User Guide

N32G45XVL-STB Development Board Hardware Usage Guide

Introduction

The purpose of this document is to allow users to quickly familiarize themselves with the N32G45XVL-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.

CONTENS

1 HARDWARE DEVELOPMENT INSTRUCTIONS 1

1.1 Briefly 1
1.2 Development board function 1
1.3 Development board layout 2
1.4 Development Board Jumper Instructions 4
1.5 Development board schematic 5

2 VERSION HISTORY 11

3 NOTICE 12

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

1 Hardware Development Instructions

1.1 Briefly

The N32G45XVL-STB development board is used for sample development of 32-bit N32G45XVL series chips of Nations Technology Co., Ltd. This document describes the functions, usage instructions and precautions of the N32G45XVL-STB development board in detail.

1.2 Development board function

The main MCU chip of the development board is N32G457VEL7, and it is packaged with LQFP100 pins. The development board connects all functional interfaces to facilitate customer development.

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

1.3 Development board layout

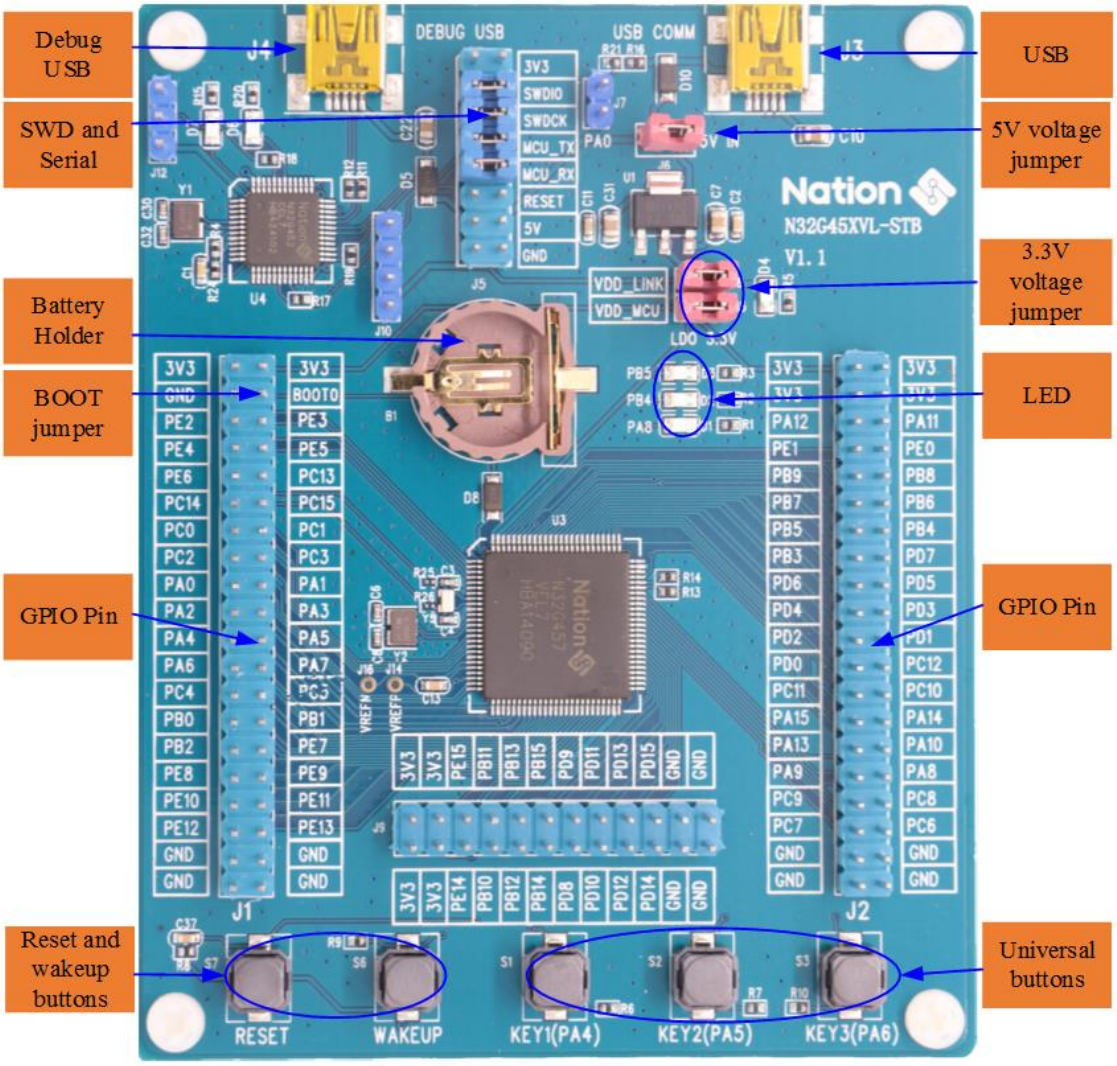

Figure 1-1 Development board layout

1) Power supply for the development board

The development board can be powered by USB COMM interface (J3) and DEBUG USB (J4), and connected to 3.3V LDO input port through J6 jumper.

2) USB interface (J3)

The Mini USB interface (J3) is used to connect the DP and DM signals of the main MCU (U3) for the

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

USB interface communication of the main MCU.Debug USB（J4）.

3) Debug USB（J4）

Through DEBUG USB interface of NS-LINK chip, main MCU program can be downloaded and debug, and the serial port connected to MCU can be converted from USB to serial port.

4) 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.

5) 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.

6) 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.

7) BOOT (J1 PIN4)

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

8) GPIO口（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

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

"UM_N32G45x Series User Manual V1.0".

