ARM Cortex™-M0

32-BIT MICROCONTROLLER

NuTiny-SDK-NUC122 User Manual For NuMicro™ NUC122 Series

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

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Revision V1.0

1 Overview

NuTiny-SDK-NUC122 is the specific development tool for NuMicro™ NUC122 series. Users can use NuTiny-SDK-NUC122P to develop and verify the application program easily.
NuTiny-SDK-NUC122 includes two portions. One is NuTiny-EVB-122 and the other is Nu-Link-Me. NuTiny-EVB-122 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-NUC122 Introduction

NuTiny-SDK-NUC122 uses the NUC122RD2AN as the target microcontroller. Figure 2-1 is NuTiny-SDK-NUC122 for NUC122 series, the left portion is called NuTiny-EVB-122 and the right portion is Debug Adaptor called Nu-Link-Me.
NuTiny-EVB-122 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 NUC122 series features. The NuTiny-EVB-122 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. 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" for detail. These two documents will be stored in the local hard disk when the user installs each driver.

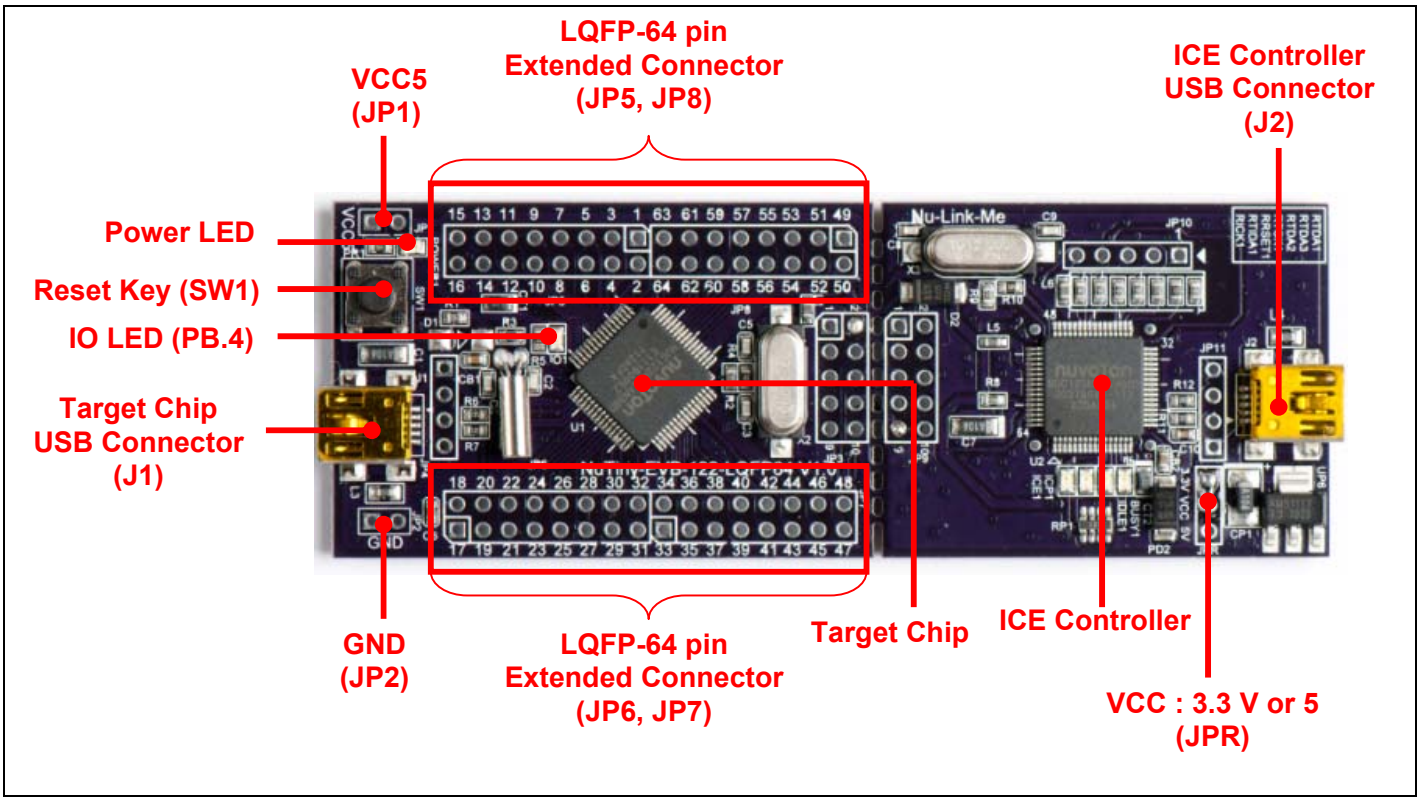

Figure 2-1 NuTiny-SDK-NUC122 (Purple PCB Board)

2.1 NuTiny-SDK-NUC122 Jumper Description

2.1.1 Power Setting

- J1: USB port in NuTiny-EVB-122
- JP1: VCC5 Voltage connecter in NuTiny-EVB-122
- J2: USB port in Nu-Link-Me

POWER Model	J2 USB Port	J1 USB Port	JP1 VCC5	Target MCU Voltage
Model 1	Connect to PC	X	DC 3.3 V or 5 V output [1]	DC 3.3 V or 5 V [1]
Model 2	X	Connect to PC	DC 4.8 V or 5 V output [2]	DC 4.8 V or 5 V [2]
Model 3	X	X	DC 2.5 V ~ 5.5 V input	DC 2.5 V ~ 5.5 V that decided by JP1 VCC5 input

X: Unused.
Note 1: It is depended on the setting (VCC via connect to 3.3 V or 5 V via) at JPR jumper in Nu-Link-Me.
Note 2: It must put a diode device (4.8 V) or make the both pins short (5 V) at the D1 in NuTiny-EVB-122.

