N32G031K8Q7-1-STB Development Board Hardware User Guide

Introduction

The purpose of this document is to allow users to quickly familiarize themselves with the N32G031K8Q7-1-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.
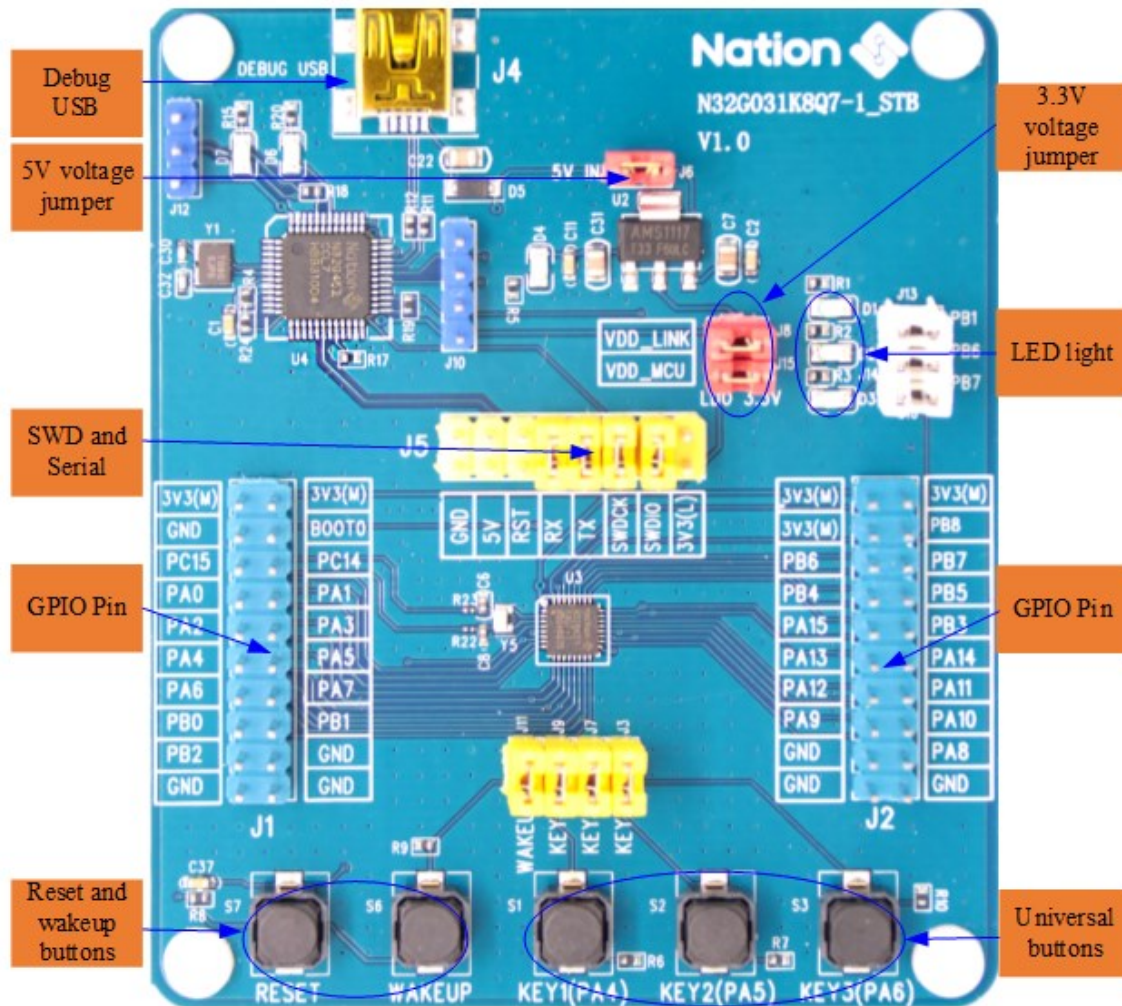
1 Hardware Development Instructions

1.1 Brief

The N32G031K8Q7-1-STB development board is used for sample development of 32-bit N32G031K8Q7-1series chips of Nsing Technology Co., Ltd. This document describes the functions, usage instructions and precautions of the N32G031K8Q7-1-STB development board in detail.