1.4 Development Board Jumper Instructions

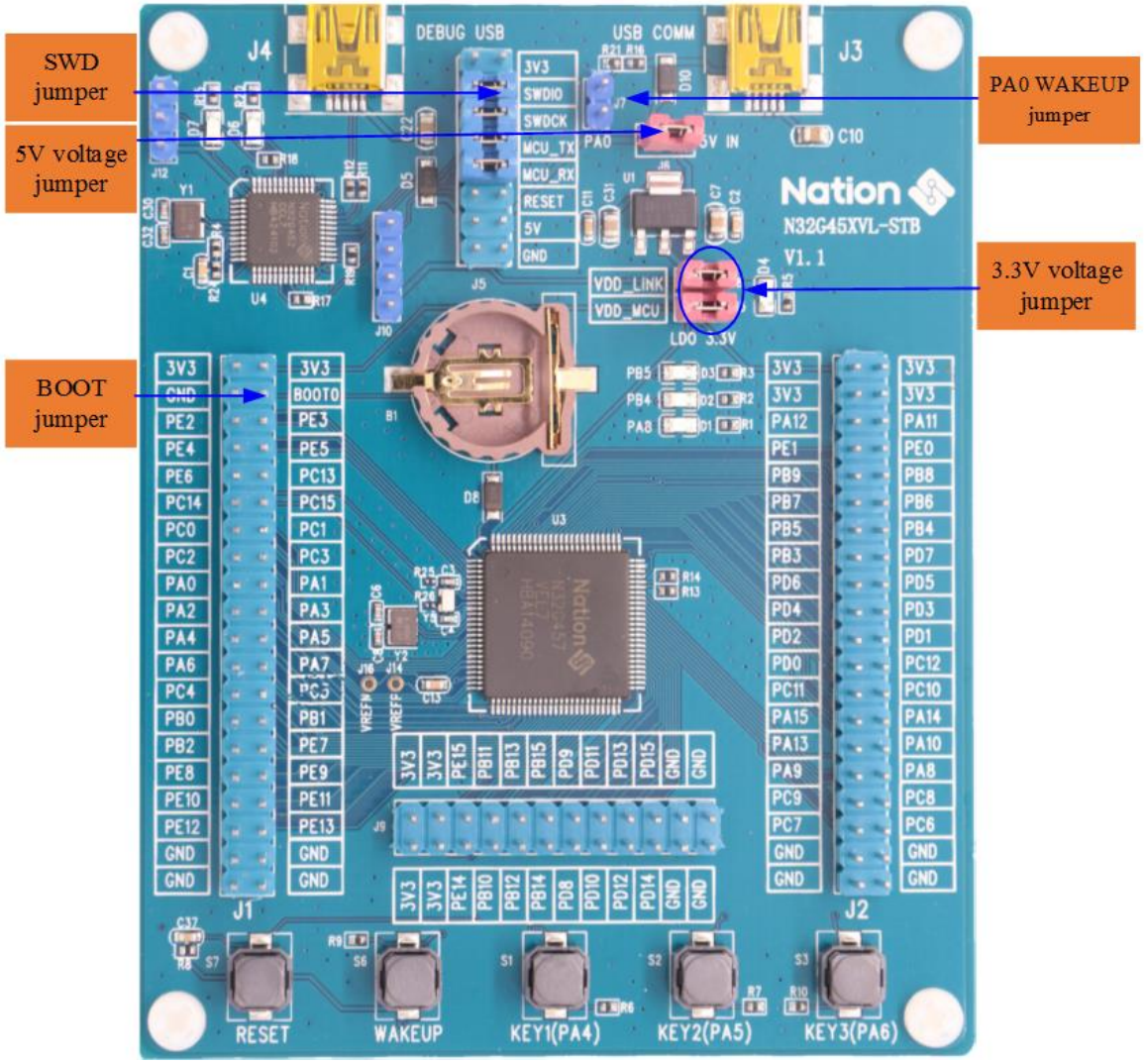

Figure 1-2 Development Board Jumper Description

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

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 two USB ports J3 and 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	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	J7	PA0 WAKEUP jumper	J7: Short this jumper, when the USB interface is inserted, wake up the MCU through PA0 (set the PA0 bit as the WKUP signal).

1.5 Development board schematic

The schematic diagram of the N32G45XVL-STB development board is described as follows (For details, please refer to"N32G45XVL-STB_V1.1").

1) 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.

