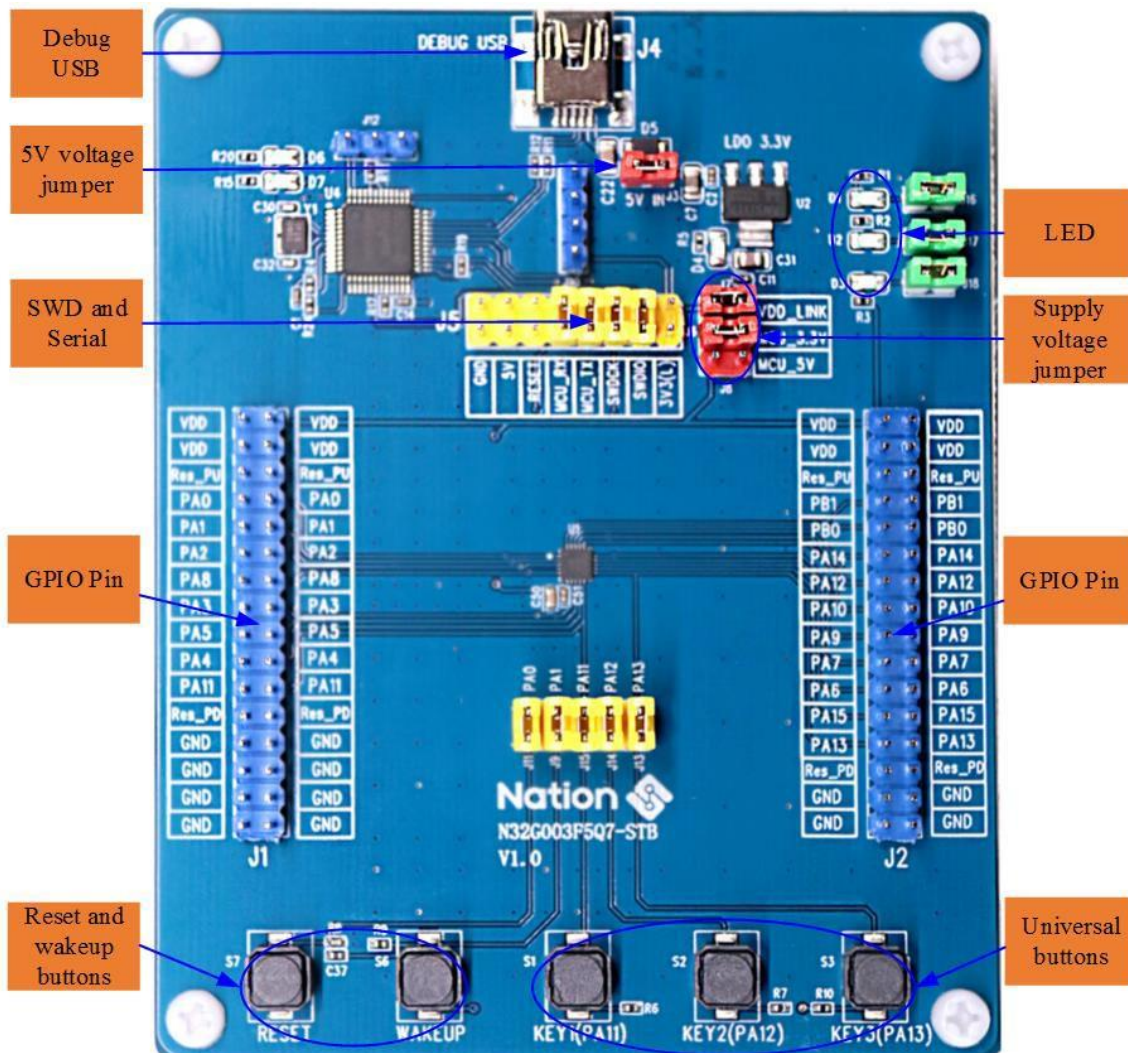


Figure 1-1 Development board layout

#### 1) Power supply for the development board

The development board can be powered by DEBUG USB (J4), and connected to 3.3V LDO input port through J3 jumper.

