

User Guide

N32G032F6S7_STB Development Board Hardware User Guide

Introduction

The purpose of this document is to allow users to quickly familiarize themselves with the N32G032F6S7_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	3
1.1	Brief	3
1.2	Development Board Function	3
1.3	Development Board Layout	3
1.4	Development Board Jumper Usage Instructions	5
1.5	Development board schematic	6
2	Version History	12
3	Disclaimer	13

1 Hardware Development Instructions

1.1 Brief

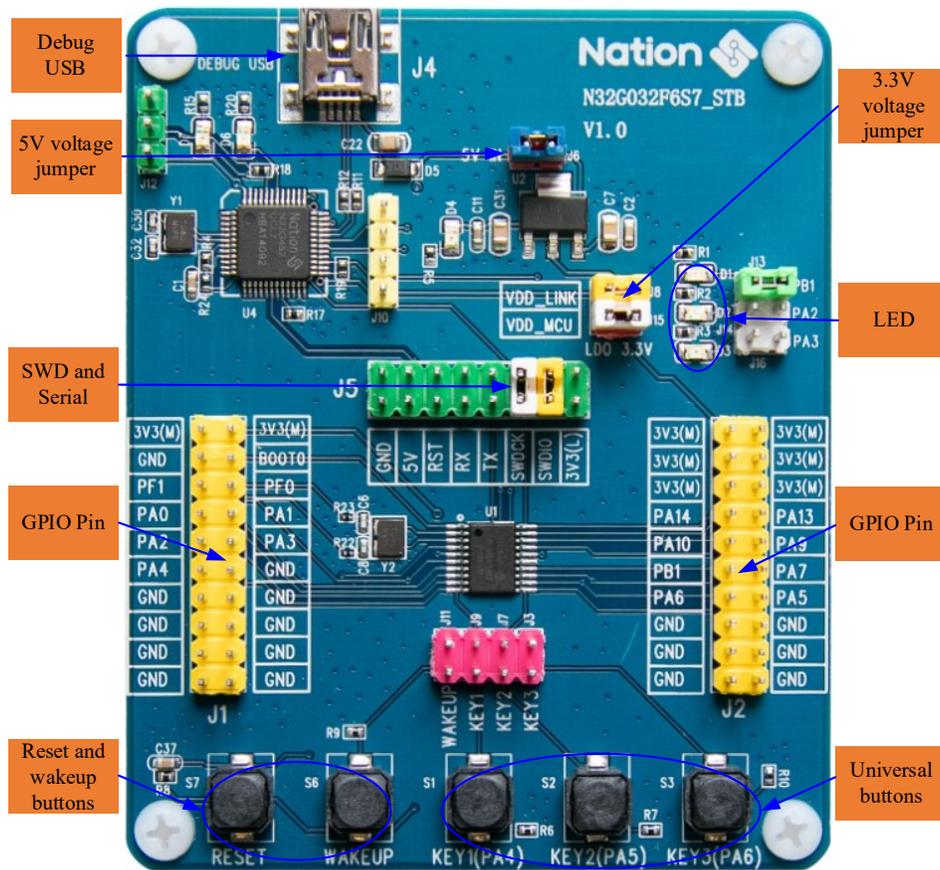
The N32G032F6S7_STB development board is used for sample development of the high-performance 32-bit N32G032F6S7 series chips of Nsing Technology Plt. Ltd. This document describes the functions, usage instructions and precautions of the N32G032F6S7_STB development board in detail.

1.2 Development Board Function

The part number of the main MCU chip of the development board is N32G032F6S7, 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



- **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)**

Through the DEBUG USB interface of NS-LINK chip, it can provide main MCU program download and debugging functions, and can also connect to the MCU's serial port to provide USB to serial conversion function.

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

The SWD interface can be used to download and debug the main MCU program. Programs can be downloaded to the chip by using ULINK2 or JLINK. Alternatively, programs can be downloaded by shorting SWDIO and SWDCK with a jumper cap, and connecting to the onboard NSLINK through Debug USB

- **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.

- **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.

- **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 definition of the GPIOs, please refer to "UM_N32G032x Series Datasheet".