2.1.2 Debug Connector

- JP3: Connector in target board (NuTiny-EVB-122) for connecting with Nuvoton ICE adaptor (Nu-Link or Nu-Link-Me)
- JP9: Connector in ICE adaptor (Nu-Link-Me) for connecting with a target board (for example NuTiny-EVB-122)

2.1.3 USB Connector

- J1: Mini USB Connector in NuTiny-EVB-122 for application using
- J2: Mini USB Connector in Nu-Link-Me connected to a PC USB port

2.1.4 Extended Connector

- JP5, JP6, JP7 and JP8: Connect to all chip pins in NuTiny-EVB-122

2.1.5 Reset Button

- SW1: Reset button to reset the target chip in NuTiny-EVB-122

2.1.6 Power Connector

- JP1: VCC5 connector in NuTiny-EVB-122
- JP2: GND connector in NuTiny-EVB-122

2.2 Pin Assignment for Extended Connector

NuTiny-EVB-122 provides NUC122RD2AN on board and the extended connector for LQFP-64 pin. Table 2-1 is the pin assignment for NUC122RD2AN.

Pin No	Pin Name	Pin No	Pin Name
01	PB.14, /INT0	33	VSS
02	X32O	34	PC.13
03	X32I	35	PC.12
04	PA.11, I2C1SCL	36	PC.11, MOSI10
05	PA.10, I2C1SDA	37	PC.10, MISO10
06	PD.8	38	VDD
07	PD.9	39	PC.9, SPICLK1
08	PD.10	40	PC.8, SPISS10
09	PD.11	41	PA.15, PWM3
10	PB.4, RX1	42	VSS
11	PB.5, TX1	43	PA.14, PWM2
12	PB.6, RTS1	44	PA.13, PWM1
13	PB.7, CTS1	45	PA.12, PWM0
14	LDO	46	ICE_DAT
15	VDD	47	ICE_CK
16	VSS	48	AVDD
17	VBUS	49	PD.0
18	VDD33	50	PD.1
19	D-	51	PD.2
20	D+	52	PD.3
21	PB.0, RX0	53	PD.4
22	PB.1, TX0	54	PD.5
23	PB.2, RTS0	55	PB.15, /INT1
24	PB.3, CTS0	56	XT1_OUT
25	PC.5	57	XT1_IN
26	PC.4	58	/RESET
27	PC.3, MOSI00	59	VSS
28	PC.2, MISO00	60	VDD
29	PC.1, SPICLK0	61	PS2DAT
30	PC.0, SPISS00	62	PS2CLK
31	PB.10, TM2, SPISS01	63	PVSS
32	PB.9, TM1, SPISS11	64	PB.8, TM0

Table 2-1 Pin Assignment for NUC122 LQFP-64

2.3 NuTiny-SDK-NUC122 PCB Placement

Users can refer to Figure 2-2 for the NuTiny–SDK-NUC122 PCB placements.

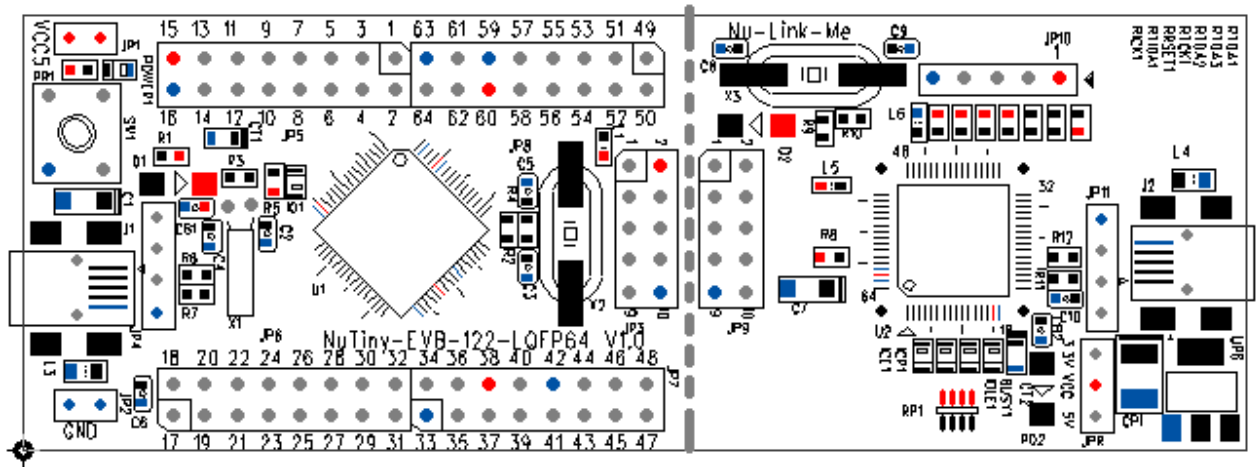

Figure 2-2 NuTiny-SDK-NUC122 PCB Placement

3 How to Start NuTiny-SDK-NUC122 on the Keil µVision® 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. Please refer to Chapter 6.1 for the detail download flow. 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

