

## User Guide

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# N32G030F6S7-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 N32G030F6S7-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 N32G030F6S7-STB development board is used for sample development of 32-bit N32G030F6S7 series chips of Nations Technology Co., Ltd. This document describes the functions, usage instructions and precautions of the N32G030F6S7-STB development board in detail.

## **1.2 Development board function**

The main MCU chip of the development board is N32G030F6S7, and it is packaged with TSSOP20 pins. The development board connects all functional interfaces to facilitate customer development.

### 1.3 Development board layout

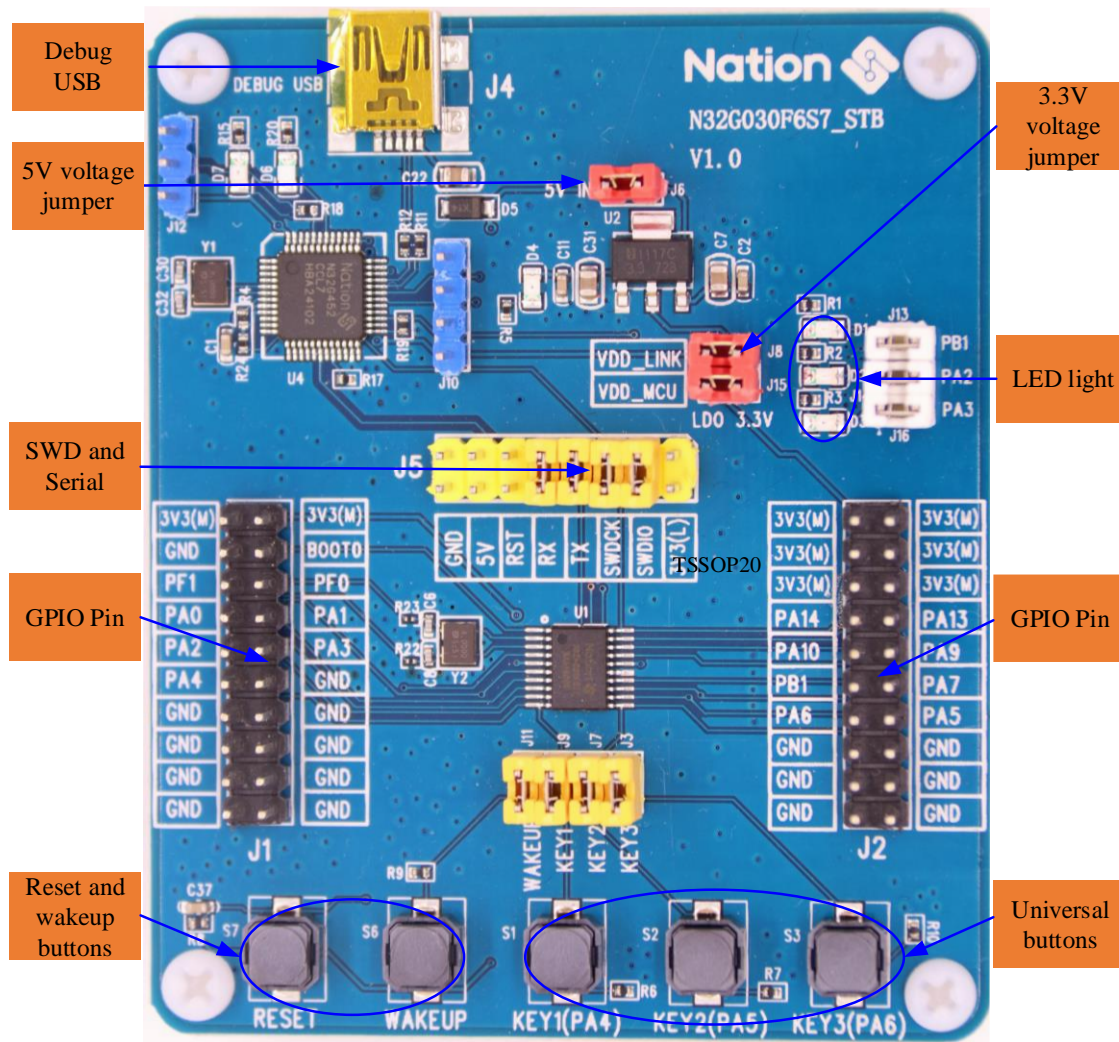


Figure 1-1 Development board layout

#### 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 J6 jumper.

#### 2) Debug USB(J4)

Through the DEBUG USB interface of NS-LINK chip (U4), it can provide MCU program download debugging function, or connect the serial port of MCU to provide USB serial port function.

### **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 PA9 (TX) and PA10 (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 NRST pin and PA0-WKUP 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 PA4, PA5 and PA6 of the chip respectively.

### **6) BOOT (J1 PIN4)**

J1 PIN4 is BOOT0 pin, which can be shorted to power and ground through jumper caps as needed.

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

The GPIO interface of the chip is all led out, and the 3.3V voltage and GND pins are also reserved on the pins, which is convenient for testing. For the specific definition of the interface, please refer to "DS\_N32G030 Series Datasheet".

