N32G032K6Q7_STB Development Board Hardware User Guide

Introduction

The purpose of this document is to allow users to quickly familiarize themselves with the N32G032K6Q7_STB development board, understand the functions, instructions and precautions of the development board, so as to facilitate MCU debugging, and development based on the development board.

1   Hardware Development Instructions
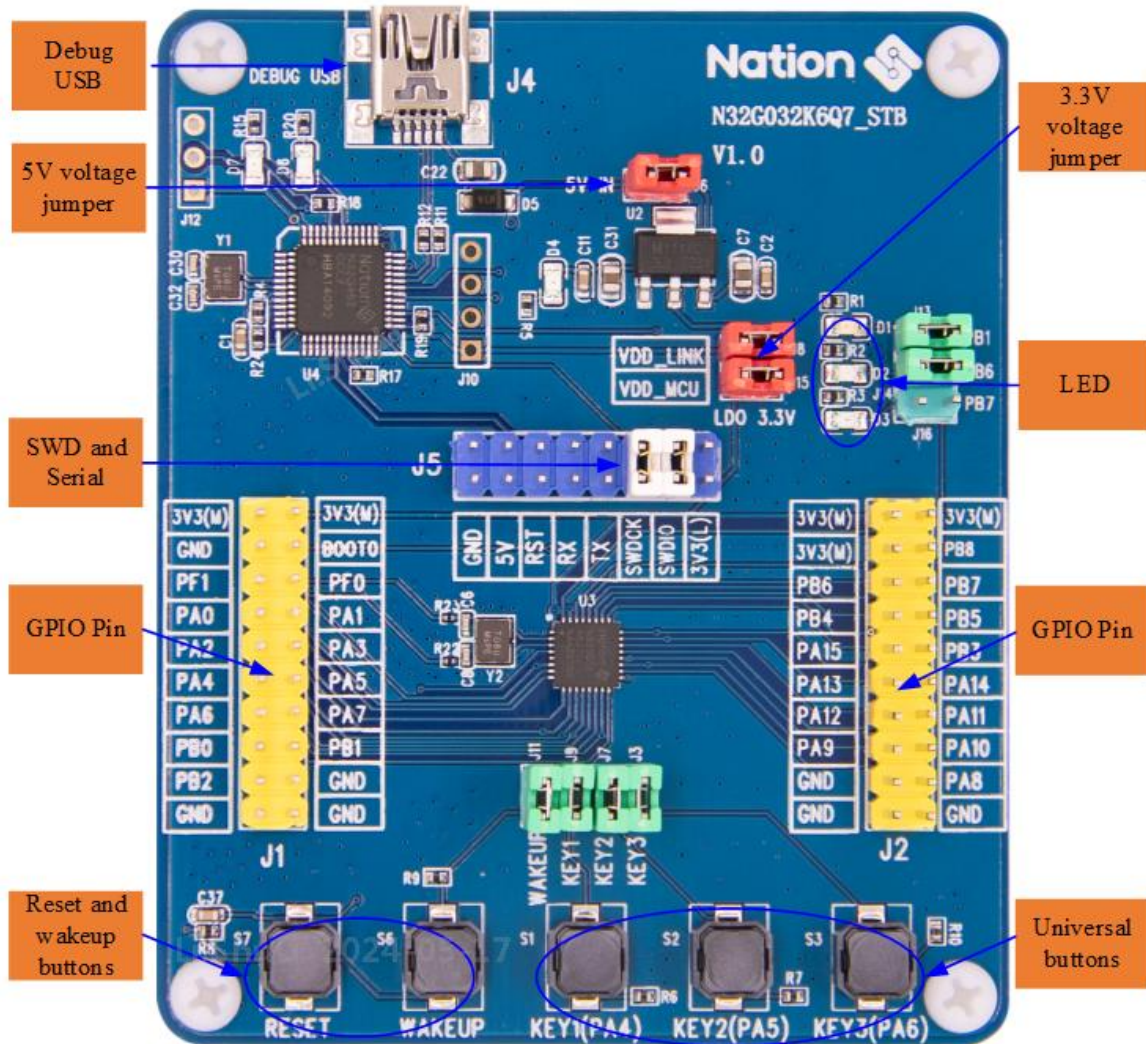
1.1 Brief

The N32G032K6Q7_STB development board is used for sample development of the high-performance 32-bit N32G032K6Q7 series chips of Nations Technology Plt. Ltd. This document describes the functions, usage instructions and precautions of the N32G032K6Q7_STB development board in detail.

