



NuTiny-SDK-NUC029LAN User Manual

for NuMicro™ NUC029xAN Series

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1 Overview

The NuTiny-SDK-NUC029LAN is a specific development tool for NuMicro™ NUC029xAN series-NUC029LAN/NUC029TAN by which users can develop and verify the application program easily. The NuTiny-SDK-NUC029LAN includes two portions: NuTiny-EVB-NUC029LAN (an evaluation board) and Nu-Link-Me (Debug Adaptor). With the NuTiny-SDK-NUC029LAN, users do not need additional ICE or debug equipment.

2 Introduction to NuTiny-SDK-NUC029LAN

The following figure shows the NuTiny-SDK-NUC029LAN for NUC029xAN series, in which the left portion is called NuTiny-EVB-NUC029LAN and the right portion is Debug Adaptor called Nu-Link-Me.

The NuTiny-EVB-NUC029LAN is similar to other development board. Users can use it to develop and verify applications to emulate the real behavior. In fact, the real chip NUC029LAN is mounted on the board. The NuTiny-EVB-NUC029LAN can be a real system controller to design user target system.

The Nu-Link-Me is a Debug Adaptor which connects the USB port of your PC 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 Nu-Link-Me Debug adaptor with Keil or IAR, please refer to “Nuvoton NuMicro™ IAR ICE Driver User Manual” or Nuvoton NuMicro™ Keil ICE Driver User Manual” for details.

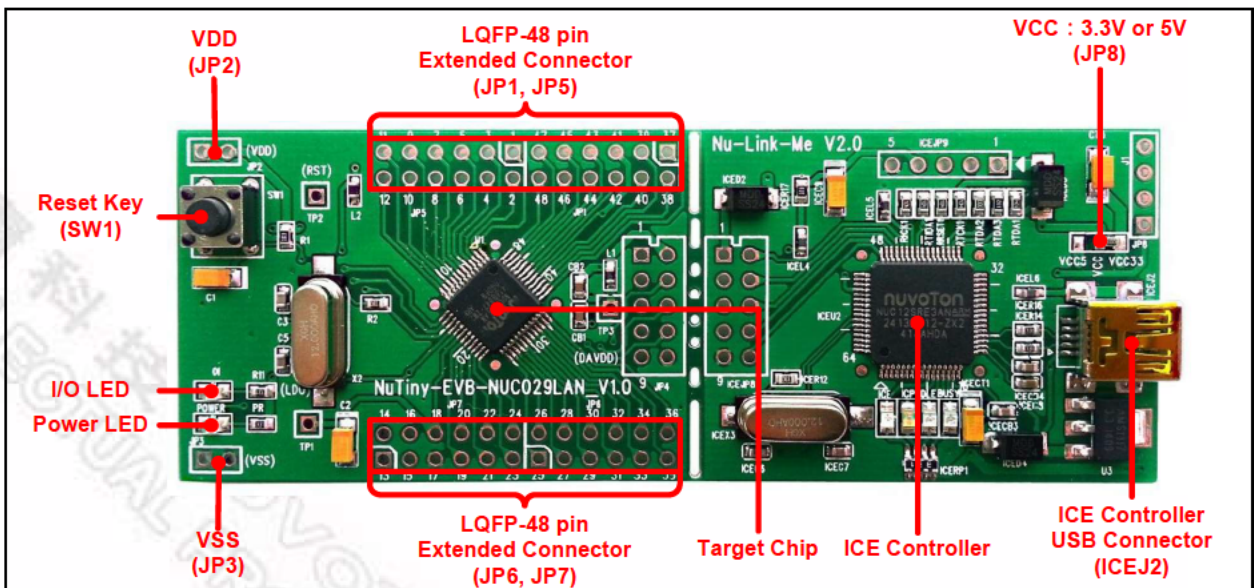


Figure 2-1 NuTiny-SDK-NUC029LAN (Green PCB Board)

2.1 NuTiny-SDK-NUC029LAN Jumper Description

2.1.1 Power Settings

- **JP2**: VDD Voltage connector in NuTiny-EVB-NUC029LAN
- **ICEJ2**: USB port in Nu-Link-Me

| Model | JP8 | ICEJ2 USB port | JP2 VDD | MCU Voltage |
|---------|------------------------|----------------|------------------------|-----------------------------|
| Model 1 | Select VCC33 (default) | Connect to PC | DC 3.3V output | DC 3.3V |
| Model 2 | X | X | DC 2.5 V ~ 5.5 V Input | Voltage by JP2 input |

X: Unused.