#### 2) Debug USB (J4) .

Through the DEBUG USB interface of the NS-LINK chip (U4), it can provide the function of downloading and debugging the main MCU program, and can also connect the serial port of the MCU to

provide the function of USB to serial port.

### **3) SWD interface and Serial port (J5)**

SWD interface: SWDIO and SWDCK, used to download and debug the main MCU program, you can use ULINK2 or JLINK to download and debug the MCU, or you can short the SWDIO signal pin and the SWDCK signal pin with the jumper cap, and download the MCU through DEBUG USB debugging.

Serial port: MCU\_TX and MCU\_RX, used as serial port external signal, MCU's PA2 (TX) and PA3 (RX) are used as serial port, which can be connected to serial port devices separately, or the jumper cap can short the MCU\_TX signal pin and the MCU\_RX signal pin, Through the NS-LINK on the development board, the USB port is converted into a serial port, which is convenient for customers to use.

### **4) Reset and Wake Buttons (S7, S6)**

S7 and S6 are the reset button and wake-up button respectively, Connect the chip's PA0 pin and PA1 pin respectively for chip reset and wake-up functions.

### **5) Universal keys (S1, S2, S3)**

S1, S2, and S3 are general buttons, which are connected to the pins PA11, PA12 and PA13 of the chip respectively.

### **6) GPIO□ (J1, J2)**

The GPIO interface of the chip is all led out, and the 3.3V voltage, GND pin, 3.3V pull-up and GND pull-down are also reserved on the pins, which is convenient for testing. For the specific definition of the interface, please refer to "UM\_N32G003 Series User Manual ".