1.2 Development Board Function

The part number of the main MCU chip in the development board is N32G032K6Q7, and it is packaged with QFN32 pins. The development board connects all functional interfaces to facilitate customer development.

1.3 Development Board Layout

Figure 1-1 Development Board Layout

- **Power supply for the development board**

The development board can be powered by DEBUG USB (J4) and connected to 3.3V LDO input through J6 jumper.

- **Debug USB(J4)**

Through the DEBUG_USB interface of NS-LINK chip, it can provide main MCU program download and debugging functions, and can also connect to the MCU's serial port to provide USB to serial conversion function.

- **SWD interface and Serial port (J5)**

The SWD interface can be used to download and debug the main MCU program. Programs can be downloaded to the chip by using ULINK2 or JLINK. Alternatively, programs can be downloaded by shorting SWDIO and

SWDCK with a jumper cap, and connecting to the onboard NSLINK through Debug USB

- **Reset and Wake Buttons (S7, S6)**

S7 and S6 are the reset button and wake-up button respectively, connected to the chip's NRST pin and PA0-WKUP pin, used for chip reset and wake-up functions.

- **Universal keys (S1, S2, S3)**

S1, S2, and S3 are general buttons, which are connected to the pins PA4, PA5 and PA6 of the chip respectively.

- **GPIO（J1，J2）**

The GPIO interfaces of the chip are all lead out, and the 3.3V voltage and GND pins are also reserved on the pins, which is convenient for testing. For the specific definitions of the GPIOs, please refer to "UM_N32G032x Series Datasheet".

1.4 Development Board Jumper Usage Instructions

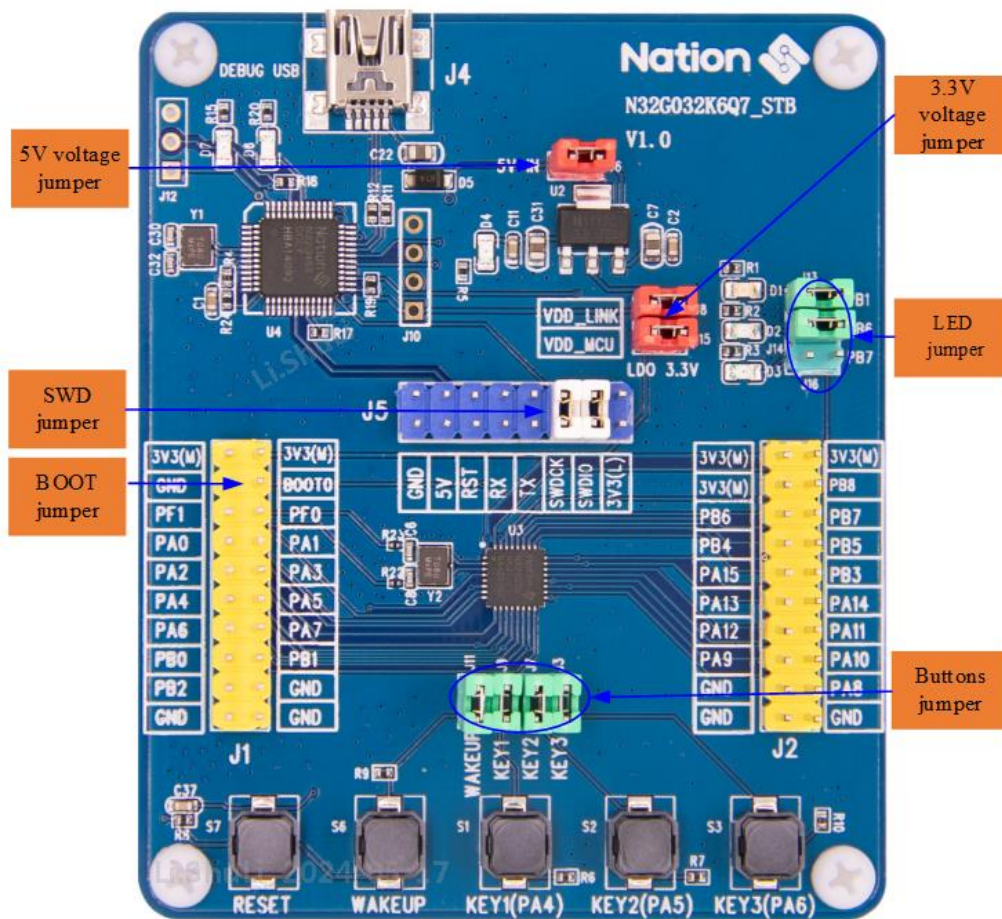**Figure 1-2 Development Board Jumper Description**

