NuTiny-SDK-M051 User's Manual
For NuMicro M051™ Series

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1 Overview

NuTiny-SDK-M051 is the specific development tool for NuMicro M051™ series –M052/M054/M058/M0516. Users can use NuTiny-SDK-M051 to develop and verify the application program easily.
NuTiny-SDK-M051 includes 2 portions. One is M052_Tiny-EVB and the other is Nu-Link-Me. M052_Tiny-EVB is evaluation board and Nu-Link-Me is its Debug Adaptor. Thus, users do not need additional ICE equipment.

2 NuTiny-SDK-M051 introduction

NuTiny-SDK-M051 can support NuMicro M051™ series. Figure 2-1 is NuTiny-SDK-M051 for M051 series and the left portion is called M052-TINY-EVB and the right portion is Debug Adaptor called Nu-Link-Me.
M052-TINY-EVB 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 M0516LAN is mounted on the board. The on board chip covers M052, M054 and M058's features. The M052_Tiny-EVB can be a real system controller to design user target system.
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 Keil or IAR Please refer to "Nuvoton NuMicro™ IAR ICE driver user manual " or Nuvoton NuMicro™ Keil ICE driver user manual" in detail.

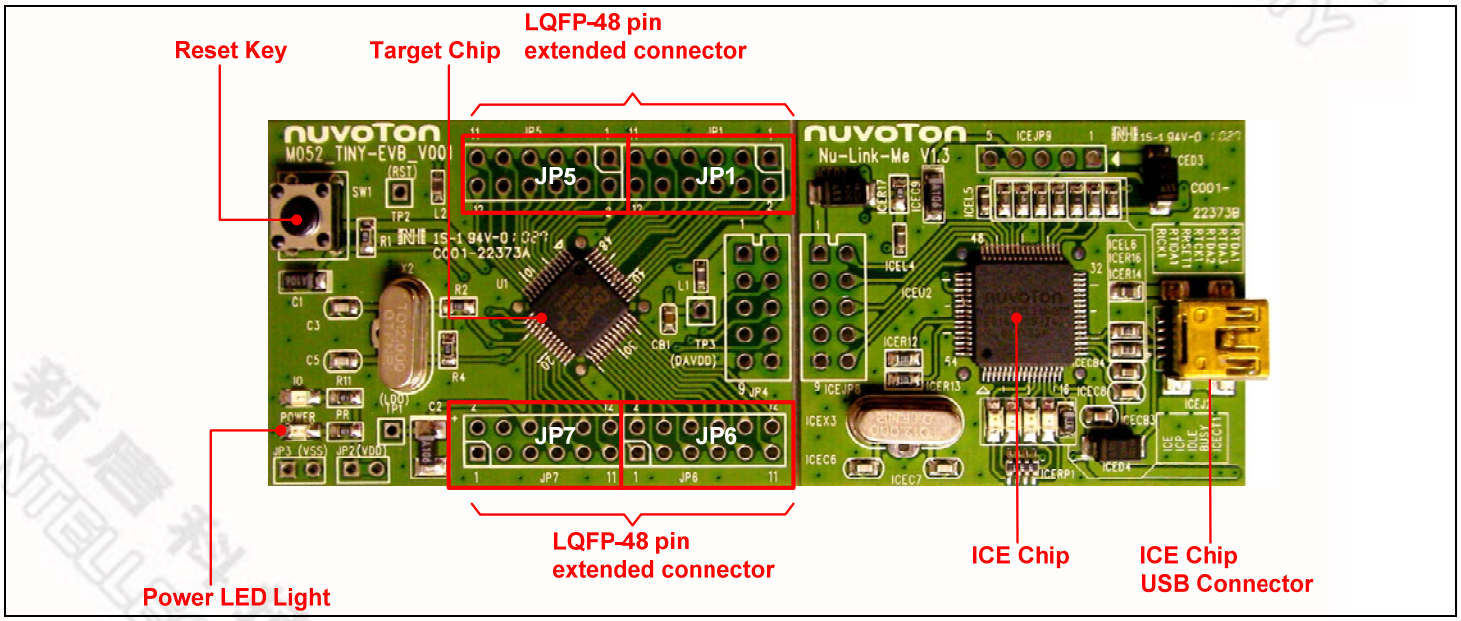


Figure 2-1 NuTiny-SDK-M051 (Green Color PCB Board)

2.1 NuTiny -SDK-M051 Jumper Description

2.1.1 Power Setting

- JP2: VCC5 Voltage connecter in M052_TINY-EVB
- J2: USB port in Nu-Link-Me

POWER model	J1 USB port	J2 USB port	JP2 VCC5	MCU Voltage
Model 1	**X**	**Connect to PC**	**DC 5V output**	**DC 5V**
Model 2	**X**	**X**	**DC 2.8-5.5V input**	**Voltage by VCC input**

X: Not use.

