

## User Guide

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### UG\_N32G430C8L7\_STB Development Board Hardware User Guide

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#### Introduction

The purpose of this document is to enable users to quickly familiarize themselves with the N32G430C8L7\_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.

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# **1 Hardware Development Instructions**

## **1.1 Brief**

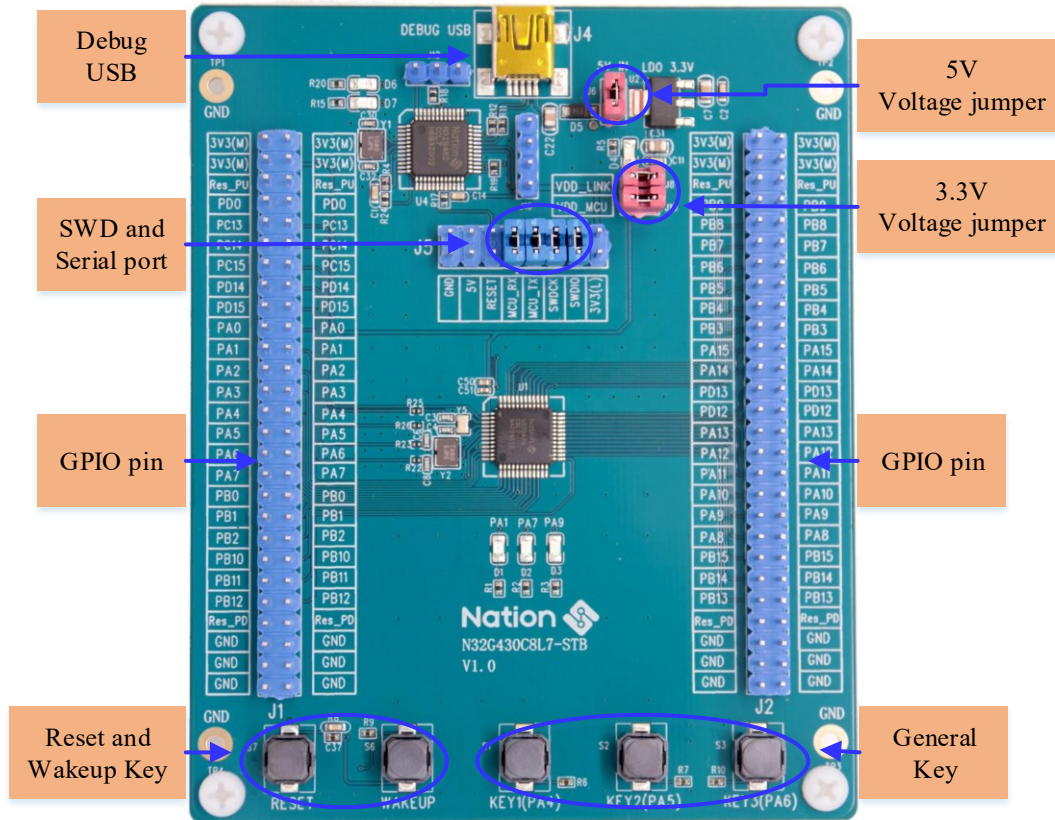
The N32G430C8L7\_STB development board is used for sample development of Nsing Technologies Inc.'s high-performance 32-bit N32G430C8L7 series chips. This document describes the functions, usage instructions, and precautions of the N32G430C8L7\_STB development board in detail.

## **1.2 Development Board Function**

The part number of the main MCU chip model in the development board is N32G430C8L7, and it is packaged with LQFP48 pin. The development board connects all functional interfaces to facilitate customer development.

## **1.3 Development Board Layout**

**Figure 1-1 Development Board Layout1**



- **Power supply for development board**

The development board can be powered via Debug USB (J4) and connected to 3.3V LDO input via J6 jumper.

- **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).

- **SWD 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. PA9 (TX) and PA10 (RX) of MCU are used as serial port, which can connect external serial port device separately. Or by shorting the MCU\_TX signal pin and 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 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.

- **Universal keys (S1, S2, S3)**

S1, S2 and S3 are connected to chip's PA4, PA5 and PA6 pins respectively as universal keys.

- **BOOT(J1 PIN12)**

J1 PIN12 is the BOOT0 pin, which can be shorted to the adjacent power supply and ground through the jumper cap as needed.

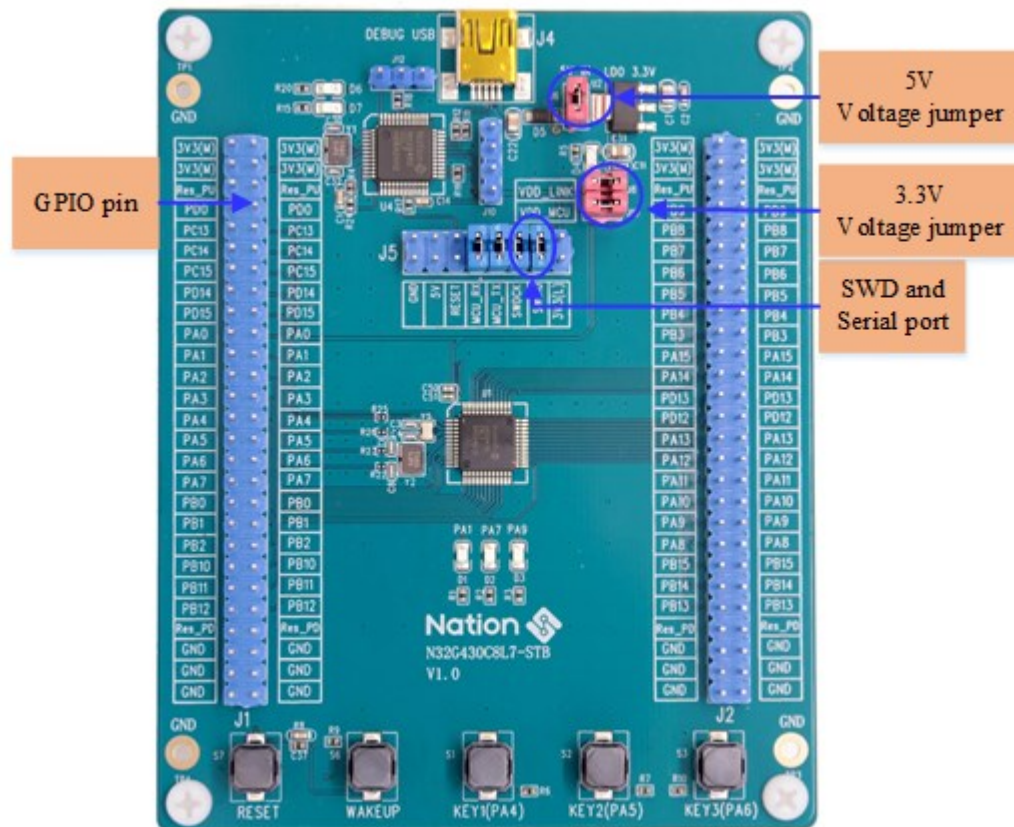
- **GPIO port (J1, J2)**

All the GPIO interfaces of the chip are lead out, and 3.3V voltage and GND pins are reserved