Table 1-1 Development Board Jumper Description List

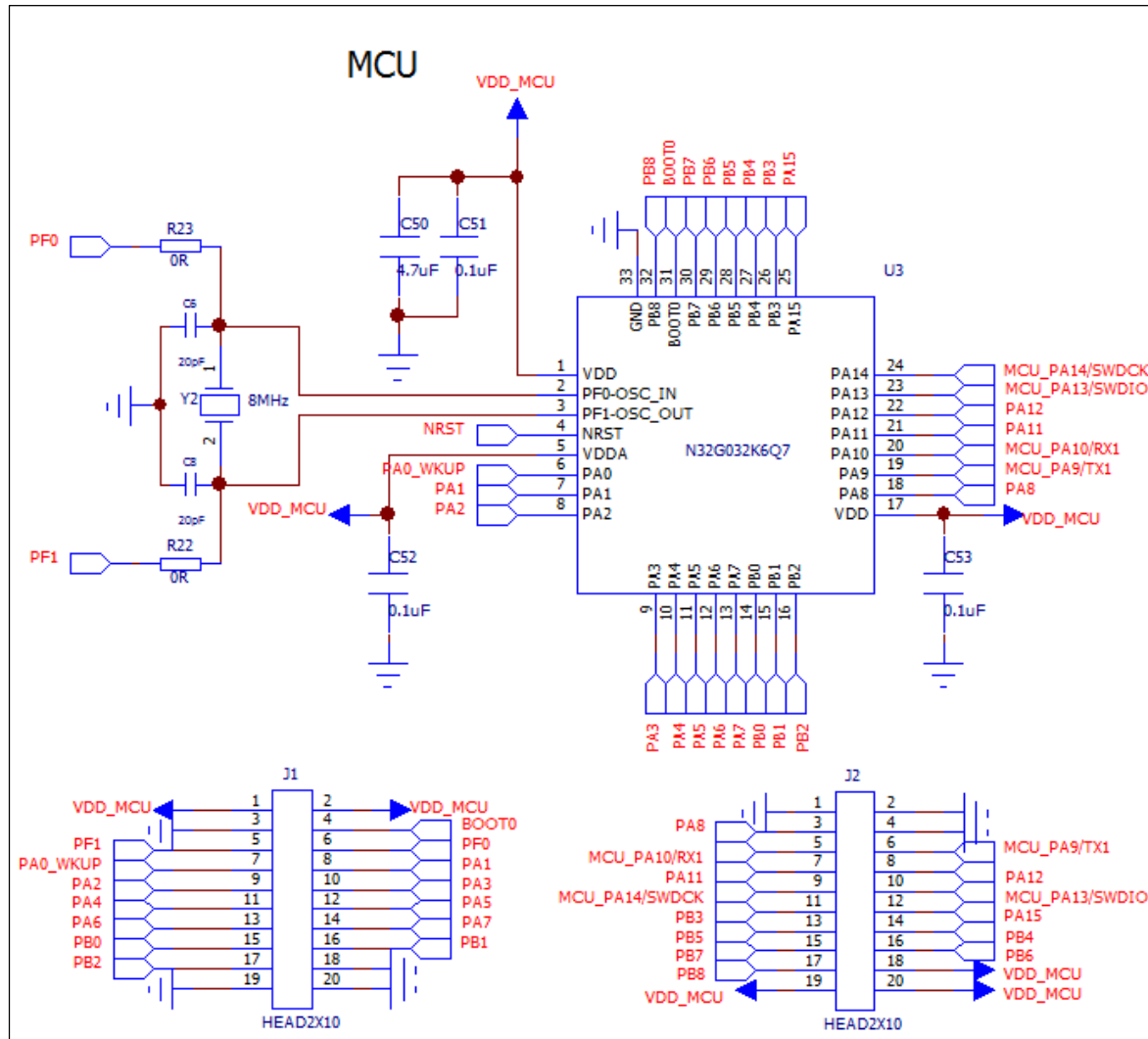| No.	Jumper Bit Number	Jumper Function	Instructions for Use
1	J6	5V input voltage jumper	The jumper J6 is used to connect the USB port J4 to supply power to the LDO3.3V input port.
2	J8, J15	3.3V power supply jumper	J8: Power supply 3.3V to NS-LINK MCU chip. J15: Power supply 3.3V to the main MCU chip.
3	J5	SWD jumper	Using NS-LINK to download the program to the MCU through the USB DEBUG port, you need to short 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 the TX signal pin and the RX signal pin. The serial port corresponding to N32G032 is PA9 and PA10 of USART1.
4	J1 (Boot0 pin)	BOOT jumper	The BOOT0 pin can be jumpered to GND and 3V3 as needed for convenience
5	J3, J7, J9, J11	Button jumper	The button jumper can disconnect and connect GPIO with the button. J9: KEY1 (PA4) J7: KEY2 (PA5) J3: KEY3 (PA6) J11: WAKEUP (PA0)
6	J13, J14, J16	LED jumper	The LED jumper can disconnect and connect GPIO with the LED J13: D1 (PB1) J14: D2 (PB6) J16: D3 (PB7)

