

## User guide

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# N32G401C8L7-STB Development board hardware user guide

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### Introduction

The purpose of this document is to enable users to quickly get familiar with the N32G401C8L7-STB development board, understand the function of the development board, use instructions and precautions, so as to conduct MCU debugging and development based on the development board.

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# **1 Hardware Development Instructions**

## **1.1 Overview**

The N32G401C8L7-STB development board is used for sample development of Nations Technologies Inc. 's high-performance 32-bit N32G401C8L7 series chips. Intended Audience This document describes the functions, usage instructions, and precautions of the N32G401C8L7-STB development board.

## **1.2 Development board function**

The main MCU chip model of the development board is N32G401C8L7 and LQFP48 pin package. The development board connects all functional interfaces to facilitate customer development.

### 1.3 Development board layout

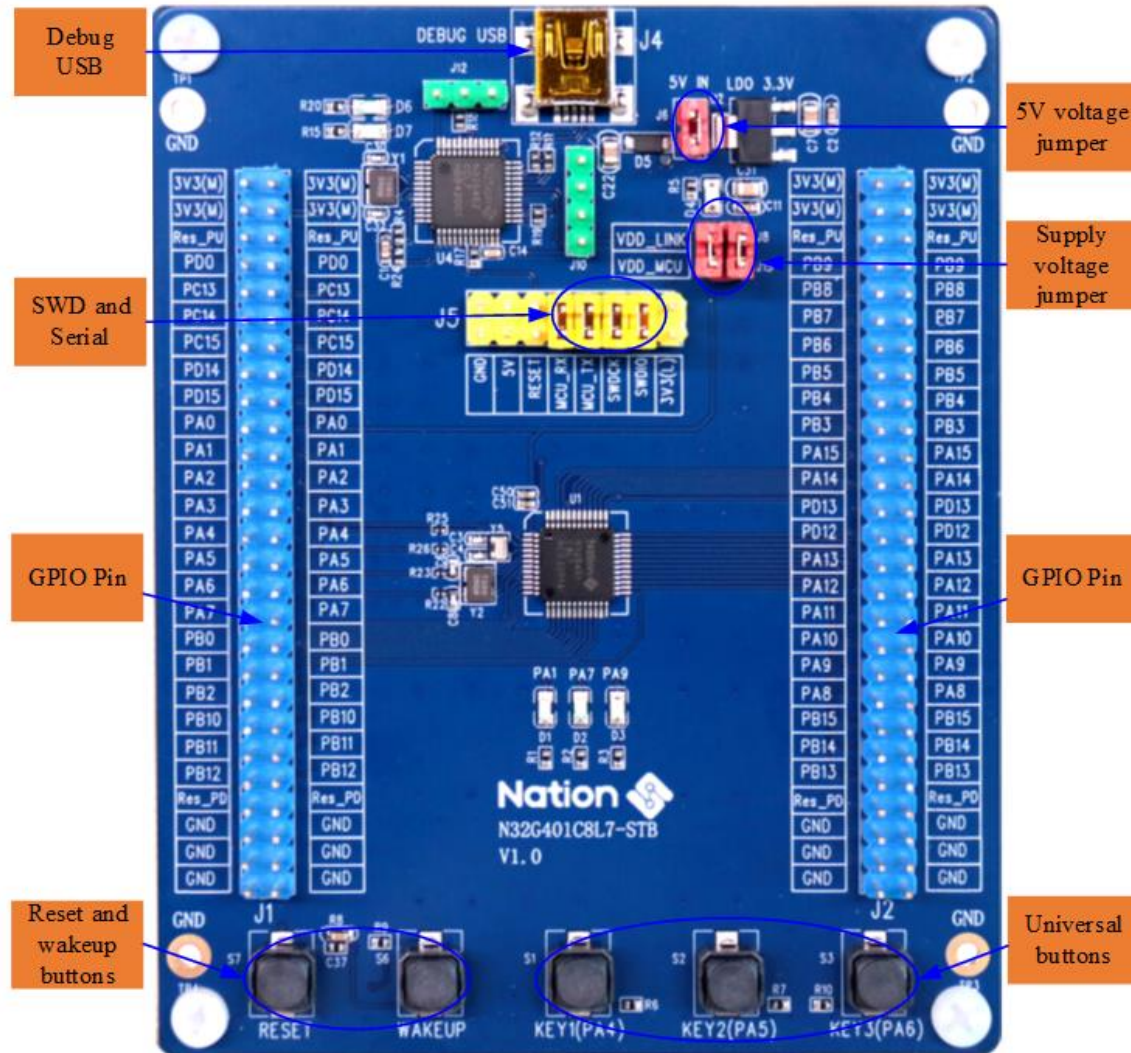


Figure 1-1 Development board layout1

#### 1) Power supply for development board

The development board can be powered via Debug USB (J4) and connected to 3.3V LDO input via J3 jumper.

