Arm® Cortex®-M

32-bit Microcontroller

NuMicro® Family
NuTiny-SDK-M4521
User Manual

For additional information or questions, please contact: Nuvoton Technology Corporation.

www.nuvoton.com

Table of Contents

1 OVERVIEW

NuTiny-SDK-M4521 is the specific development tool for NuMicro® M4521 series. Users can use NuTiny-SDK-M4521 to develop and verify the application program easily.

NuTiny-SDK-M4521 includes two portions. One is NuTiny-EVB-M4521 and the other is Nu-Link-Me. NuTiny-EVB-M4521 is the evaluation board and Nu-Link-Me is its Debug Adaptor. Thus, users do not need other additional ICE or debug equipments.

2 NUTINY-SDK-M4521 INTRODUCTION

NuTiny-SDK-M4521 uses the M4521SE6AE as the target microcontroller. Figure 2-1 is NuTiny-SDK-M4521 for M4521 series, the left portion is called NuTiny-EVB-M4521 and the right portion is Debug Adaptor called Nu-Link-Me.

NuTiny-EVB-M4521 is similar to other development boards. Users can use it to develop and verify applications to emulate the real behavior. The on board chip covers M4521 series features. The NuTiny-EVB-M4521 can be a real system controller to design users' target systems.

Nu-Link-Me is a Debug Adaptor. The Nu-Link-Me Debug Adaptor connects your PC's USB port to your target system (via Serial Wired Debug Port) and allows you to program and debug embedded programs on the target hardware. The Nu-Link-Me V3.0 also supports VCOM function, which gives users more flexibility when debug. To use Nu-Link-Me Debug adaptor with IAR or Keil, please refer to "Nuvoton NuMicro® IAR ICE driver user manual "or Nuvoton NuMicro® Keil ICE driver user manual" in detail. These two documents will be stored in the local hard disk when the user installs each driver. To use Nu-Link-Me 3.0 VCOM function, please refer to Chapter 5.

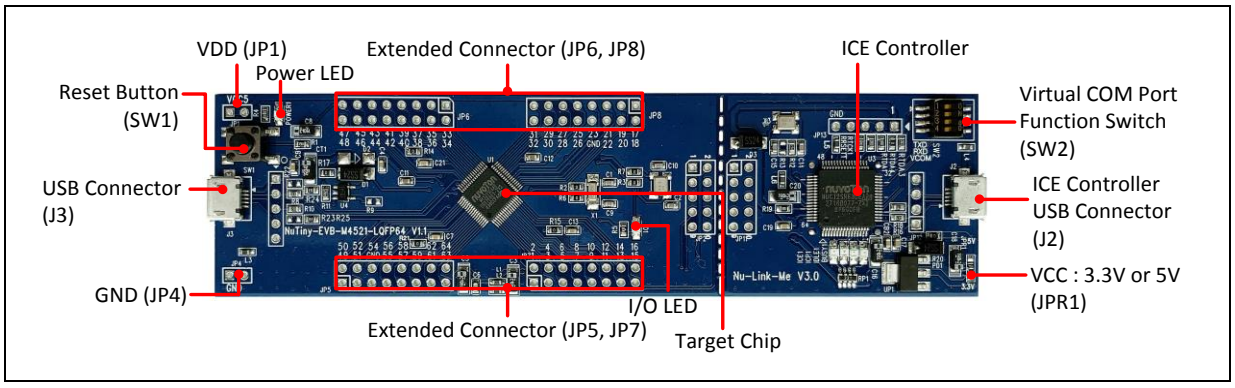


Figure 2-1 NuTiny-SDK-M4521 (PCB Board)

2.1 NuTiny -SDK-M4521 Jumper Description

2.1.1 Power Setting

- JP1: V_{DD} Voltage connecter in NuTiny-EVB-M4521
- J2: USB port in Nu-Link-Me
- JPR1: Select 5.0V or 3.3V for system power

Model	JPR1	JP1 V_{DD}	J2 ICE USB Port	MCU Voltage
Model 1	Select 3.3V (Default)	DC 3.3V Output	Connect to PC	DC 3.3V
Model 2	Select 5.0V	DC 5.0V Output	Connect to PC	DC 5.0V
Model 3	Select 3.3V or 5.0V	DC 2.5V ~ 5.0V Input	Connect to PC	Voltage by JP1 Input
Model 4*	X	DC 2.5V ~ 5.0V Input	X	Voltage by JP1 Input

X: Unused.
Note*: Need to separate NuTiny-EVB-M4521 and Nu-Link-Me.

2.1.2 Debug Connector

- JP2: Connector in target board (NuTiny-EVB-M4521) for connecting with Nuvoton ICE adaptor (Nu-Link-Me)
- JP11: Connector in ICE adaptor (Nu-Link-Me) for connecting with a target board (NuTiny-EVB-M4521)

2.1.3 USB Connector

- J2: Micro USB Connector in Nu-Link-Me connected to a PC USB port
- J3: Micro USB Connector in NuTiny-EVB-M4521 for application use

2.1.4 Extended Connector

- JP5, JP6, JP7, and JP8: Show all chip pins in NuTiny-EVB-M4521

2.1.5 Reset Button

- SW1: Reset button in NuTiny-EVB-M4521

2.1.6 Power Connector

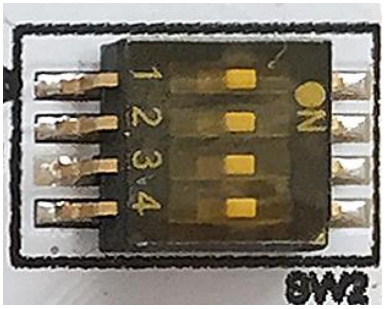
- JP1: V_{DD} connector in NuTiny-EVB-M4521
- JP4: GND connector in NuTiny-EVB-M4521

2.1.7 Virtual COM Port Function Switch

- **SW2**: Switch SW2 on/off before power on to enable/disable VCOM function.

SW2 connects pin 6(PD.0/RXD) and pin 10(PD.1/TXD) in NuTiny-EVB-M4521 with pin 22(PB.1/TXD) and pin 21(PB.0/RXD) in Nuvoton ICE adaptor (Nu-Link-Me V3.0). SW2

connects pin 30(VCOM) in Nuvoton ICE adaptor (Nu-Link-Me V3.0) to GND to enable VCOM function.

Switch Pin Number	Disable VCOM Mode	Enable VCOM Mode	
1	Off	On	
2	Off	On	
3	Off	On	
4	X	X	

X: Unused.

2.2 Pin Assignment for Extended Connector

NuTiny-EVB-M4521 provides M4521SE6AE on board and the extended connector for LQFP64-pin. Table 2-1 is the pin assignment for M4521SE6AE.

Pin No.	Pin Name	Type	Description
1	PB.15	I/O	General purpose digital I/O pin.
	EADC_CH12	A	EADC analog input channel 12.
	EBI_nCS1	O	EBI chip select 1 enable output pin.
2	PB.5	I/O	General purpose digital I/O pin.
	EADC_CH13	A	EADC analog input channel 13.
	SPI0_MOSI0	I/O	SPI0 1st MOSI (Master Out, Slave In) pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	EBI_AD6	I/O	EBI address/data bus bit 6.
	UART2_RXD	I/O	Data receiver input pin for UART2.
3	PB.6	I/O	General purpose digital I/O pin.
	EADC_CH14	A	EADC analog input channel 14.
	SPI0_MISO0	I/O	SPI0 1st MISO (Master In, Slave Out) pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	EBI_AD5	I/O	EBI address/data bus bit 5.
4	PB.7	I/O	General purpose digital I/O pin.
	EADC_CH15	A	EADC analog input channel 15.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	SPI1_CLK	I/O	SPI1 serial clock pin
	EBI_AD4	I/O	EBI address/data bus bit 4.
	STADC	I/O	ADC external trigger input.
5	nRESET	I	External reset input: active LOW, with an internal pull-up. Set this pin low reset to initial state.
6	PD.0	I/O	General purpose digital I/O pin.
	EADC_CH6	A	EADC analog input channel 6.
	UART0_RXD	I	Data receiver input pin for UART0.
	INT3	I	External interrupt3 input pin.
	T3	I/O	Timer3 event counter input / toggle output.
7	AV_{SS}	P	Ground pin for analog circuit.
8	PD.8	I/O	General purpose digital I/O pin.
	EADC_CH7	A	EADC analog input channel 7.
	EBI_nCS0	O	EBI chip select 0 enable output pin.
9	PD.9	I/O	General purpose digital I/O pin.