1.2 Development Board Function

The part number of the main MCU chip in the development board is N32G031K8Q7-1, 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)**

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

conversion function.

- **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 PIN4)**

J1 PIN4 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_N32G031 Series Datasheet".

1.4 Development Board Jumper Usage Instructions
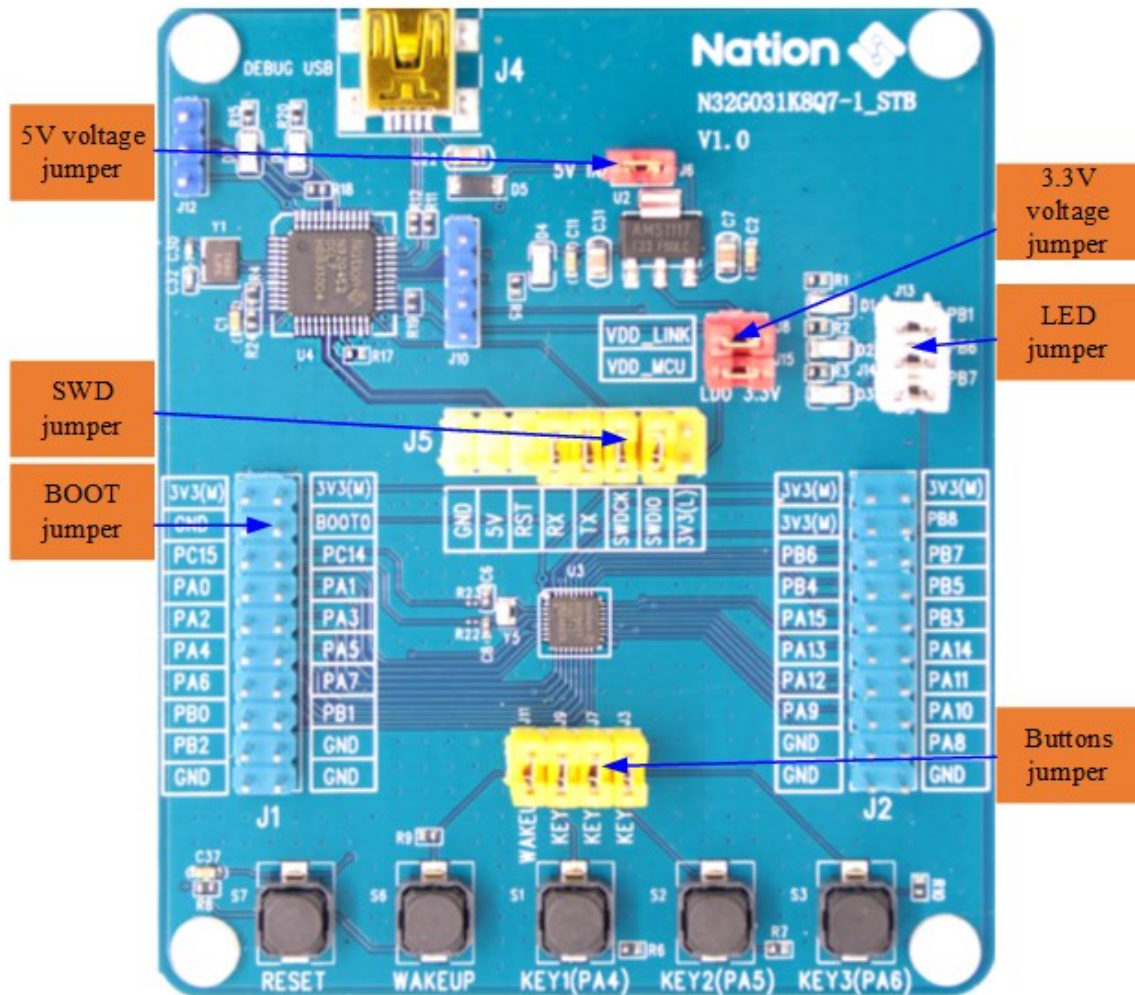
Figure 1-2 Development Board Jumper Usage Description

