

nuvoTon NuTiny-SDK-NUC122 ARM Cortex-M0 32-Bit Microcontroller User Manual

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NuTiny-SDK-NUC122 User Manual

ARM Cortex™-M0 32-BIT MICROCONTROLLER

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

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Overview

NuTiny-SDK-NUC122 is the specific development tool for the 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 the equipment.

NuTiny-SDK-NUC122 Introduction

NuTiny-SDK-NUC122 uses the NUC122RD2AN as the target microcontroller. Figure 2-1 is NuTiny-SDK-NUC122 for the 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 onboard 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 the NuLink-Me Debug adaptor with IAR or Keil, please refer to the "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.

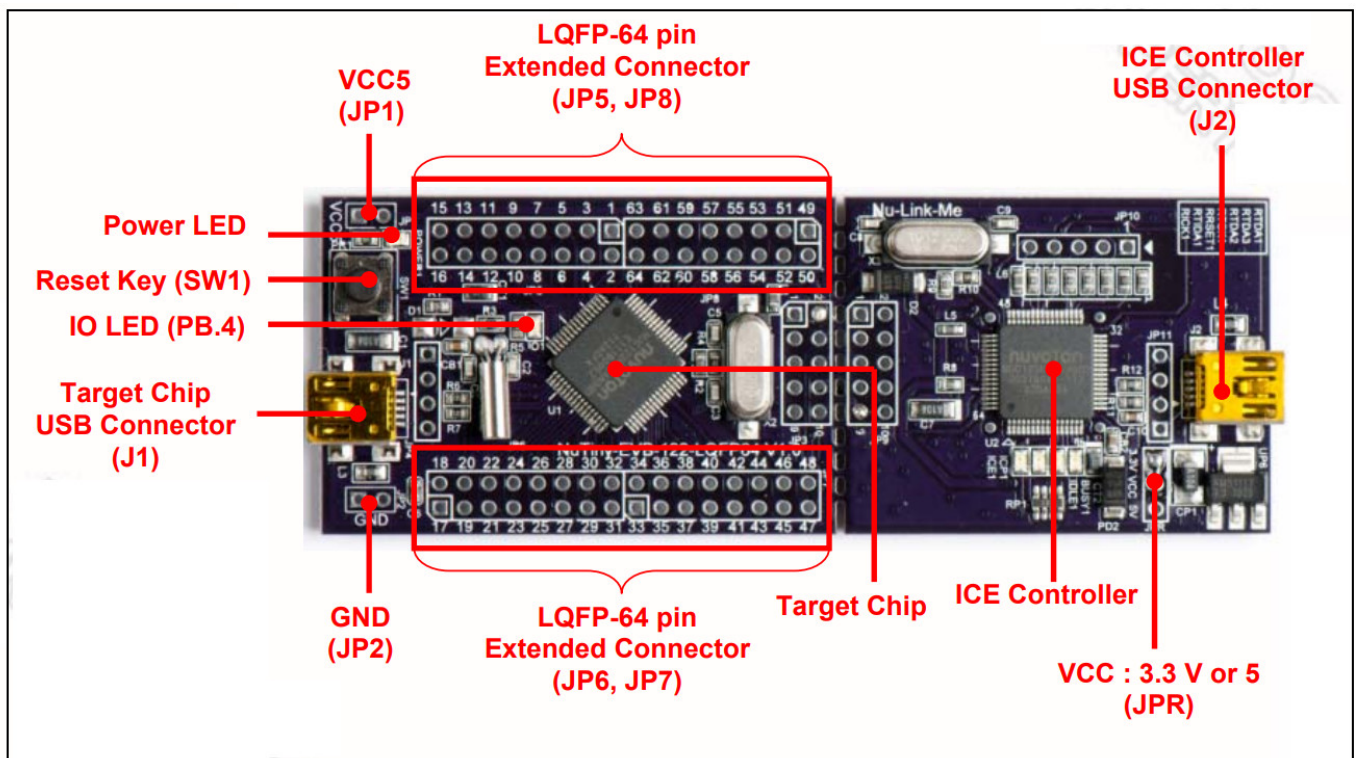


Figure 2-1 NuTiny-SDK-NUC122 (Purple PCB Board)

2.1 NuTiny-SDK-NUC122 Jumper Description

2.1.1 Power Setting

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

POWER Model	J2 USB Port	J1 USB Port	JP1 VCC5
Model 1	Connect to PC	X	DC 3.3 V or 5 V output [1]
Model 2	X	Connect to PC	DC 4.8 V or 5 V output [2]
Model 3	X	X	DC 2.5 V ~ 5.5 V ir

X: Unused.

