

**User Guide**

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**N32G030C8L7-STB Development Board Hardware**

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**Introduction**

The purpose of this document is to allow users to quickly familiarize themselves with the N32G030C8L7-STB development board, understand the functions, usage instructions, precautions, and facilitate MCU debugging and development based on the development board.

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# **1 Hardware Development Instructions**

## **1.1 Brief**

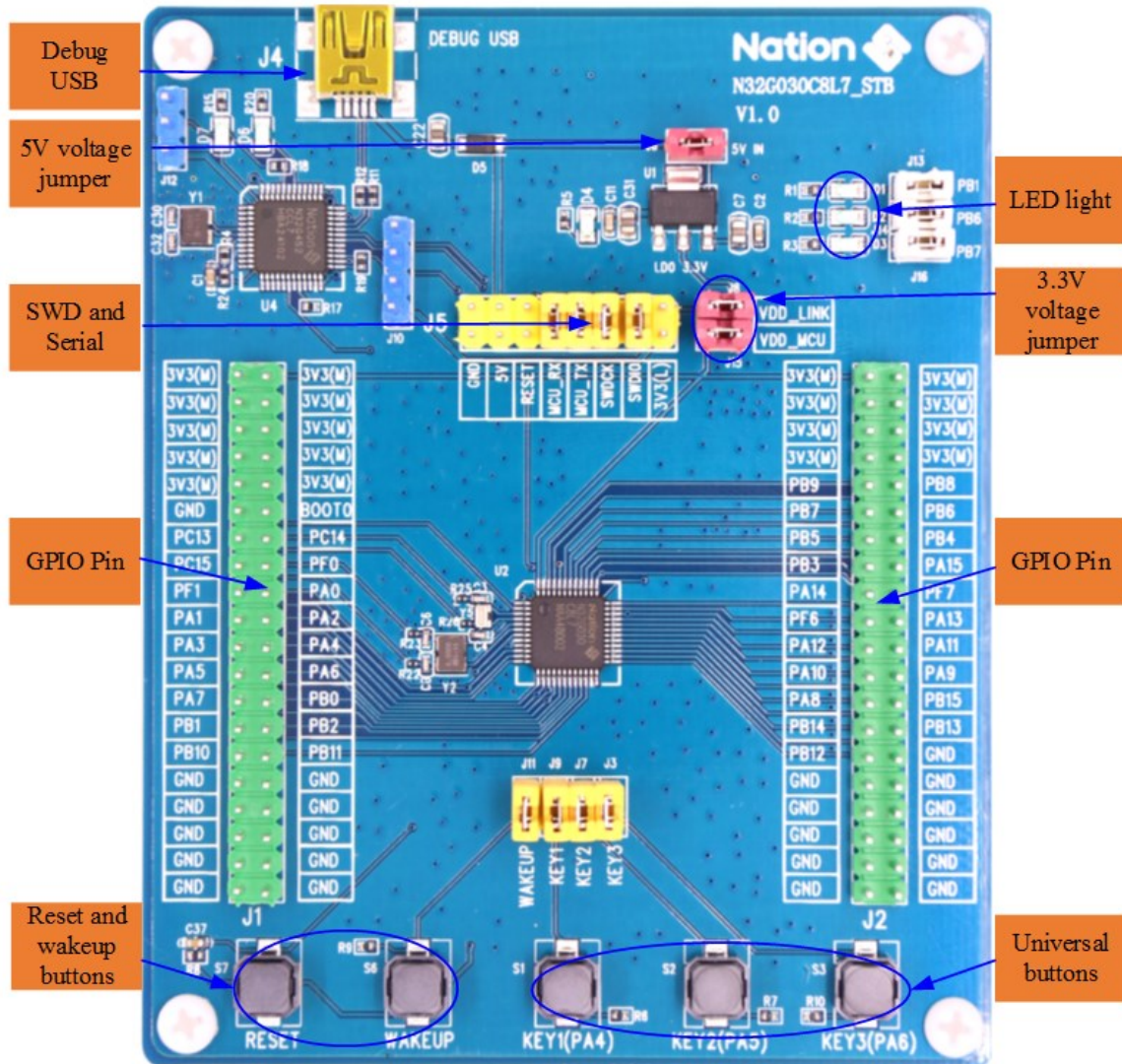
The N32G030C8L7-STB development board is used for sample development of 32-bit N32G030C8L7series chips of NSING Technologies. This document describes the functions, usage instructions and precautions of the N32G030C8L7-STB development board in detail.