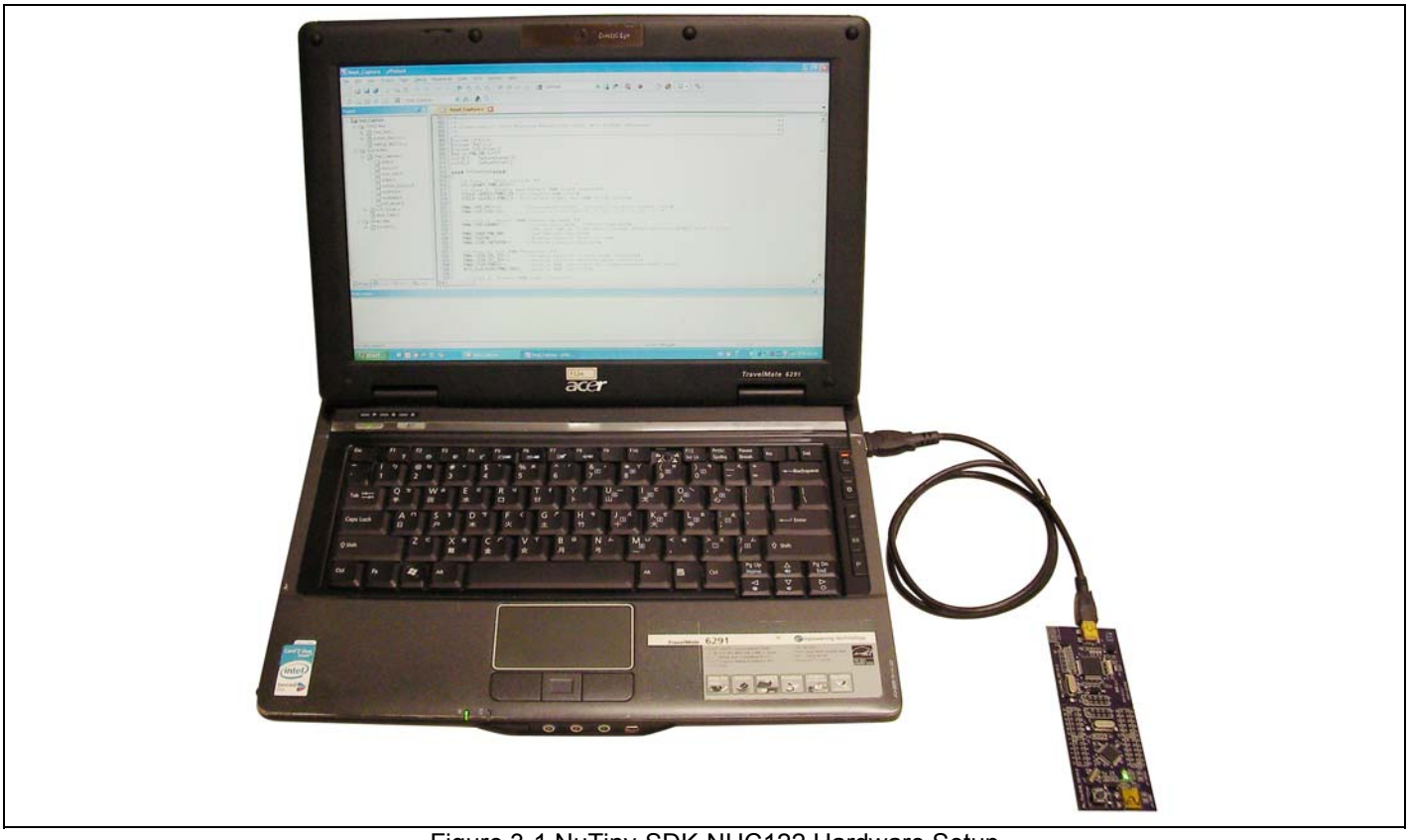

Figure 3-1 NuTiny-SDK-NUC122 Hardware Setup

3.4 Smpl_NuTiny-NUC122 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-SDK-NUC122 board. It can be found on Figure 3-2 list directory and downloaded from Nuvoton NuMicro™ website following on Chapter 6.3.