Note 1: It is depended on the setting (VCC via connecting to 3.3 V or 5 V via) at the JPR jumper in Nu-Link-Me.

Note 2: It must put a diode device (4.8 V) or make 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 NuLink-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 the 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 the 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	X320	34	PC.13
03	X321	35	PC.12
04	PA.11, I2C1SCL	36	PC.11, MOSI10
05	PA.10, I2C1SDA	37	PC.10, MIS010
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, PWM
14	LDO	46	ICE DAT
15	VDD	47	ICE CK
16	VSS	48	ADD
17	VBUS	49	PD.0
18	VDD33	50	PD.1
19	D-	51	PD.2
20	D+	52	PD.3
21	PB.0, RXO	53	PD.4
22	PB.1, TXO	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, MOS100	59	VSS
28	PC.2, MIS000	60	VDD
29	PC.1, SPICLK0	61	PS2DAT
30	PC.0, SPISSOO	62	PS2CLK
31	PB.10, TM2, SPISSO1	63	PVSS
32	PB.9, TM1, SPISS11	64	PB.8, TMO

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.

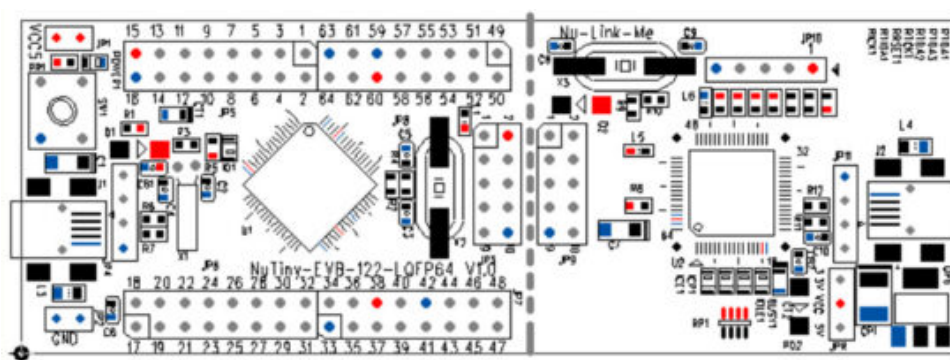


Figure 2-2 NuTiny-SDK-NUC122 PCB Placement

How to Start NuTiny-SDK-NUC122 on the Keil μ Vision® IDE®

3.1 Keil uVision

IDE Software Download and Install

Please visit the Keil company website (<http://www.keil.com>) to download the Keil μ Vision® 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® μ Vision IDE driver” file. Please refer to Chapter 6.1 for the detailed 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 in Figure 3-1