2.1.2 Debug Connectors

- **JP4**: Connector in target board (NuTiny-EVB-NUC029LAN) for connecting with Nuvoton ICE adaptor (Nu-Link-Me)
- **ICEJP8**: Connector in ICE adaptor (Nu-Link-Me) for connecting with a target board (e.g. NuTiny-EVB-NUC029LAN)

2.1.3 USB Connectors

- **ICEJ2**: Mini USB Connector in Nu-Link-Me connected to a PC USB port

2.1.4 Extended Connectors

- **JP1, JP5, JP6** and **JP7**: Show all chip pins in NuTiny-EVB-NUC029LAN

2.1.5 Buttons

- **SW1**: Reset button in NuTiny-EVB-NUC029LAN

2.1.6 Power Connectors

- **JP2**: VDD connector in NuTiny-EVB-NUC029LAN
- **JP3**: VSS connector in NuTiny-EVB-NUC029LAN



2.2 Pin Assignment for Extended Connectors

The NuTiny-EVB-NUC029LAN provides the NUC029LAN target chip on board and the extended connectors (**JP1**, **JP5**, **JP6** and **JP7**) for LQFP48-pin. The following table is the pin assignment for NUC029LAN.

| Pin No | Pin Name | Pin No | Pin Name |
|--------|------------------------------|--------|--------------------------------|
| 01 | P1.5,MOSI_0,AIN5, ACMP0_P | 25 | P2.5,AD13,PWM5,SDA1 |
| 02 | P1.6,MISO_0,AIN6, ACMP2_N | 26 | P2.6,AD14,PWM6,ACMP1_O |
| 03 | P1.7,SCLK0,AIN7, ACMP2_P | 27 | P2.7,AD15,PWM7 |
| 04 | /RST | 28 | P4.4,nCS,SCL1 |
| 05 | P3.0,RXD,ACMP1_N | 29 | P4.5,ALE,SDA1 |
| 06 | AV _{SS} | 30 | P4.6,ICE_CLK |
| 07 | P3.1,TXD,ACMP1_P | 31 | P4.7,ICE_DATA |
| 08 | P3.2,nINT0,STADC,T0EX | 32 | P0.7,AD7,SCLK1 |
| 09 | P3.3,nINT1,MCLK,T1EX | 33 | P0.6,AD6,MISO_1 |
| 10 | P3.4,T0,SDA0 | 34 | P0.5,AD5,MOSI_1 |
| 11 | P3.5,T1,SCL0,CKO | 35 | P0.4,AD4,SPISS1 |
| 12 | P4.3,PWM3 | 36 | P4.1,PWM1,T3EX |
| 13 | P3.6,nWR,CKO, ACMP0_O | 37 | P0.3,AD3,RTS0,RXD |
| 14 | P3.7,nRD | 38 | P0.2,AD2,CTS0,TXD |
| 15 | XTAL2 | 39 | P0.1,AD1,RTS1,RXD1, ACMP3_N |
| 16 | XTAL1 | 40 | P0.0,AD0,CTS1,TXD1, ACMP3_P |
| 17 | V _{SS} | 41 | V _{DD} |
| 18 | LDO_CAP | 42 | AV _{DD} |
| 19 | P2.0,AD8,PWM0 | 43 | P1.0,AIN0,T2,nWRL |
| 20 | P2.1,AD9,PWM1 | 44 | P1.1,AIN1,T3,nWRH |
| 21 | P2.2,AD10,PWM2 | 45 | P1.2,AIN2,RXD1 |
| 22 | P2.3,AD11,PWM3 | 46 | P1.3,AIN3,TXD1 |
| 23 | P2.4,AD12,PWM4,SCL1 | 47 | P1.4,AIN4,SPISS0,ACMP0_N |
| 24 | P4.0,PWM0,T2EX | 48 | P4.2,PWM2 |

Table 2-1 Pin Assignment for NUC029LAN

2.3 NuTiny-SDK-NUC029LAN PCB Placement

The following figure shows the NuTiny-SDK-NUC029LAN PCB placement.