Pin No.	Pin Name	Type	Description
	EADC_CH10	A	EADC analog input channel 10.
	EBI_ALE	O	EBI address latch enable output pin.
10	PD.1	I/O	General purpose digital I/O pin.
	EADC_CH11	A	EADC analog input channel 11.
	PWM0_SYNC_IN	I	PWM0 counter synchronous trigger input pin.
	UART0_TXD	O	Data transmitter output pin for UART0.
	T0	I/O	Timer0event counter input / toggle output
	EBI_nRD	O	EBI read enable output pin.
11	PD.2	I/O	General purpose digital I/O pin.
	STADC	I	ADC external trigger input.
	T0_EXT	I	Timer0 external capture input.
	PWM0_BRAKE0	I	PWM0 break input 0
	EBI_nWR	O	EBI write enable output pin.
	INT0	I	External interrupt0 input pin.
12	PD.3	I/O	General purpose digital I/O pin.
	T2	I/O	Timer2 event counter input / toggle output
	T1_EXT	I	Timer1 external capture input
	PWM0_BRAKE1	I	PWM0 break input 1
	EBI_MCLK	O	EBI external clock output pin
	INT1	I	External interrupt1 input pin.
13	V_{BAT}		Power supply by batteries for RTC and PF.0~PF.2.
14	PF.0	I/O	General purpose digital I/O pin.
	X32_OUT	O	External 32.768 kHZ (low speed) crystal output pin.
	INT5	I	External interrupt5 input pin.
15	PF.1	I/O	General purpose digital I/O pin.
	X32_IN	I	External 32.768 kHZ (low speed) crystal input pin.
16	PF.2	I/O	General purpose digital I/O pin.
	TAMPER	I/O	TAMPER detector loop pin
17	PD.12	I/O	General purpose digital I/O pin.
	UART3_TXD	O	Data transmitter output pin for UART3.
	PWM1_CH0	I/O	PWM1 output/capture input.
	EBI_ADR16	O	EBI address bus bit 16.
18	PD.13	I/O	General purpose digital I/O pin.
	UART3_RXD	I	Data receiver input pin for UART3.

Pin No.	Pin Name	Type	Description
	PWM1_CH1	I/O	PWM1 output/capture input.
	EBI_ADR17	O	EBI address bus bit 17.
19	PD.14	I/O	General purpose digital I/O pin.
	UART3_nCTS	I	Clear to Send input pin for UART3.
	PWM1_CH2	I/O	PWM1 output/capture input.
	EBI_ADR18	O	EBI address bus bit 18.
20	PD.15	I/O	General purpose digital I/O pin.
	UART3_nRTS	O	Request to Send output pin for UART3.
	PWM1_CH3	I/O	PWM1 output/capture input.
	EBI_ADR19	O	EBI address bus bit 19.
21	PD.7	I/O	General purpose digital I/O pin.
	PWM0_SYNC_IN	I	PWM0 counter synchronous trigger input pin.
	T1	I/O	Timer1 event counter input / toggle output
	PWM0_CH5	I/O	PWM0 output/capture input.
	EBI_nRD	O	EBI read enable output pin.
22	PF.3	I/O	General purpose digital I/O pin.
	XT1_OUT	O	External 4~20 MHz (high speed) crystal output pin.
	I2C1_SCL	I/O	I2C1 clock pin.
23	PF.4	I/O	General purpose digital I/O pin.
	XT1_IN	I	External 4~20 MHz (high speed) crystal input pin.
	I2C1_SDA	I/O	I2C1 data input/output pin.
24	V_{SS}	A	Ground pin for digital circuit.
25	V_{DD}	A	Power supply for I/O ports and LDO source for internal PLL and digital function.
26	LDO_CAP	A	LDO output pin. **Note:** This pin needs to be connected with a 1uF capacitor.
27	PC.0	I/O	General purpose digital I/O pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.
	UART2_nCTS	I	Clear to Send input pin for UART2.
	PWM0_CH0	I/O	PWM0 output/capture input.
	EBI_AD8	I/O	EBI address/data bus bit 8.
	INT2	I	External interrupt2 input pin.
	UART3_TXD	O	Data transmitter output pin for UART3.
	T3_EXT	I	Timer3 external capture input.
28	PC.1	I/O	General purpose digital I/O pin.

Pin No.	Pin Name	Type	Description
	CLKO	O	Clock Out
	UART2_nRTS	O	Request to Send output pin for UART2.
	PWM0_CH1	I/O	PWM0 output/capture input.
	EBI_AD9	I/O	EBI address/data bus bit 9.
	UART3_RXD	I/O	Data receiver input pin for UART3.
29	PC.2	I/O	General purpose digital I/O pin.
	SPI1_SS	I	SPI1 slave select pin.
	UART2_TXD	O	Data transmitter output pin for UART2.
	PWM0_CH2	I/O	PWM0 output/capture input.
	EBI_AD10	I/O	EBI address/data bus bit 10.
30	PC.3	I/O	General purpose digital I/O pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	UART2_RXD	I	Data receiver input pin for UART2.
	PWM0_CH3	I/O	PWM0 output/capture input.
	EBI_AD11	I/O	EBI address/data bus bit 11.
31	PC.4	I/O	General purpose digital I/O pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	I2C1_SCL	I/O	I2C1 clock pin.
	PWM0_CH4	I/O	PWM0 output/capture input.
	EBI_AD12	I/O	EBI address/data bus bit 12.
32	PC.5	I/O	General purpose digital I/O pin.
	PWM0_CH5	I/O	PWM0 output/capture input.
	EBI_AD13	I/O	EBI address/data bus bit 13.
33	PC.6	I/O	General purpose digital I/O pin.
	I2C1_SMBAL	O	I2C1 SMBus SMBALTER# pin
	PWM1_CH0	I/O	PWM1 output/capture input.
	EBI_AD14	I/O	EBI address/data bus bit 14.
	UART0_TXD	O	Data transmitter output pin for UART0.
34	PC.7	I/O	General purpose digital I/O pin.
	I2C1_SMBSUS	O	I2C1 SMBus SMBSUS# pin (PMBus CONTROL pin)
	PWM1_CH1	I/O	PWM1 output/capture input.
	EBI_AD15	I/O	EBI address/data bus bit 15.
	UART0_RXD	I	Data receiver input pin for UART0.
35	PF.5	I/O	General purpose digital I/O pin.

Pin No.	Pin Name	Type	Description
	ICE_CLK	I	Serial wired debugger clock pin
36	PF.6	I/O	General purpose digital I/O pin.
	ICE_DAT	I/O	Serial wired debugger data pin
37	PE.8	I/O	General purpose digital I/O pin.
	UART1_TXD	O	Data transmitter output pin for UART1.
	SPI0_MISO1	I/O	SPI0 2nd MISO (Master In, Slave Out) pin.
	I2C1_SCL	I/O	I2C1 clock pin.
	SC0_PWR	O	SmartCard power pin.
	CLKO	O	Clock Out
	PWM0_BRAKE0	I	PWM0 break input 0
	T1	I/O	Timer1 event counter input / toggle output
38	PE.9	I/O	General purpose digital I/O pin.
	UART1_RXD	I	Data receiver input pin for UART1.
	SPI0_MOSI1	I/O	SPI0 2nd MOSI (Master Out, Slave In) pin.
	I2C1_SDA	I/O	I2C1 data input/output pin.
	SC0_RST	O	SmartCard reset pin.
	PWM1_BRAKE1	I	PWM1 break input 1
	T2	I/O	Timer2 event counter input / toggle output
39	PE.10	I/O	General purpose digital I/O pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	SPI0_MISO0	I/O	SPI0 1st MISO (Master In, Slave Out) pin.
	UART1_nCTS	I	Clear to Send input pin for UART1.
	I2C0_SMBAL	O	I2C0 SMBus SMBALTER# pin
	SC0_DAT	I/O	SmartCard data pin.
	UART3_TXD	O	Data transmitter output pin for UART3.
	I2C1_SCL	I/O	I2C1 clock pin.
40	PE.11	I/O	General purpose digital I/O pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	SPI0_MOSI0	I/O	SPI0 1st MOSI (Master Out, Slave In) pin.
	UART1_nRTS	O	Request to Send output pin for UART1.
	I2C0_SMBSUS	O	I2C0 SMBus SMBSUS# pin (PMBus CONTROL pin)
	SC0_CLK	O	SmartCard clock pin.
	UART3_RXD	I	Data receiver input pin for UART3.
	I2C1_SDA	I/O	I2C1 data input/output pin.