on the pins for easy testing. Refer to DS\_N32G430 Series Data Manual 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	1. SWD jumper	1. Using NS-Link to download programs to MCU through USB Debug port, and need to short SWDIO and SWDCK pins.
4	J5	Serial jumper	When NS-Link is used as a serial port through the USB Debug port, and need to short the MCU_TX and MCU_RX signal pins.
5	J1 (Boot0 pin)	The BOOT jumper	The BOOT0 pin can be connected to GND and 3V3 through jumpers as close as required.

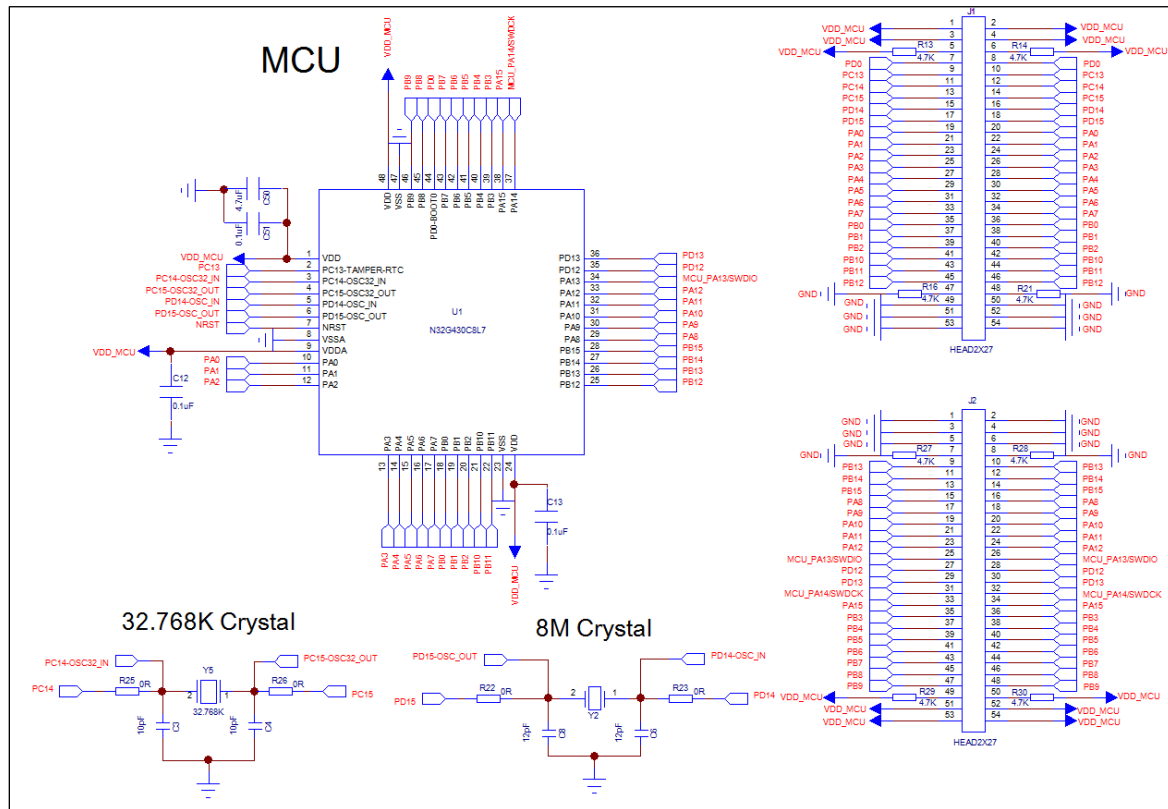
## 1.5 Development Board Schematic Diagram

The schematic diagram of the N32G430C8L7\_STB development board is described as follows (please refer to N32G430C8L7\_STB\_V1.0 for details).

### ● MCU connection

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

### Figure 1-3 MCU Connection Diagram

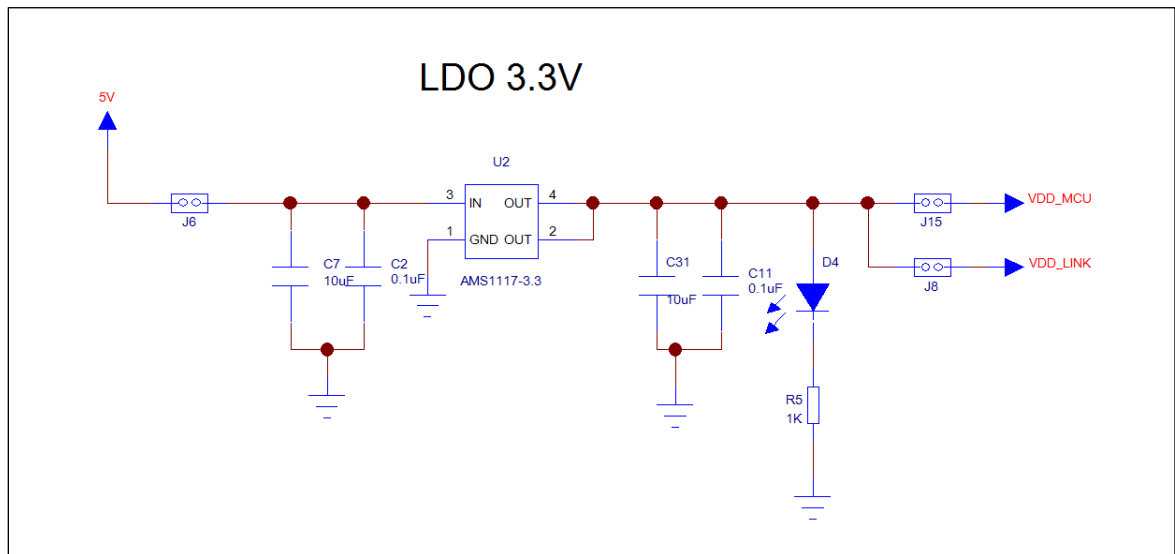
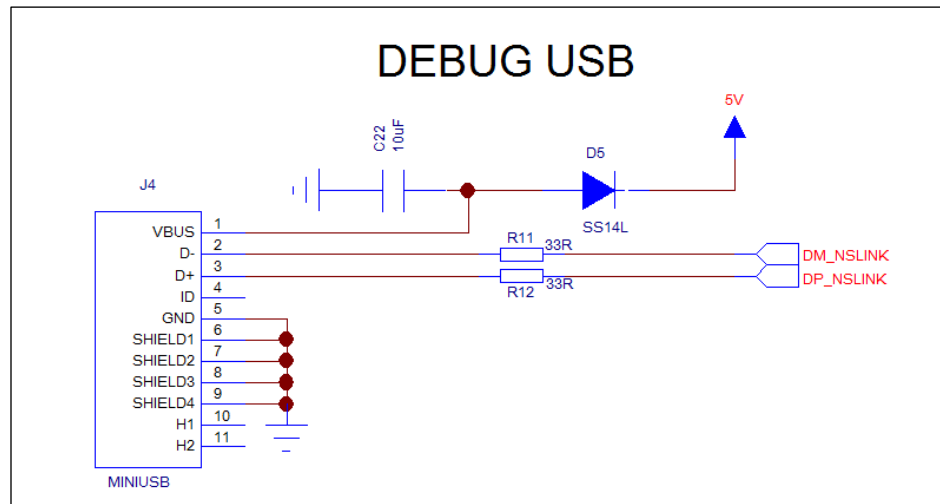