1.4 Development Board Jumper Usage Instructions

Figure 1-2 Development Board Jumper Description

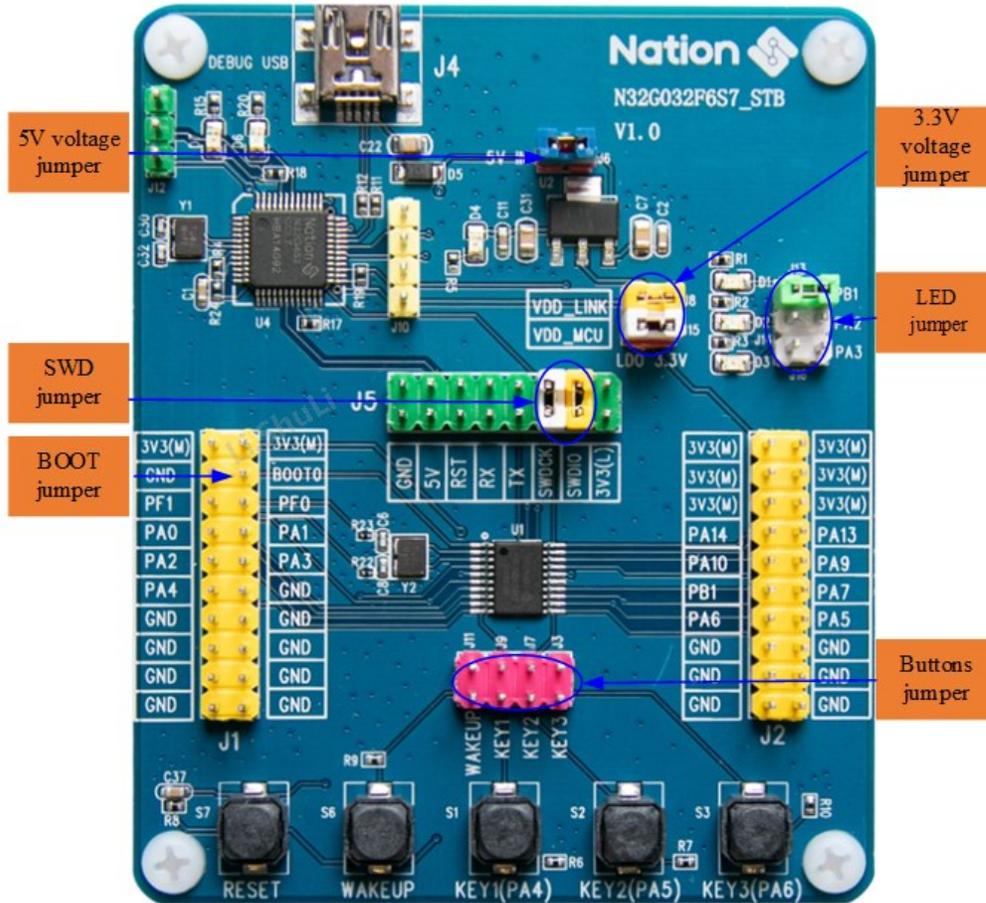


Table 1-1 Development Board Jumper Description List

No.	Jumper Bit Number	Jumper Function	Instructions for Use
1	J6	5V input voltage jumper	The jumper J6 is used to connect the USB port 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.

No.	Jumper Bit Number	Jumper Function	Instructions for Use
	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. The serial port corresponding to N32G032 is PA9 and PA10 of USART1.
4	J1 (Boot0 pin)	BOOT jumper	The BOOT0 pin can be jumpered to GND and 3V3 as needed for convenience
5	J3, J7, J9, J11	Button jumper	The button jumper can disconnect and connect GPIO with the button. J9: KEY1 (PA4) J7: KEY2 (PA5) J3: KEY3 (PA6) J11: WAKEUP (PA0)
6	J13, J14, J16	LED jumper	The LED jumper can disconnect and connect GPIO with the LED J13: D1 (PB1) J14: D2 (PA2) J16: D3 (PA3)