1.5 Development Board Schematic

The schematic diagram of the N32G032K6Q7_STB development board is described as follows (For details, please refer to"N32G032K6Q7_STB_V1.0").

- **MCU connection**

Refer to Figure 1-3 for the schematic diagram of the MCU connection. VDD and VDDA pins of the MCU is connected to a capacitor, and all GPIOs are connected to the J1 and J2 pins for easy debugging.
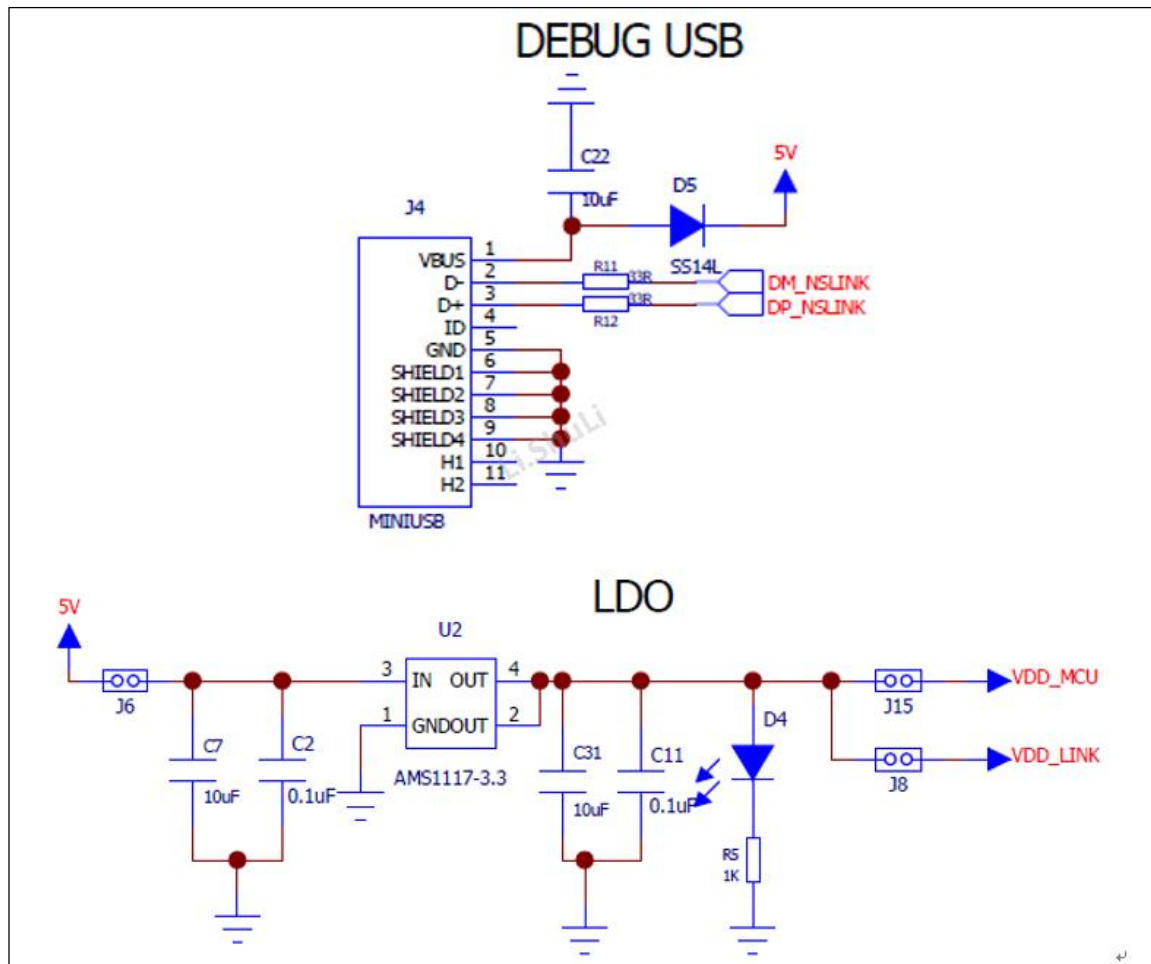
Figure 1-3   MCU Connection Diagram