Pin No.	Pin Name	Type	Description
41	PE.12	I/O	General purpose digital I/O pin.
	SPI1_SS	I/O	SPI1 slave select pin
	SPI0_SS	I/O	SPI0 slave select pin.
	UART1_TXD	O	Data transmitter output pin for UART1.
	I2C0_SCL	I/O	I2C0 clock pin.
42	PE.13	I/O	General purpose digital I/O pin.
	SPI1_CLK	I/O	SPI1 serial clock pin
	SPI0_CLK	I/O	SPI0 serial clock pin.
	UART1_RXD	I	Data receiver input pin for UART1.
	I2C0_SDA	I/O	I2C0 data input/output pin.
43	V_{DDIO}	A	Power supply for PE.8~PE.13.
44	USB_VBUS	A	Power supply from USB* host or HUB.
45	USB_D-	I	USB differential signal D-.
46	USB_D+	I	USB differential signal D+.
47	PF.7	I/O	General purpose digital I/O pin.
48	USB_VDD33_CAP	A	Internal power regulator output 3.3V decoupling pin. **Note:** This pin needs to be connected with a 1uF capacitor.
49	PA.3	I/O	General purpose digital I/O pin.
	UART0_RXD	I	Data receiver input pin for UART0.
	UART0_nRTS	O	Request to Send output pin for UART0.
	I2C0_SCL	I/O	I2C0 clock pin.
	SC0_PWR	O	SmartCard power pin.
	PWM1_CH2	I/O	PWM1 output/capture input.
	EBI_AD3	I/O	EBI address/data bus bit 3.
50	PA.2	I/O	General purpose digital I/O pin.
	UART0_TXD	O	Data transmitter output pin for UART0.
	UART0_nCTS	I	Clear to Send input pin for UART0.
	I2C0_SDA	I/O	I2C0 data input/output pin.
	SC0_RST	O	SmartCard reset pin.
	PWM1_CH3	I/O	PWM1 output/capture input.
	EBI_AD2	I/O	EBI address/data bus bit 2.
51	PA.1	I/O	General purpose digital I/O pin.
	UART1_nRTS	O	Request to Send output pin for UART1.
	UART1_RXD	I	Data receiver input pin for UART1.

Pin No.	Pin Name	Type	Description
	SC0_DAT	I/O	SmartCard data pin.
	PWM1_CH4	I/O	PWM1 output/capture input.
	EBI_AD1	I/O	EBI address/data bus bit 1.
	STADC	I/O	ADC external trigger input.
52	PA.0	I/O	General purpose digital I/O pin.
	UART1_nCTS	I	Clear to Send input pin for UART1.
	UART1_TXD	O	Data transmitter output pin for UART1.
	SC0_CLK	O	SmartCard clock pin.
	PWM1_CH5	I/O	PWM1 output/capture input.
	EBI_AD0	I/O	EBI address/data bus bit 0.
	INT0	I	External interrupt0 input pin.
53	V_{SS}	A	Ground pin for digital circuit.
54	V_{DD}	A	Power supply for I/O ports and LDO source for internal PLL and digital function.
55	AV_{DD}	A	Power supply for internal analog circuit.
56	V_{REF}	I	Voltage reference input for ADC. **Note:** This pin needs to be connected with a 1uF capacitor.
57	PB.0	I/O	General purpose digital I/O pin.
	EADC_CH0	A	EADC analog input.
	SPI0_MOSI1	I/O	SPI0 2nd MOSI (Master Out, Slave In) pin.
	UART2_RXD	I	Data receiver input pin for UART2.
	T2	I/O	Timer2 event counter input / toggle output
	EBI_nWRL	O	EBI low byte write enable output pin.
	INT1	I	External interrupt1 input pin.
58	PB.1	I/O	General purpose digital I/O pin.
	EADC_CH1	A	EADC analog input channel 1.
	SPI0_MISO1	I/O	SPI0 2nd MISO (Master In, Slave Out) pin.
	UART2_TXD	O	Data transmitter output pin for UART2.
	T3	I/O	Timer3 event counter input / toggle output
	SC0_RST	O	SmartCard reset pin.
	PWM0_SYNC_OUT	O	PWM0 counter synchronous trigger output pin.
	EBI_nWRH	O	EBI high byte write enable output pin
59	PB.2	I/O	General purpose digital I/O pin.
	EADC_CH2	A	EADC analog input channel 2.
	SPI0_CLK	I/O	SPI0 serial clock pin.

Pin No.	Pin Name	Type	Description
	SPI1_CLK	I/O	SPI1 serial clock pin
	UART1_RXD	I	Data receiver input pin for UART1.
	SC0_CD	I	SmartCard card detect pin.
	UART3_RXD	I	Data receiver input pin for UART3.
	T2_EXT	I	Timer2 external capture input.
60	PB.3	I/O	General purpose digital I/O pin.
	EADC_CH3	A	EADC analog input channel 3.
	SPI0_MISO0	I/O	SPI0 1st MISO (Master In, Slave Out) pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	UART1_TXD	O	Data transmitter output pin for UART1.
	EBI_ALE	O	EBI address latch enable output pin.
	UART3_TXD	O	Data transmitter output pin for UART3.
	T0_EXT	I	Timer0 external capture input.
61	PB.4	I/O	General purpose digital I/O pin.
	EADC_CH4	A	EADC analog input channel 4.
	SPI0_SS	I/O	SPI0 slave select pin.
	SPI1_SS	I/O	SPI1 slave select pin
	UART1_nCTS	I	Clear to Send input pin for UART1.
	EBI_AD7	I/O	EBI address/data bus bit 7.
	UART2_TXD	O	Data transmitter output pin for UART2.
	T1_EXT	I	Timer1 external capture input.
62	PB.8	I/O	General purpose digital I/O pin.
	EADC_CH5	A	EADC analog input channel 5.
	UART1_nRTS	O	Request to Send output pin for UART1.
	PWM0_CH2	I/O	PWM0 output/capture input.
63	PB.11	I/O	General purpose digital I/O pin.
	EADC_CH8	A	EADC analog input channel 8.
64	PB.12	I/O	General purpose digital I/O pin.
	EADC_CH9	A	EADC analog input channel 9.

Table 2-1 Pin Assignment for M4521

2.3 NuTiny-SDK-M4521 PCB Placement

Users can refer to Figure 2-2 for the NuTiny-SDK-M4521 PCB placement.

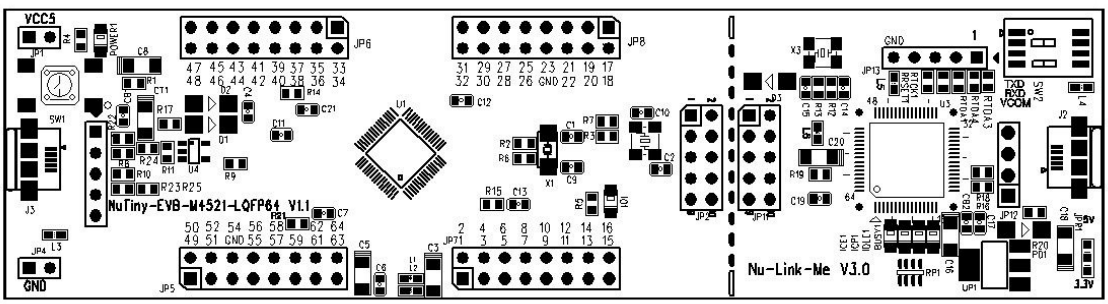


Figure 2-2 NuTiny-SDK-M4521 PCB Placement

3 HOW TO START NUTINY-SDK-M4521 ON THE KEIL MVISION® IDE

3.1 Keil uVision® IDE Software Download and Install

Please visit the Keil company website (http://www.keil.com) to download the Keil µVision® IDE and install the RVMDK.

3.2 Nuvoton Nu-Link Driver Download and Install

Please visit the Nuvoton company NuMicro® website (http://www.nuvoton.com/NuMicro) to download "NuMicro® Keil µVision® IDE driver" file. When the Nu-Link driver has been well downloaded, please unzip the file and execute the "Nu-Link_Keil_Driver.exe" to install the driver.

3.3 Hardware Setup

The hardware setup is shown as Figure 3-1.