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

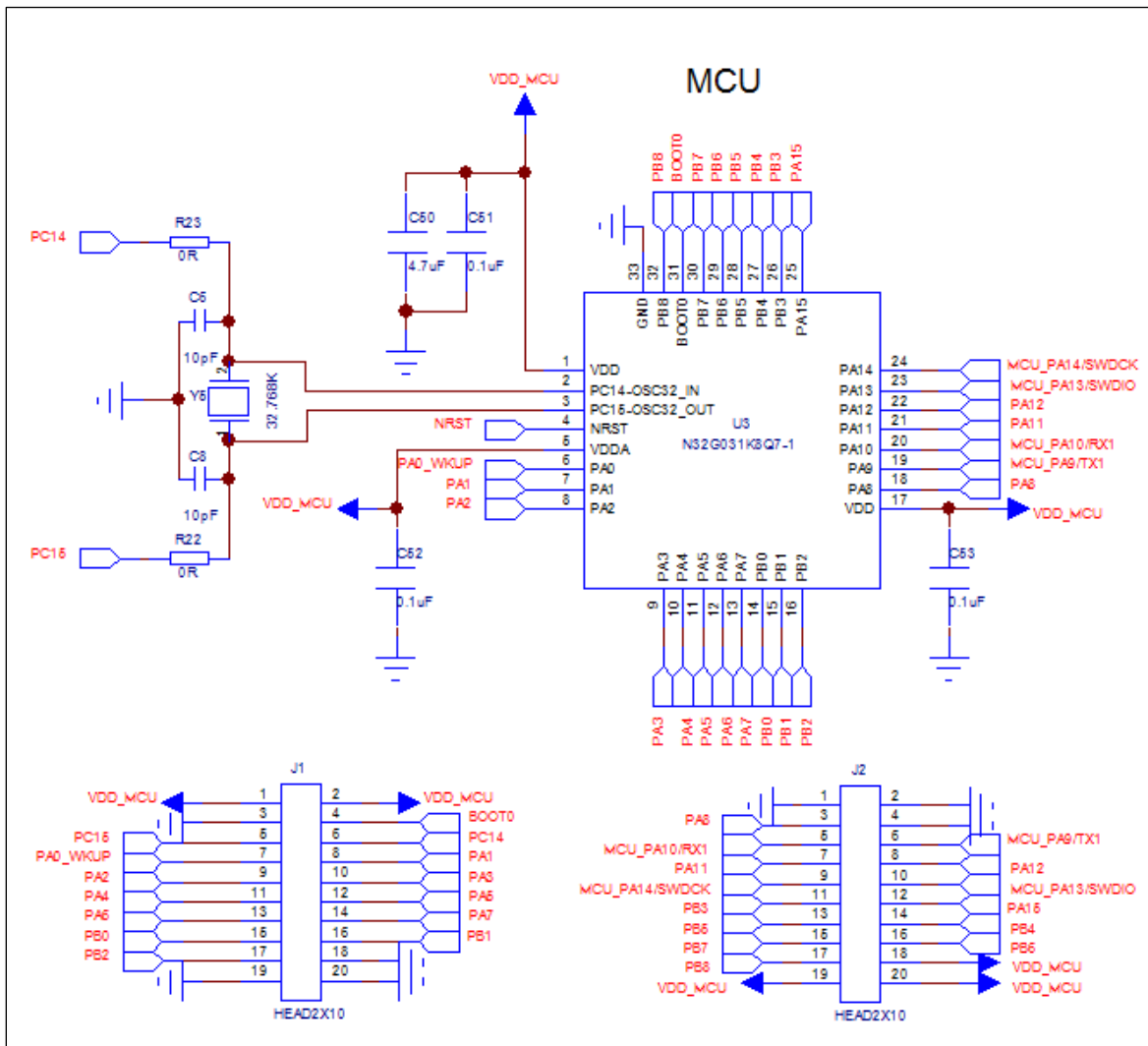|			
			DEBUG port, you need to short the SWDIO signal pin and the SWDCK signal pin.
	J5	Serial jumper	When using NS-LINK as a serial port through the USB DEBUG port, you need to short the MCU_TX signal pin and the MCU_RX signal pin.
4	J1 PIN4	BOOT jumper	J1 PIN4：BOOT0.
5	J13、J14、J16	LED light jumper	The LED light jumper can break the connection between GPIO and LED J13：D1(PB1) J14：D2(PB6) J16：D3(PB7)
6	J3、J7、J9、J11	button jumper	The button jumper can break the connection between GPIO and the button J9：KEY1(PA4) J7：KEY2 (PA5) J3：KEY3(PA6) J11：WAKEUP(PA0)