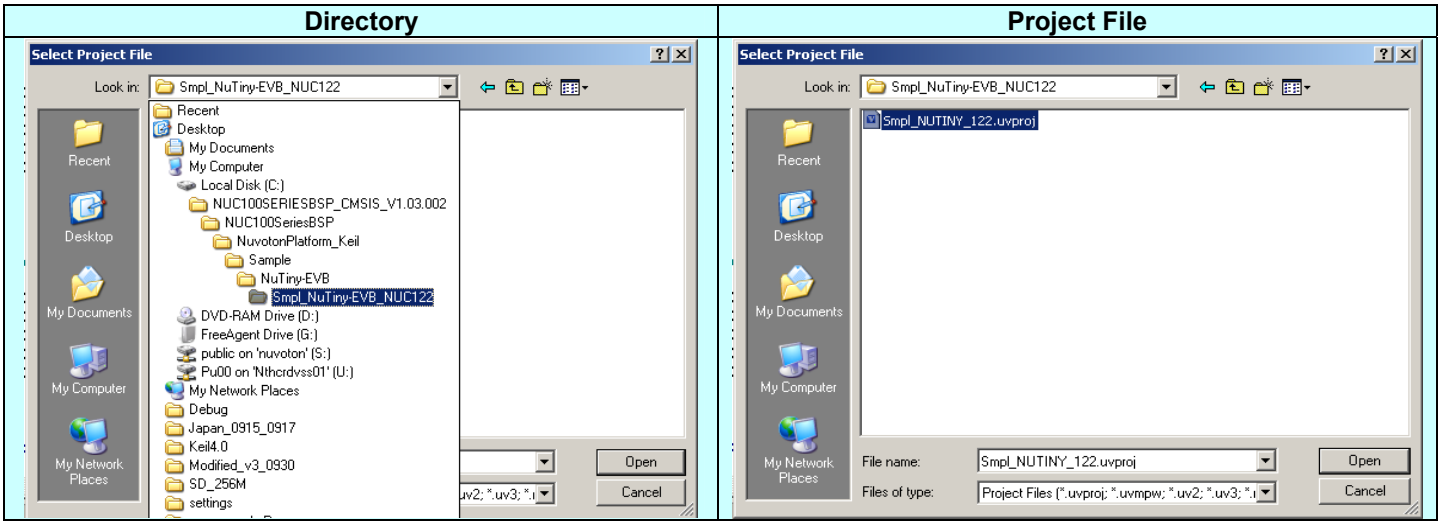

Figure 3-2 Smpl_NuTiny_122 Example Directory

To use this example:
The PB.4 LED will toggle on the NuTiny-EVB-122 board.

- **Start µVision®**
- **Project-Open**
  Open the Smpl_NuTiny_122.uvproj project file
- **Project - Build**
  Compile and link the Smpl_NuTiny-NUC122 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-NUC122 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 connect to the Nuvoton Company NuMicro™ website (http://www.nuvoton.com/NuMicro) to download "NuMicro™ IAR ICE driver user manual" file. Please refer to Chapter 6.2 for the detail download flow. When the Nu-Link driver has been well downloaded, please unzip the file and execute the "Nu-Link_IAR_Driver.exe" to install the driver.