- **Power supply design**

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



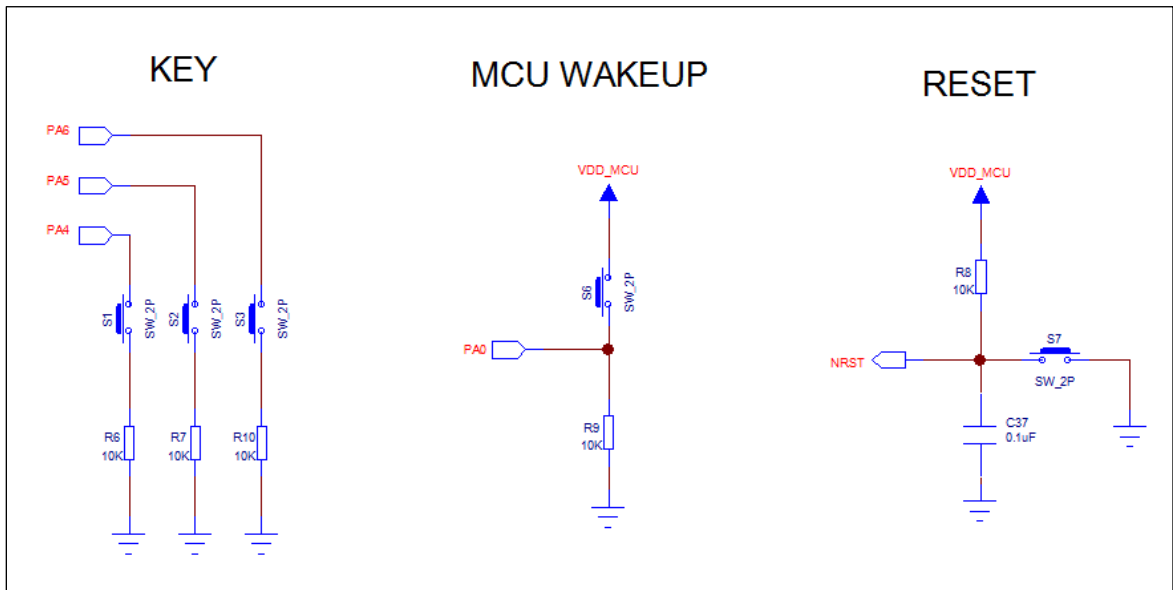
Figure 1-4 Power Supply Design



## ● Button 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.

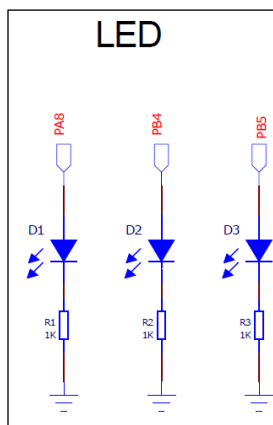
Figure 1-5 Key Design

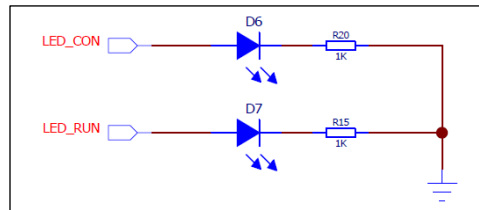


### ● LED light design

Refer to Figure 1-6 for the principle diagram of LED light design. There are 5 LED lights in total. D1, D2 and D3 are connected to PB1, PB6 and PB7 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