- **Power design**

Refer to Figure 1-4 for the schematic diagram of the power supply design. The PCB is powered by 5V through USB (J4), and then outputs 3.3V through the LDO (U2) to supply power to the entire PCB board.
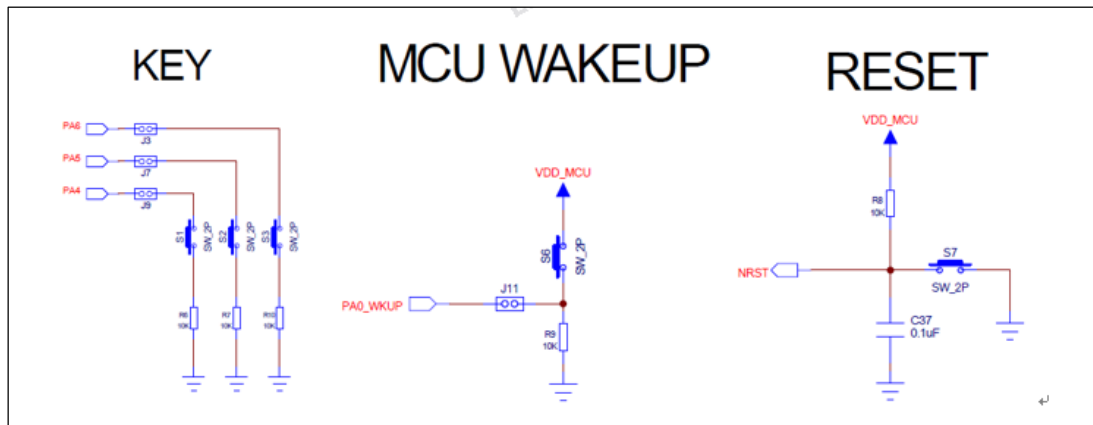
Figure 1-4 Power Design