## 1.4 Development Board Jumper Instructions

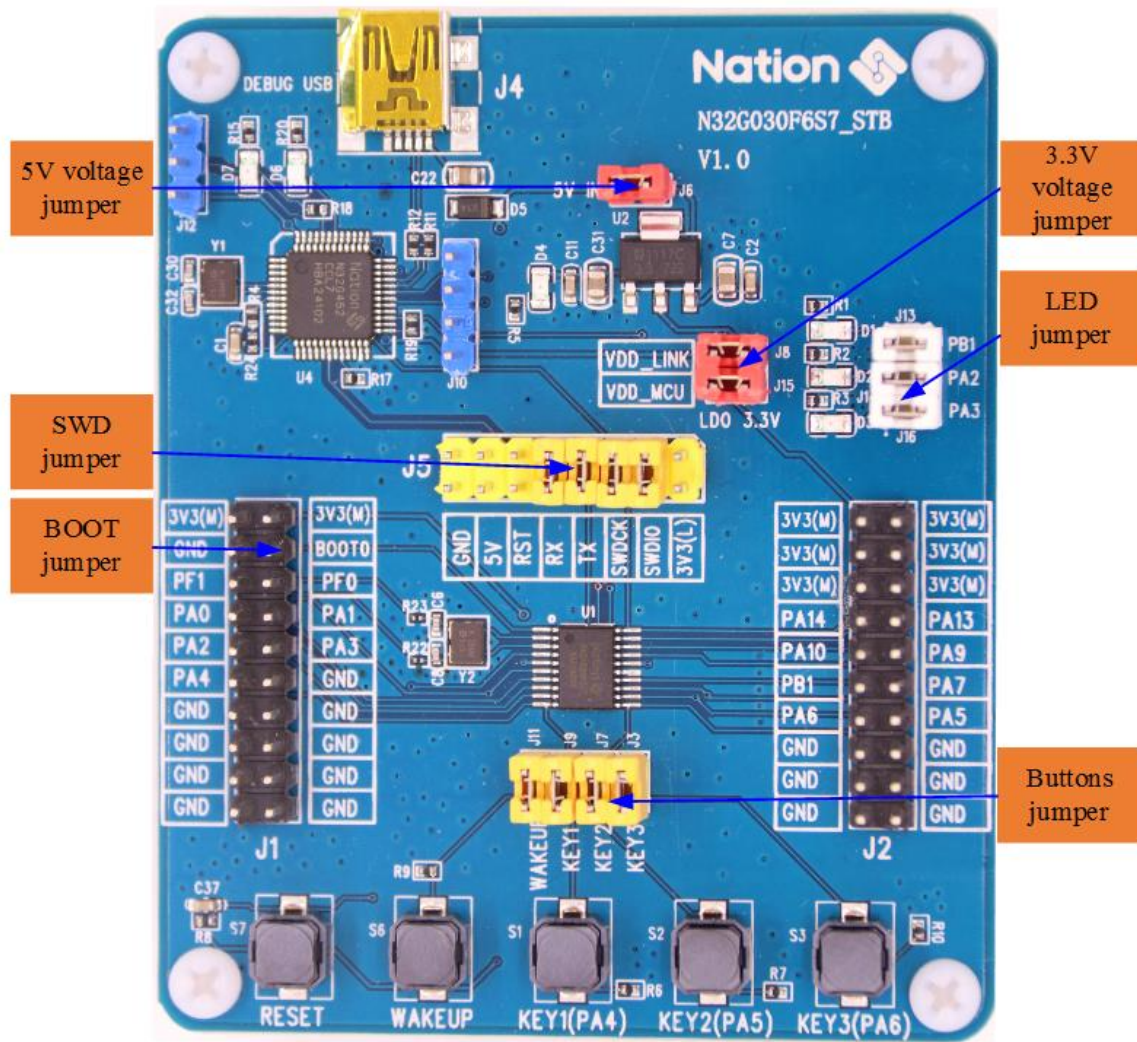


Figure 1-2 Development Board Jumper Description



Table 1-1 Development Board Jumper Description List

| No. | Jumper bit number | Jumper function          | Instructions for use  |
|-----|-------------------|--------------------------|---|
| 1   | 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.<br>J15: Power supply 3.3V 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   | J1 PIN4           | BOOT jumper              | J1 PIN4: BOOT0.   |
| 5   | J13、J14、J16       | LED light jumper         | LED light jumper to disconnect GPIO from LED<br>J13: D1(PB1)<br>J14: D2(PB6)<br>J16: D3(PB7)  |
| 6   | J3、J7、J9、J11      | button jumper            | Button jumper to disconnect the GPIO from the button<br>J9: KEY1(PA4)<br>J7: KEY2 (PA5)<br>J3: KEY3(PA6)<br>J11: WAKEUP(PA0)                        |