#### 2) Debug USB (J4)

The MCU can be connected to the onboard NSLINK via Debug USB or used as a serial port (NSLINK as a serial to USB tool).

#### 3) SWD 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, PA2 (TX) and PA3 (RX) of MCU are used as serial port, you can connect external serial port device separately, or you can short the MCU\_TX signal pin and MCU\_RX signal pin with the jumper cap, 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 up buttons (S7, S6)**

S7 and S6 are reset buttons and wake buttons respectively, which are connected to NRST pins and PA0-WKUP pins of the chip respectively for chip reset and wake functions.

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

S1, S2 and S3 are connected to chip PA4, PA6 and PA7 pins respectively as universal keys.

#### **6) BOOT**

PD0 is BOOT0 pin, which can be shorted to power and ground through jumper as needed.

#### **7) GPIO port (J1, J2)**

All the GPIO interfaces of the chip are elicited, and 3.3V voltage and GND pins are reserved on the pins for easy testing. Refer to DS\_N32G401C8L7 Series Datasheet for the specific definition of the interface.

## 1.4 Development board jumper instructions

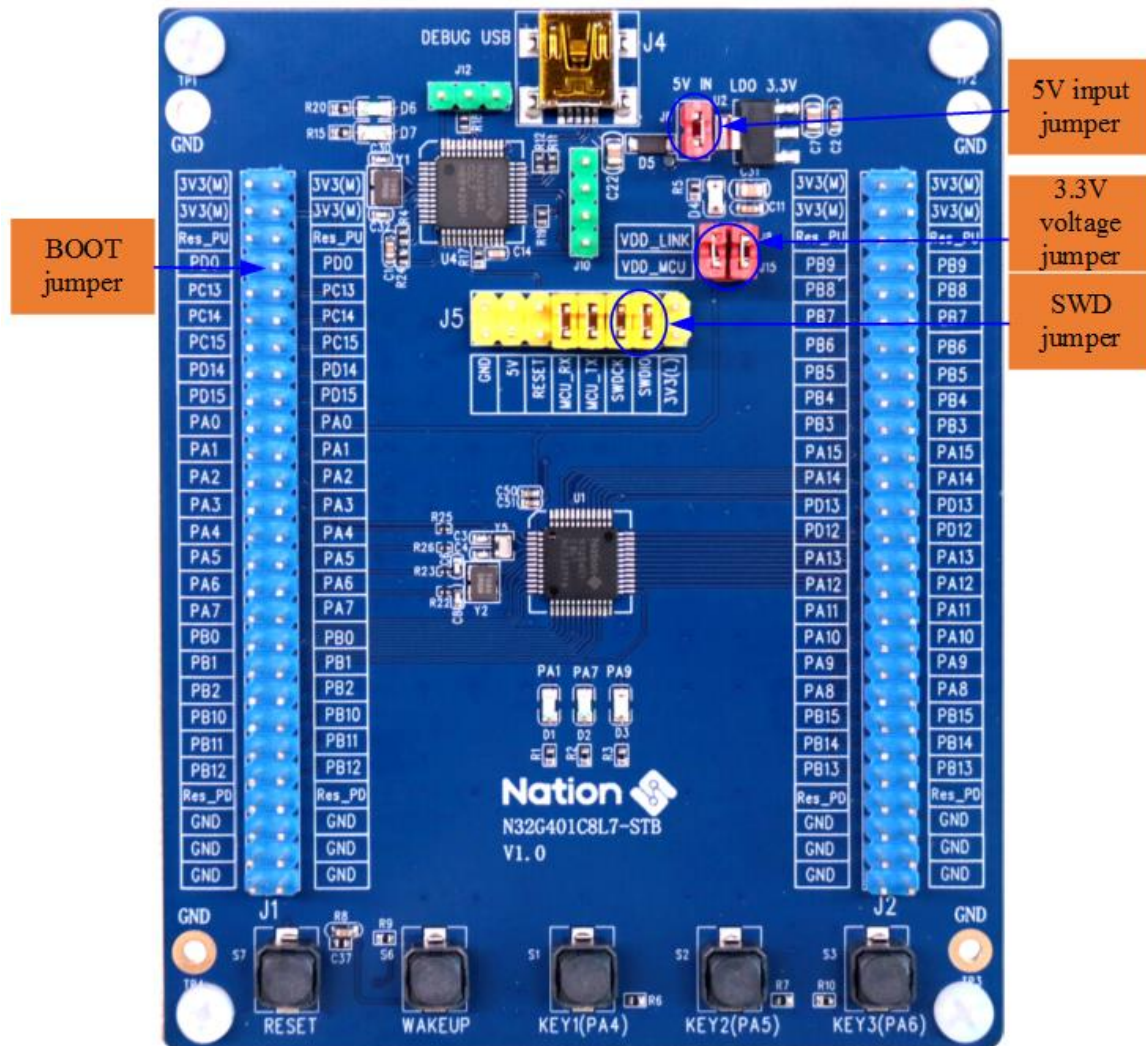


Figure 1-2 Development board jumper description

Table 1-1 Development board jumper description list

No.	Jump line item number	Jump line function	Directions for use
1	J6	5V voltage jumper	J6 jumper Connects to the USB port (J4) and supplies power to the LDO3.3V input port.
2	J8 and J15	3.3V power supply jumper	J8: Supply 3.3V power to NS-Link MCU chip. J15: Supply 3.3V power to master MCU chip.
3	J5	SWD jumper	Use NS-Link to download programs to MCU through USB Debug port, and need to short-circuit SWDIO and SWDCK pins.
		Serial jumper	When NS-Link is used as a serial port through the USB Debug port, short connect the TX and RX pins.
4	J1 PIN7、8	BOOT jumper	J1 PIN7、 PIN8: BOOT0。

## 1.5 Development board schematic diagram

The schematic diagram of the N32G401C8L7-STB development board is described as follows (see N32G401C8L7-STB\_V1.0 for details).

### 1) MCU connection

Refer to Figure 1-3 for the SCHEMATIC diagram of MCU connection. VDD and VDDA of MCU are both connected with capacitors, and all GPIO are led out and connected to J1 and J2 pins for easy debugging.