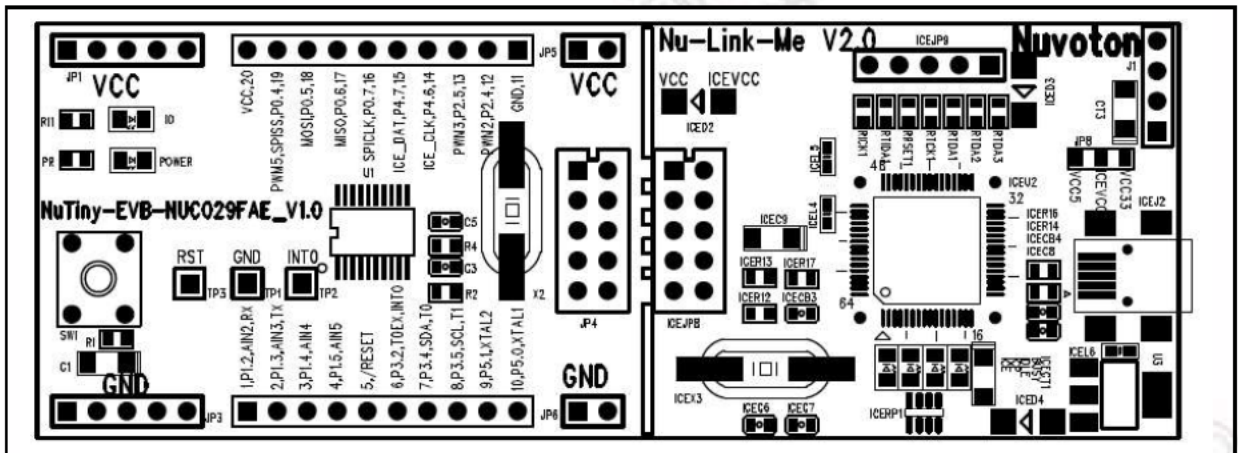


Figure 2-2 NuTiny-SDK-NUC029LAN PCB Placement

3 Starting to Use NuTiny-SDK-NUC029LAN on the Keil μ Vision[®] IDE

3.1 Downloading and Installing Keil μ Vision[®] IDE Software

Please connect to the Keil company website (<http://www.keil.com>) to download the Keil μ Vision[®] IDE and install the RVMDK.

3.2 Downloading and Installing Nuvoton Nu-Link Driver

Please connect to Nuvoton NuMicro[™] website (<http://www.nuvoton.com/NuMicro>) to download the “NuMicro[™] Keil μ Vision[®] IDE driver” file. Please refer to *section 6.1* for the detailed download flow. After the Nu-Link driver is 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 the following figure.