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

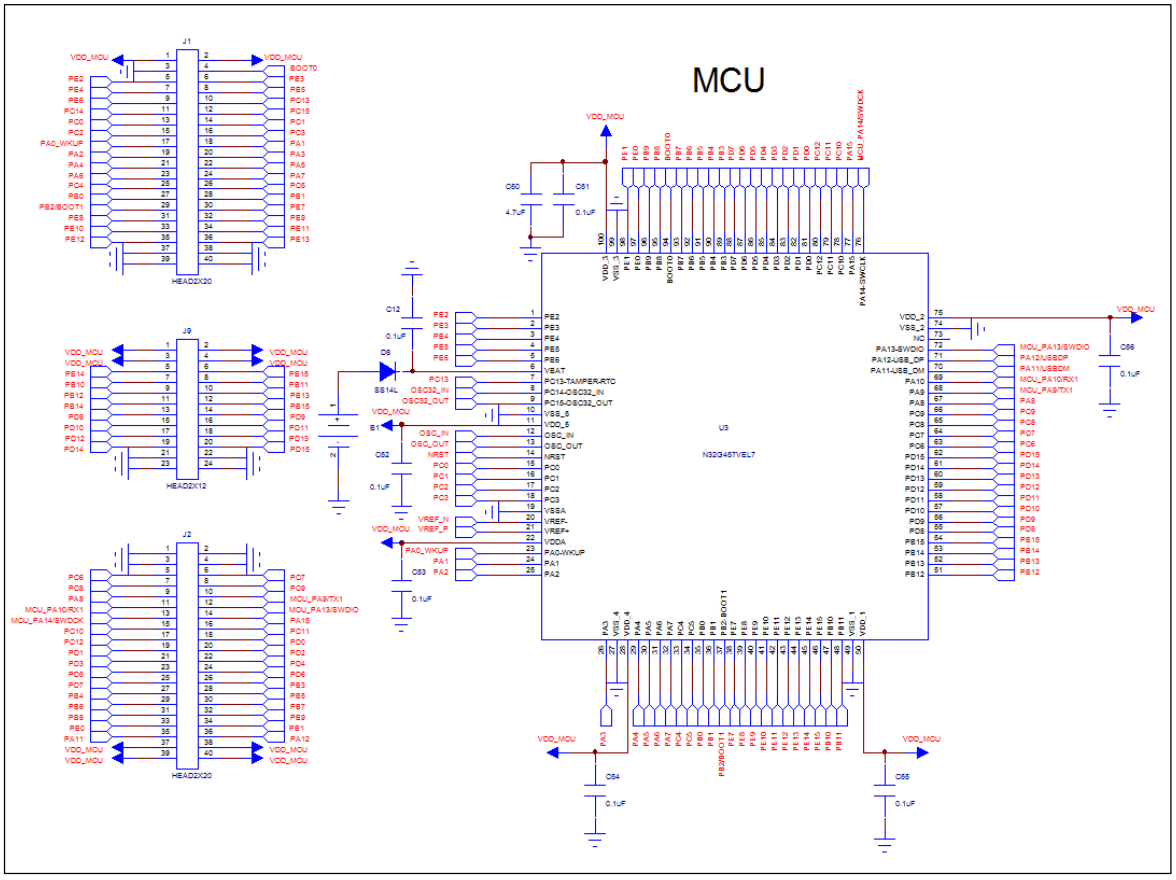

Figure 1-3 MCU connection diagram

2) 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.

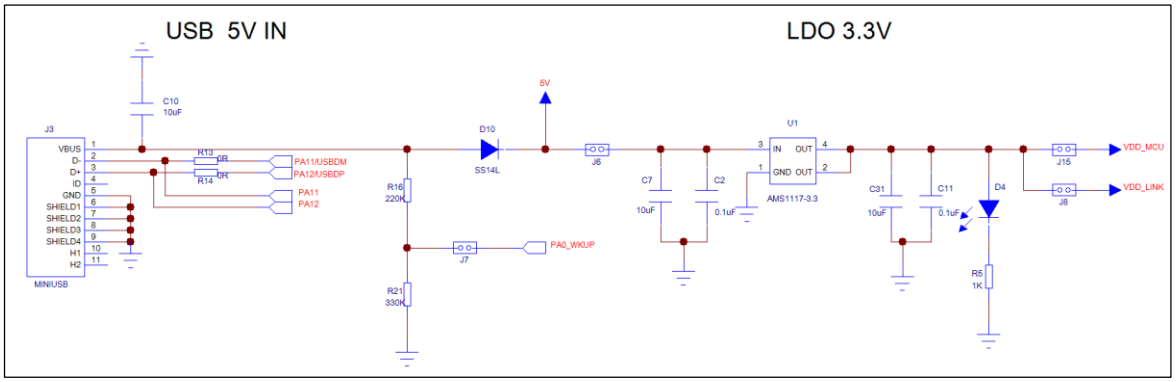

Figure 1-4 Power Design

3) Button design

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North. Nanshan District, Shenzhen, 518057, P.R.China

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.