Figure 3-1 NuTiny-SDK-M4521 Hardware Setup

3.4 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-SDK-M4521 board. It can be found on Figure 3-2 list directory and downloaded from Nuvoton NuMicro® website.

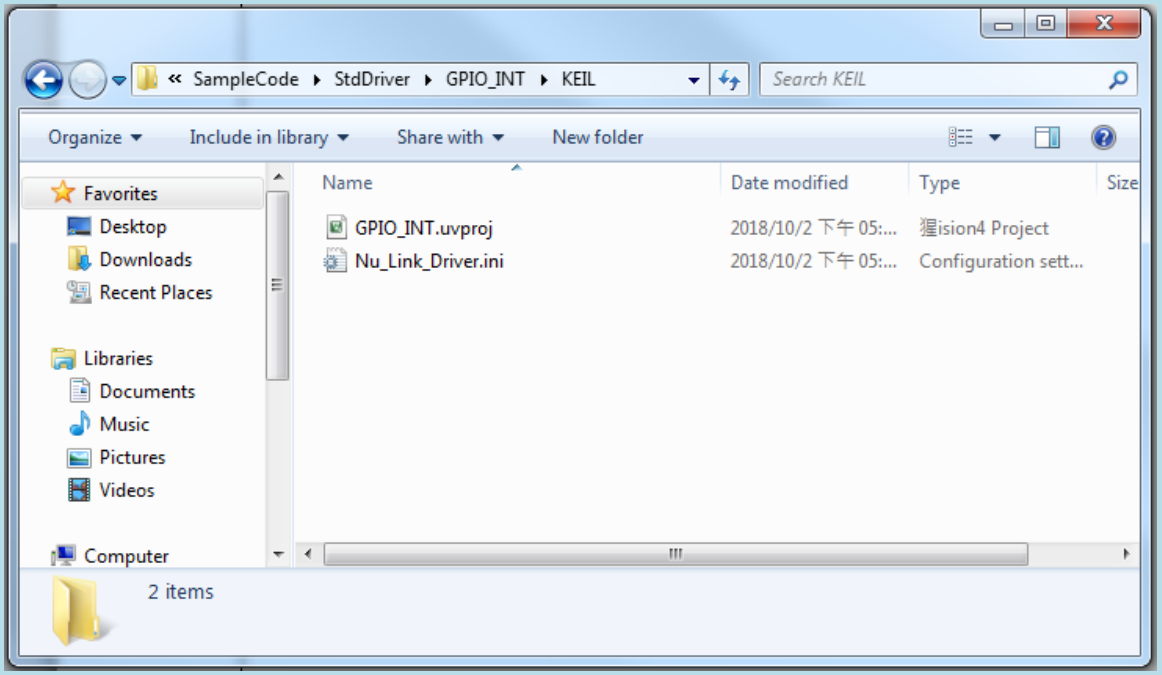
Directory	\\M4521_BSP_CMSIS_V3.00.000\SampleCode\StdDriver\GPIO_INT\KEIL
Project File	

Figure 3-2 Example Directory

To use this example:

This sample code runs some functions about system manager controller and clock controller, and will show messages by Uart. Users can see the messages by following the steps of Chapter 5.

- **Start µVision®**
- **Project-Open**
  Open the SYS.uvproj project file
- **Project - Build**
  Compile and link the SYS application
- **Flash – Download**
  Program the application code into on-chip Flash ROM
- **Start debug mode**
  Using the debugger commands, you may:
  - Review variables in the watch window
  - Single step through code
  - Reset the device
  - Run the application

4 HOW TO START NUTINY-SDK-M4521 ON THE IAR EMBEDDED WORKBENCH

4.1 IAR Embedded Workbench Software Download and Install

Please connect to IAR company website (http://www.iar.com) to download the IAR Embedded Workbench and install the EWARM.

4.2 Nuvoton Nu-Link Driver Download and Install

Please visit the Nuvoton company NuMicro® website (http://www.nuvoton.com/NuMicro) to download the "NuMicro® IAR EWARM Driver" file. When the Nu-Link driver has been well downloaded, please unzip the file and execute the "Nu-Link_Keil_Driver.exe" to install the driver.

4.3 Hardware Setup

The hardware setup is shown as Figure 4-1.

Figure 4-1 NuTiny-SDK-M4521 Hardware Setup

4.4 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-SDK-M4521 board. It can be found on Figure 4-2 list directory and downloaded from Nuvoton NuMicro® website.

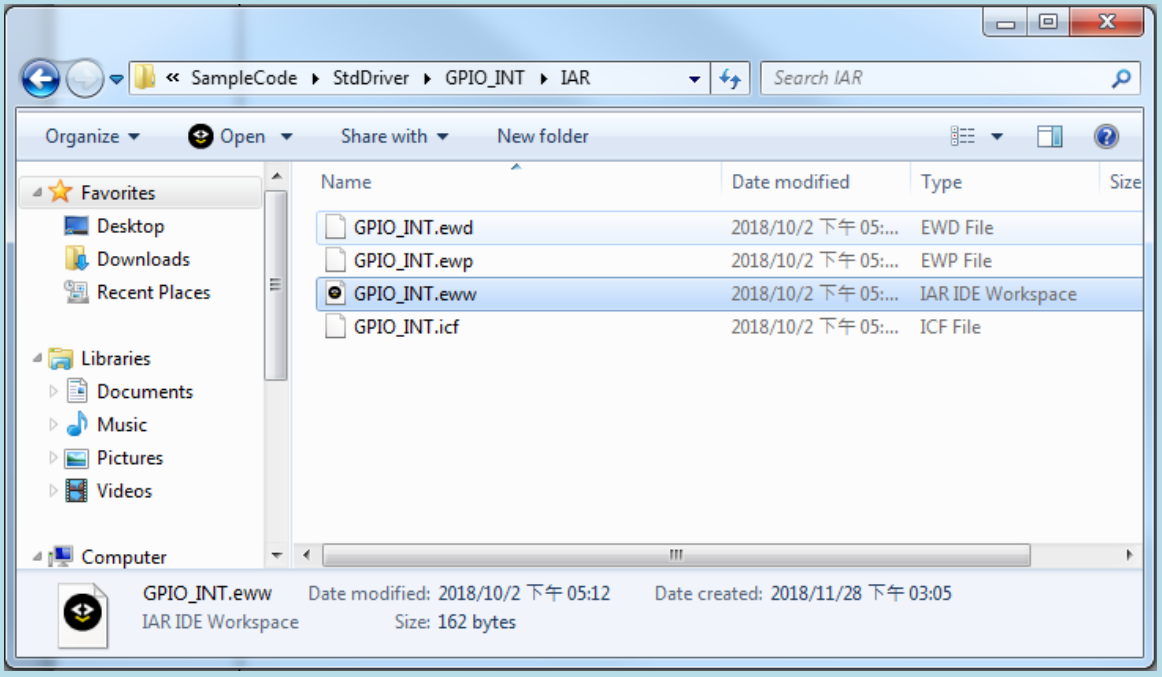
Directory	\\M4521_BSP_CMSIS_V3.00.000\SampleCode\StdDriver\GPIO_INT\IAR
Project File	

Figure 4-2 Example Directory

To use this example:

This sample code runs some functions about system manager controller and clock controller, and will show messages by Uart. Users can see the messages by following the steps of Chapter 5.

- Start IAR Embedded Workbench
- File-Open-Workspace
  Open the SYS.eww workspace file
- Project - Make
  Compile and link the SYS application
- Project – Download and Debug
  Program the application code into on-chip Flash ROM
  - Single step through code
  - Reset the device
  - Run the application

5 STARTING TO USE NU-LINK-ME 3.0 VCOM FUNCTION

5.1 Downloading and Installing VCOM Driver

Please connect to Nuvoton NuMicro® website (http://www.nuvoton.com/NuMicro) to download the “NuMicro® ICP Programming Tool” file. After the ICP Programming Tool driver is downloaded, please unzip the file and execute the “ICP Programming Tool.exe”. Simply follow the installation and optional steps to install ICP Programming Tool and Nu-Link USB Driver, which included VCOM driver.