Note: header logo and website

- **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.
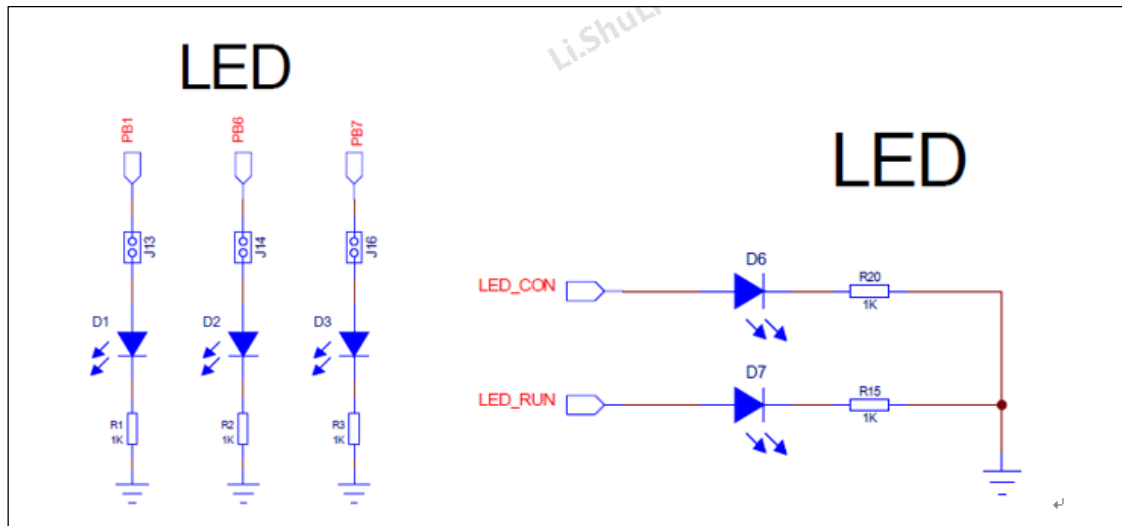
Figure 1-5 Button Design

- **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 PB1, PB6 and PB7 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.
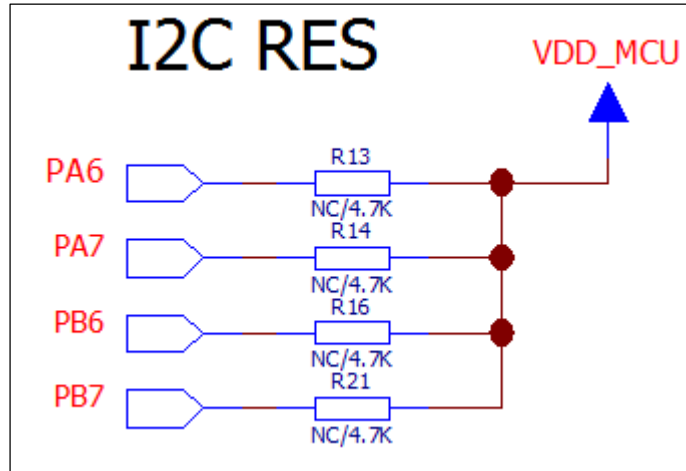
Figure 1-6 LED Light Design

- **I²C pull-up resistor**

Reference to Figure 1-7 for the I²C pull-up resistor design, which is default unpopulated. Users can solder a 4.7K pull-up resistor according to their usage needs.
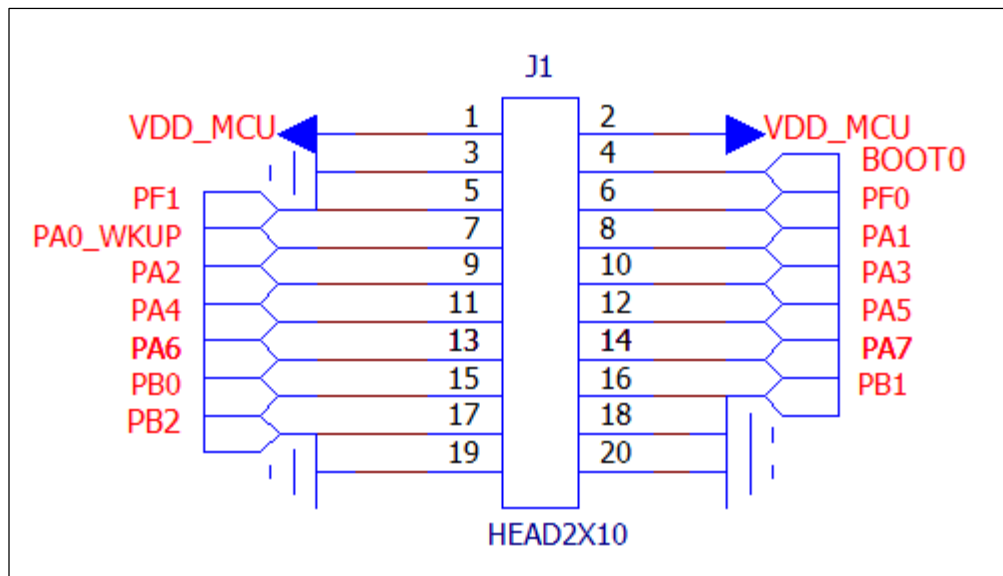
Figure 1-7 I2C Pull-up Resistor Design