2.1.2 Debug Connector

- JP4: Target ICE Connector in M052_TINY-EVB
- JP8: Nuvoton ICE Connector in Nu-Link-Me

2.1.3 USB Connecter

- J1: mini USB Connecter in M052_TINY-EVB
- J2: mini USB Connecter in Nu-Link-Me

2.1.4 Extended Connecter

- JP1, JP5, JP6 and JP7: Show all of chip pins in M052_TINY-EVB

2.1.5 Reset Button

- SW1: Reset button in M052_TINY-EVB

2.1.6 Power Connecter

- JP2: VCC connecter in M052_TINY-EVB
- JP3: GND connecter in M052_TINY-EVB

2.2 Pin Assignment for Extended Connector

M052_TINY-EVB provides M0516LAN on board and the extended connector for LQFP-48 pin. Table 2-1 is the pin assignment for M0516LAN.

Pin No	Pin Name	Pin No	Pin Name
01	MOSI_0,AIN5,P1.5	25	P2.5,AD13,PWM5
02	MISO_0,AIN6,P1.6	26	P2.6,AD14,PWM6
03	SCLK0,AIN7,P1.7	27	P2.7,AD15,PWM7
04	/RST	28	P4.4,/CS
05	P3.0,RXD	29	P4.5,ALE
06	AVSS	30	P4.6,ICE_CLK
07	P3.1,TXD	31	P4.7,ICE_DATA
08	P3.2,/INT0,STADC	32	P0.7,AD7,SCLK1
09	P3.3,/INT1,MCLK	33	P0.6,AD6,MISO_1
10	P3.4, T0,SDA	34	P0.5,AD5,MOSI_1
11	P3.5,T1,SCL	35	P0.4,AD4,/SS1
12	P4.3,PWM3	36	P4.1,PWM1
13	P3.6,/WR,CKO	37	P0.3,AD3,RTS0
14	P3.7,/RD	38	P0.2,AD2,CST0
15	XTAL2	39	P0.1,AD1,RTS1
16	XTAL1	40	P0.0,AD0,CTS1
17	VSS	41	VDD
18	LDO_CAP	42	AVDD
19	P2.0,AD8,PWM0	43	P1.0,AIN0,P1.0
20	P2.1,AD9,PWM1	44	P1.1,AIN1,T3
21	P2.2,AD10,PWM2	45	P1.2,AIN2,RXD1
22	P2.3,AD11,PWM3	46	P1.3AIN3,TXD1
23	P2.4,AD12,PWM4	47	P1.4,AIN4,/SS0
24	P4.0,PWM0	48	P4.2,PWM2

Table 2-1 pin assignment for M0516LAN

2.3 NuTiny-SDK-M051 PCB Placement

Users can refer Figure 2-2 for the NuTiny -SDK-M051 PCB placement.

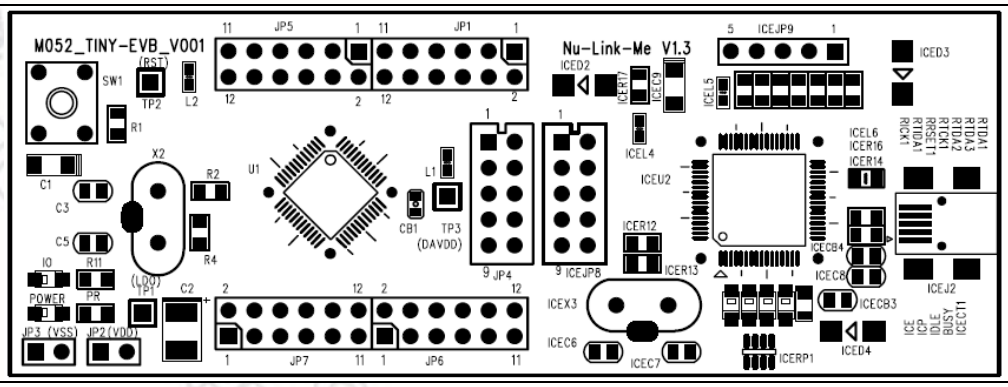


Figure 2-2 NuTiny-SDK-M051 PCB Placement

3 How to start NuTiny -SDK-M051 on the Keil uVision® IDE

3.1 Keil uVision® IDE Software Download & Install

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

3.2 Nuvoton Nu-Link Driver Download & Install

Please connect to Nuvoton company NuMicro™ website (http://www.nuvoton.com/NuMicro) to download "NuMicro™ Keil uVision® IDE driver" file. Please refer the Chapter 6.1 for the detail download flow. When the download had finished, 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