## **1.2 Development Board Function**

The part number of the main MCU chip in the development board is N32G030C8L7, and it is packaged with LQFP48 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 port through J6 jumper.

- **Debug USB (J4)**

MCU can be connected to the on-board NSLINK via debug USB or used as a serial port

(NSLINK as Serial to USB tool).

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

SWD interface: SWDIO and SWDCK are 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 perform MCU downloading and debugging through DEBUG USB.

Serial port: MCU\_TX and MCU\_RX are used as serial port external signals. MCU's PA9 (TX) and PA10 (RX) are used as serial port, which can be connected to external serial port devices separately. Or by shorting the MCU\_TX signal pin and the MCU\_RX signal pin with jumper cap, customers can use the NS-LINK on the development board to convert the USB port to a serial port for convenience.

- **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.

- **BOOT (J1 PIN12)**

J1 PIN12 is BOOT0 pin, which can be shorted to power and ground through jumper caps as needed.

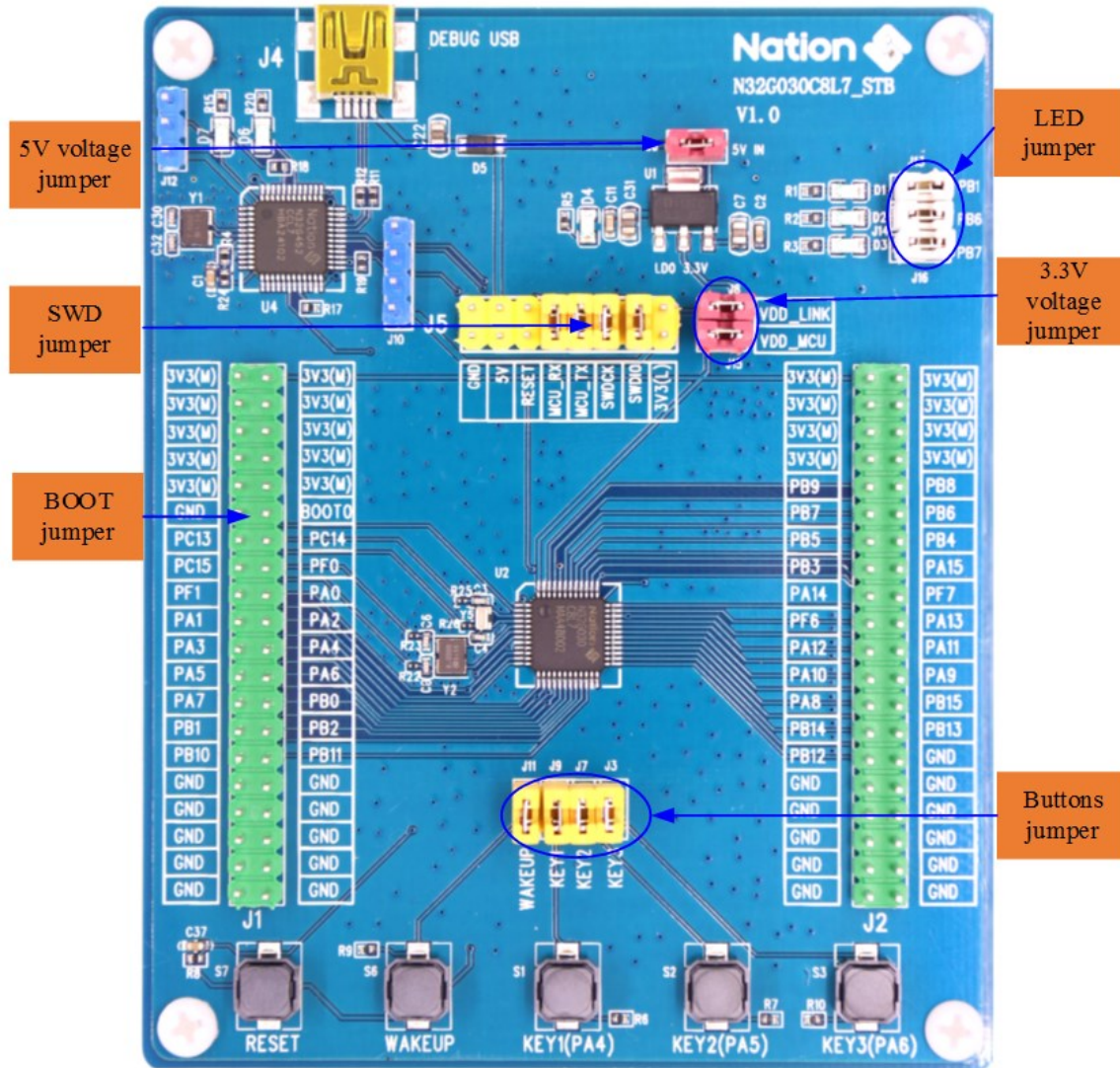
- **GPIO (J1, J2)**

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 "DS\_N32G030 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 ports 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 MCU_TX signal pin and the MCU_RX signal pin.
4	J1 PIN12	BOOT jumper	J1 PIN12: BOOT0.
5	J13, J14, J16	LED light jumper	LED light jumper to disconnect GPIO from LED J13: D1(PB1) J14: D2(PB6) J16: D3(PB7)
6	J3, J7, J9, J11	Button jumper	Button jumper to disconnect the GPIO from the button J9: KEY1(PA4) J7: KEY2 (PA5) J3: KEY3(PA6) J11: WAKEUP(PA0)

## 1.5 Development Board Schematic

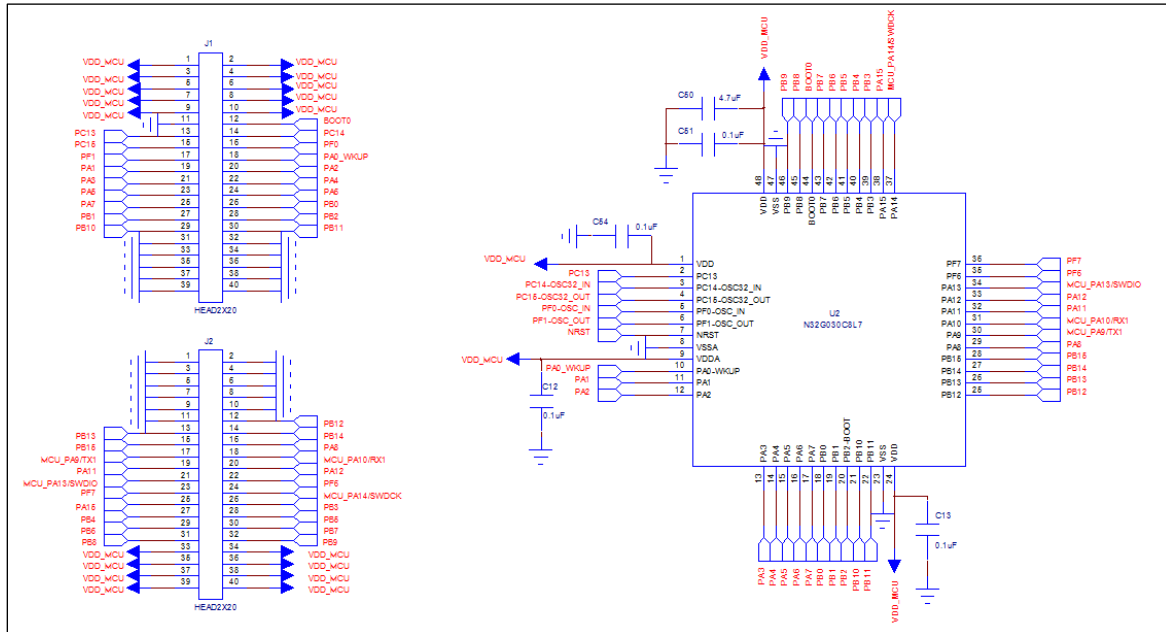
The schematic diagram of the N32G030C8L7-STB development board is described as follows (For details, please refer to "N32G030C8L7-STB\_V1.0").