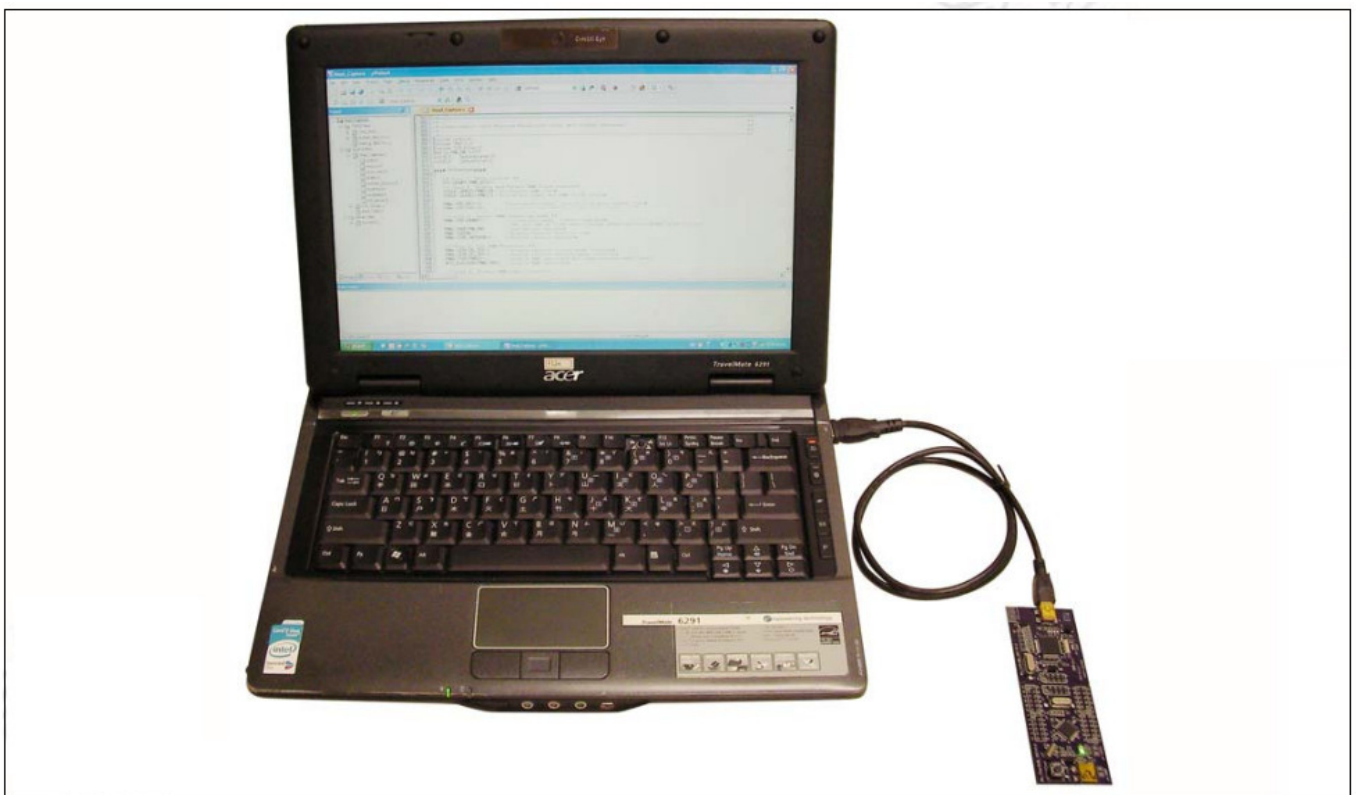


Figure 3-1 NuTiny-SDK-NUC122 Hardware Setup

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 the Figure 3-2 list directory and downloaded from the Nuvoton NuMicro™ website following Chapter 6.3.