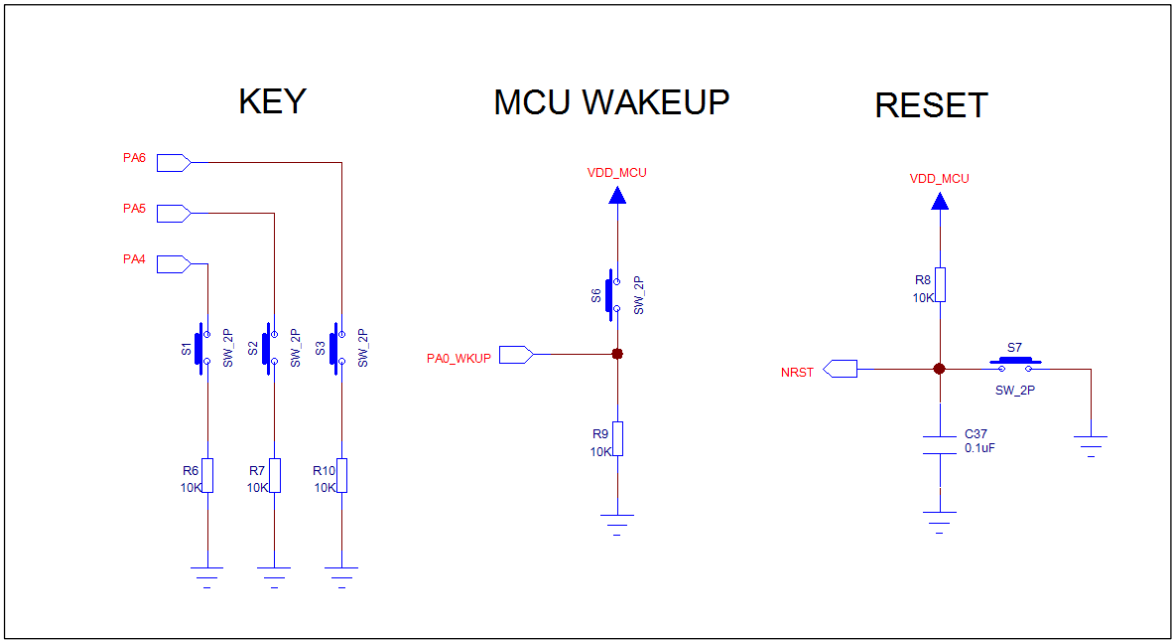

Figure 1-5 Button Design

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 PA8, PB4 and PB5 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.