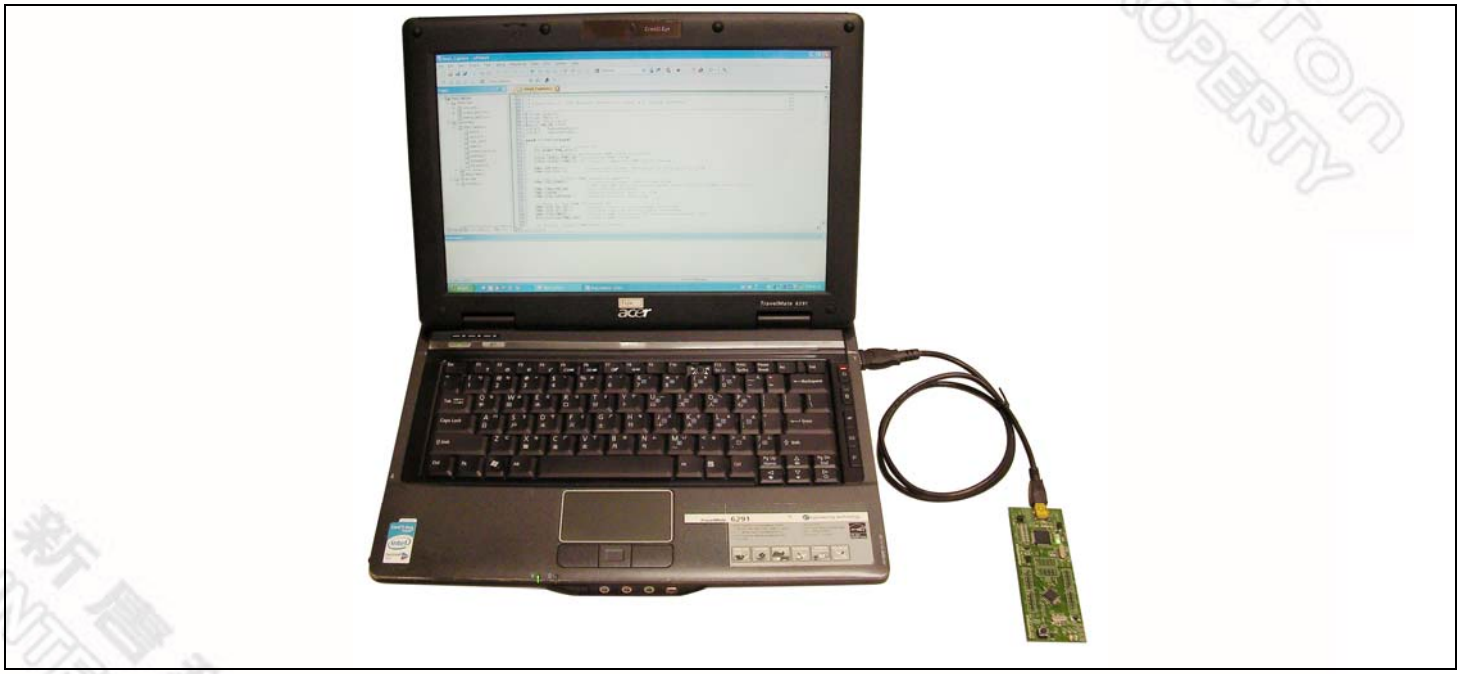


Figure 3-1 NuTiny-SDK-M051 Hardware Setup

3.4 Smpl_NuTiny-M051 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-SDK-M051 board. The example can be found on the Figure 3-2 list directory.