1.5 Development Board Schematic

The schematic diagram of the N32G031K8Q7-1-STB development board is described as follows (For details, please refer to"N32G031K8Q7-1-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.
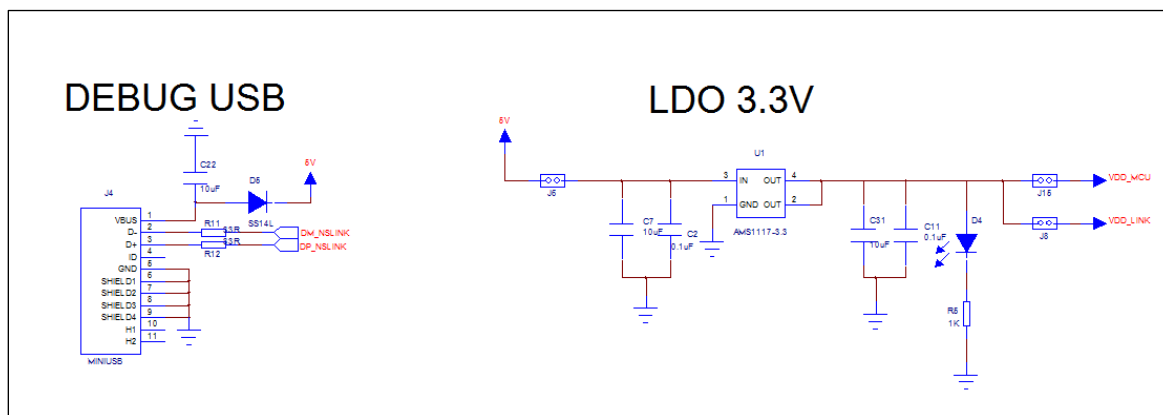
Figure 1-3   MCU Connection Diagram

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.
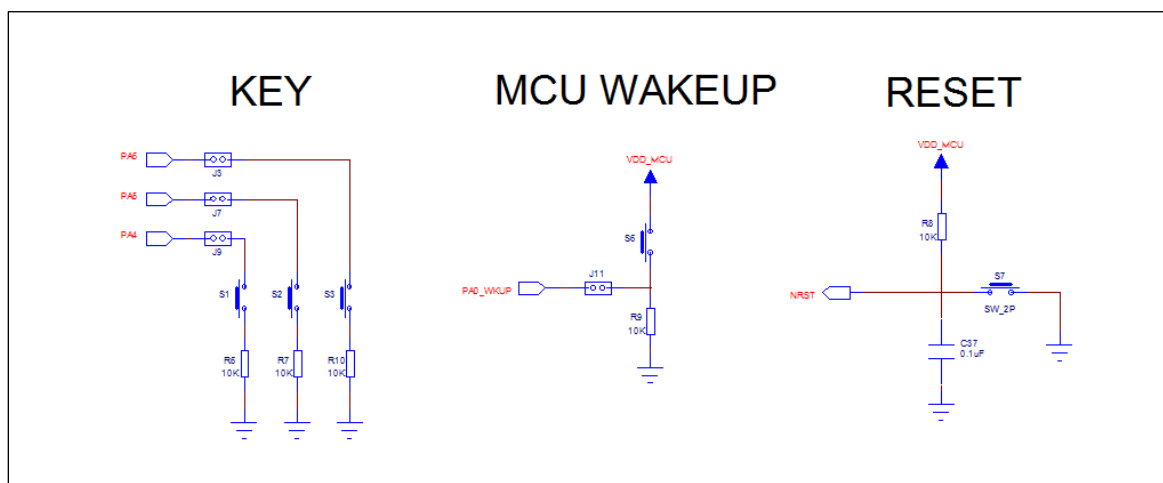
Figure 1-4 Power Design