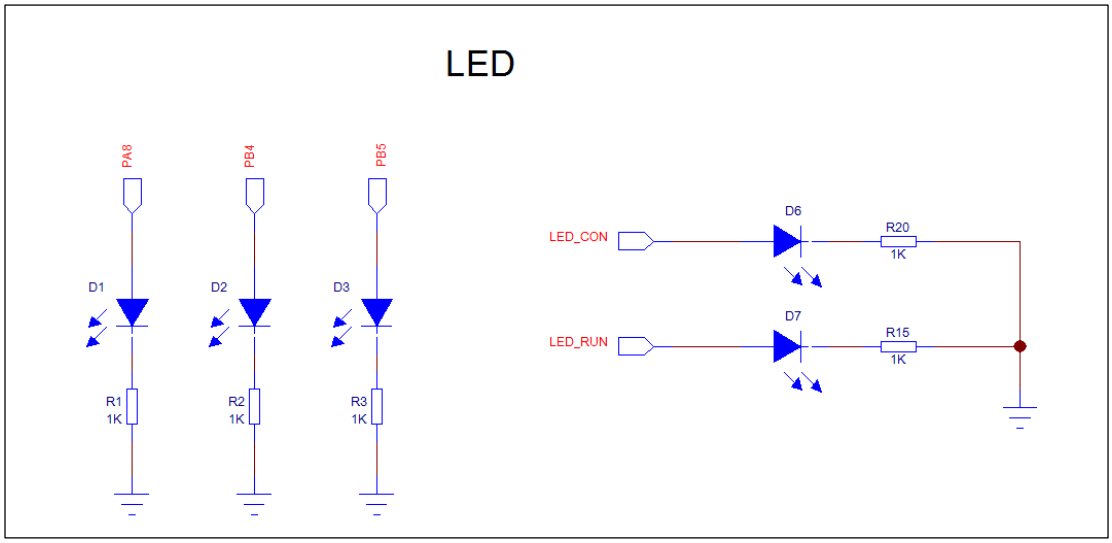

Figure 1-6 LED Light Design

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

5) Crystal

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

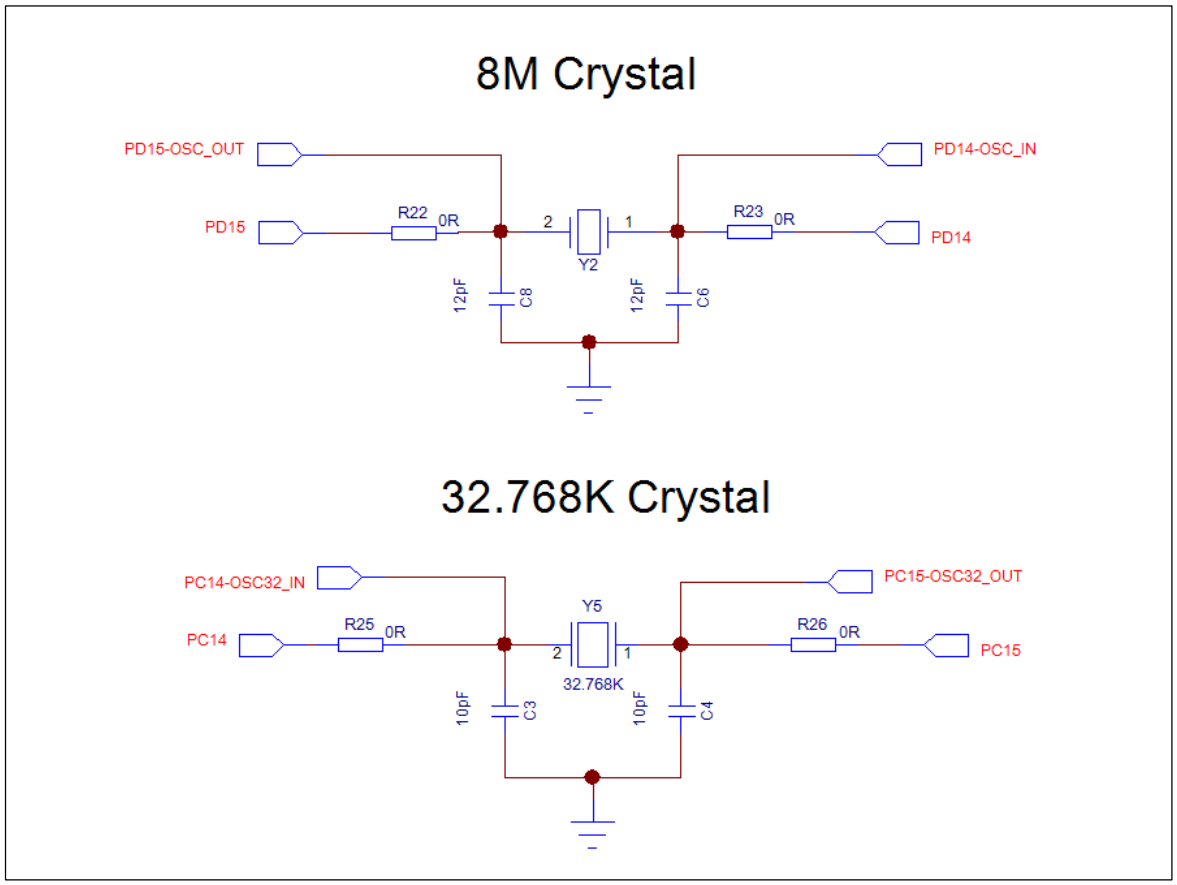

Figure 1-7 crystal design

6) BAT

Refer to Figure 1-8 for the external schematic diagram of the BAT battery, which can supply power to the VBAT pin through the external battery holder on the PCB board and an external CR1220 battery