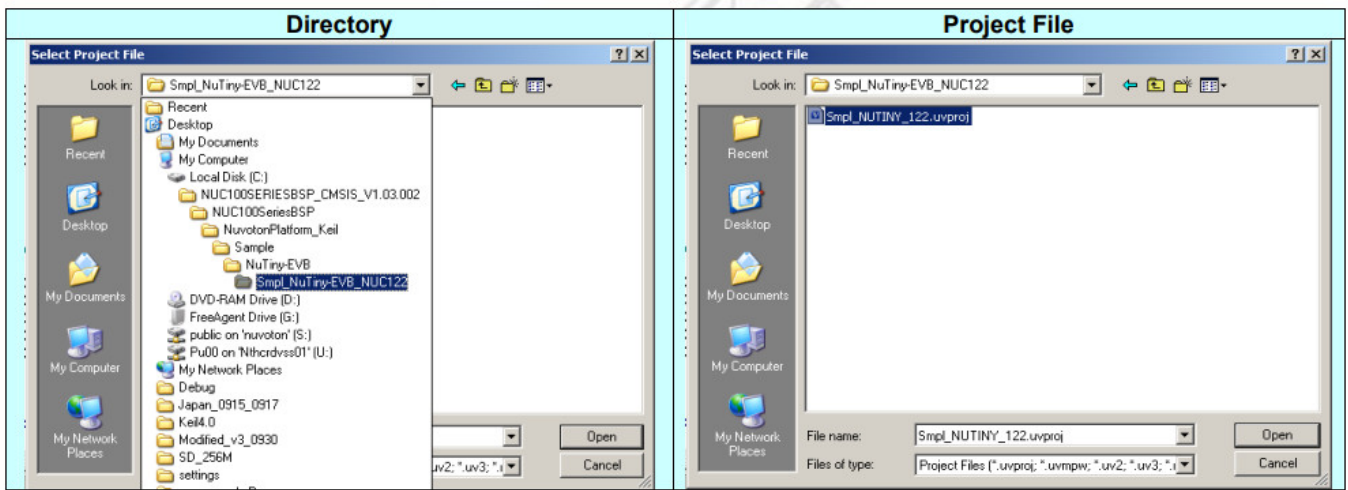


Figure 3-2 Smpl_NuTiny_122 Example Directory

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 to debug mode**

Using the debugger commands, you may:



- **Review variables in the watch window**



- **Single-step through code**



- **Reset the device**



- **Run the application**

How to Start NuTiny-SDK-NUC122 on the IAR Embedded Workbench

4.1 IAR Embedded Workbench Software Download and Install

Please connect to the 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 the “NuMicro™ IAR ICE driver user manual” file. Please refer to Chapter 6.2 for the detailed 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 in Figure 4-1



Figure 4-1 NuTiny-SDK-NUC122 Hardware Setup

4.4 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 4-2 list directory and downloaded from Nuvoton NuMicro™ website following on Chapter 6.3.