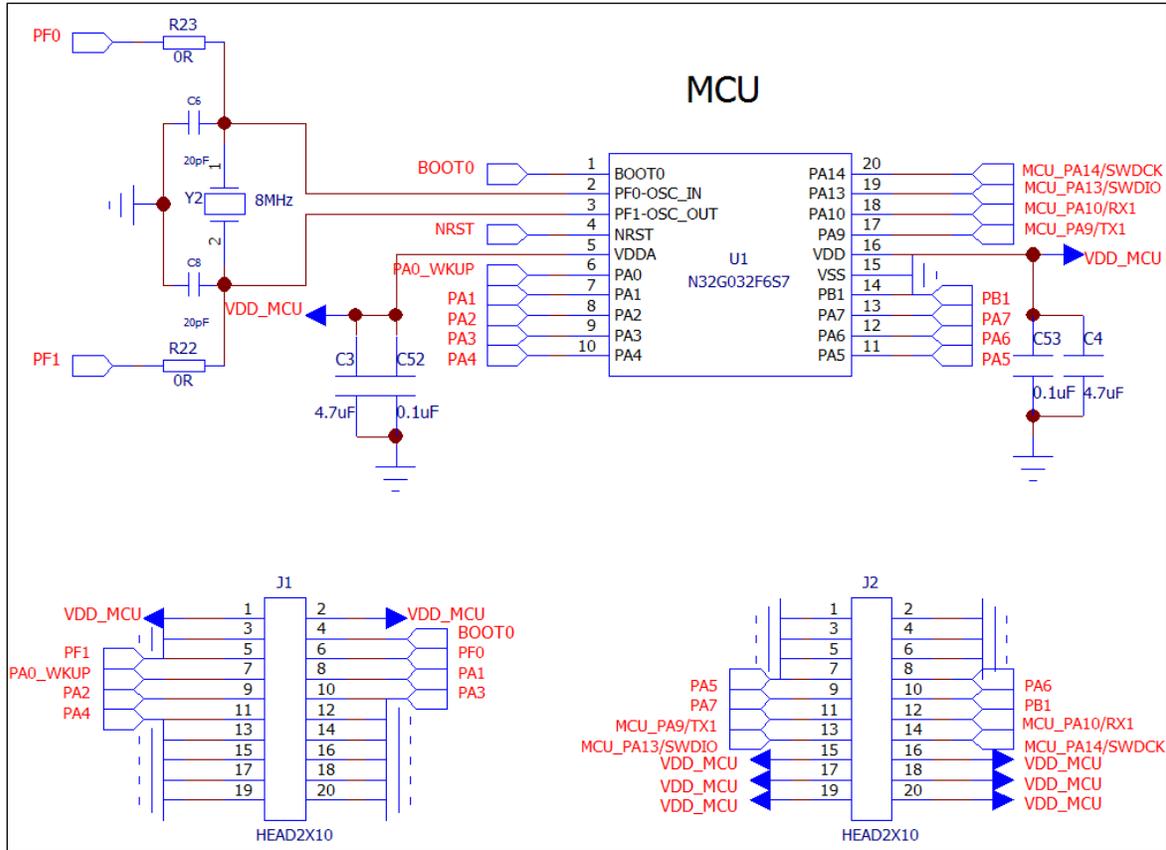
1.5 Development Board Schematic

The schematic diagram of the N32G032F6S7_STB development board is described as follows (For details, please refer to "N32G032F6S7_STB_V1.0").

- **MCU connection**

Refer to Figure 1-3 for the schematic diagram of the MCU connection. VDD and VDDA pins of the MCU is connected to a capacitor, and all GPIOs are connected to the J1 and J2 pins for easy debugging.