4.3 Hardware Setup

The hardware setup is shown as Figure 4-1

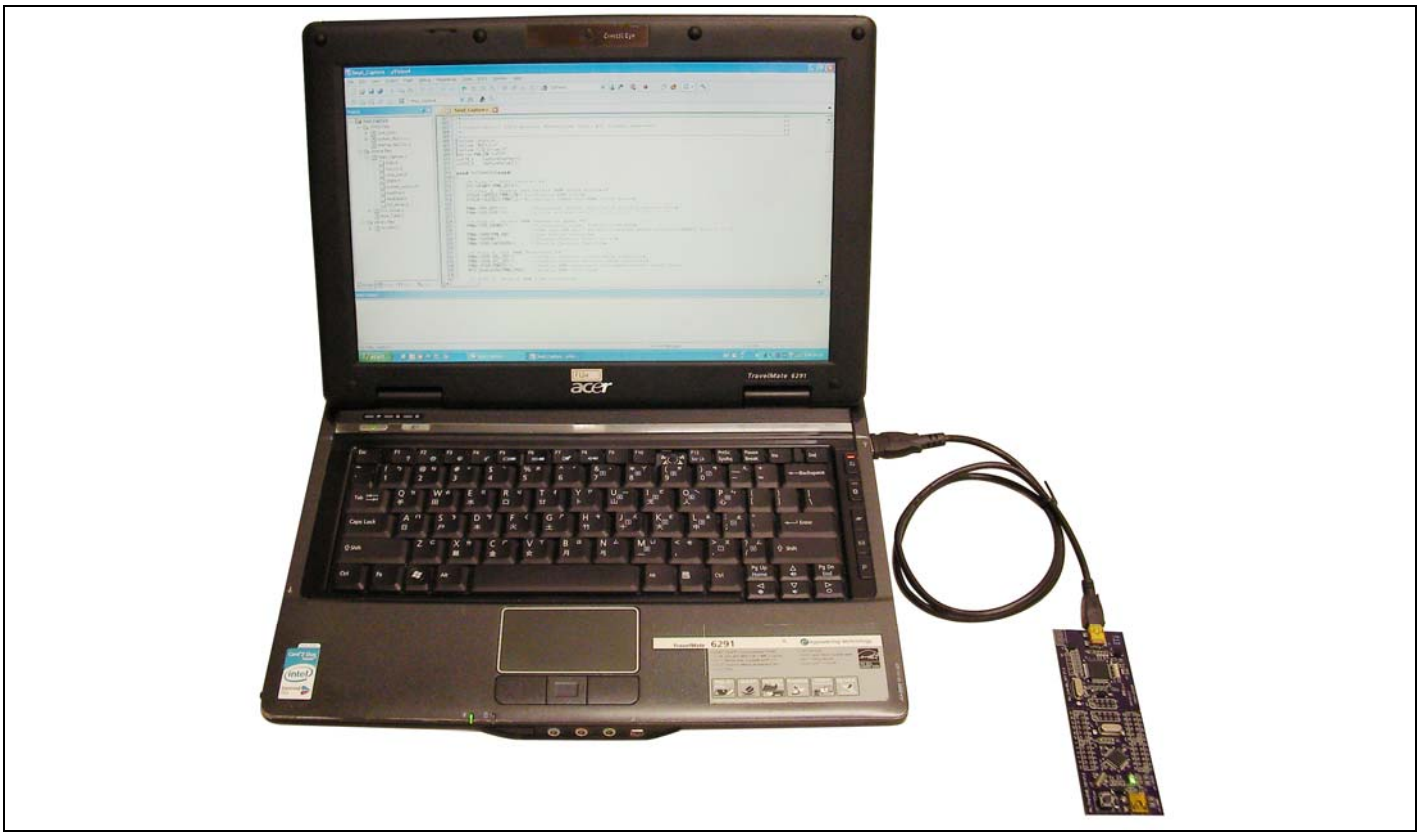

Figure 4-1 NuTiny-SDK-NUC122 Hardware Setup

4.4 Smpl_NuTiny-NUC122 Example Program

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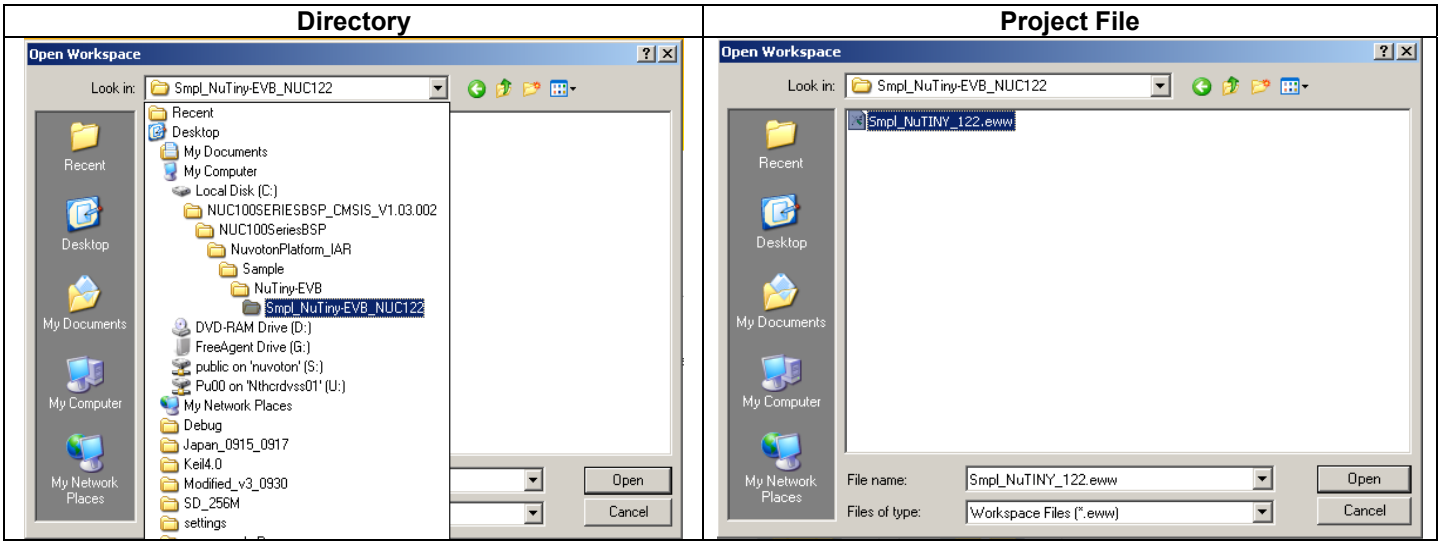
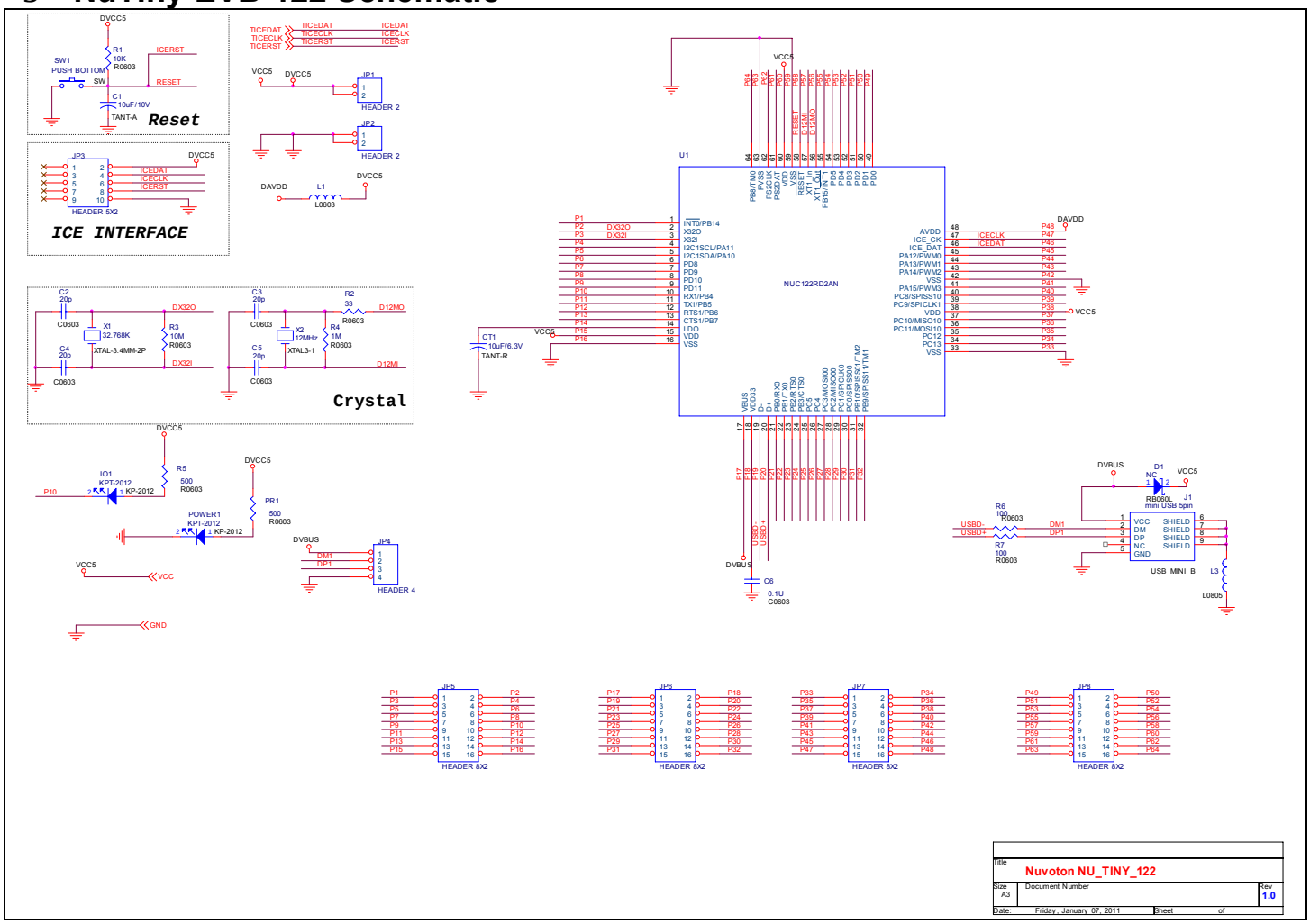