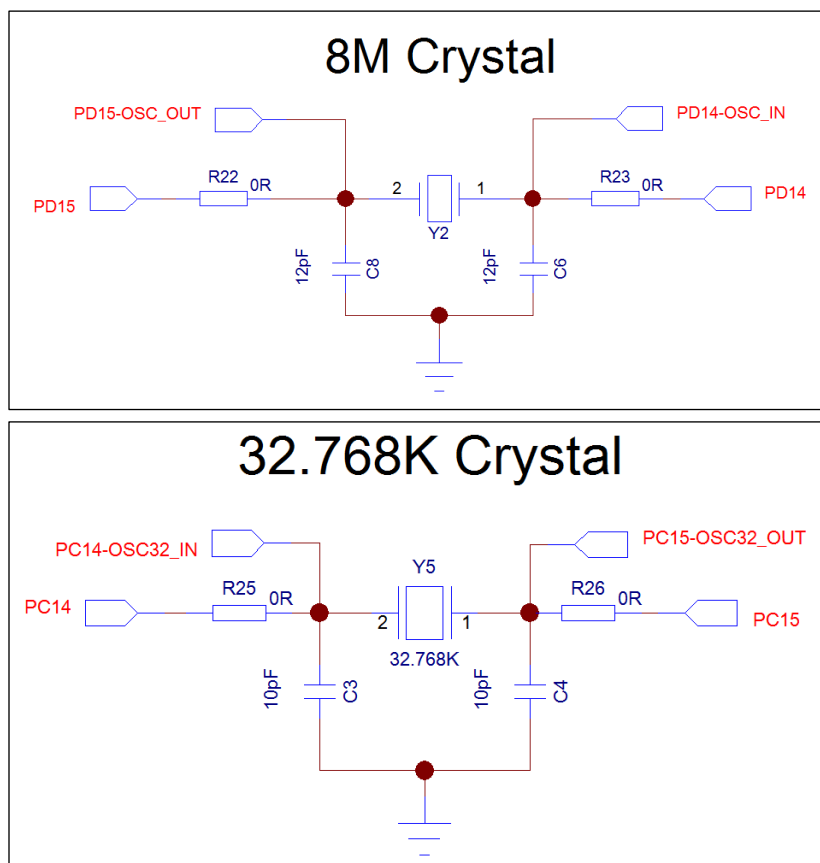




## ● Crystal

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

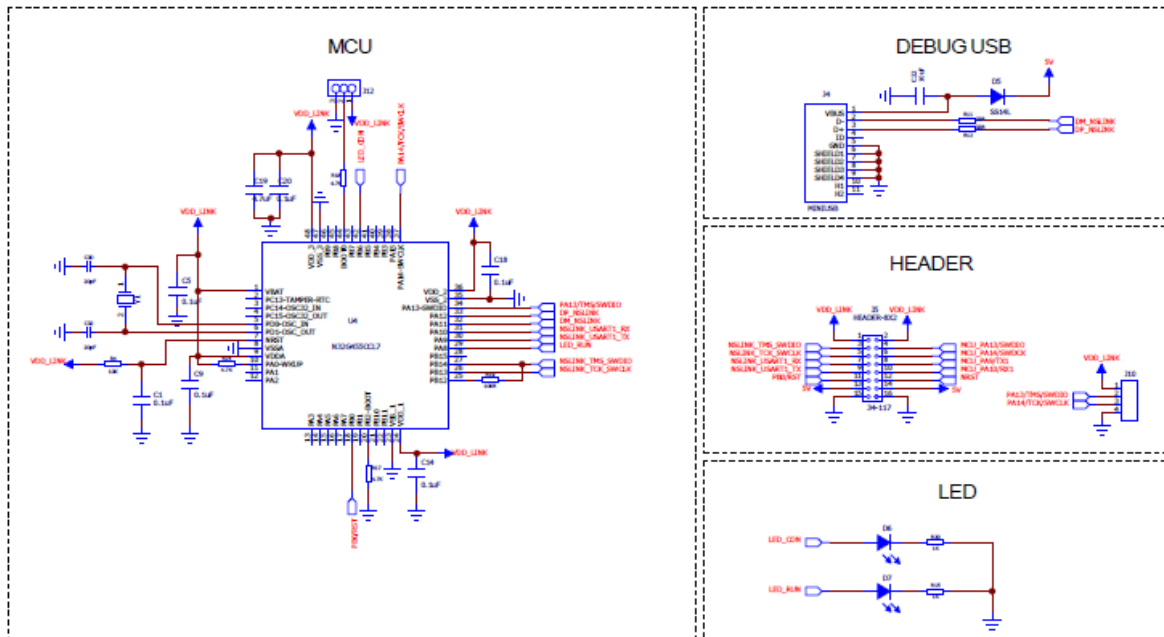
**Figure 1-7 Crystal Design**



## ● NS-LINK

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

**Figure 1-8 NS-LINK**

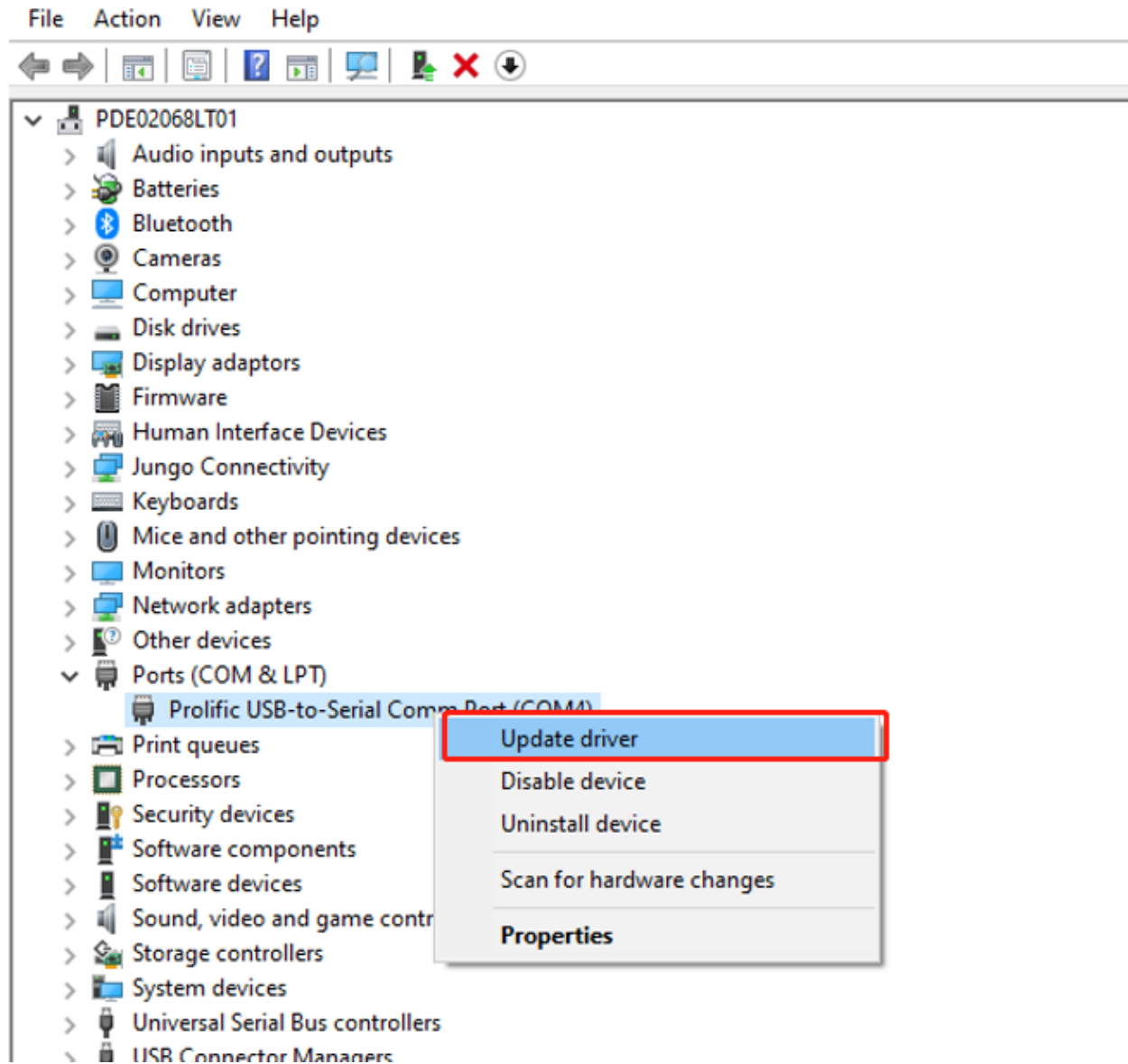


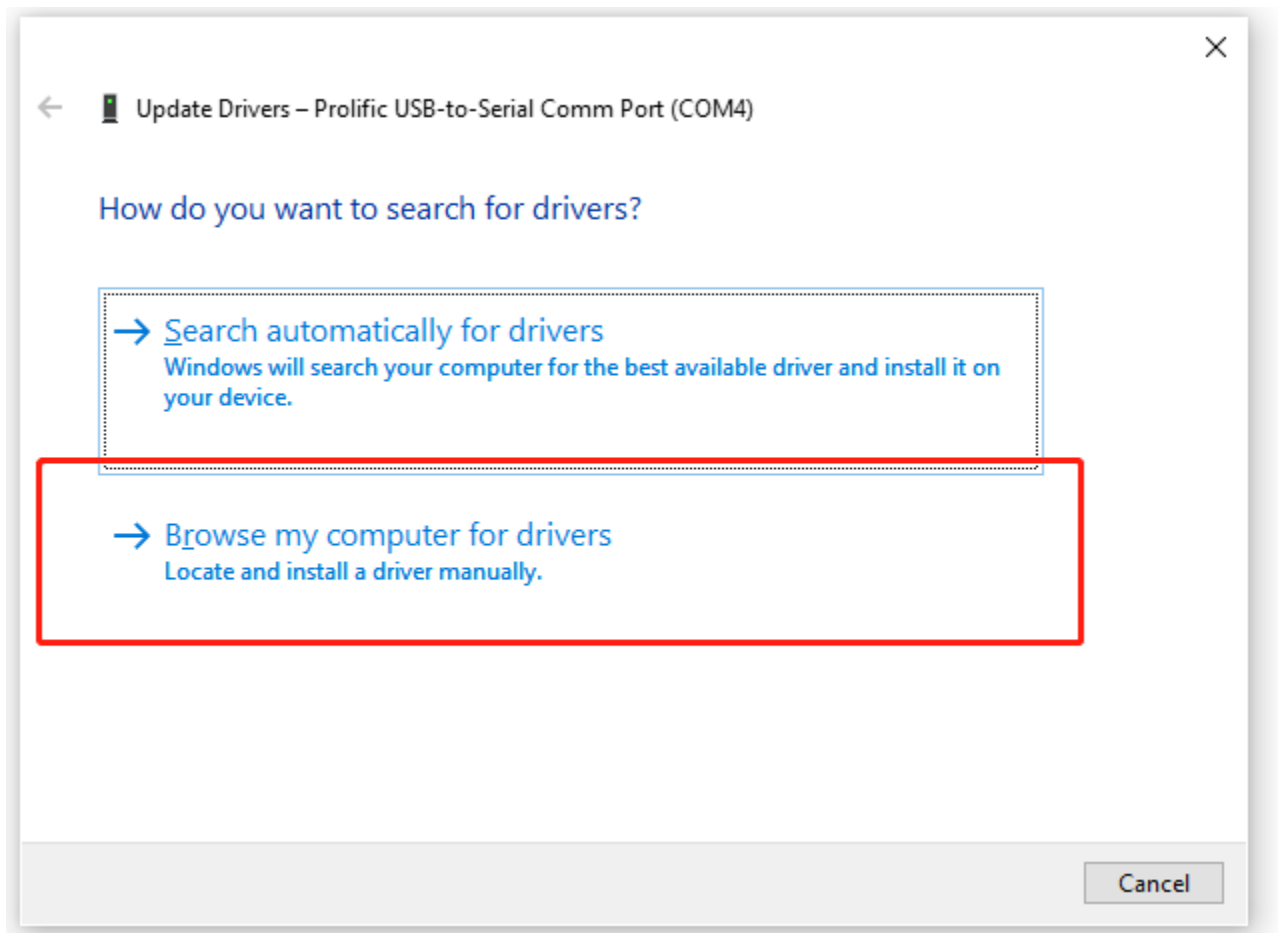
- **Description of peripheral devices:**

- 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.
- 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 two pins, and it can be omitted if there is no need.
- DP, DM: 33Ω series resistance, placed close to the pins.

## 1.6 NS-Link Instruction


Computer-right-click-management-device manager, find the device you want to install the driver, right-click-update driver-browse the folder where the driver is located.





Browse to select the path of the driver file.

×

←  Update Drivers – Prolific USB-to-Serial Comm Port (COM4)

### Browse for drivers on your computer

Search for drivers in this location:

▼ Browse...


☒ Include subfolders

→ Let me pick from a list of available drivers on my computer  
This list will show available drivers compatible with the device, and all drivers in the same category as the device.


Next Cancel

Select the type of device to update the driver.






×


←  Update Drivers – Prolific USB-to-Serial Comm Port (COM4)

Select the device driver you want to install for this hardware.

 Select the manufacturer and model of your hardware device and then click Next. If you have a disk that contains the driver that you want to install, click Have Disk.