## 1.4 Development Board Jumper Instructions

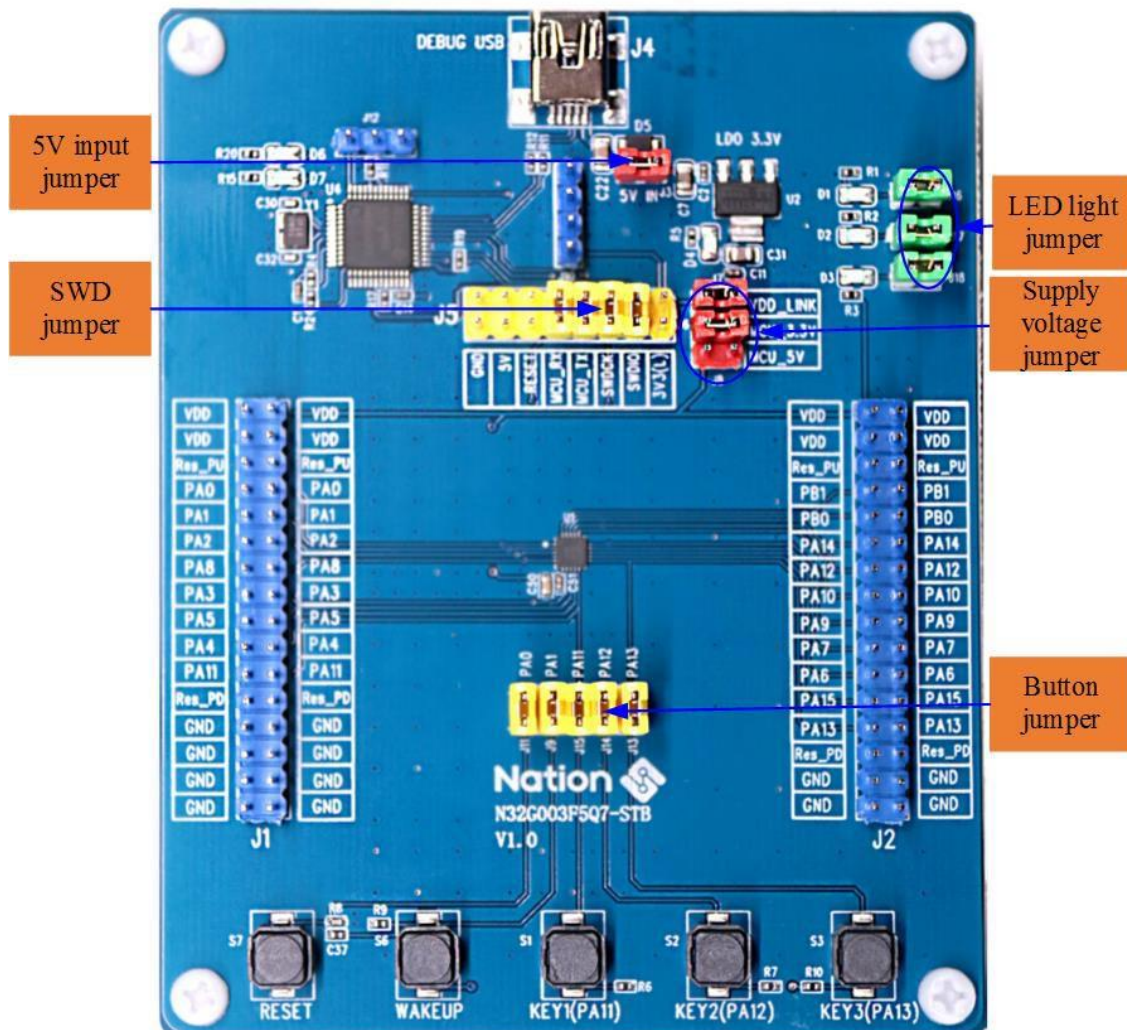


Figure 1-2 Development Board Jumper Description

Table 1-1 Development Board Jumper Description List

No.	Jumper bit number	Jumper function	Instructions for use
1	J3	5V input voltage jumper	The J3 jumper is used to connect the J4 USB interface to supply power to the LDO3.3V input port.
2	J6、J7、J8	Power supply jumper	J7: Power supply 3.3V to NS-LINK MCU chip. J6: Choose to supply 3.3V to the main MCU chip. J8: Choose to supply 5V to the main MCU chip.
3	J5	SWD jumper	Use NS-LINK to download the program to the MCU through the USB DEBUG port, you need to short-circuit the SWDIO signal pin and the SWDCK signal pin.
	J5	Serial jumper	When using NS-LINK as a serial port through the USB DEBUG port, you need to short-circuit the MCU_TX signal pin and the MCU_RX signal pin.
4	J16、J17、J18	LED light jumper	The LED light jumper can disconnect the GPIO from the LED J16: D1(PA6) J17: D2(PA7) J18: D3(PA10)
5	J9、J11、J13、J14、J15	Button jumper	Button jumper can disconnect GPIO from the button J9: WAKEUP (PA1) J11: RESET (PA0) J15: KEY1 (PA11) J14: KEY2 (PA12) J13: KEY2 (PA13)

## 1.5 Development board schematic

The schematic diagram of the N32G003F5Q7-STB development board is described as follows (For details, please refer to "N32G003F5Q7-STB\_V1.0").



## 1) MCU connection

Refer to Figure 1-3 for the schematic diagram of the MCU connection. The MCU VDD pin is connected two capacitors, and all GPIOs are connected to the J1 and J2 pins for easy debugging.