Figure 4-2 Smpl_NuTiny-NUC122 Example Directory

To use this example:
The PB.4 LED will toggle on the NuTiny-EVB-122 board.

- **Start IAR Embedded Workbench**
- **File-Open-Workspace**
  Open the Smpl_NuTiny_122.eww workspace file
- **Project - Make**
  Compile and link the Smpl_NuTiny-122 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 NuTiny-EVB-122 Schematic



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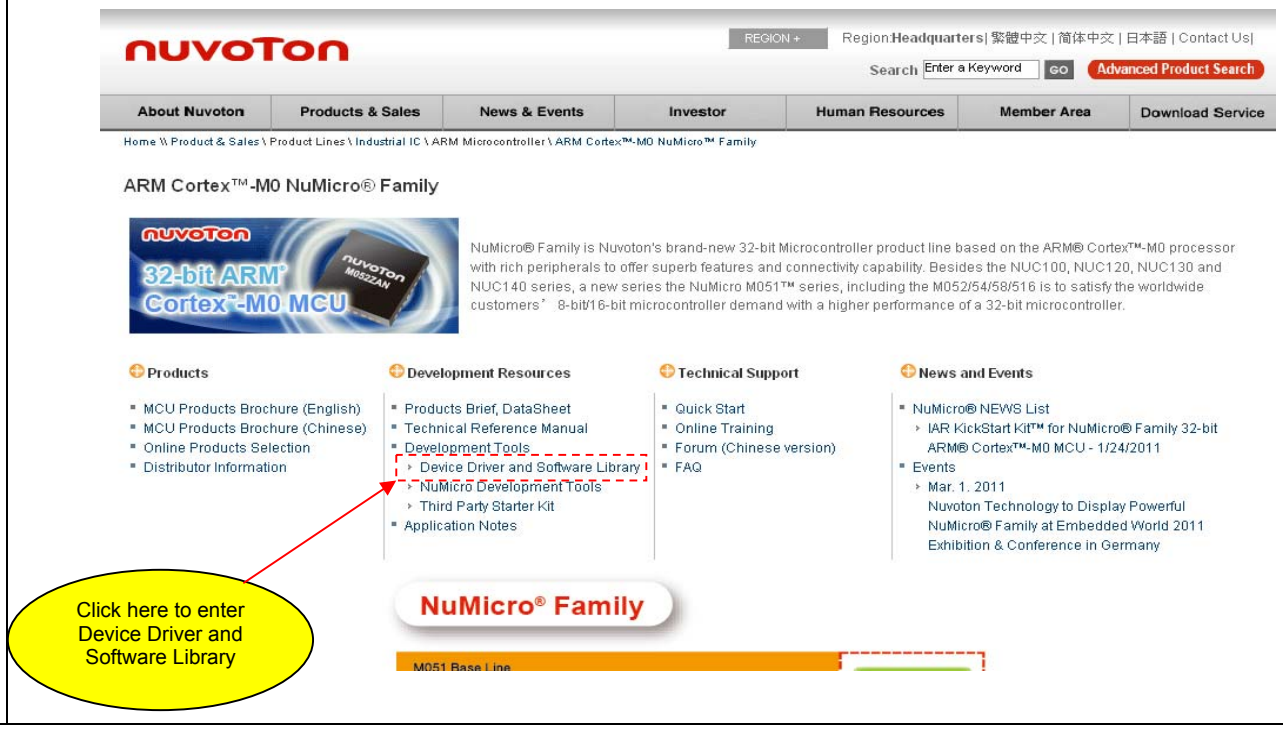
6 Download NuMicro™ Family Related Files from Nuvoton Website