☐ Show compatible hardware

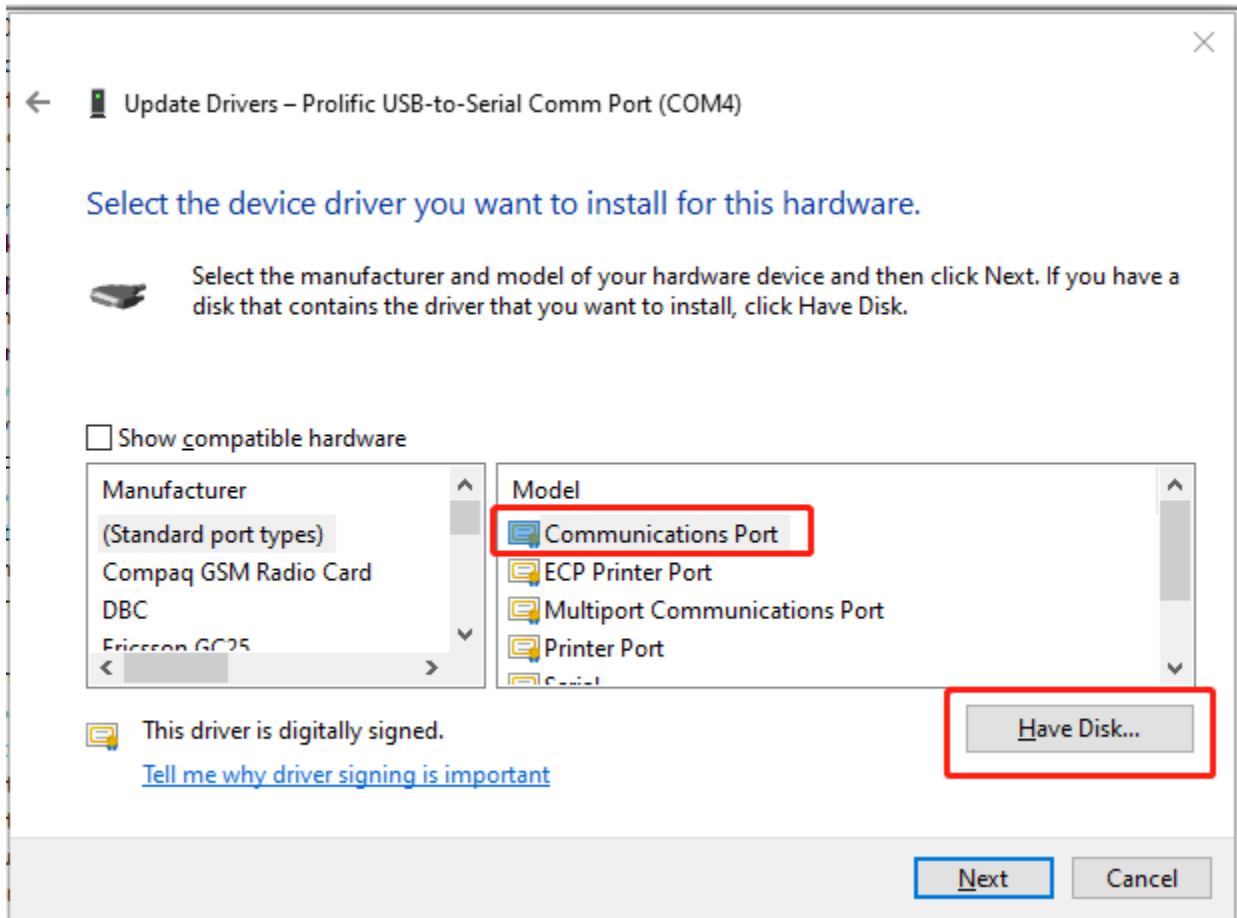
Manufacturer	Model
(Standard port types)	 Communications Port
Compaq GSM Radio Card	 ECP Printer Port
DBC	 Multiport Communications Port
Ericsson GC25	 Printer Port
< >	 Serial

 This driver is digitally signed. [Tell me why driver signing is important](#)

[Have Disk...](#)

[Next](#) [Cancel](#)



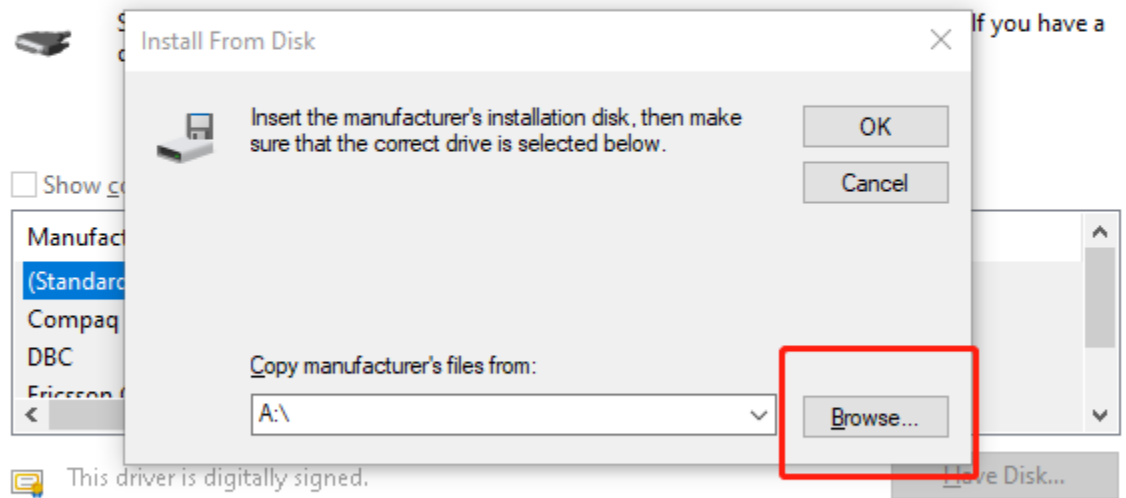


Browse to select the CMSIS-DAP.INF driver file.



← Update Drivers – Prolific USB-to-Serial Comm Port (COM4)

Select the device driver you want to install for this hardware.