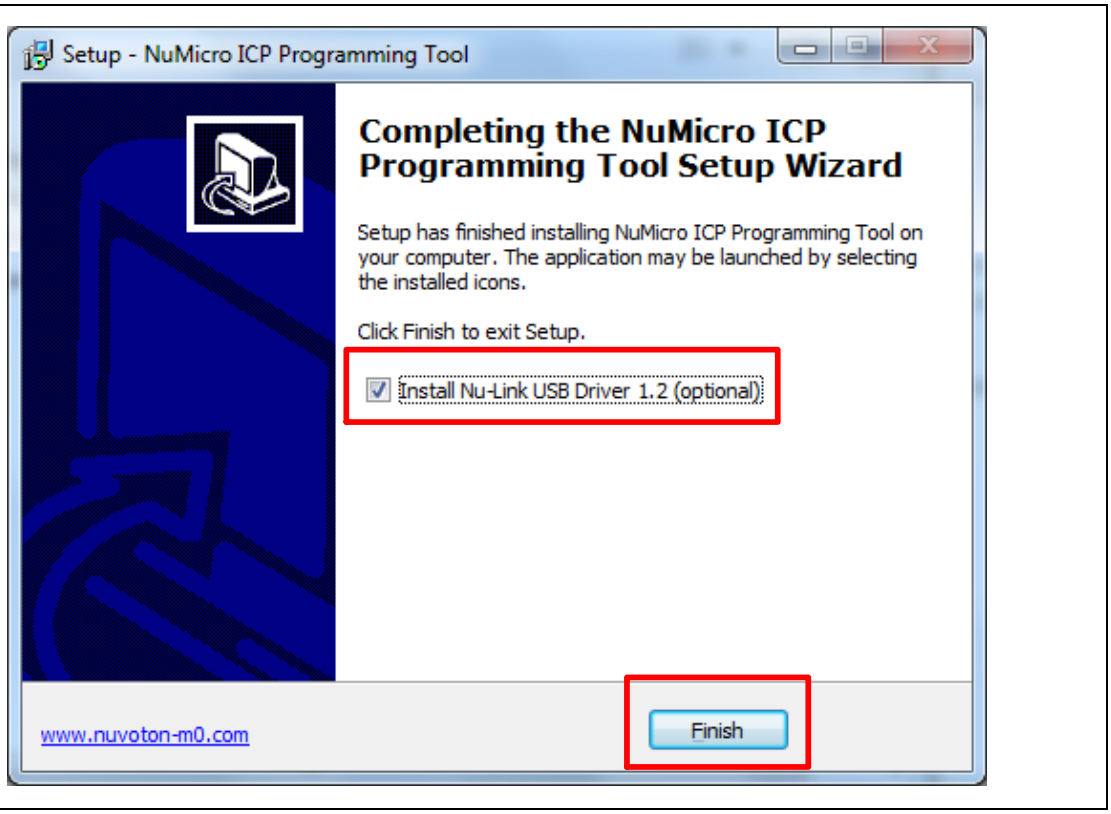


Figure 5-1 Optional Step after ICP Programming Tool Installation

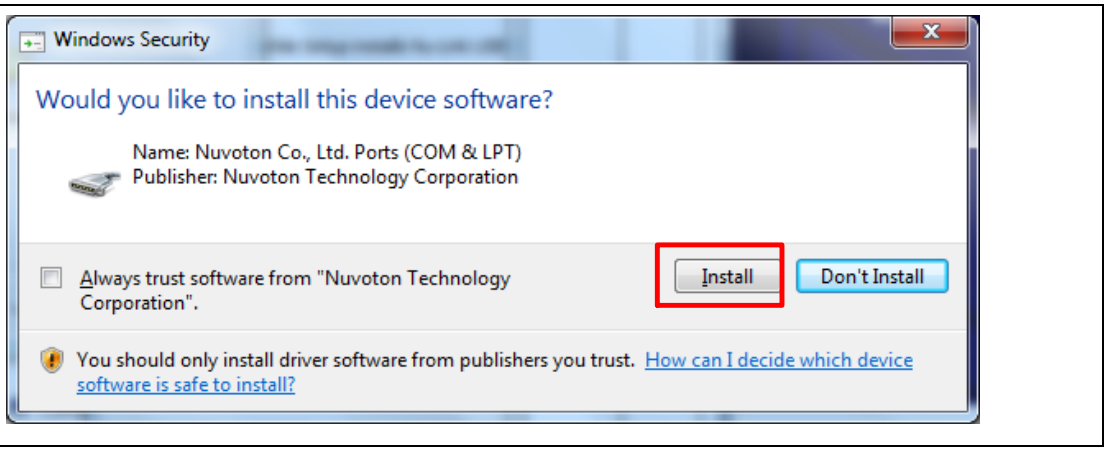


Figure 5-2 Install Nuvoton COM&LPT Driver

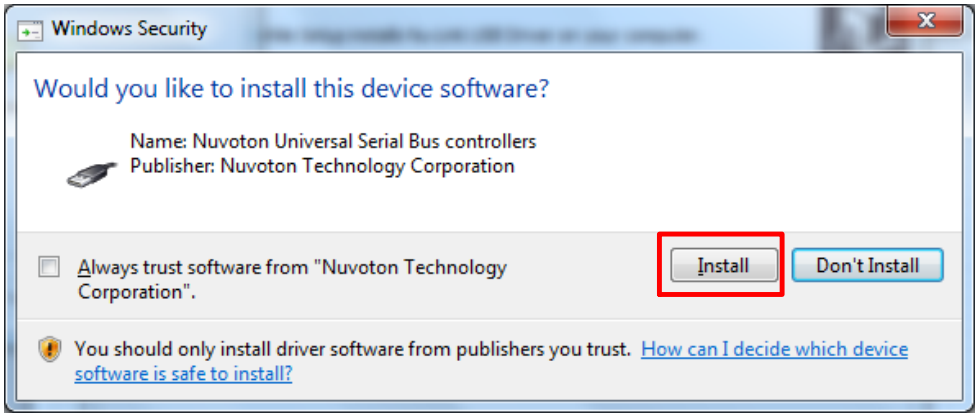


Figure 5-3 Install Nuvoton Universal Serial Bus Controllers

5.2 VCOM Mode Setting on NuTiny-SDK-M4521

Before the NuTiny-SDK-M4521 is connected to the PC, please enable SW2 VCOM function by switching on SW2. The NuTiny-EVB-M4521 transmits through UART0 to VCOM to send out data. Switch SW2 off when using UART0 function without VCOM function.

After connected USB port in Nu-Link-Me to the PC, user can find a “Nuvoton Virtual Com Port” from Device Manager as Figure 5-4.

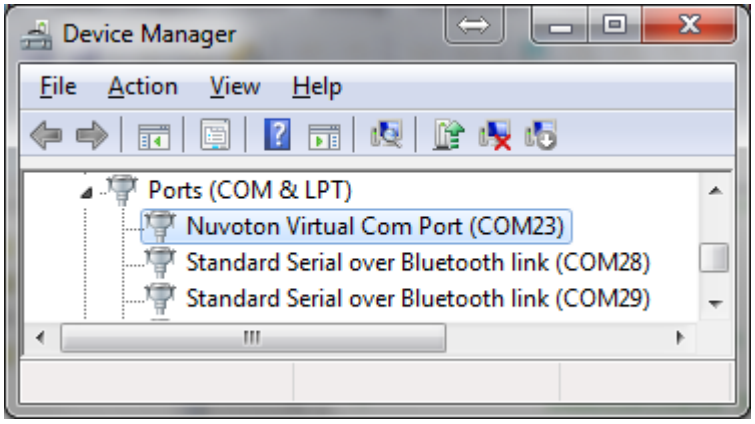


Figure 5-4 Nuvoton Virtual Com Port

5.3 Setup on the Development Tool

The example is demonstrated on the Keil µVision® IDE.

5.3.1 Check the Using UART on the Keil µVision® IDE

Please open the project and find system_M4521.h (which can be found in \\M4521_BSP_CMSIS_V3.00.000\Library\Device\Nuvoton\M4521\Include) to check the using UART in DEBUG_PORT. The setting has to be the same as the using UART in the NuTiny-EVB-M4521.