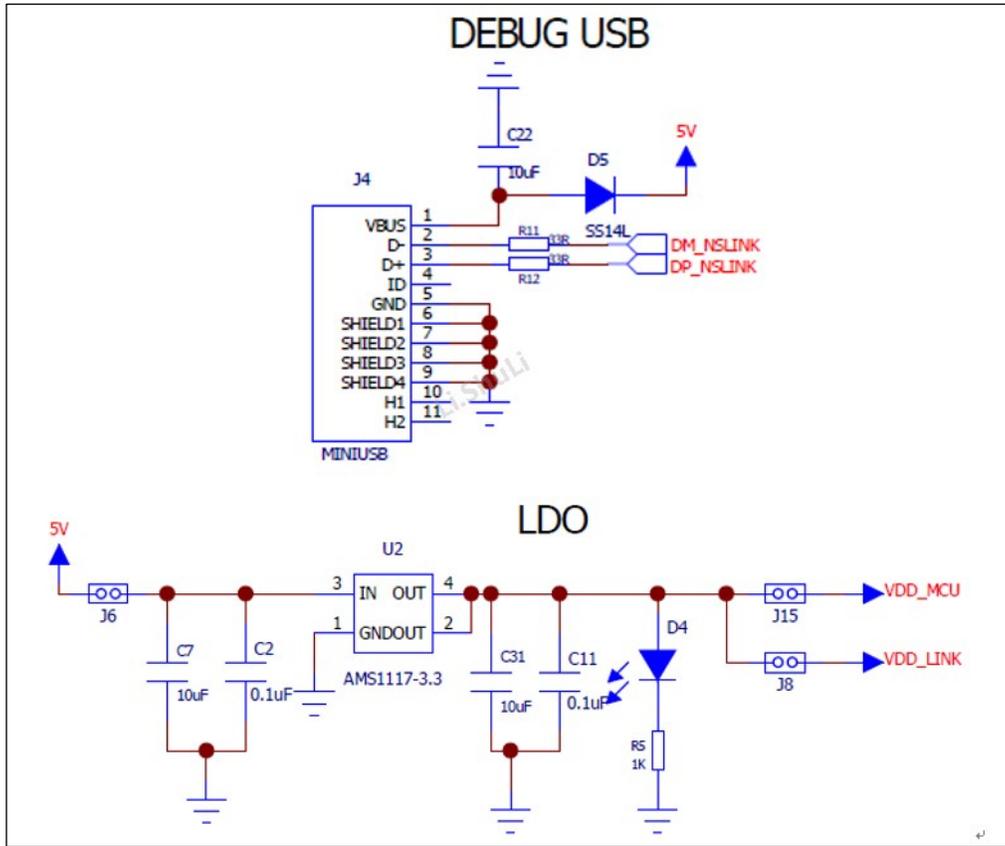
Figure 1-3 MCU Connection Diagram



- **Power design**

Refer to Figure 1-4 for the schematic diagram of the power supply design. The PCB is powered by 5V through USB (J4), and then outputs 3.3V through the LDO (U2) to supply power to the entire PCB board.

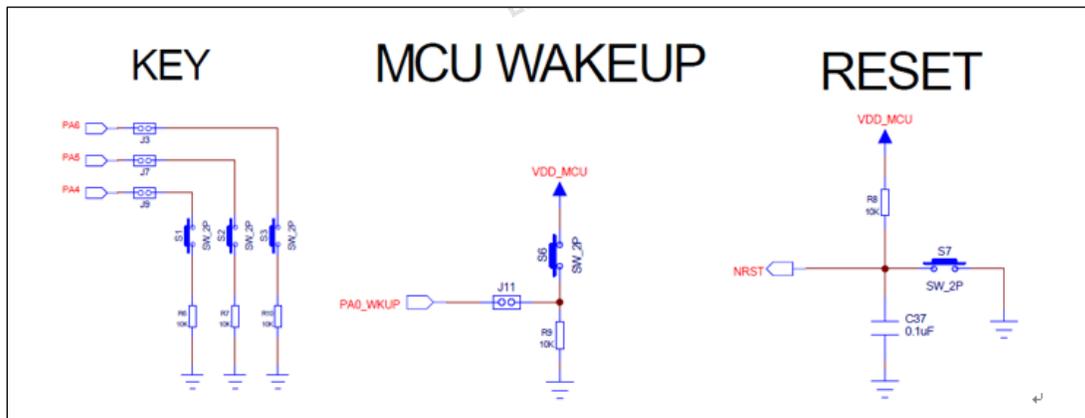
Figure 1-4 Power Design



- **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.