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.
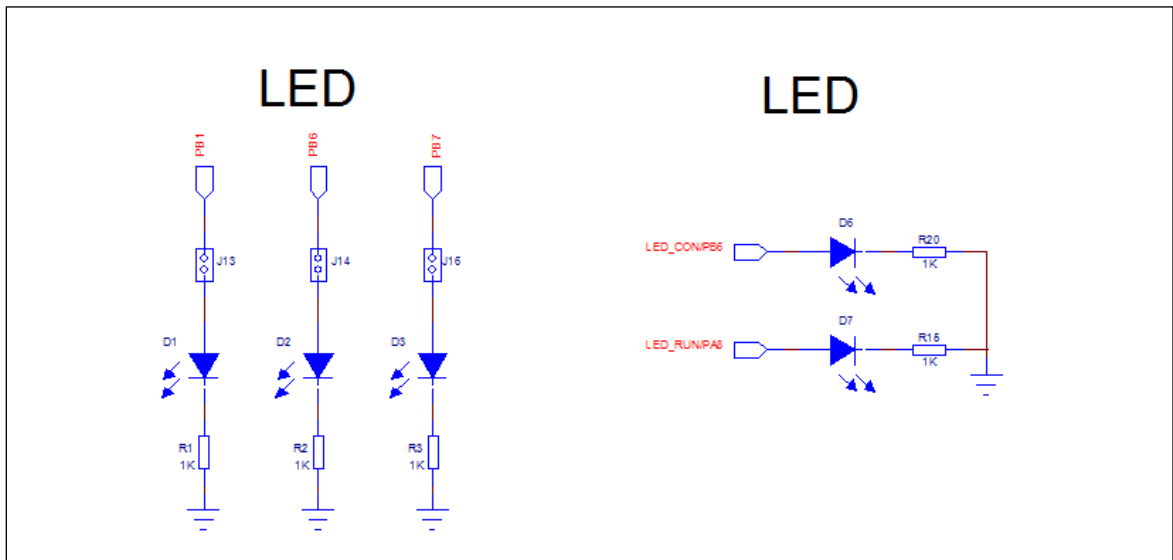
Figure 1-5 Button Design

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.
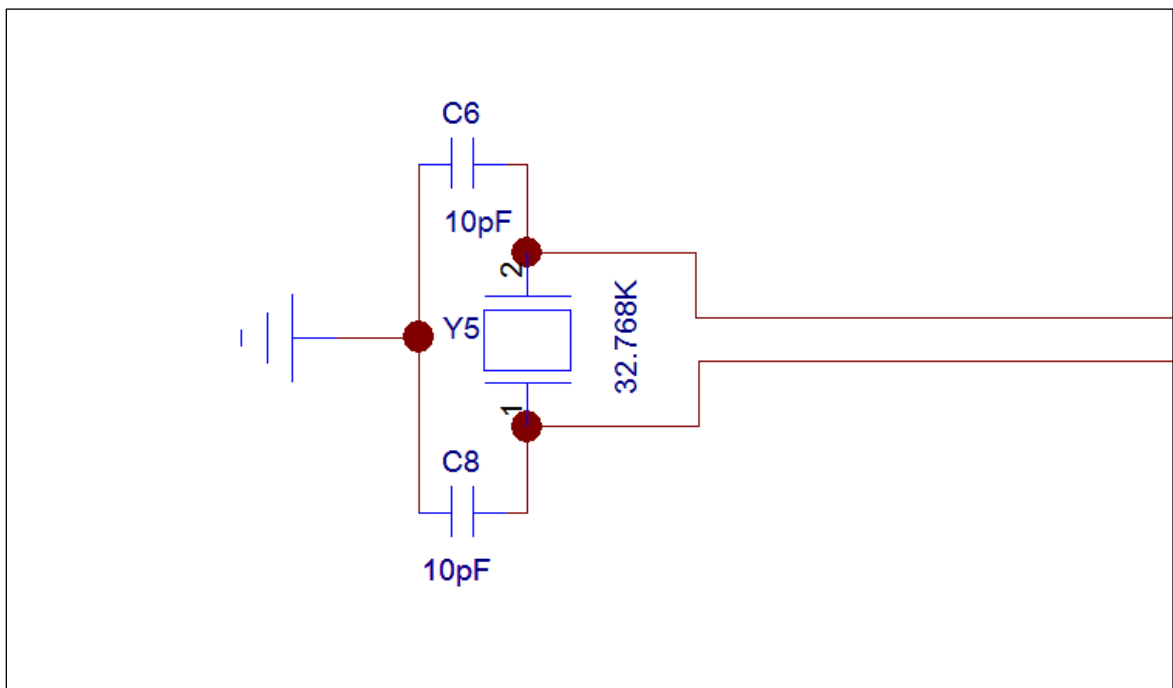
Figure 1-6 LED Light Design