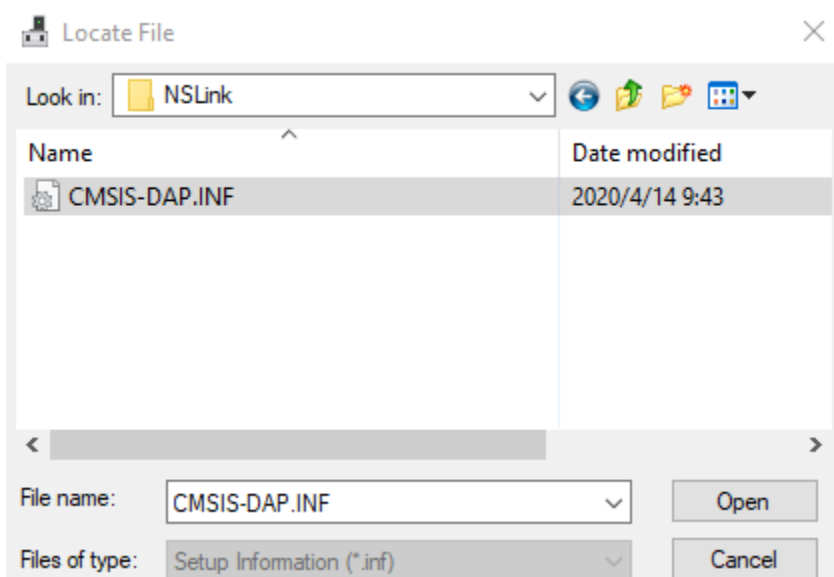


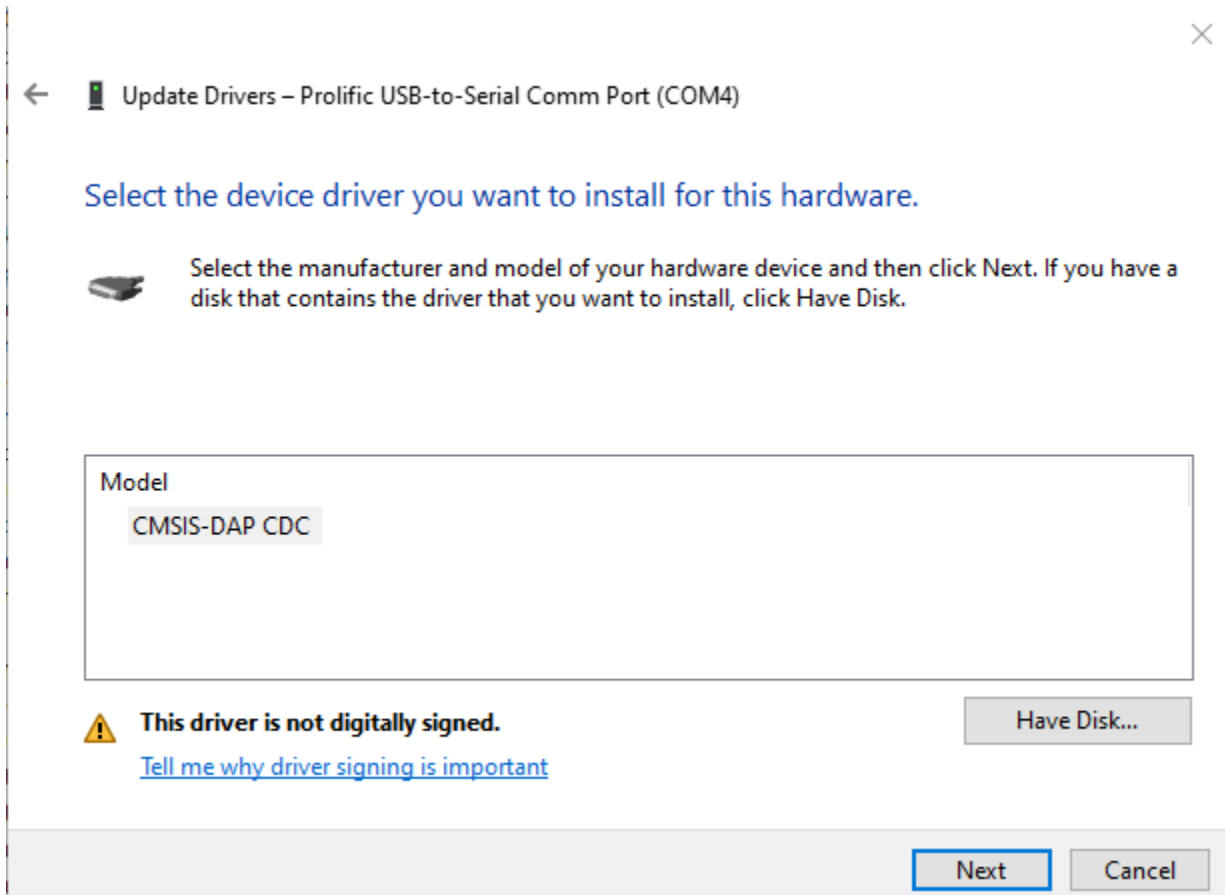
This driver is digitally signed.

[Tell me why driver signing is important](#)

Next


Cancel





After the driver is installed, the prompt interface is as follows:



←  Update Drivers – Prolific USB-to-Serial Comm Port (COM4)

### Windows encountered a problem installing the drivers for your device

Windows found drivers for your device but encountered an error while attempting to install them.