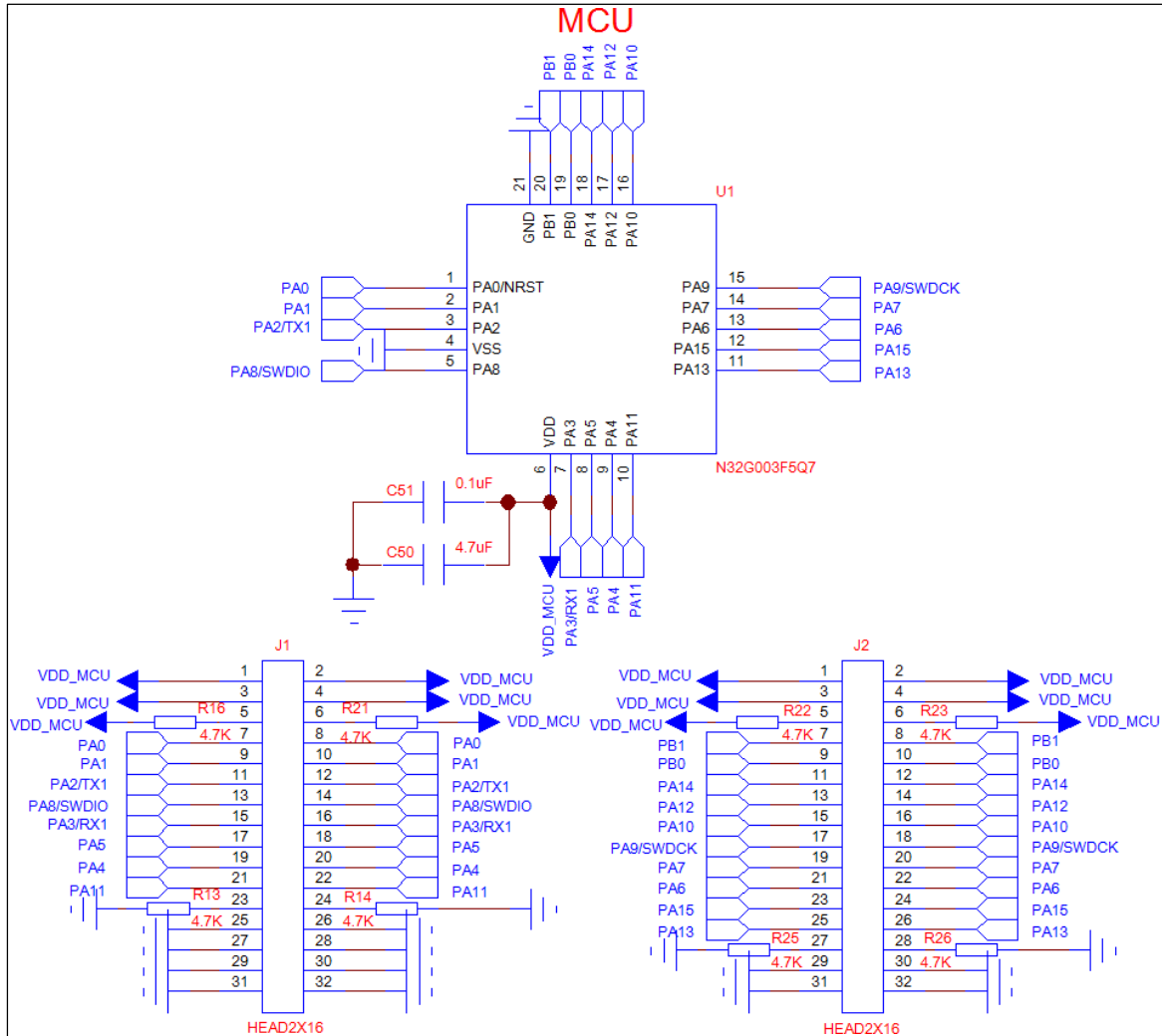
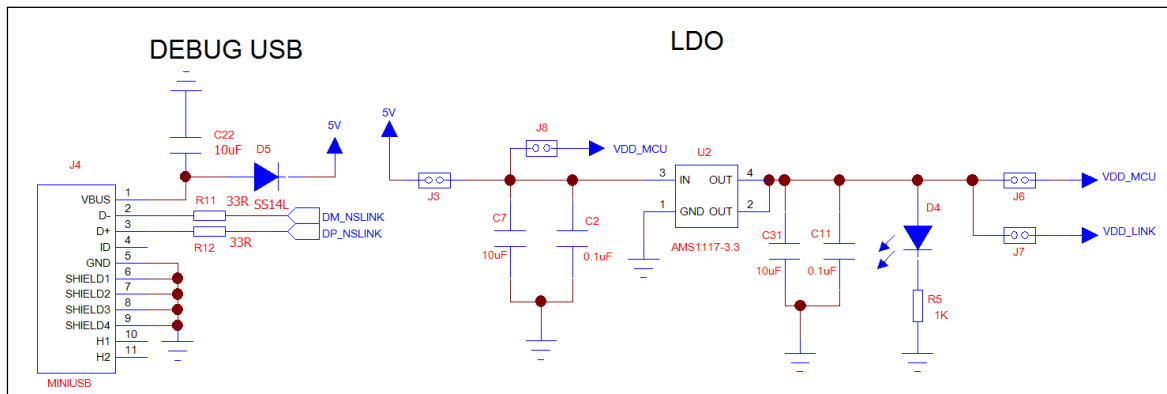


Figure 1-3 MCU connection diagram

## 2) Power Design

Refer to Figure 1-4 for the schematic diagram of the power supply design. The PCB is powered by 5V through USB, and then outputs 3.3V through the LDO to supply power to the entire PCB board.