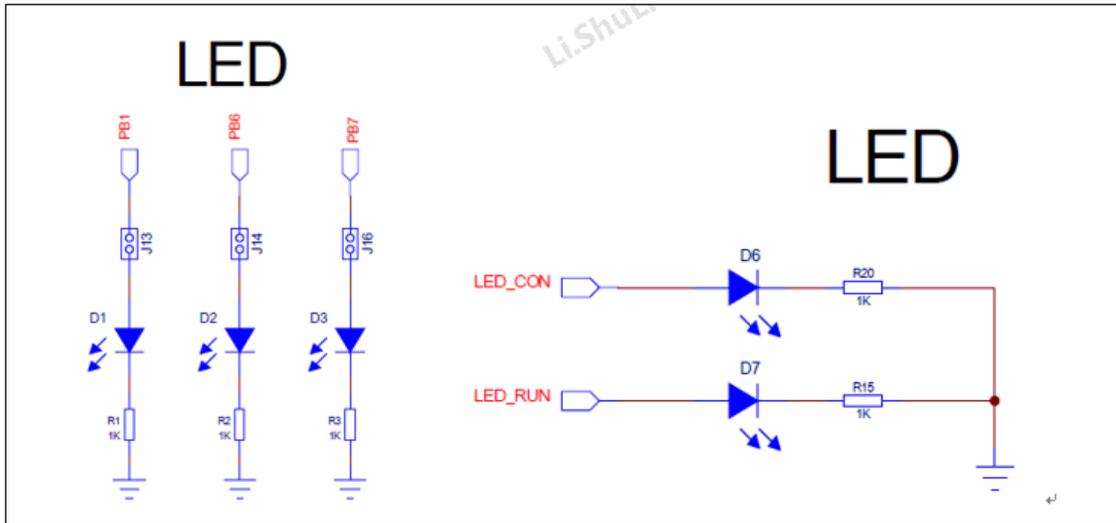
Figure 1-5 Button Design



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, 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.

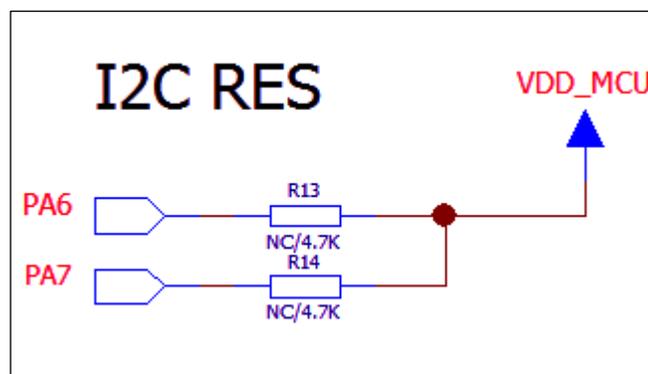
Figure 1-6 LED Light Design



- **I2C pull-up resistor**

Reference to Figure 1-7 for the I2C pull-up resistor design, which is default unpopulated. Users can solder a 4.7K pull-up resistor according to their usage needs.

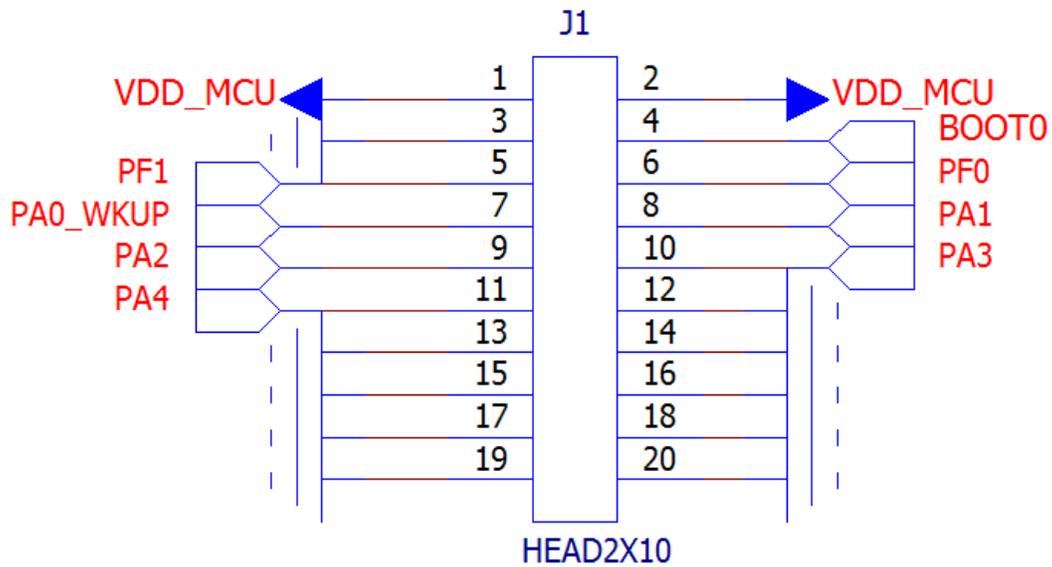
Figure 1-7 I2C Pull-up Resistor Design



- **BOOT**

Refer to Figure 1-8 for the external BOOT schematic. BOOT0 is connected to PIN4 of J1, and you can jumper PIN3 of J1 to GND or PIN2 of J1 to the power supply VDD..