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

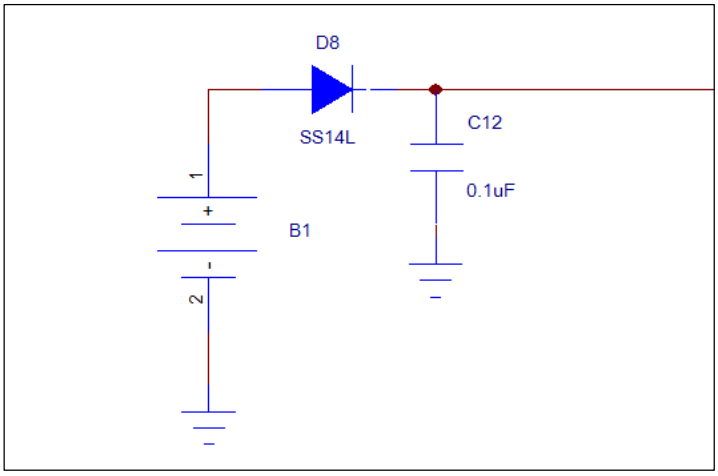

Figure 1-8 BAT

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

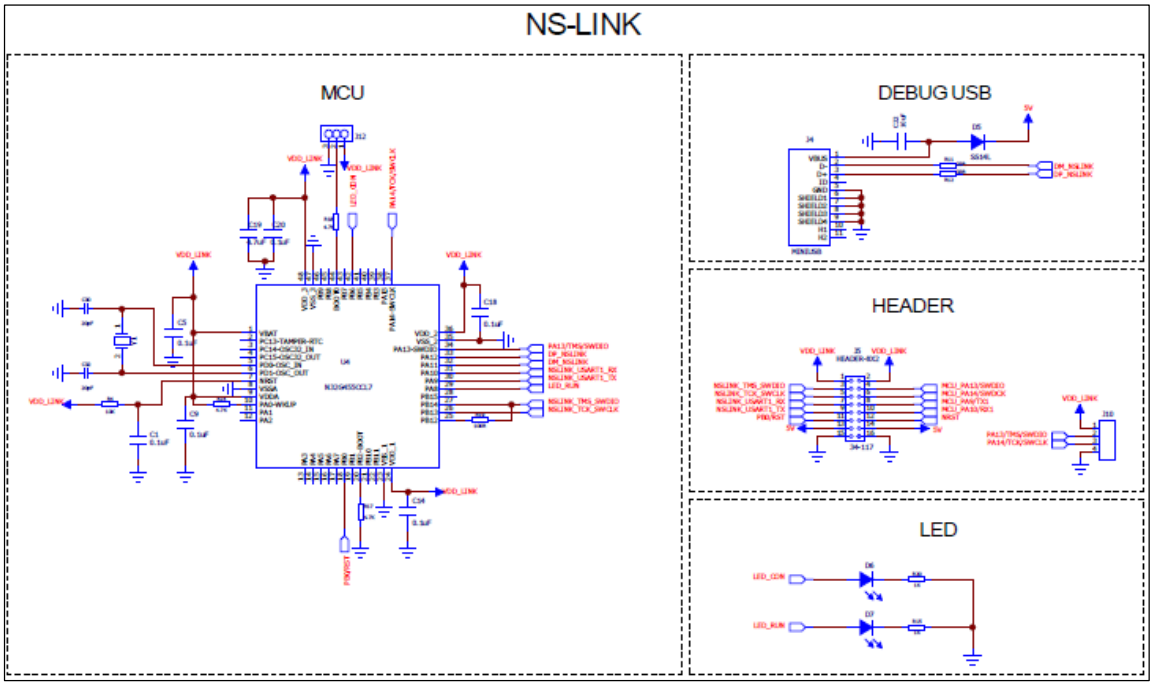

Figure 1-9 NS-LINK

- **Description of peripheral devices:**

1) When designing PCB LAYOUT, put two capacitors near VDD (PIN100), 4.7uF and 0.1uF

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

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 pin, and it can be omitted if there is no need.

3) DP, DM: 33Ω series resistance, placed close to the pins

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

2 Version history

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

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China

3 Notice

This document is the exclusive property of Nations Technologies Inc. (Hereinafter referred to as NATIONS). This document, and the product of NATIONS described herein (Hereinafter referred to as the Product) are owned by NATIONS under the laws and treaties of the People's Republic of China and other applicable jurisdictions worldwide.

NATIONS does not grant any license under its patents, copyrights, trademarks, or other intellectual property rights. Names and brands of third party may be mentioned or referred thereto (if any) for identification purposes only.

NATIONS reserves the right to make changes, corrections, enhancements, modifications, and improvements to this document at any time without notice. Please contact NATIONS and obtain the latest version of this document before placing orders.