### Figure 1-4 Power Design

### 3) Button design

Refer to Figure 1-5 for the schematic diagram of the key design. There are a total of 5 keys, which are the three general keys, the MCU wake-up key and reset key.

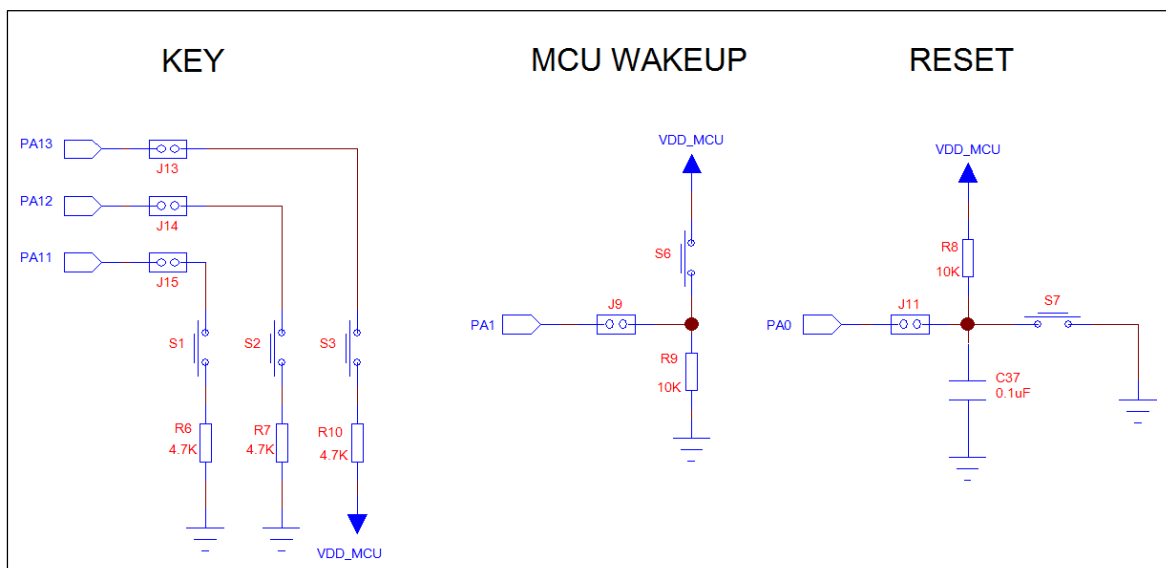


Figure 1-5 Button Design

#### 4) LED light design

Refer to Figure 1-6 for the schematic diagram of LED light design. There are a total of 5 LED lights. D1, D2, and D3 are connected to PA6, PA7 and PA10 of the main MCU respectively, which can be used for debugging. D6 and D7 are used for NS-LINK MCU control to monitor the running status of NS-LINK.