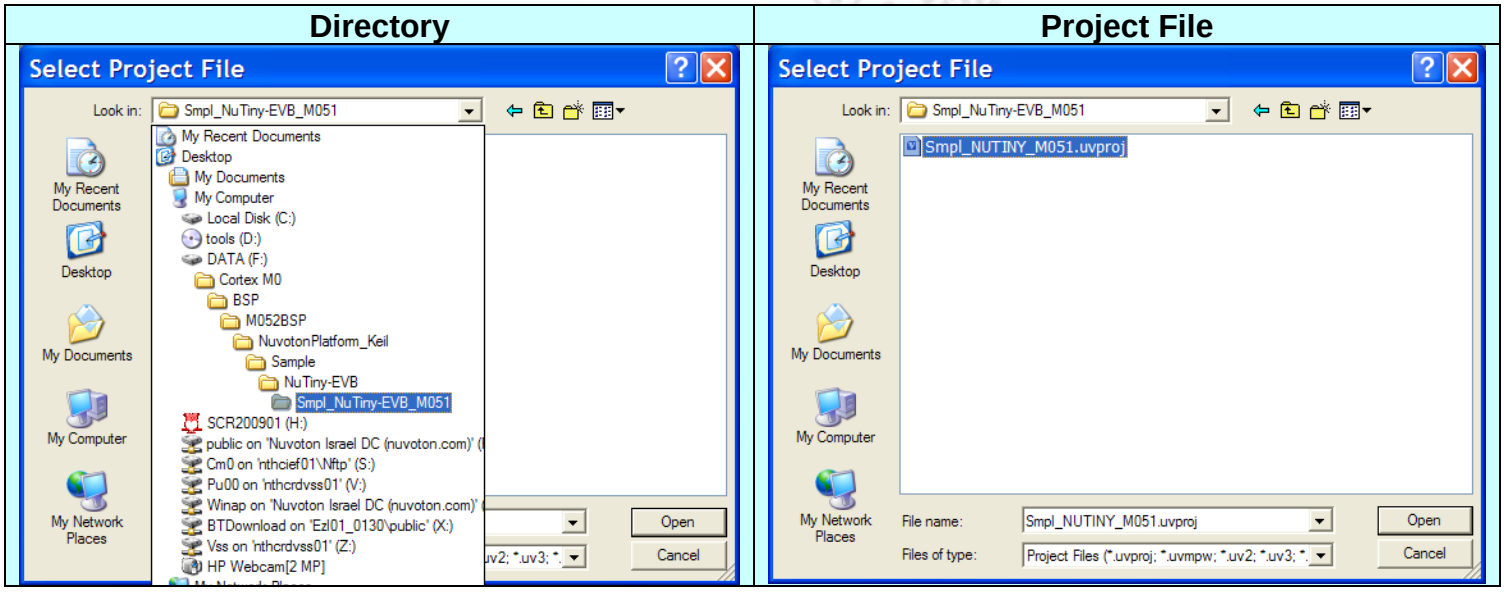


Figure 3-2 Smpl_NuTiny-M051 Example Directory

To use this example:

- **Start uVision**
- Open the Smpl_NuTiny-M051.uvproj project file
  Project-Open
- Compile and link the Smpl_NuTiny-M051 application

  Project - Build
- Program the application into on-chip Flash ROM

  Flash – Download

The LED will toggle on the M052_TINY-EVB board.

Start debug mode

Using the debugger commands, you may:

- Single step through code
- Run the application\
- Review variables in the watch window
- Reset the device to re-run the application

4 How to start NuTiny-SDK-M051 on the IAR Embedded Workbench

4.1 IAR Embedded Workbench Software Download &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 & Install

Please connect to Nuvoton company NuMicro™ website (www.nuvoton.com/NuMicro) to download "NuMicro™ IAR ICE driver user manual" file. Please refer the 6.2 for the detail download flow. When the download had finished, 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 3-1