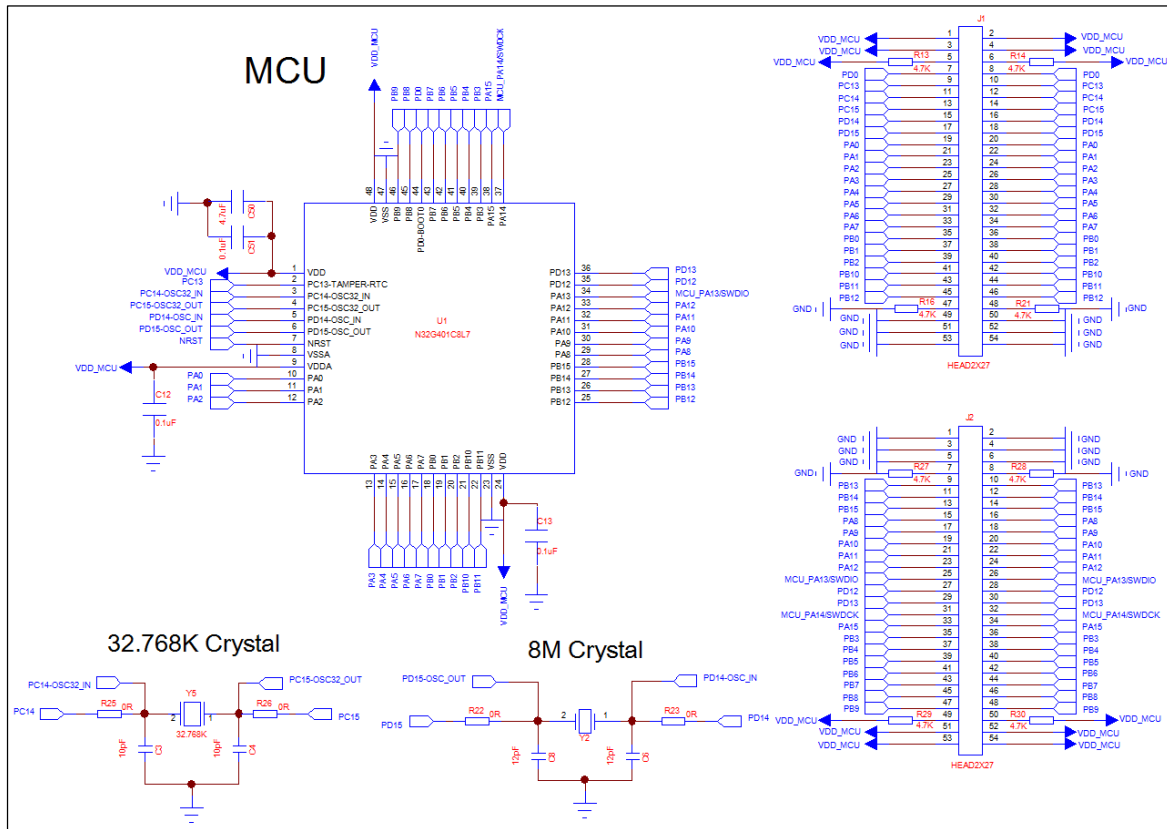


Figure 1-3 MCU connection diagram

## 2) Power supply design

Refer to Figure 1-4 for the schematic diagram of power supply design. PCB supplies 5V power through USB (J4) and 3.3V voltage through LDO to supply power to the whole PCB board.

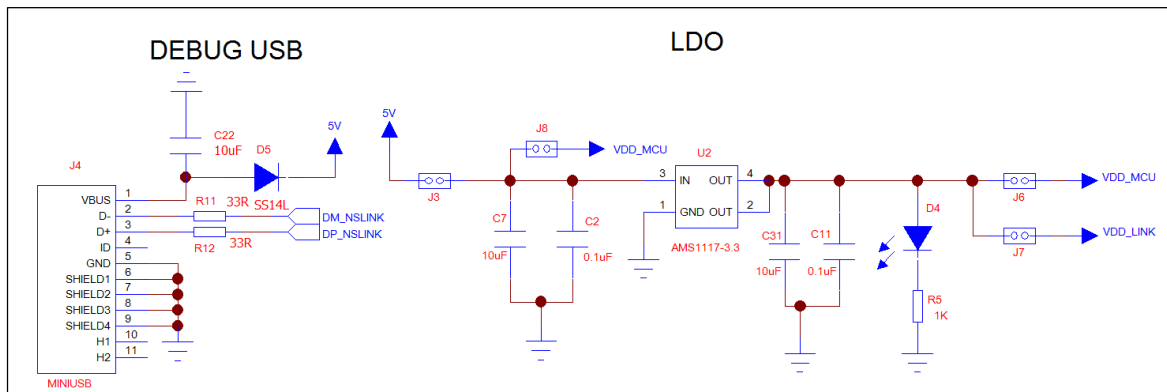


Figure 1-4 Power supply design

## 3) The key design

Refer to Figure 1-5 for the schematic diagram of button design. There are five buttons in total, namely MCU reset button, wake up button and three universal buttons.