## 1.5 Development board schematic

The schematic diagram of the N32G030F6S7-STB development board is described as follows (For details, please refer to "N32G030F6S7-STB\_V1.0").

### 1) MCU connection

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

The schematic diagram illustrates the internal components and connections of the NS2G030F6S7 microcontroller (MCU). The MCU is shown with its pinout and internal connections to various components.

**MCU Pinout and Connections:**

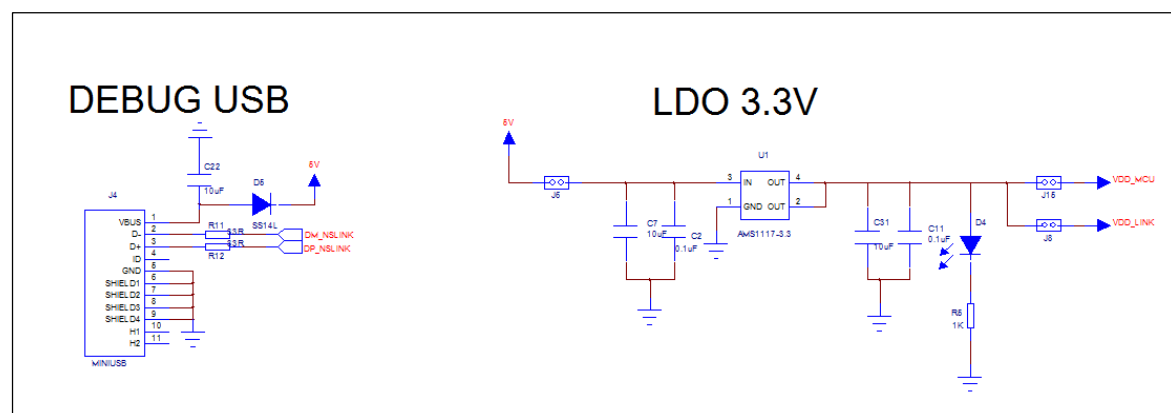
- Pin 1:** BOOT0
- Pin 2:** PF0-OSC\_IN
- Pin 3:** PF1-OSC\_OUT
- Pin 4:** NRST
- Pin 5:** VDDA
- Pin 6:** PA0
- Pin 7:** PA1
- Pin 8:** PA2
- Pin 9:** PA3
- Pin 10:** PA4
- Pin 11:** PA6
- Pin 12:** PA7
- Pin 13:** PB1
- Pin 14:** VSS
- Pin 15:** VDD
- Pin 16:** PA9
- Pin 17:** PA10
- Pin 18:** PA13
- Pin 19:** PA14
- Pin 20:** PA14