- **BOOT**

Refer to Figure 1-8 for the external BOOT schematic. BOOT0 is connected to PIN4 of J1, and you can jumper PIN3 of J1 to GND or PIN2 to the power supply VDD.
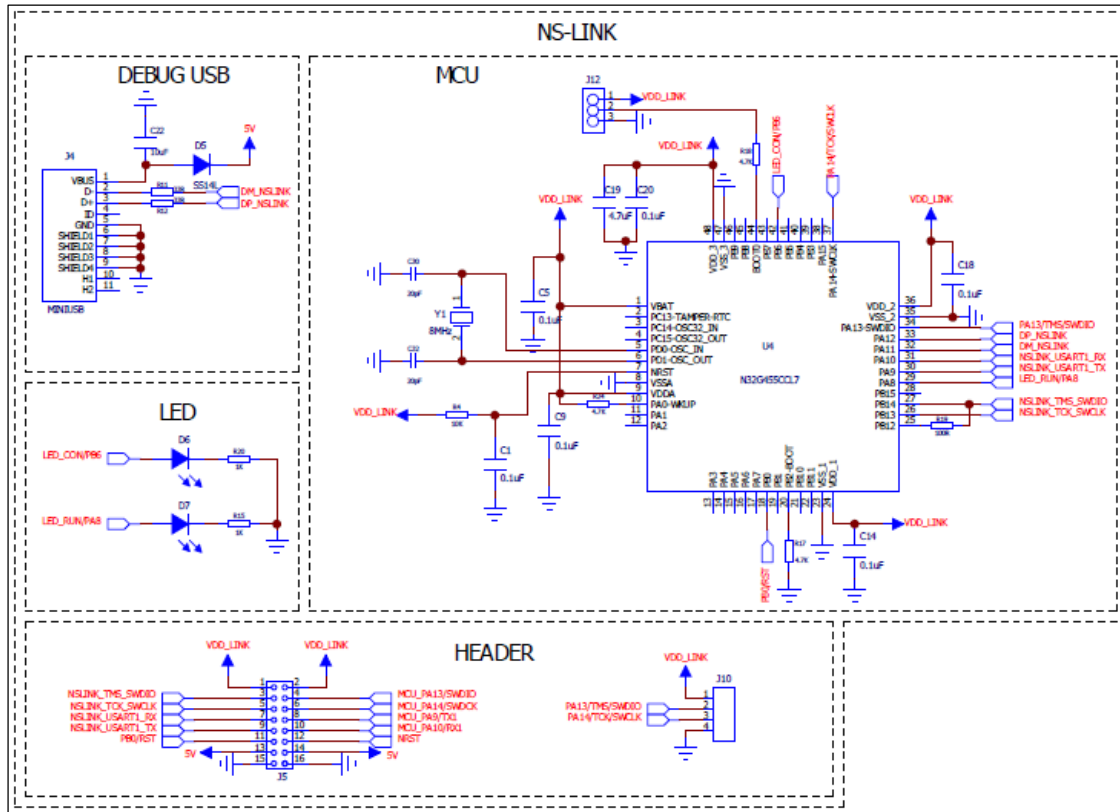
Figure 1-8 BOOT

- **NS-LINK**

Refer to Figure 1-9 for the schematic diagram of NS-LINK. Users can directly connect the USB cable to download the program through the DEBUG USB port, without the need for a ULINK or JLINK debugger.

You can also debug through the DEBUG USB virtual serial port.

Figure 1-9 NS-LINK

- **Description of peripheral devices:**

  – When designing PCB LAYOUT, put two capacitors near VDD (PIN1), 4.7uF and 0.1uF respectively, and put 0.1uF capacitors near the other VDD (PIN17) and VDDA (PIN5) pins.

  – PF0-OSC_IN, PF1-OSC_OUT: the external crystal needs to be connected close to the pins

2 Version History

Version	Date	Changes
V1.0	2020.08.26	Initial version

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