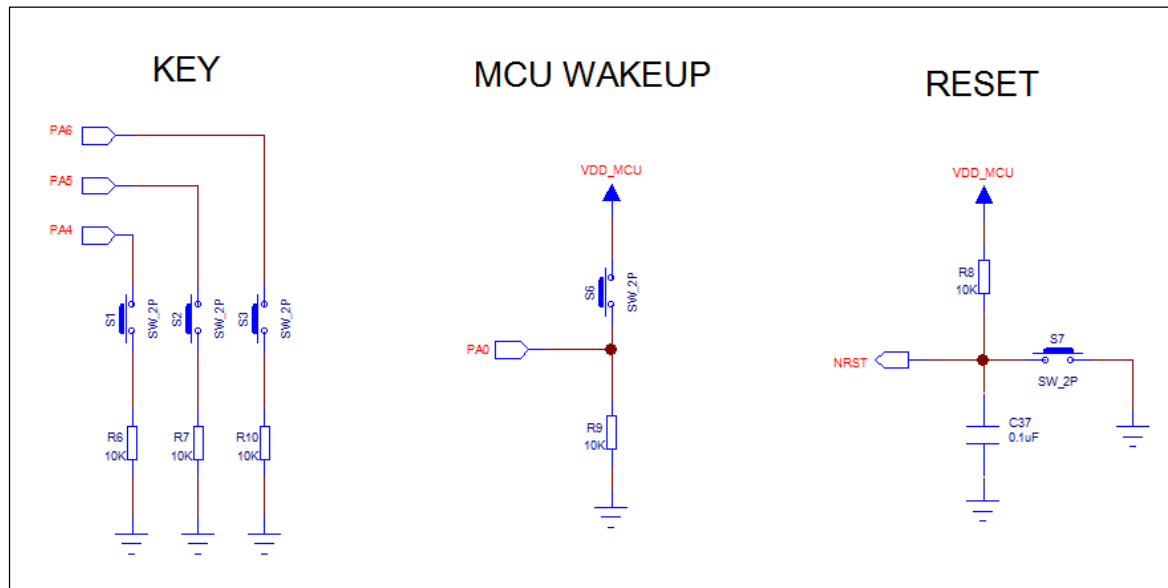


Figure 1-5 Key design

#### 4) LED lighting design

Refer to Figure 1-6 for the principle diagram of LED lamp design. There are 5 LED lamps in total. D1, D2 and D3 are connected to PA1, PA7 and PA9 of 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.