**Internal Connections and Components:**

- Power Supply:** VDDA is connected to VDD. VDD is connected to VSS. VSS is connected to ground.
- Capacitors:** C5 (12pF) and C8 (12pF) are connected to the oscillator pins (PF0-OSC\_IN and PF1-OSC\_OUT). C3 (4.7uF) and C62 (0.1uF) are connected to the VDDA pin. C53 (0.1uF) and C4 (4.7uF) are connected to the VDD pin.
- Resistors:** R23 (0R) and R22 (0R) are connected to the oscillator pins (PF0-OSC\_IN and PF1-OSC\_OUT).
- Headers:** J1 and J2 are 20-pin headers. J1 is connected to VDDA, VDD, VSS, PA0, PA1, PA2, PA3, PA4, PA6, PA7, PA9, PA10, PA13, PA14, and NRST. J2 is connected to VDDA, VDD, VSS, PA0, PA1, PA2, PA3, PA4, PA6, PA7, PA9, PA10, PA13, PA14, and NRST.

Figure 1-3 MCU connection diagram

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.

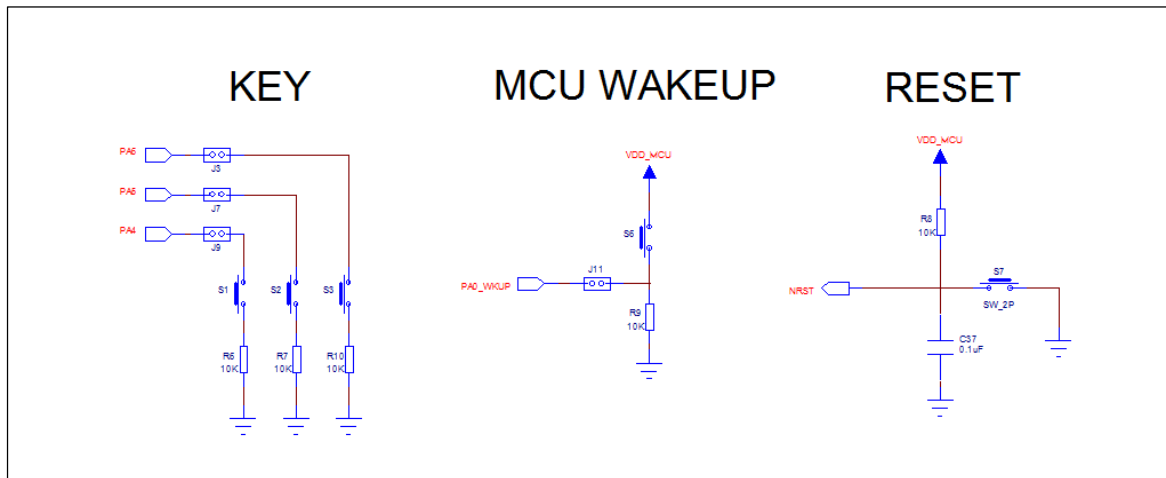


Figure 1-5 Button Design

### 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 PB1, PA2 and PA3 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.