Figure 1-8 DOOT

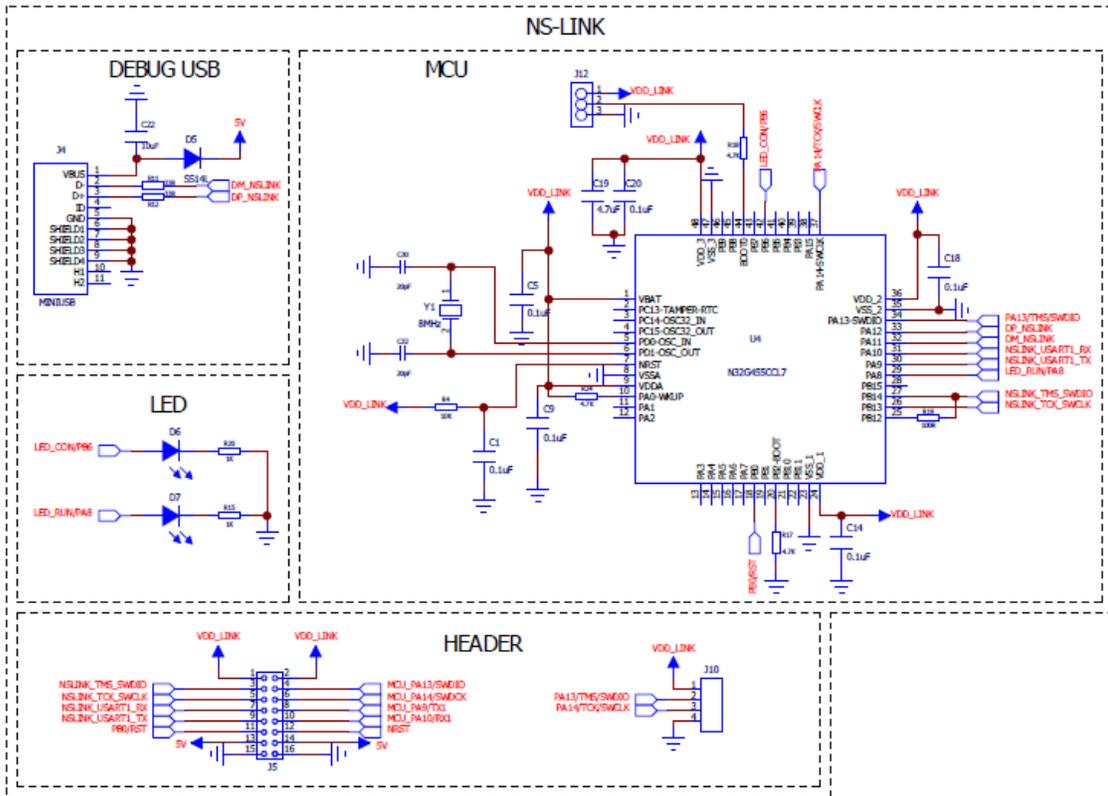


- **NS-LINK**

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, without the need for a ULINK or JLINK debugger.

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

Figure 1-9 NS-LINK



● Description of peripheral devices:

- When designing PCB LAYOUT, put two capacitors near VDD (PIN16) and VDDA (PIN5), 4.7uF and 0.1uF respectively.
- PF0-OSC_IN, PF1-OSC_OUT: External crystal needs to be connected close to the pins

2 Version History

Version	Date	Changes
V1.0	2020.07.17	Initial version

3 Disclaimer

This document is the exclusive property of NSING TECHNOLOGIES PTE. LTD.(Hereinafter referred to as NSING).

This document, and the product of NSING described herein (Hereinafter referred to as the Product) are owned by NSING under the laws and treaties of Republic of Singapore and other applicable jurisdictions worldwide. The intellectual properties of the product belong to Nations Technologies Inc. and Nations Technologies Inc. does not grant any third party 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. NSING reserves the right to make changes, corrections, enhancements, modifications, and improvements to this document at any time without notice. Please contact NSING 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 supporter 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.