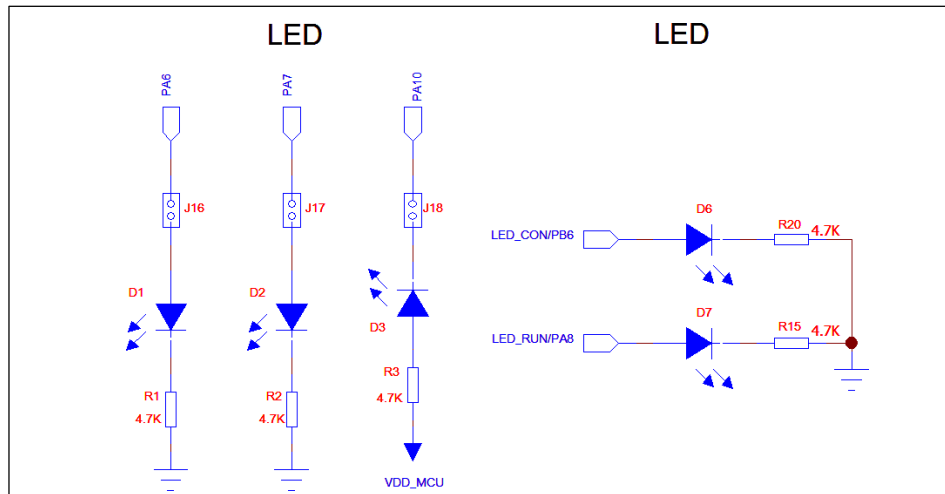


Figure 1-6 LED Light Design

## 5) NS-LINK

Refer to Figure 1-7 for the schematic diagram of NS-LINK. Users can directly connect the USB cable to download the program through the DEBUG USB port, omitting the ULINK or JLINK writer. You can also debug through the DEBUG USB analog serial port.

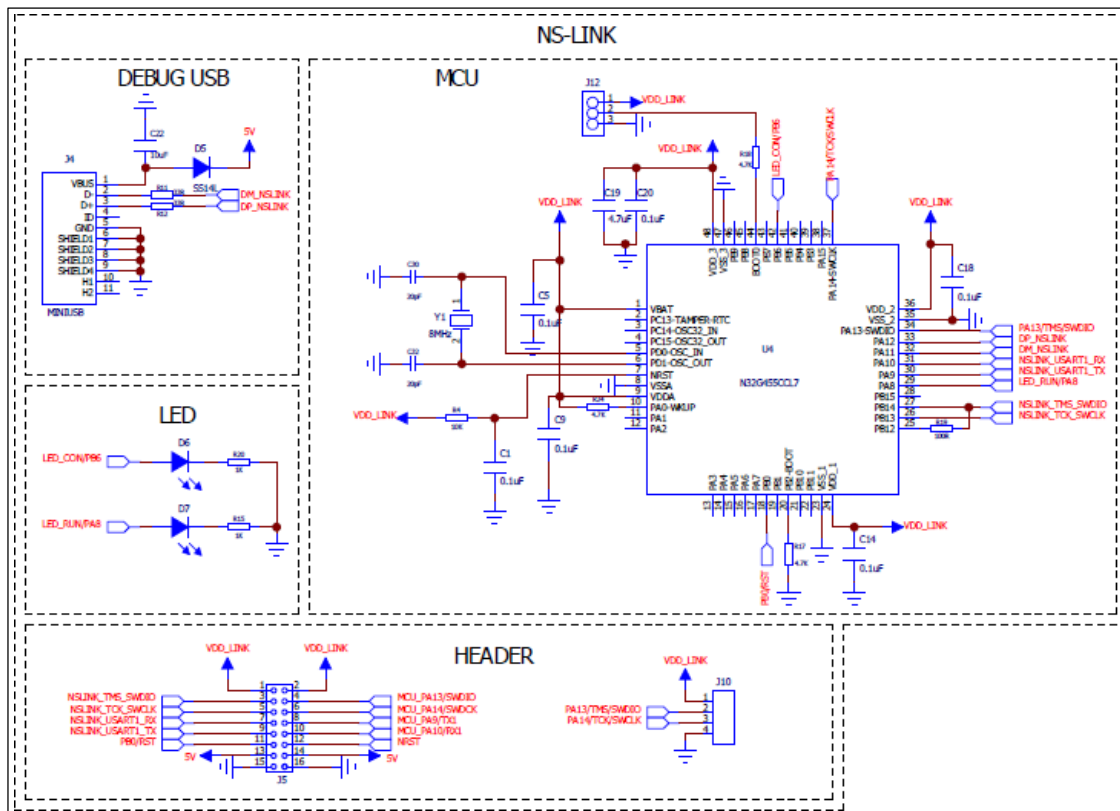


Figure 1-7 NS-LINK

- **Description of peripheral devices:**

- 1) When designing PCB LAYOUT, put two capacitors near VDD, Which are 4.7uF and 0.1uF respectively.

## 2 Version history

Version	Date	Modify
V1.0	2022-11-25	Initial version

### 3 Notice

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