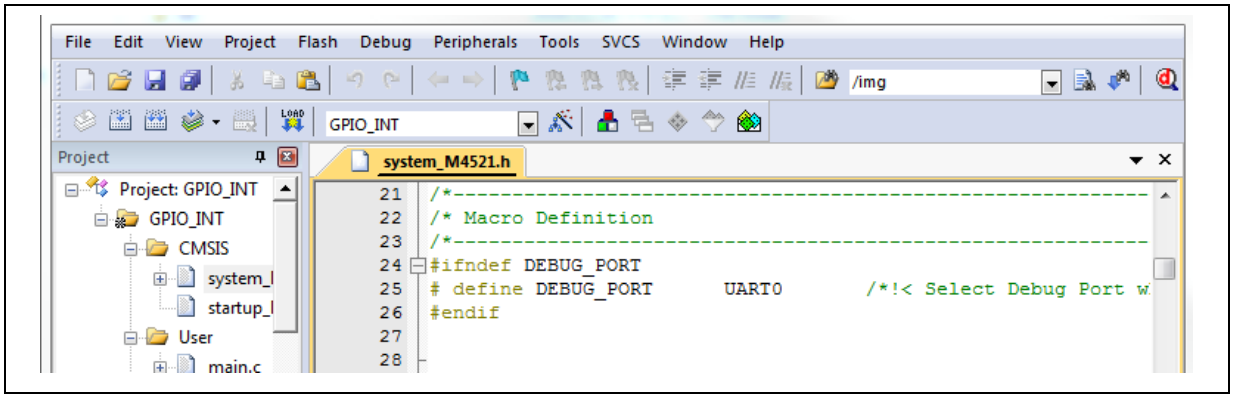
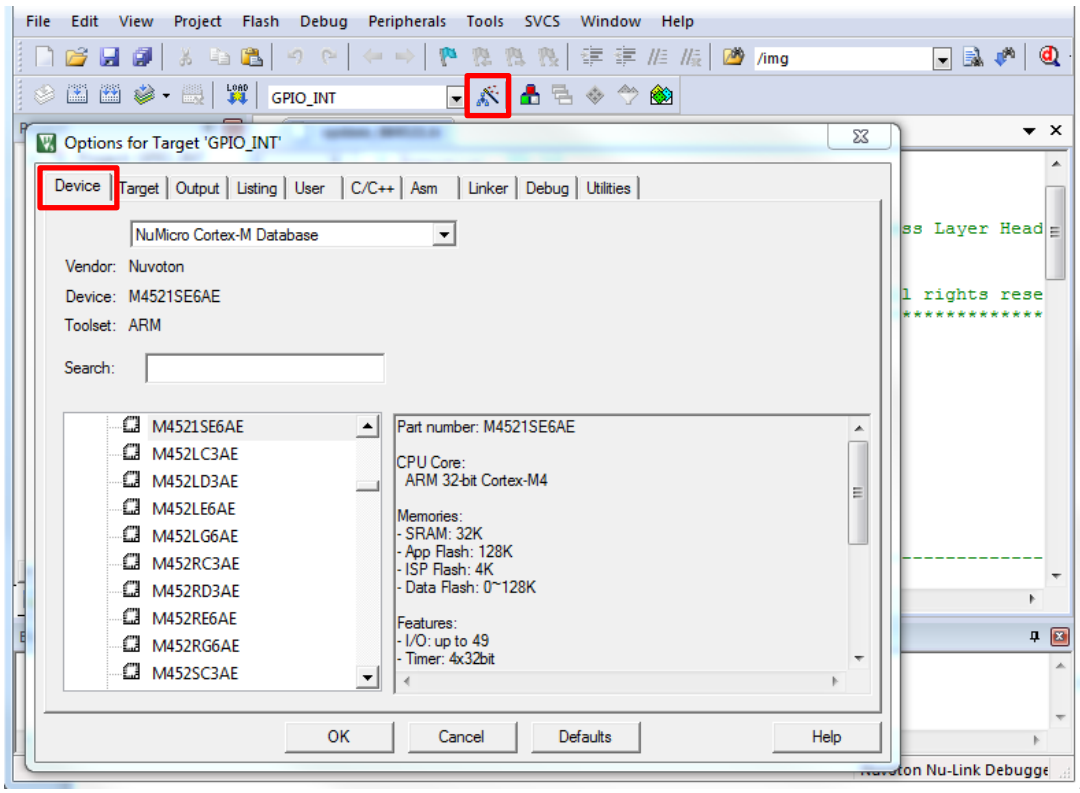


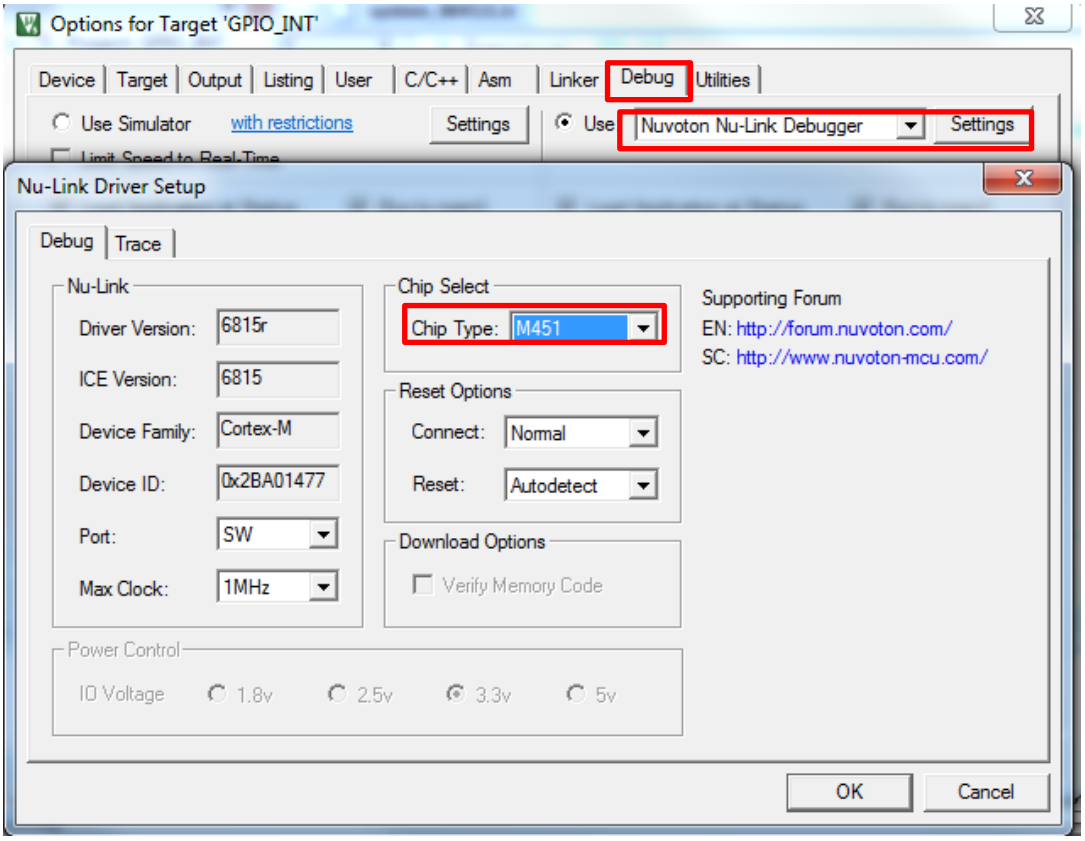
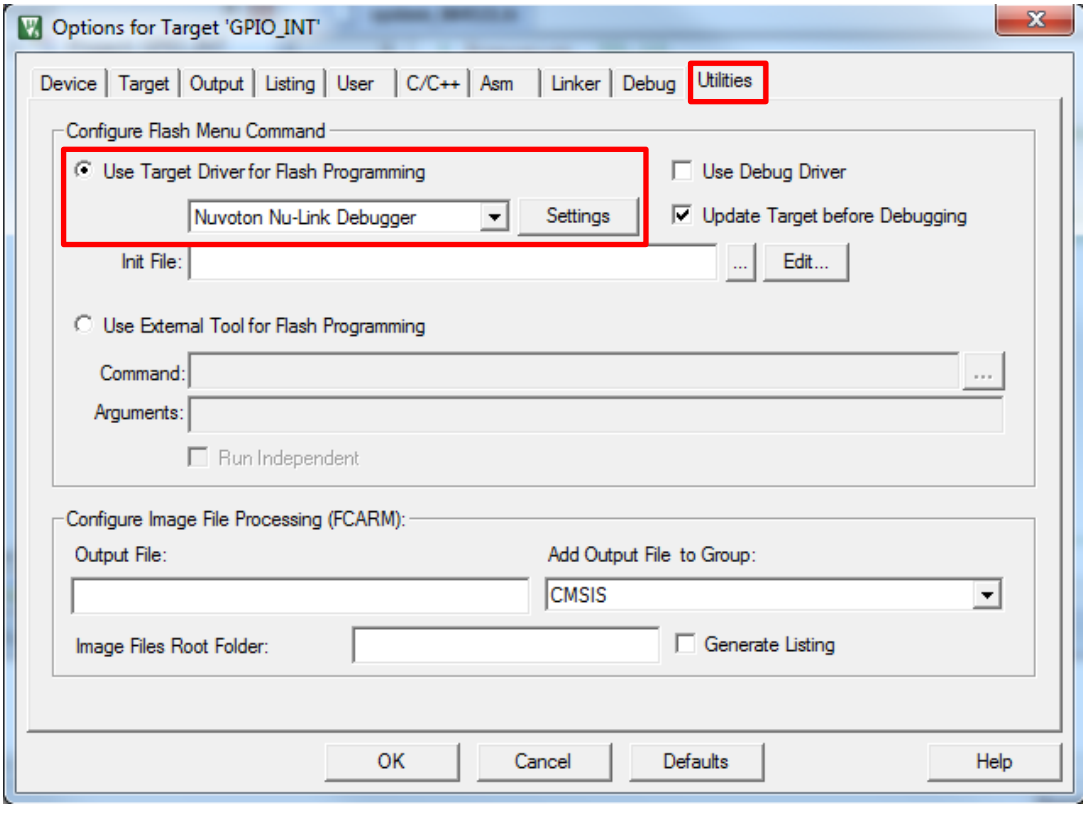
Figure 5-5 The Using UART on Keil µVision® IDE