6.1 Download NuMicro™ Keil µVision® IDE Driver

Step1	Visit the Nuvoton NuMicro™ website: http://www.nuvoton.com/NuMicro
Step2	

Step 3

M051 Series BSP_RegCtrlPrg_v1.00.001.zip NUC100 Series Driver Reference Guide	M051 series software package based on register programming coding rule for sample code & user guide.	V1.00.001 V1.03.001
NUC100 Series BSP_CMSIS_v1.03.002.zip NUC100 Series Driver Reference Guide (Simplified Chinese)	NUC100 series software package based on CMSIS version 1.3. It supports both IAR and Keil development environment with drivers and samples codes. Examples source code for NuTiny-100/120 and Learining Board are included. For detailed, please download it and unzip it.	V1.03.002 V1.03.001

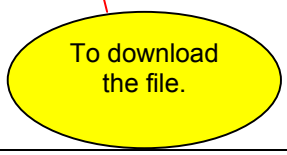
Programmer Software Tools Package

File name	Description	Version
ICP Programming Tool (Build 4228) V1.03.zip	NuMicro ICP tool & user manual	V1.03
ISP Programming Tool.zip	NuMicro ISP Programming Tool & user manual	V1.40
NuGang Programmer V5.31.zip	NuGang Programmer software & user manual	V5.31

Nu-Link Driver

File name	Description	Version
Nu-Link Driver for Keil RVMDK(Build 4228) V1.03.zip	This driver is to support Nu-Link recognized by Keil RVMDK Development Environment and support all NuMicro Family Devices selectable.	V1.03
Nu-Link Driver for IAR EWARM(Build 4228) V1.03.zip	This driver is to support Nu-Link recognized by IAR EWARM Development Environment and support all NuMicro Family Devices selectable.	V1.03