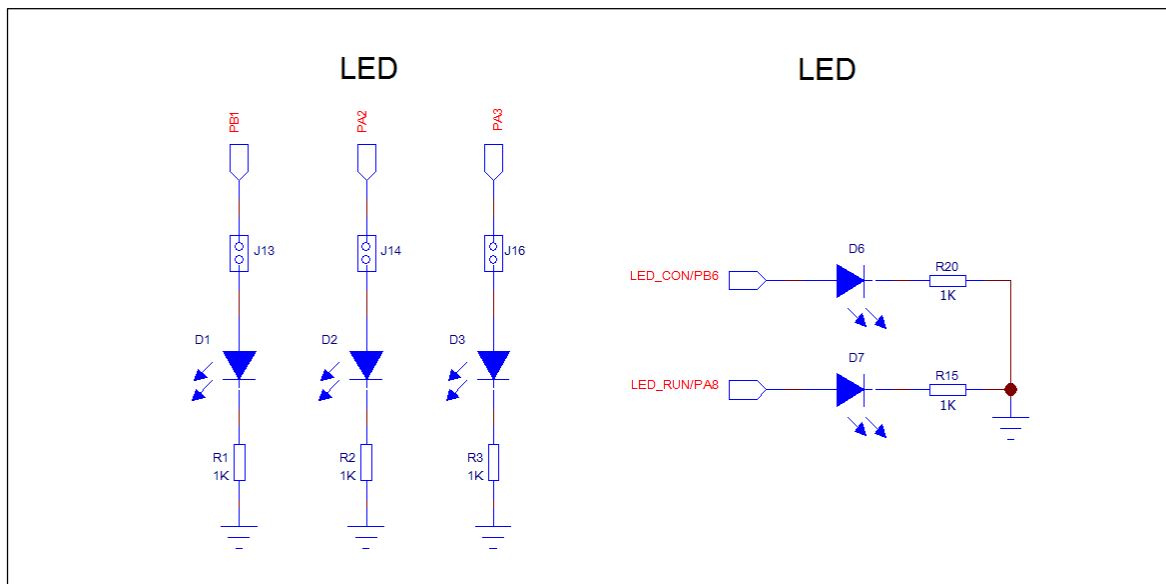


Figure 1-6 LED Light Design

## 5) crystal

Refer to Figure 1-7 for the crystal connection diagram. The chip has external 8MHz crystals.