5.3.2 Check the Target Device and Debug Setting

The target device has to be the same as the setting in Debug. Please click “Target Option” to open the Option windows, and find the setting in “Device”, “Debug”, and “Utilities” page. Please follow the steps below to check the setting.

Step 1



Step 2	 Options for Target 'GPIO_INT' Device Target Output Listing User C/C++ Asm Linker Debug Utilities Use Simulator with restrictions Settings Use Nuvoton Nu-Link Debugger Settings Nu-Link Driver Setup Debug Trace Nu-Link Driver Version: 6815r ICE Version: 6815 Device Family: Cortex-M Device ID: 0x2BA01477 Port: SW Max Clock: 1MHz Chip Select Chip Type: M451 Reset Options Connect: Normal Reset: Autodetect Download Options Verify Memory Code Power Control IO Voltage 1.8v 2.5v 3.3v 5v Supporting Forum EN: http://forum.nuvoton.com/ SC: http://www.nuvoton-mcu.com/ OK Cancel
Step 3	 Options for Target 'GPIO_INT' Device Target Output Listing User C/C++ Asm Linker Debug Utilities Configure Flash Menu Command Use Target Driver for Flash Programming Nuvoton Nu-Link Debugger Settings Use Debug Driver Update Target before Debugging Init File: Edit... Use External Tool for Flash Programming Command: Arguments: Run Independent Configure Image File Processing (FCARM): Output File: Add Output File to Group: CMSIS Image Files Root Folder: Generate Listing OK Cancel Defaults Help

5.3.3 Build and Download Code to NuTiny-SDK-M4521

Please build the project and download code to NuTiny-SDK-M4521.

5.3.4 Open the Serial Port Terminal

User can use serial port terminal, PuTTY for example, to print out debug message.

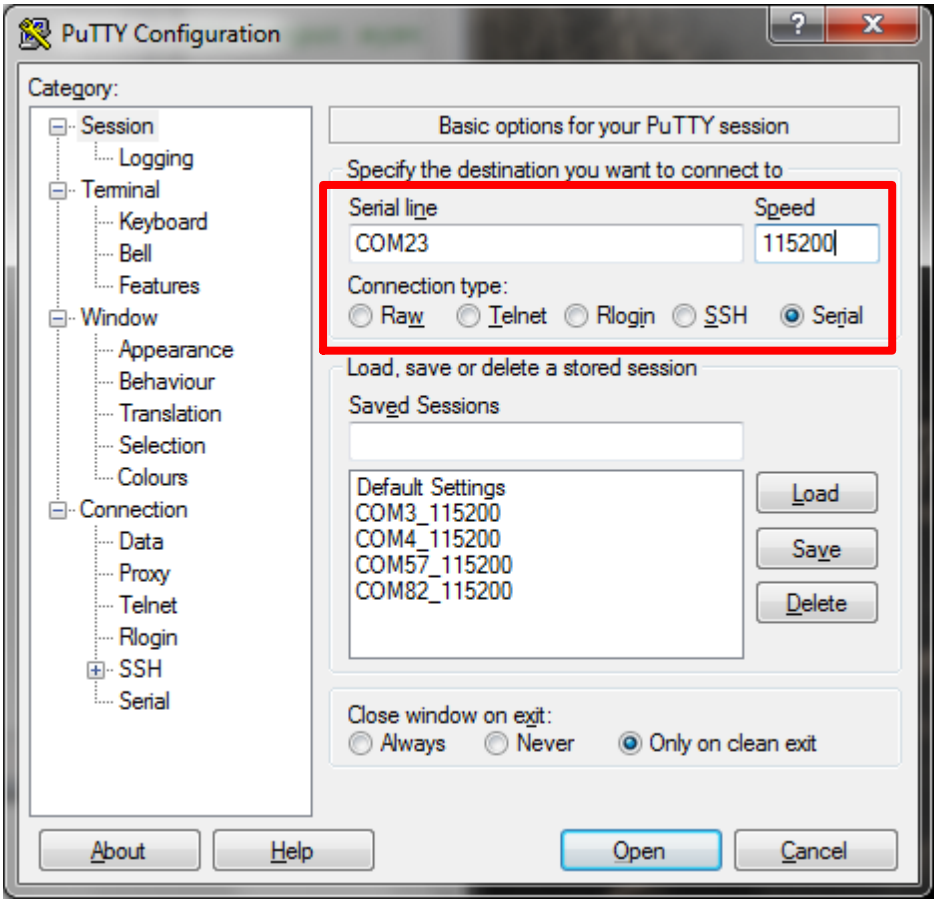


Figure 5-6 Set Baud Rate

5.3.5 Reset Chip

After pushing the reset button, the chip will reprogram application and print out debug message.