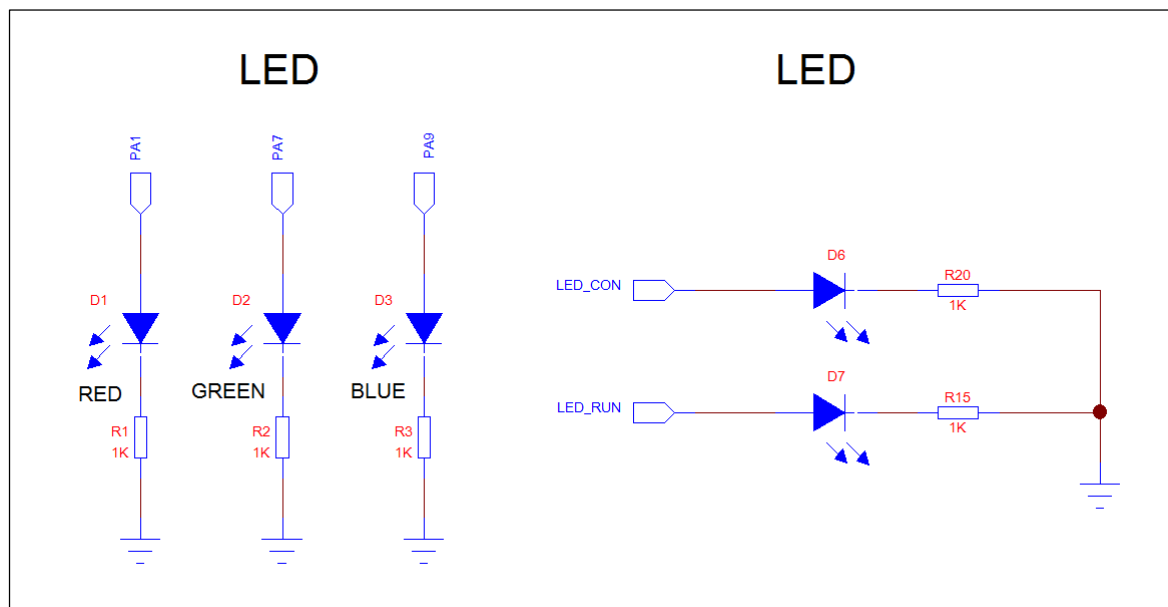


Figure 1-6 LED lamp design

#### 5) crystal

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

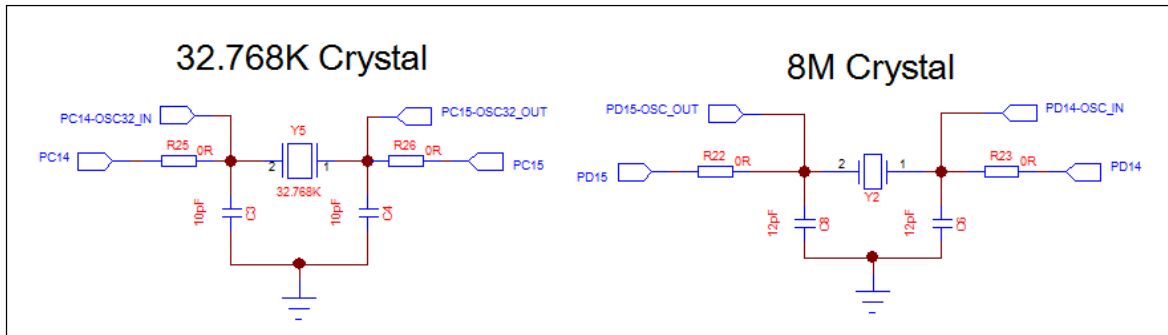


Figure 1-1 crystal design

## 6) NS-LINK

See Figure 1-8 for the NS-Link schematic diagram. Users can download programs by directly connecting the USB cable through the DEBUG USB port, without ULINK or JLINK burner. You can also use the DEBUG USB analog serial port to perform debugging.

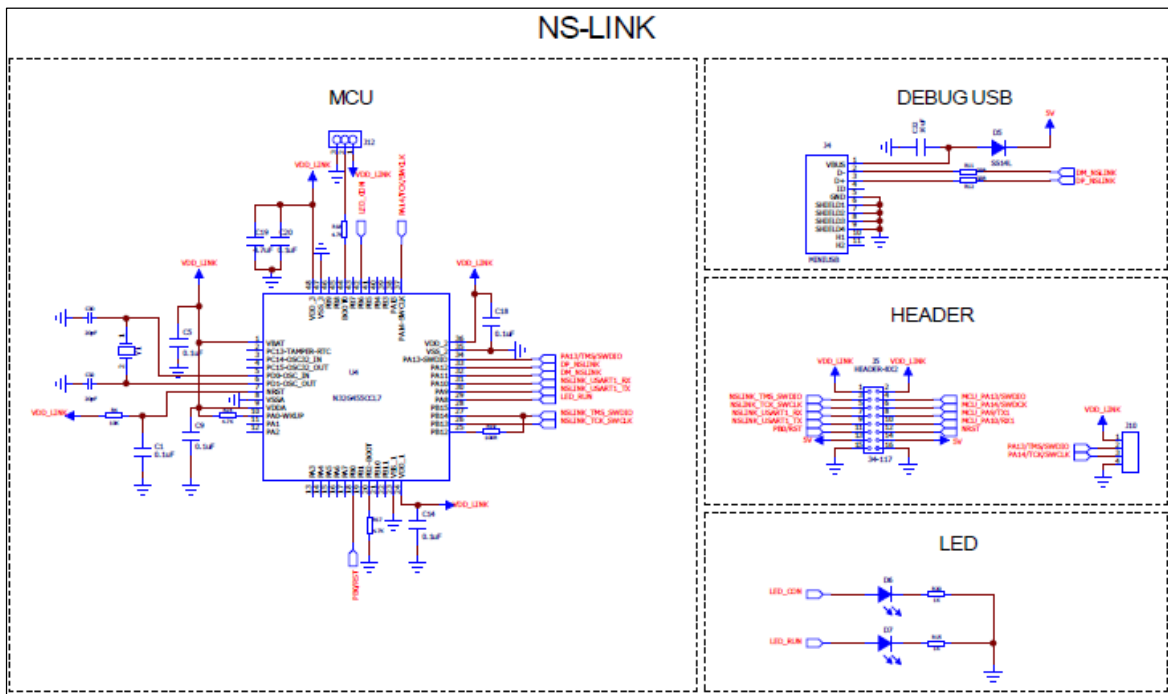


Figure 1-8 NS – LINK

### ● Description of peripheral devices:

- 1) When designing PCB LAYOUT, place two capacitors near VDD (PIN1), 4.7uF and 0.1uF respectively, and place 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 pin, and it can be omitted if there is no need

## 2 Version history

Version	Date	Remark
V1.0	2023-05-25	Create a document
V1.1.0	2025-9-17	1. Modify 1.3 chapter BOOT description 2. Modify the header and footer

### 3 Notice

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