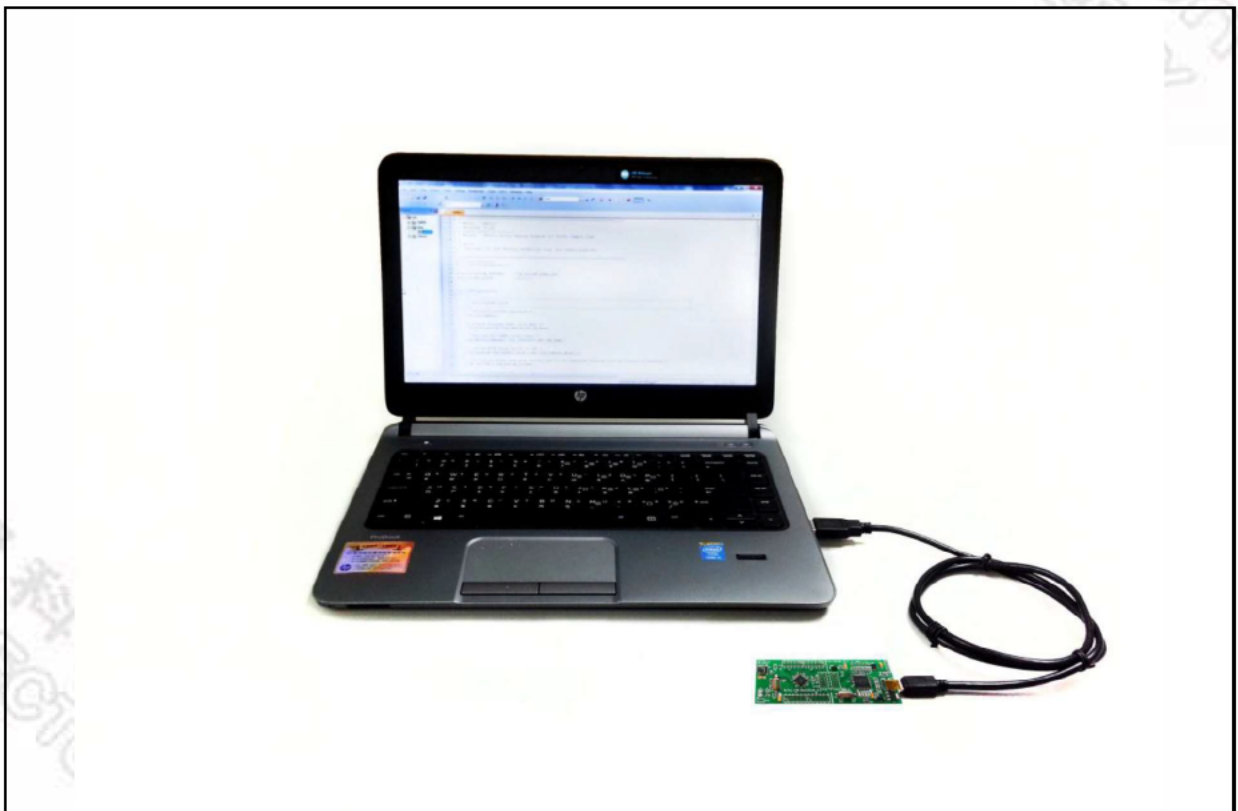


Figure 3-1 NuTiny-SDK-NUC029LAN Hardware Setup

3.4 Example Program

This example demonstrates how to download and debug an application on a NuTiny-SDK-NUC029LAN board.

The example file can be found in the directory list shown in the following figure.

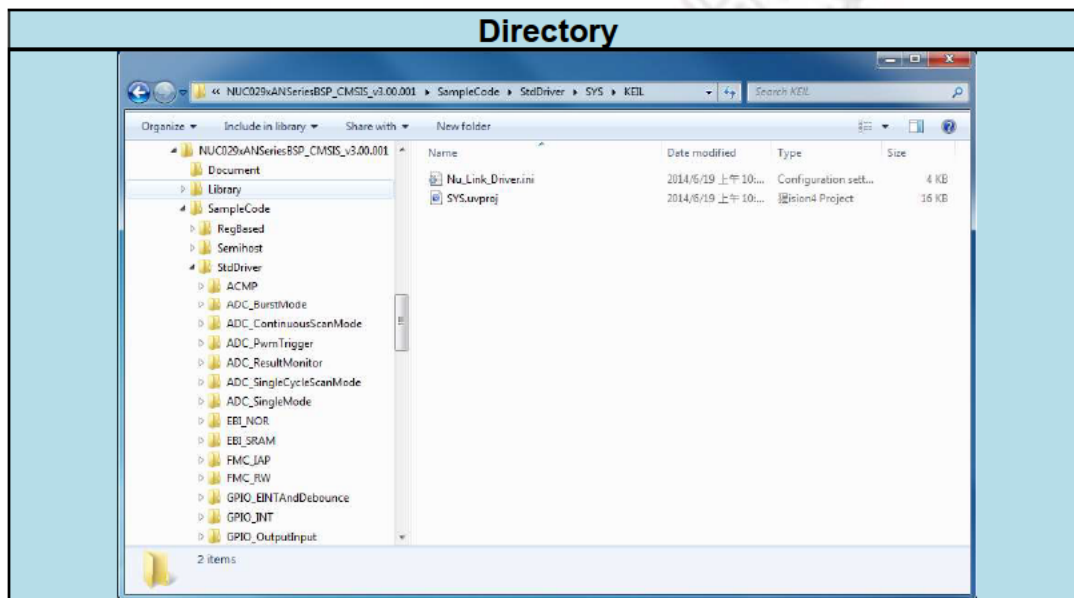










Figure 3-2 Example Directory

To use this example:

The I/O LED on the NuTiny-EVB-NUC029LAN board will turn on.

-  **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**
When using the debugger commands, you may:
 - ◆  Review variables in the watch window
 - ◆  Single step through code
 - ◆  Reset the device
 - ◆  Run the application

4 Starting to Use NuTiny-SDK-NUC029LAN on the IAR Embedded Workbench

4.1 Downloading and Installing IAR Embedded Workbench Software

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

4.2 Downloading and Installing Nuvoton Nu-Link Driver

Please connect to Nuvoton Company NuMicro™ website (<http://www.nuvoton.com/NuMicro>) to download “NuMicro™ IAR EWARM Driver” file. Please refer to *section 6.2* for the detail download flow. After the Nu-Link driver is 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 the following figure.