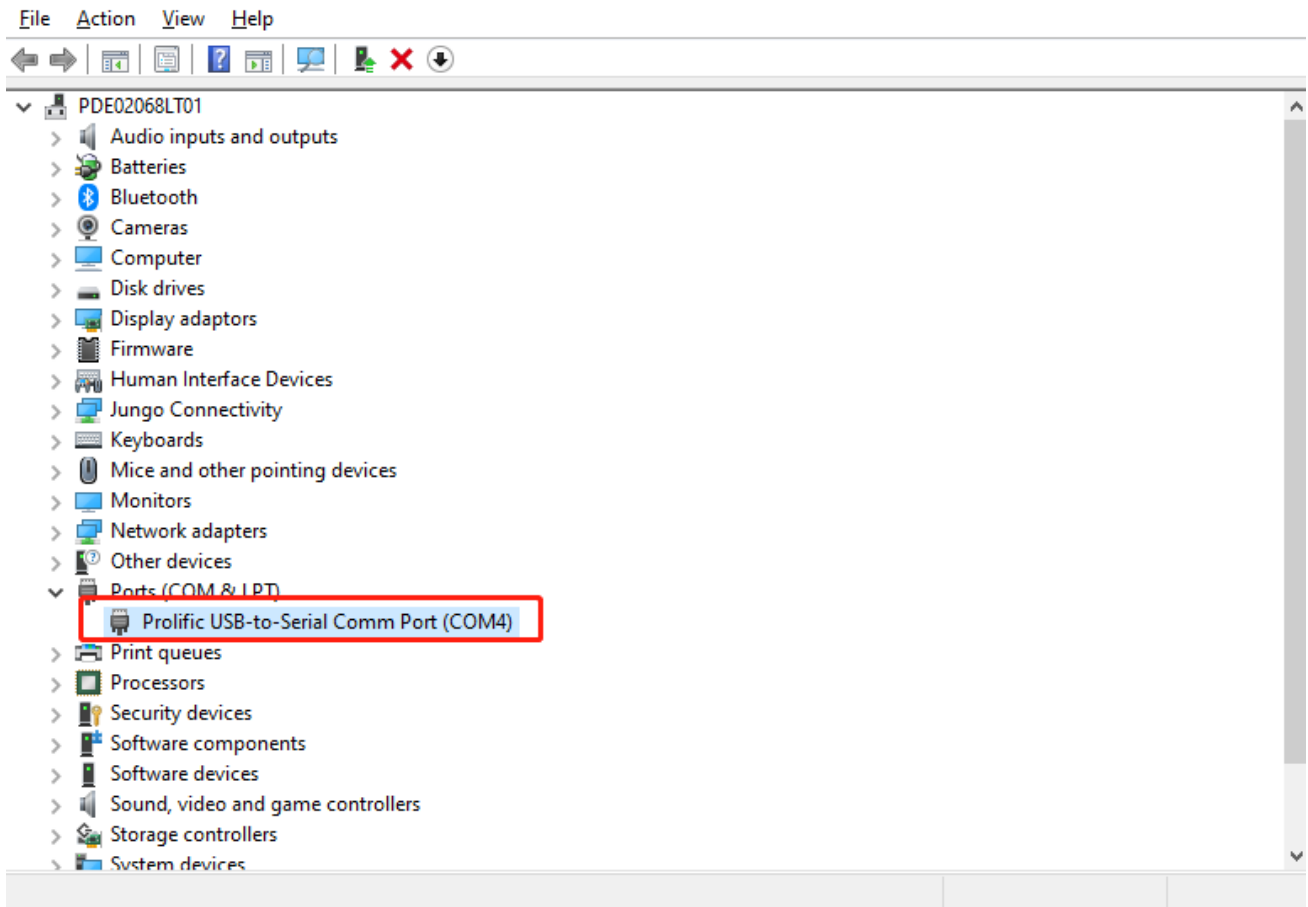
CMSIS-DAP CDC

The third-party INF does not contain digital signature information.

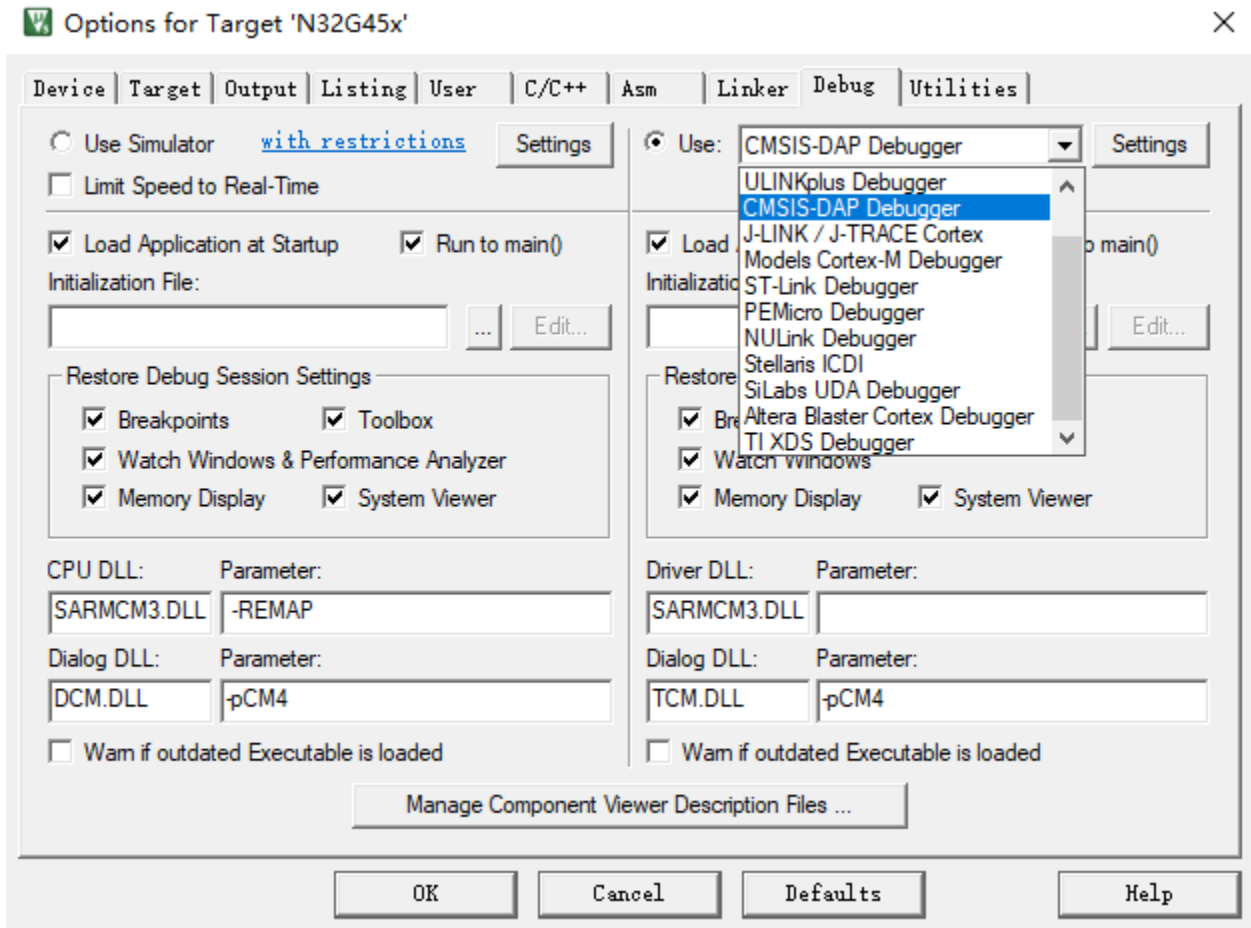
If you know the manufacturer of your device, you can visit their website and check the support section for drivers.

[Close](#)

After the driver is installed successfully, you can find the CMSIS-DAP CDC serial port in the port column. At this point, you can use the CDC function of NSLink, the serial port parameters are 115200bps baud rate, data bit 8, stop bit 1, no parity bit.



Open the Keil development environment, select the menu Project-Options-Debug



Select CMSIS-DAP Debugger, click Settings, you can see the emulator CMSIS-DAP-NSLink, after successfully connecting to the target board, IDCODE information will be displayed on the right.

Options for Target 'N32G45x'

CMSIS-DAP Cortex-M Target Driver Setup

Debug | Trace | Flash Download

CMSIS-DAP - JTAG/SW Adapter

CMSIS-DAP-NSLink

Serial No: 0001A0000002

Firmware Version: 2.0.0

☒ SWJ Port: SW

Max Clock: 10MHz

SW Device

IDCODE	Device Name	Move
SWDIO 0x2BA01477	ARM CoreSight SW-DP	Up Down

☒ Automatic Detection ID CODE:

☐ Manual Configuration Device Name:

Add Delete Update AP: 0x00

Debug

Connect & Reset Options

Connect: Normal Reset: Autodetect

☒ Reset after Connect

☐ Log Debug Accesses ☐ Stop after Reset

Cache Options

☒ Cache Code ☒ Cache Memory

Download Options

☐ Verify Code Download ☐ Download to Flash

OK Cancel Help

OK Cancel Defaults Help

## 2 Version History

Version	Date	Changes
V1.0	2022.2.25	Initial version



### 3 Disclaimer

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