### ● MCU connection

Refer to Figure 1-3 for the schematic diagram of the MCU connection. Each VDD pin of

the MCU is connected with a capacitor, and all GPIOs are connected to the J1 and J2 pins for easy debugging.

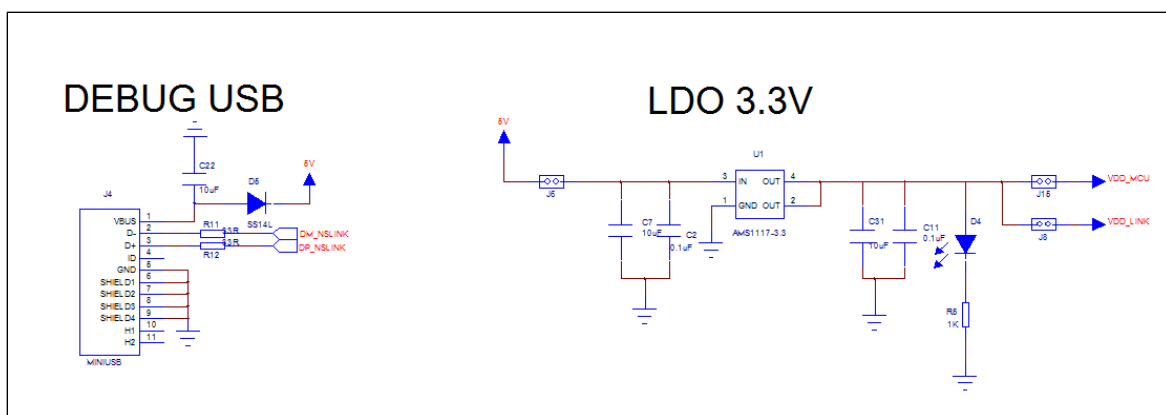
### Figure 1-3 MCU Connection Diagram



- **Power design**

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

### Figure 1-4 Power Design

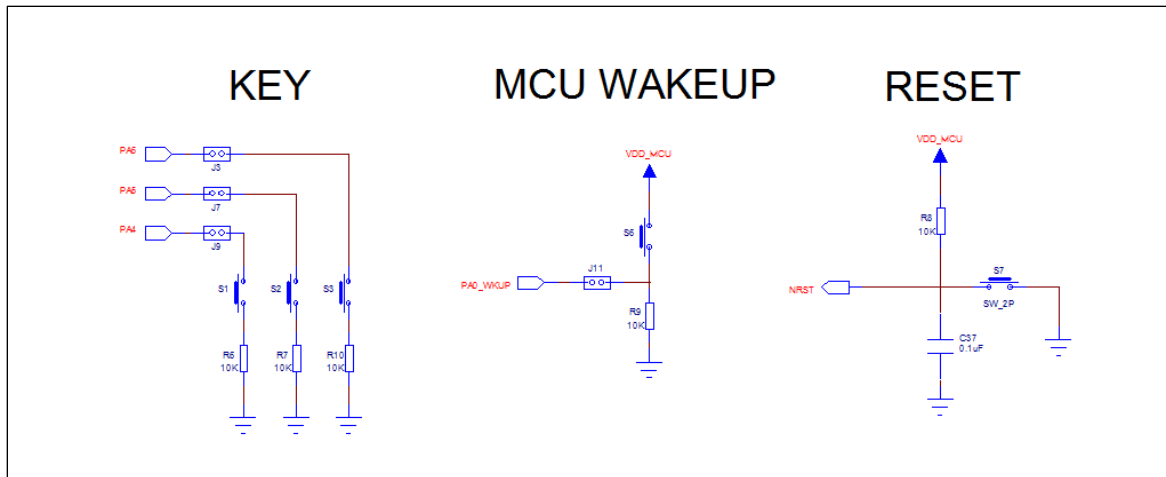




## ● Button design

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.