Figure 4-1 NuTiny-SDK-NUC029LAN Hardware Setup

4.4 Example Program

This example demonstrates how to download and debug an application on a NuTiny-SDK-NUC029LAN board.

The example file can be found in the directory list shown in the following figure.

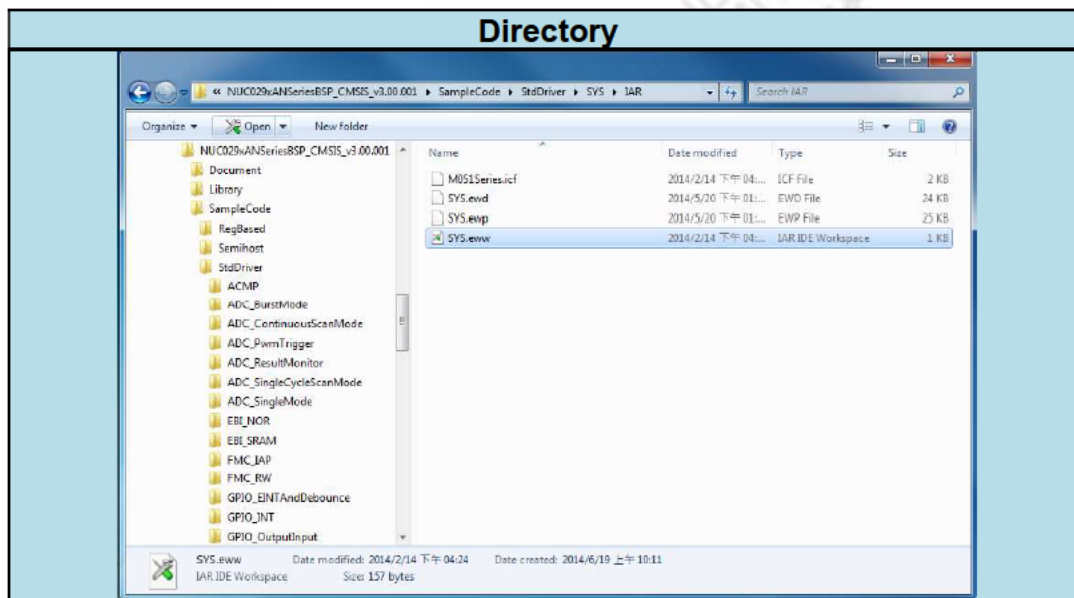








Figure 4-2 Example Directory

To use this example:

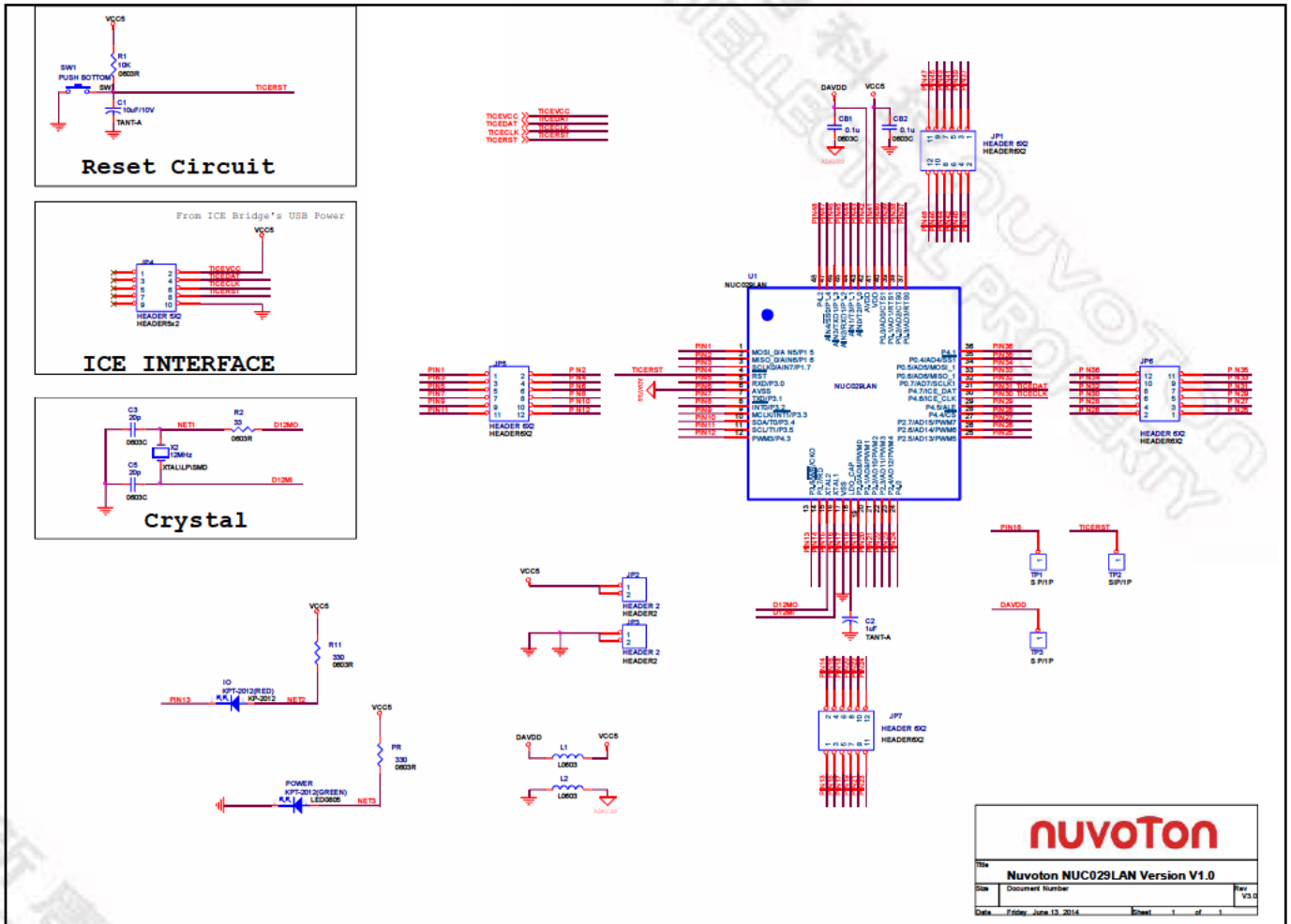
The I/O LED on the NuTiny-EVB-NUC029LAN board will turn on.