Although NATIONS has attempted to provide accurate and reliable information, NATIONS assumes no responsibility for the accuracy and reliability of this document.

It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. In no event shall NATIONS be liable for any direct, indirect, incidental, special, exemplary, or consequential damages arising in any way out of the use of this document or the Product.

NATIONS Products are neither intended nor warranted for usage in systems or equipment, any malfunction or failure of which may cause loss of human life, bodily injury or severe property damage. Such applications are deemed, "Insecure Usage".

Insecure usage includes, but is not limited to: equipment for surgical implementation, atomic energy control instruments, airplane or spaceship instruments, all types of safety devices, and other applications intended to support or sustain life.

All Insecure Usage shall be made at user's risk. User shall indemnify NATIONS and hold NATIONS harmless from and against all claims, costs, damages, and other liabilities, arising from or related to any customer's Insecure Usage.

Any express or implied warranty with regard to this document or the Product, including, but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement are disclaimed to the fullest extent permitted by law.

Unless otherwise explicitly permitted by NATIONS, anyone may not use, duplicate, modify, transcribe or otherwise distribute this document for any purposes, in whole or in part.

Nations Technologies Inc.
Tel：+86-755-86309900
Email：info@nationstech.com
Address: Nations Tower, #109 Baoshen Road, Hi-tech Park North.
Nanshan District, Shenzhen, 518057, P.R.China