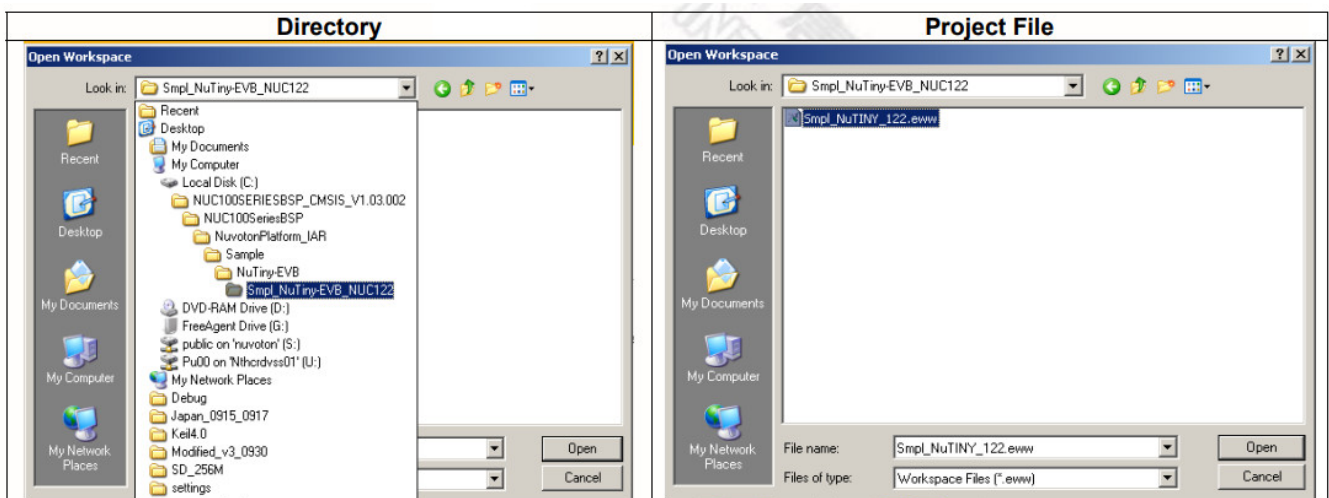


Figure 4-2 Smpl_NuTiny-NUC122 Example Directory

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**

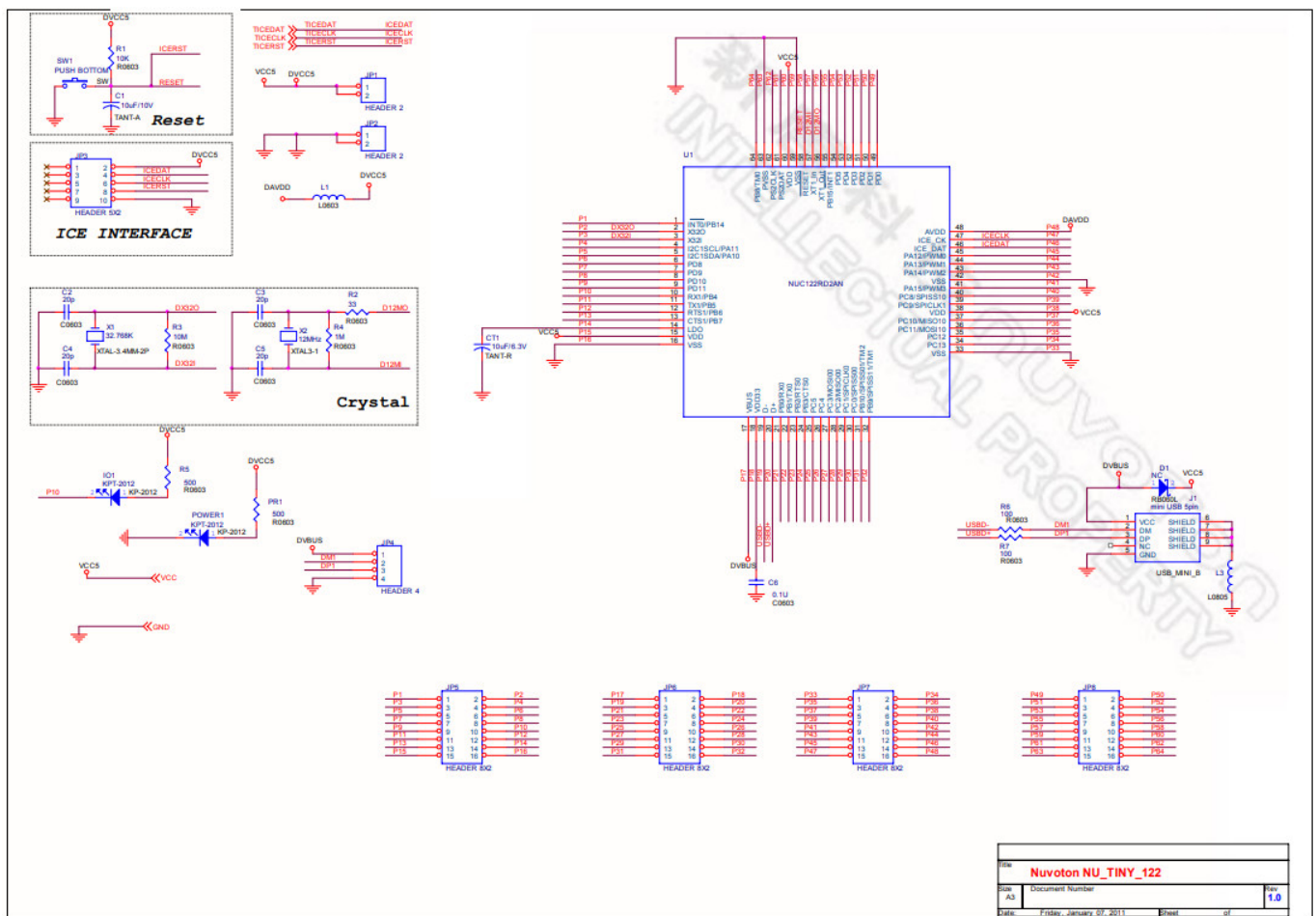
Program the application code into on-chip Flash ROM.