-  **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

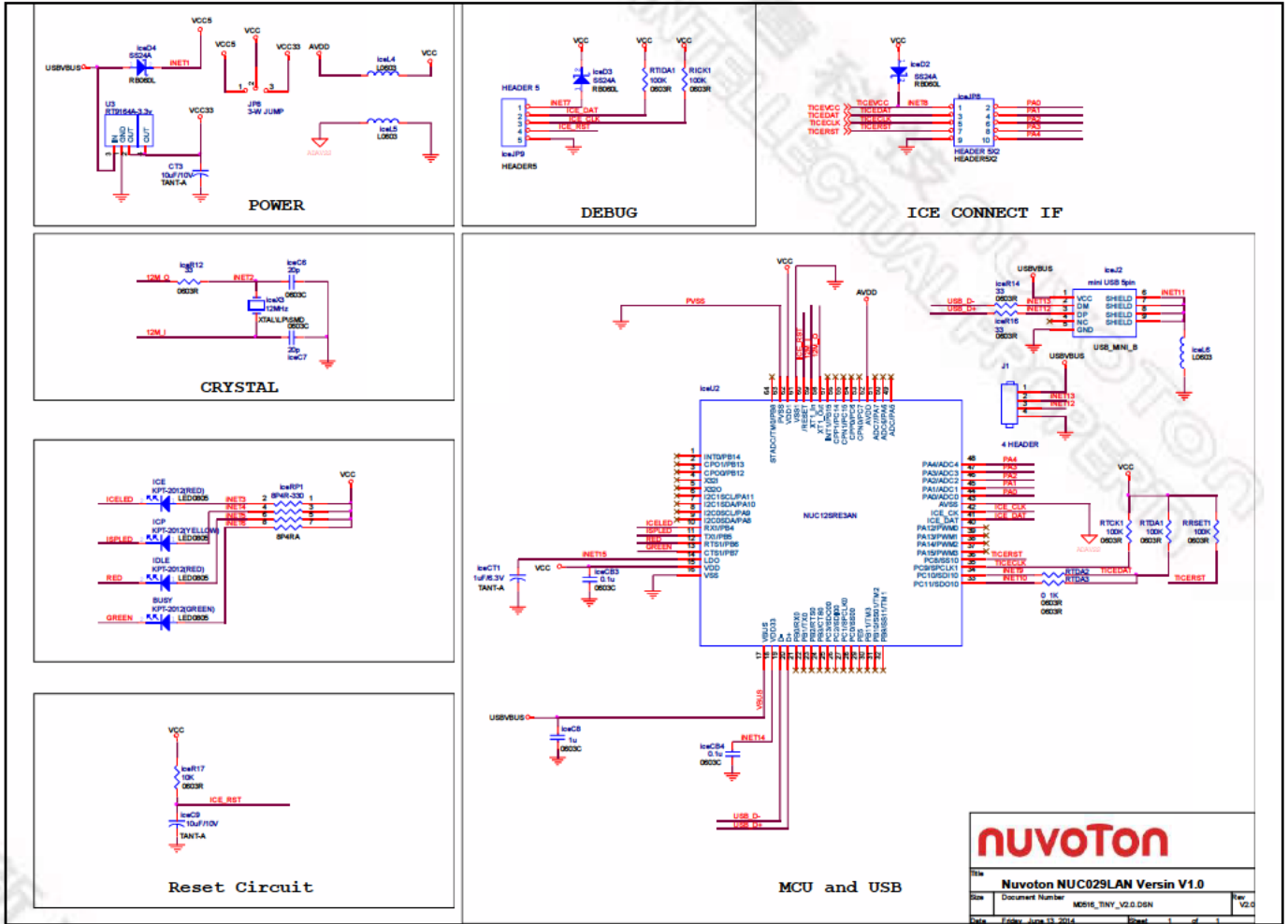


5 NuTiny-SDK-NUC029LAN Schematics

5.1 NuTiny-EVB-NUC029LAN Schematic



5.2 Nu-Link-Me Schematic



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| | | | |
|-------|-----------------|-------------------------------|-------------|
| Title | | Nuvoton NUC029LAN Versin V1.0 | |
| Size | Document Number | M0516_TINY_V2.0.DSN | Rev. V2.0 |
| Date | Entry | June 13, 2014 | Page 1 of 1 |



6 Downloading NuMicro™ Related Files from Nuvoton Website

6.1 Downloading NuMicro™ Keil µVision® IDE Driver

| | |
|---------------------|---|
| <p>Step1</p> | <p>Visit the Nuvoton NuMicro™ website: http://www.nuvoton.com/NuMicro.</p> |
| <p>Step2</p> | <p>The screenshot shows the Nuvoton website interface. A red dashed box highlights the 'Support' menu item in the top navigation bar. A yellow oval with an arrow points to 'Support' with the text '2-1. Move to "Support"'. Another yellow oval with an arrow points to the 'Tool & Software' sub-menu item with the text '2-2. Click here to enter Tool & Software'. The main content area displays a product matrix for ARM Cortex-M0 MCUs, categorized by flash size (256K, 128K, 64K, 32K, 16K) and application (Industrial Control, Low Power, USB Application, Automotive Application, Audio Application). Various product models like NUC100, Nano120, NUC120, NUC230, NUC240, AU9120*, NUC220, Nano110, Nano100, NUC140, NUC130, M051, NUC122, NUC123, Nano102, Nano112, and Mini51 are shown. The right sidebar contains sections for 'Online Support', 'Featured Products', 'Featured Videos', and 'Featured Applications'.</p> |

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- NuTiny Board

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 - Customer Target Board
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 - Customer Target Board
- IC Programming
 - NuvoTon Gang Programmer
 - Third Party Writer

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Step4

Programmer Software Tools Package

| File name | Description | Version | Date |
|---|--|------------|------------|
| ICP Programming Tool V1.25.6287.zip Revision History | NuMicro ICP tool & user manual | V1.25.6287 | 2014-01-16 |
| ISP Programming Tool V1.44.zip Revision History | NuMicro ISP Programming Tool & user manual | V1.44 | 2014-01-20 |
| NuGang Programmer V6.21.zip Revision History | NuMicro NuGang Programmer V6.21 software & user manual | V6.21 | 2014-01-24 |

Nu-Link Driver

| File name | Description | Version | Date |
|--|--|------------|------------|
| Nu-Link Driver for Keil RVMDK V1.25.6287.zip Revision History | This driver is to support Nu-Link to work under Keil RVMDK Development Environment for all NuMicro Family Devices. | V1.25.6287 | 2014-01-16 |
| Nu-Link Driver for IAR EWARM V1.25.6287.zip Revision History | This driver is to support Nu-Link to work under IAR EWARM Development Environment for all NuMicro Family Devices. | V1.25.6287 | 2014-01-16 |

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Step5 Download the NuMicro™ Keil μVision® IDE driver.