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Crystal

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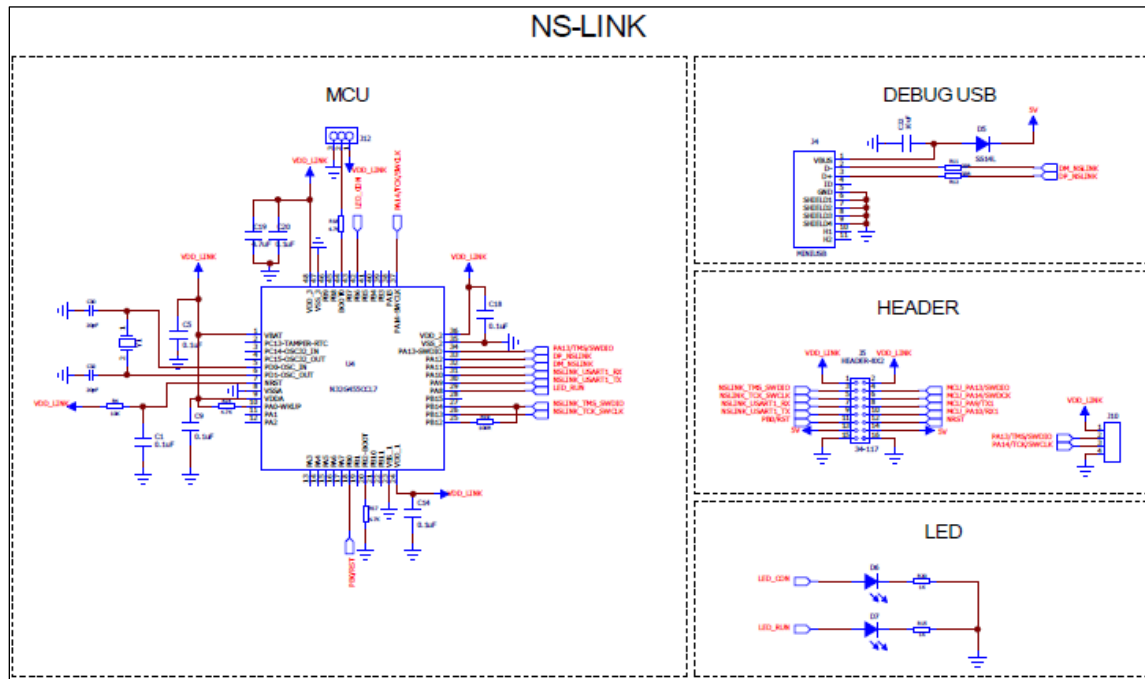
Figure 1-7 Crystal Design

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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 a 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 (PIN1), 4.7uF and 0.1uF respectively, and put 0.1uF capacitors near the other VDD pins.

2 Version History

Version	Date	Changes
V1.0	2020.07.25	Initial version

3 Disclaimer

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