-  Single-step through code

-  Reset the device

-  Run the application

NuTiny-EVB-122 Schematic



Download NuMicro™ Family Related Files from Nuvoton Website

6.1 Download NuMicro™ Keil µVision® IDE Driver

Step 1

Visit the Nuvoton NuMicro™ website: <http://www.nuvoton.com/NuMicro>

Step 2

The screenshot shows the Nuvoton NuMicro website. The header includes the Nuvoton logo and a 'REGION' dropdown. The main navigation bar has links for 'About Nuvoton', 'Products & Sales', 'News & Events', and 'Investor'. Below this is a breadcrumb trail: 'Home \ Product & Sales \ Product Lines \ Industrial IC \ ARM Microcontroller \ ARM Cortex™-M0 NuMicro™ Family'. The main heading is 'ARM Cortex™-M0 NuMicro® Family'. A featured image shows a '32-bit ARM® Cortex™-M0 MCU' with the Nuvoton logo. To the right, a text block describes the NuMicro® Family as Nuvoton's brand-new 32-bit MCU with rich peripherals, offering superb features and the NUC140 series, a new series the NuMicro M051™ customers' 8-bit/16-bit microcontroller demand. Below this, there are three columns of links: 'Products' (MCU Products Brochure (English), MCU Products Brochure (Chinese), Online Products Selection, Distributor Information), 'Development Resources' (Products Brief, DataSheet, Technical Reference Manual, Development Tools, Device Driver and Software Library, NuMicro Development Tools, Third Party Starter Kit, Application Notes), and 'Technical Support' (Quick Start, Online Training, Forum (Chinese v), FAQ). A red arrow points from a yellow oval callout to the 'Device Driver and Software Library' link. The callout text is 'Click here to enter Device Driver and Software Library'. At the bottom, there is a 'NuMicro® Family' button and a 'M051 Base Line' label.

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- MCU Products Brochure (Chinese)
- Online Products Selection
- Distributor Information

- Products Brief, DataSheet
- Technical Reference Manual
- Development Tools
 - Device Driver and Software Library
 - NuMicro Development Tools
 - Third Party Starter Kit
- Application Notes





- Quick Start
- Online Training
- Forum (Chinese v)
- FAQ

Click here to enter Device Driver and Software Library

NuMicro® Family

M051 Base Line

Step 3

 M051 Series BSP_RegCtrlPrg_v1.00.001.zip	M051 series software packa
 NUC100 Series Driver Reference Guide	coding rule for sample code
 NUC100 Series BSP_CMSIS_v1.03.002.zip	NUC100 series software pa
 NUC100 Series Driver Reference Guide (Simplified Chinese)	supports both IAR and Keil and samples codes. Examp and Learning Board are inc it and unzip it.

Programmer Software Tools Package

File name	
 ICP Programming Tool (Build 4228) V1.03.zip	NuMicro ICP tool & t
 ISP Programming Tool.zip	NuMicro ISP Program
 NuGang Programmer V5.31.zip	NuGang Programm

Nu-Link Driver

File name	
 Nu-Link Driver for Keil RVMDK(Build 4228) V1.03.zip	This driver is to sup Development Enviro Devices selectable.
 Nu-Link Driver for IAR EWARM(Build 4228) V1.03.zip	This driver is to sup Development Enviro Devices selectable.

Contact us: NuMicro@nuvoton.com

To download
the file.

Step 4

Download the NuMicro™ Keil μVision® IDE driver

6.2 Download NuMicro™ IAR EWARM Driver

Step 1

Visit the Nuvoton NuMicro™ website: <http://www.nuvoton.com/NuMicro>

Step 2

The screenshot shows the Nuvoton website's ARM Cortex-M0 NuMicro Family page. The page layout includes a header with the Nuvoton logo and navigation links (About Nuvoton, Products & Sales, News & Events, Investor). Below the header is a breadcrumb trail: Home \ Product & Sales \ Product Lines \ Industrial IC \ ARM Microcontroller \ ARM Cortex™-M0 NuMicro™ Family. The main heading is 'ARM Cortex™-M0 NuMicro® Family'. A banner image shows a NuMicro M0522AN chip with the text '32-bit ARM® Cortex™-M0 MCU'. To the right of the banner, a paragraph describes the NuMicro® Family as Nuvoton's brand-new 32-bit microcontroller with rich peripherals, offering superb features and performance. Below the banner, there are three columns of links: Products, Development Resources, and Technical Support. The 'Development Resources' column contains links to Products Brief, DataSheet, Technical Reference Manual, Development Tools, Device Driver and Software Library, NuMicro Development Tools, Third Party Starter Kit, and Application Notes. A red dashed box highlights the 'Development Tools' and 'Device Driver and Software Library' links. A yellow callout bubble with a red arrow points to the 'Device Driver and Software Library' link, containing the text 'Click here to enter Device Driver and Software Library'. At the bottom of the page, there is a 'NuMicro® Family' section with a 'M051 Base Line' link.