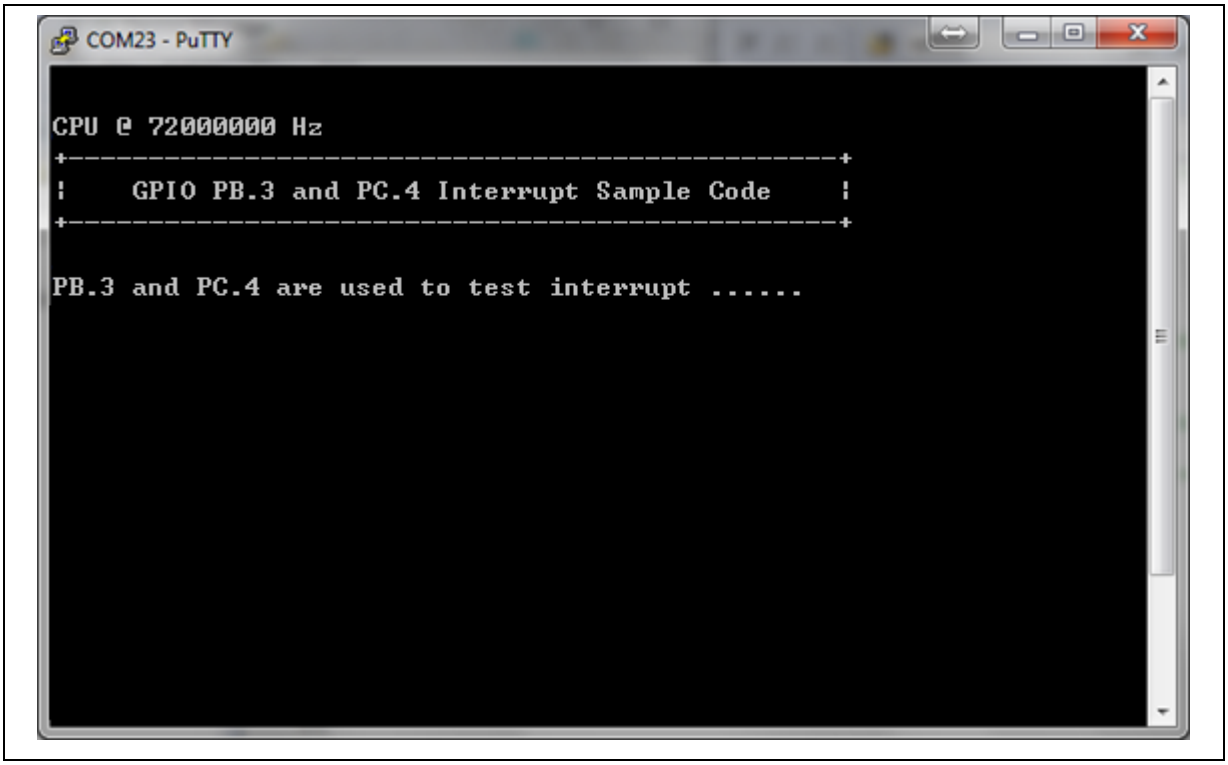
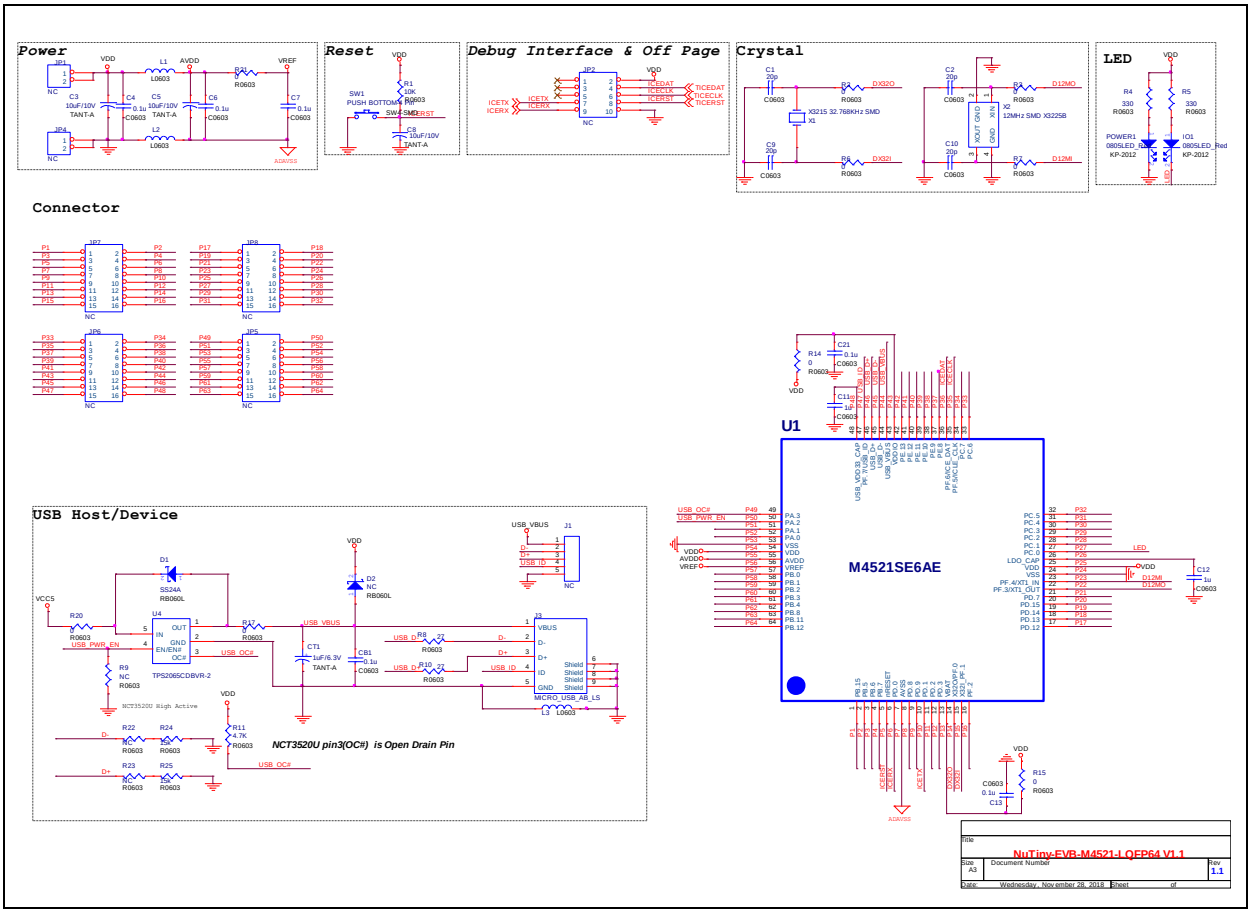


Figure 5-7 Serial Port Terminal Windows

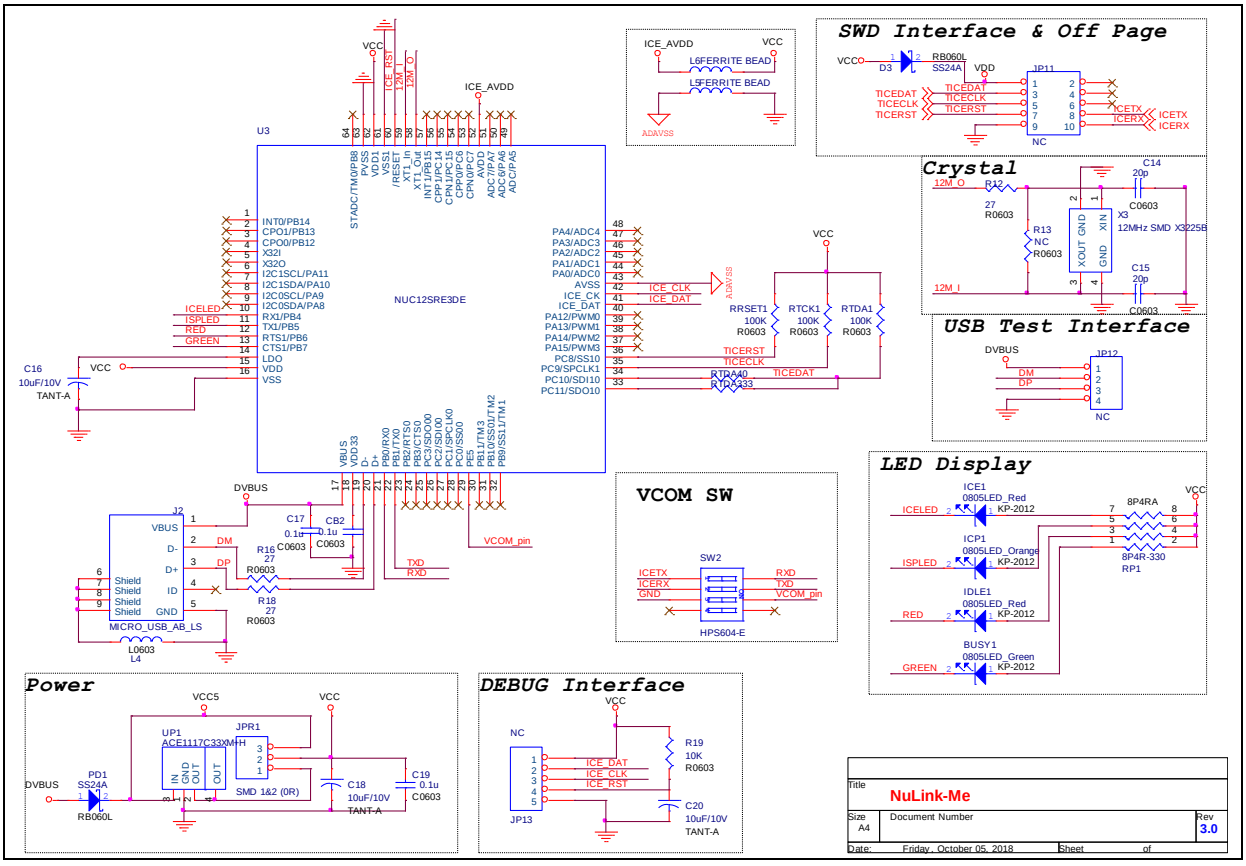
Notice: Please switch SW2 on before the NuTiny-SDK-M4521 connects to the PC. When the NuTiny-SDK-M4521 connects to the PC with SW2 switch on, PC will detect VCOM as a USB device and the detection will only be processed once. VCOM will not function if switch on SW2 after the connection.

6 NUTINY-SDK-M4521 SCHEMATIC

6.1 NuTiny-EVB-M4521 Schematic



6.2 Nu-Link-Me V3.0 Schematic



7 REVISION HISTORY

Date	Revision	Description
2018.11.28	1.00	1. Initially issued.

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