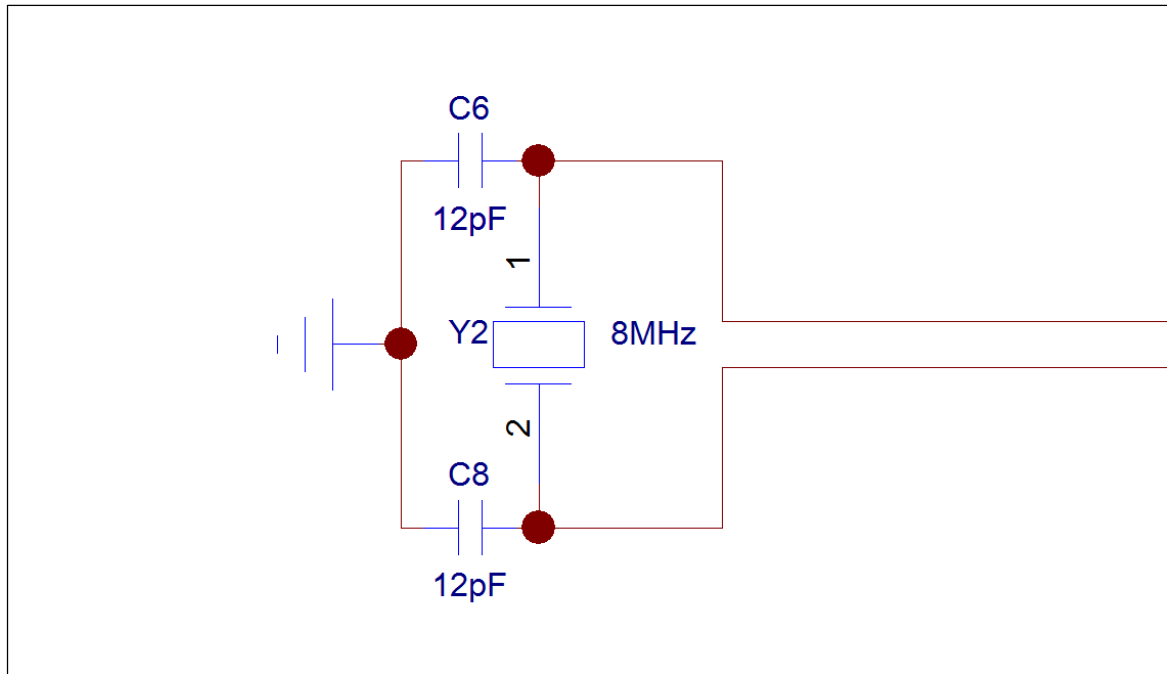


Figure 1-7 crystal design

## 6) 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, omitting the ULINK or JLINK writer. You can also debug through the DEBUG USB analog serial port.

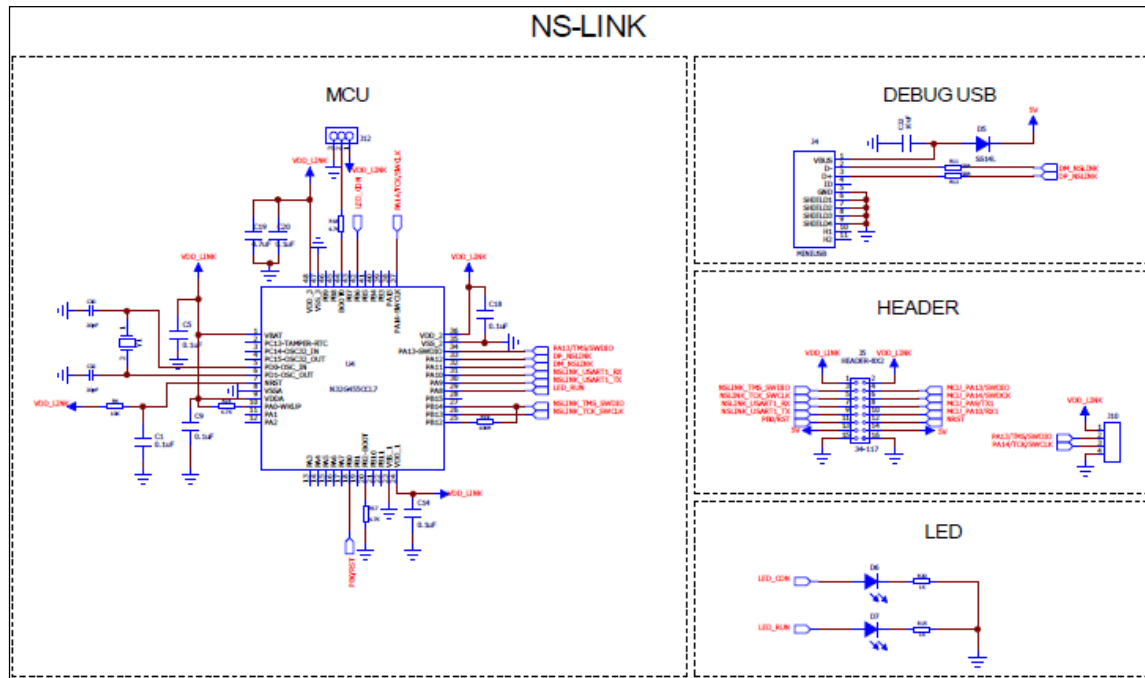


Figure 1-8 NS-LINK

● Description of peripheral devices:

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

## 2 Version history

| Version | Date       | Modify             |
|---------|------------|--------------------|
| V1.0    | 2020-07-25 | 1. Initial version |
|         |            |                    |
|         |            |                    |

### 3 Notice

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