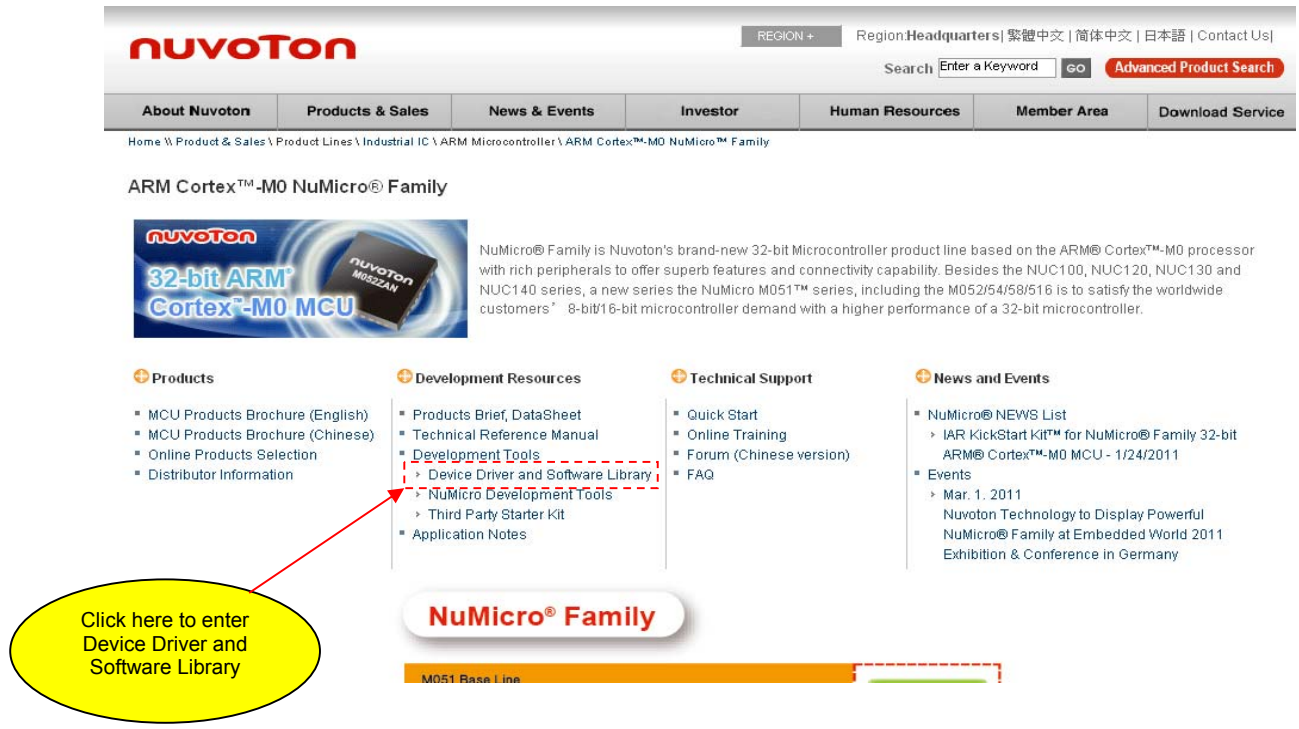
Contact us: NuMicro@nuvoton.com



Step 4

Download the NuMicro™ Keil µVision® IDE driver

6.2 Download NuMicro™ IAR EWARM Driver

Step1	Visit the Nuvoton NuMicro™ website: http://www.nuvoton.com/NuMicro
Step2	

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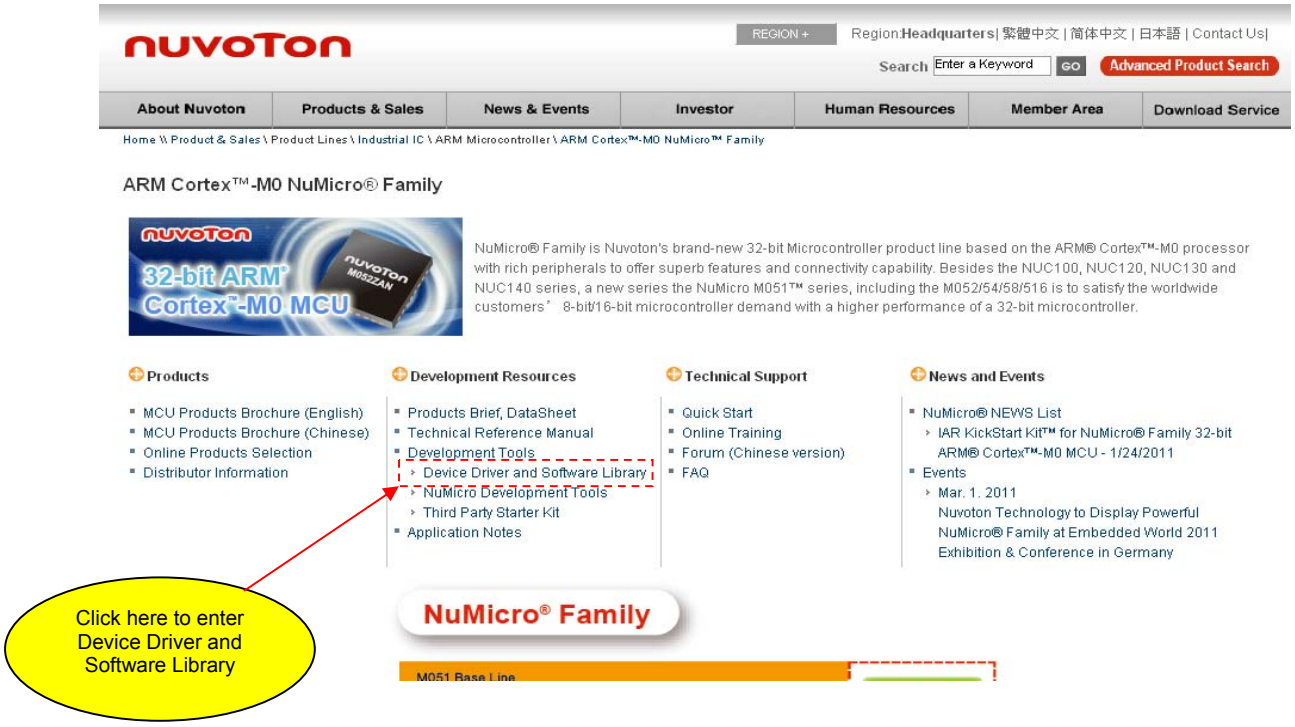
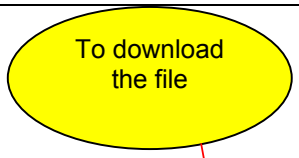
Step 4

Download the NuMicro™ IAR Embedded Workbench® driver

6.3 Download NuMicro™ NUC100 Series BSP Software Library

Step1	Visit the Nuvoton NuMicro™ website: http://www.nuvoton.com/NuMicro
Step2	

Step 3



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Step 4

Download the NuMicro™ NUC100 series software library

7 Revision History

Version	Date	Page	Description
1.0	Mar. 25, 2011	--	Initial Release

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