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Step 3	<div data-bbox="882 91 1219 255" style="border: 1px solid black; border-radius: 50%; background-color: yellow; text-align: center; padding: 5px; margin-bottom: 10px;"> To download the file </div> <div data-bbox="627 271 1524 553"> <table border="1"> <tr> <td data-bbox="627 271 1233 383">  M051 Series BSP_RegCtrlPrg_v1.00.001.zip  NUC100 Series Driver Reference Guide </td><td data-bbox="1233 271 1524 383"> M051 series software package coding rule for sample code </td></tr> <tr> <td data-bbox="627 383 1233 553">  NUC100 Series BSP_CMSIS_v1.03.002.zip  NUC100 Series Driver Reference Guide (Simplified Chinese) </td><td data-bbox="1233 383 1524 553"> NUC100 series software supports both IAR and Keil and samples codes. Example and Learning Board are included. Please download it and unzip it. </td></tr> </table> </div> <div data-bbox="627 591 1126 624" style="margin-top: 20px;"> Programmer Software Tools Package </div> <div data-bbox="627 651 1524 871"> <table border="1"> <thead> <tr> <th data-bbox="627 651 1318 707">File name</th><th data-bbox="1318 651 1524 707"></th></tr> </thead> <tbody> <tr> <td data-bbox="627 707 1318 763">  ICP Programming Tool (Build 4228) V1.03.zip </td><td data-bbox="1318 707 1524 763">NuMicro ICP tool</td></tr> <tr> <td data-bbox="627 763 1318 819">  ISP Programming Tool.zip </td><td data-bbox="1318 763 1524 819">NuMicro ISP Programmer</td></tr> <tr> <td data-bbox="627 819 1318 871">  NuGang Programmer V5.31.zip </td><td data-bbox="1318 819 1524 871">NuGang Programmer</td></tr> </tbody> </table> </div> <div data-bbox="627 909 828 943" style="margin-top: 20px;"> Nu-Link Driver </div> <div data-bbox="627 969 1524 1238"> <table border="1"> <thead> <tr> <th data-bbox="627 969 1318 1025">File name</th><th data-bbox="1318 969 1524 1025"></th></tr> </thead> <tbody> <tr> <td data-bbox="627 1025 1318 1137">  Nu-Link Driver for Keil RVMDK(Build 4228) V1.03.zip </td><td data-bbox="1318 1025 1524 1137">This driver is to support Keil Development Environment. Devices selectable.</td></tr> <tr> <td data-bbox="627 1137 1318 1238">  Nu-Link Driver for IAR EWARM(Build 4228) V1.03.zip </td><td data-bbox="1318 1137 1524 1238">This driver is to support IAR Development Environment. Devices selectable.</td></tr> </tbody> </table> </div> <div data-bbox="627 1279 1026 1312" style="margin-top: 20px;"> Contact us: NuMicro@nuvoton.com </div>	 M051 Series BSP_RegCtrlPrg_v1.00.001.zip  NUC100 Series Driver Reference Guide	M051 series software package coding rule for sample code	 NUC100 Series BSP_CMSIS_v1.03.002.zip  NUC100 Series Driver Reference Guide (Simplified Chinese)	NUC100 series software supports both IAR and Keil and samples codes. Example and Learning Board are included. Please download it and unzip it.	File name		 ICP Programming Tool (Build 4228) V1.03.zip	NuMicro ICP tool	 ISP Programming Tool.zip	NuMicro ISP Programmer	 NuGang Programmer V5.31.zip	NuGang Programmer	File name		 Nu-Link Driver for Keil RVMDK(Build 4228) V1.03.zip	This driver is to support Keil Development Environment. Devices selectable.	 Nu-Link Driver for IAR EWARM(Build 4228) V1.03.zip	This driver is to support IAR Development Environment. Devices selectable.
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Step 4	Download the NuMicro™ NUC100 series software library																		

Revision History

Version D	Date	Page	Description
1	Mar. 25, 2011	—	Initial Release

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References

-  [IAR](#)
-  [Keil Embedded Development Tools for Arm, Cortex-M, Cortex-R4, 8051, C166, and 251 processor families.](#)
-  [ARM Cortex-M0 MCUs - Nuvoton](#)