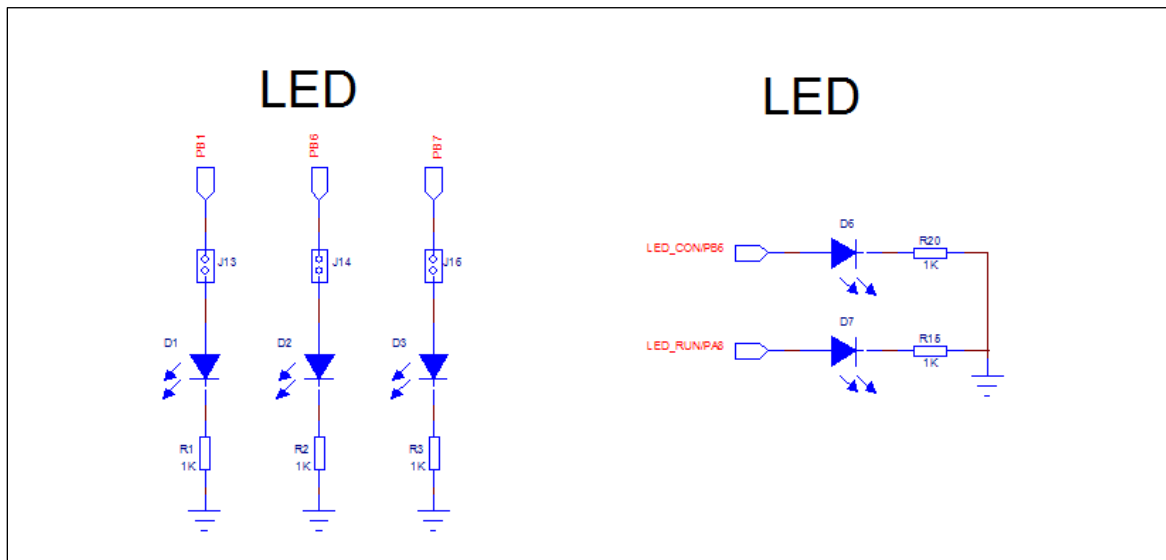
**Figure 1-5 Button Design**



## ● 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.

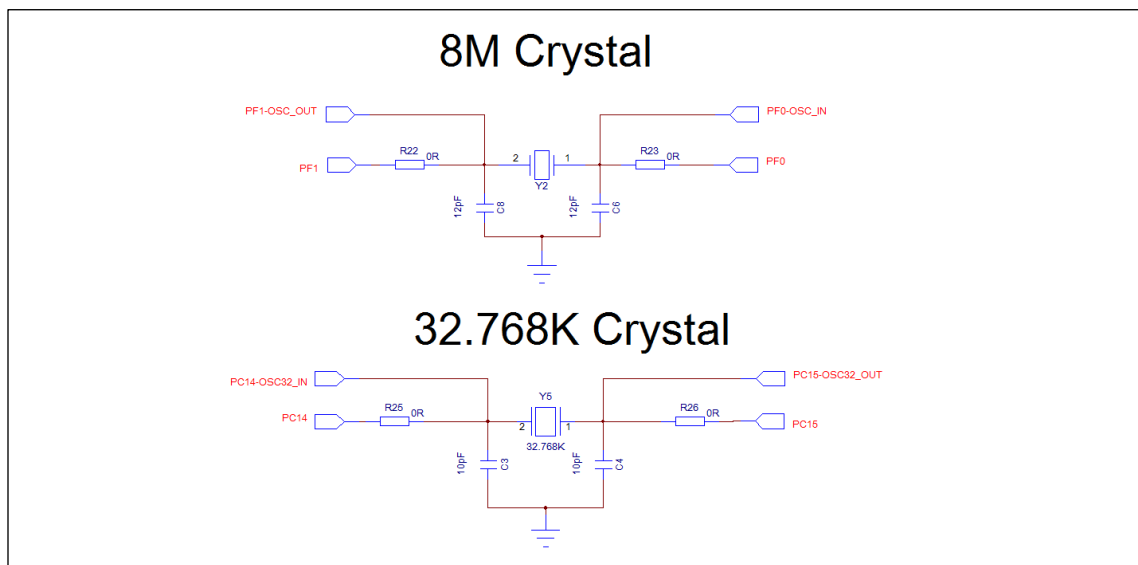
Figure 1-6 LED Light Design



## ● Crystal

Refer to Figure 1-7 for the crystal connection diagram. The chip has two external crystals, 8MHz and 32.768KHz respectively.

Figure 1-7 Crystal Design



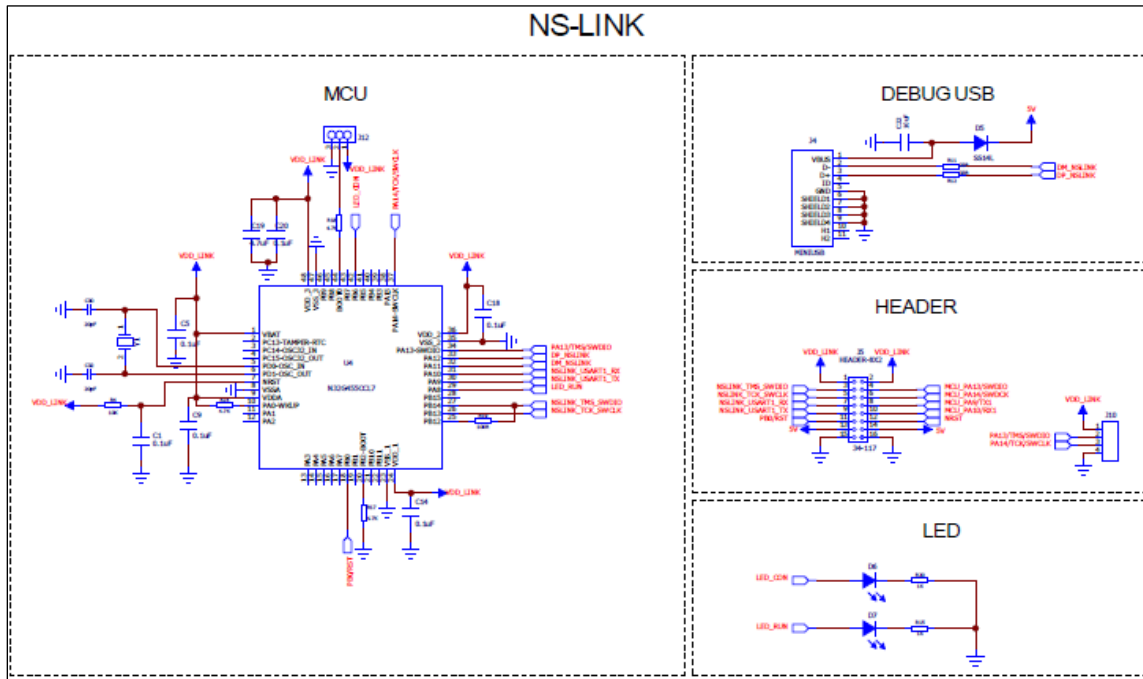
## ● NS-LINK

Refer to Figure 1-8 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

ULINK or JLINK debugger.

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

Figure 1-8 NS-LINK



### ● Description of peripheral devices:

- 1) When designing PCB LAYOUT, put two capacitors near VDD (PIN48), 4.7uF and 0.1uF respectively, and put 0.1uF capacitors near the other VDD pins
- 2) PC14-OSC32\_IN, PC15-OSC32\_OUT: When there is a need for an external high-precision RTC clock, a 32.768KHz crystal needs to be connected close to the two pins, and it can be omitted if there is no need.

## 2 Version History

Version	Date	Changes
V1.0	2020.07.25	Initial version

### 3 Disclaimer

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