Click here to download the file.

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6.2 Downloading NuMicro™ IAR EWARM Driver

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

Step2

The screenshot shows the Nuvoton NuMicro website interface. A yellow oval labeled "2-1. Move to 'Support'" points to the "Support" link in the top navigation bar. Another yellow oval labeled "2-2. Click here to enter Tool & Software" points to the "Tool & Software" option in the dropdown menu that appears under "Support". The website content includes a search bar, navigation links for Products, Applications, Support, Foundry Service, Buy, myNuvoton, and About Nuvoton. A sidebar on the left lists ARM Cortex™-M0 MCUs and Resources. The main content area features a grid of product categories like NUC100, Nano120, NUC120, NUC230, AU9110, NUC220, NUC240, AU9120*, Nano110, NUC140, Nano100, NUC130, M051, NUC122, NUC123, Nano102, Nano112, and Mini51, categorized by application areas: Industrial Control, Low Power, USB Application, Automotive Application, and Audio Application. A "Developing" label is also present. The right sidebar includes sections for Online Support, Featured Products, Featured Videos, and Featured Applications.

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Programmer Software Tools Package

| File name | Description | Version | Date |
|---|--|------------|------------|
| ICP Programming Tool V1.25.6287.zip Revision History | NuMicro ICP tool & user manual | V1.25.6287 | 2014-01-16 |
| ISP Programming Tool V1.44.zip Revision History | NuMicro ISP Programming Tool & user manual | V1.44 | 2014-01-20 |
| NuGang Programmer V6.21.zip Revision History | NuGang Programmer software & user manual | V6.21 | 2014-01-24 |

Nu-Link Driver

| File name | Description | Version | Date |
|--|--|------------|------------|
| Nu-Link Driver for Keil RVMDK V1.25.6287.zip Revision History | This driver is to support Nu-Link to work under Keil RVMDK Development Environment for all NuMicro Family Devices. | V1.25.6287 | 2014-01-16 |
| Nu-Link Driver for IAR EWARM V1.25.6287.zip Revision History | This driver is to support Nu-Link to work under IAR EWARM Development Environment for all NuMicro Family Devices. | V1.25.6287 | 2014-01-16 |

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Step5 Download the NuMicro™ IAR EWARM driver.

Click here to download the file.



Nu-Link Driver for IAR EWARM V1.25.6287.zip
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6.3 Downloading NuMicro™ NUC029xAN Series BSP Software Library

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

Step2

The screenshot shows the Nuvoton NuMicro website interface. The 'Support' menu is open, and the 'Tool & Software' option is highlighted. The website layout includes a navigation bar with 'Products', 'Applications', 'Support', 'Foundry Service', 'Buy', 'myNuvoton', and 'About Nuvoton'. A sidebar on the left lists 'ARM Cortex™-M0 MCUs' and 'Resources'. The main content area features a grid of product categories like 'Industrial Control', 'Low Power', 'USB Application', 'Automotive Application', and 'Audio Application', with various model numbers such as NUC100, Nano120, NUC120, NUC230, Nano110, NUC140, Nano100, NUC130, M051, NUC122, NUC123, Nano102, Nano112, and Mini51. A 'Developing' label is also present. The right sidebar contains sections for 'Online Support', 'Featured Products', 'Featured Videos', and 'Featured Applications'.

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| <p>Step4</p> | <p>Download the NuMicro™ NUC029xAN Series CMSIS BSP.</p> |



7 Revision History

| Revision | Date | Description |
|----------|---------------|---|
| 1.00 | Jun. 19, 2014 | First version. |
| 1.01 | Dec. 24, 2014 | Fix the typo on 6.3 Downloading NuMicro™ NUC029xAN Series BSP Software Library Step4. |

Important Notice

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Insecure usage includes, but is not limited to: equipment for surgical implementation, atomic energy control instruments, airplane or spaceship instruments, the control or operation of dynamic, brake or safety systems designed for vehicular use, traffic signal instruments, all types of safety devices, and other applications intended to support or sustain life.

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