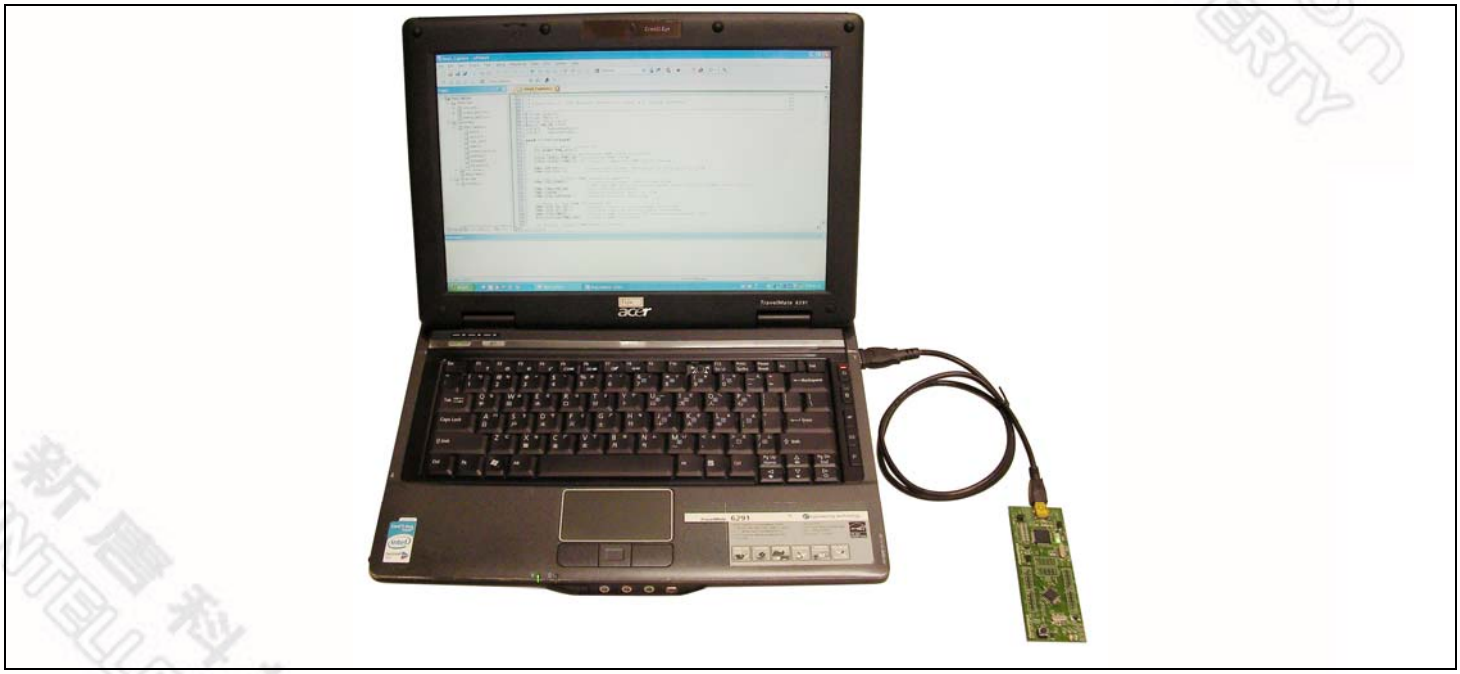


Figure 4-1 NuTiny- SDK-M051 Hardware Setup

4.4 Smpl_NuTiny-M051 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-SDK-M051 board. The example can be found on the Figure 3-2 list directory. (Samples code can be download from Nuvoton website)

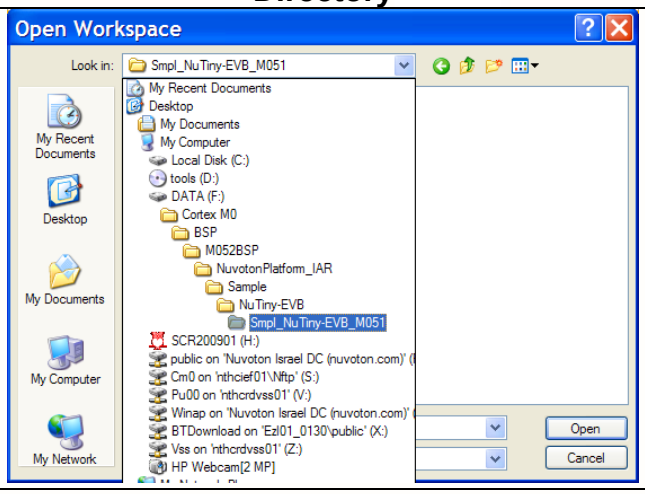
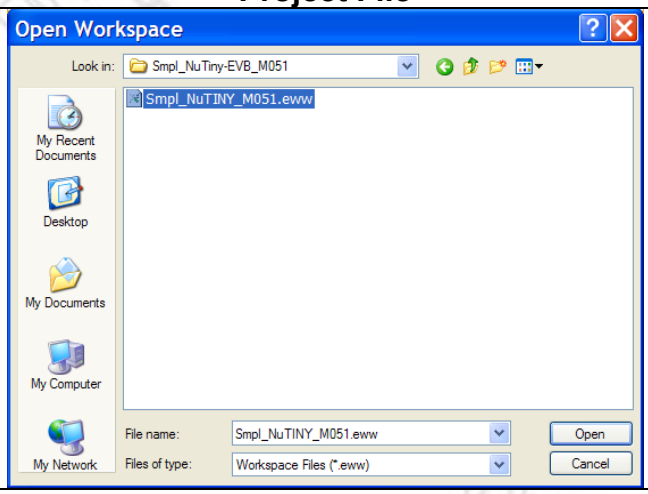
Directory	Project File
	

Figure 4-2 Smpl_NuTiny-M051 Example Directory

To use this example:

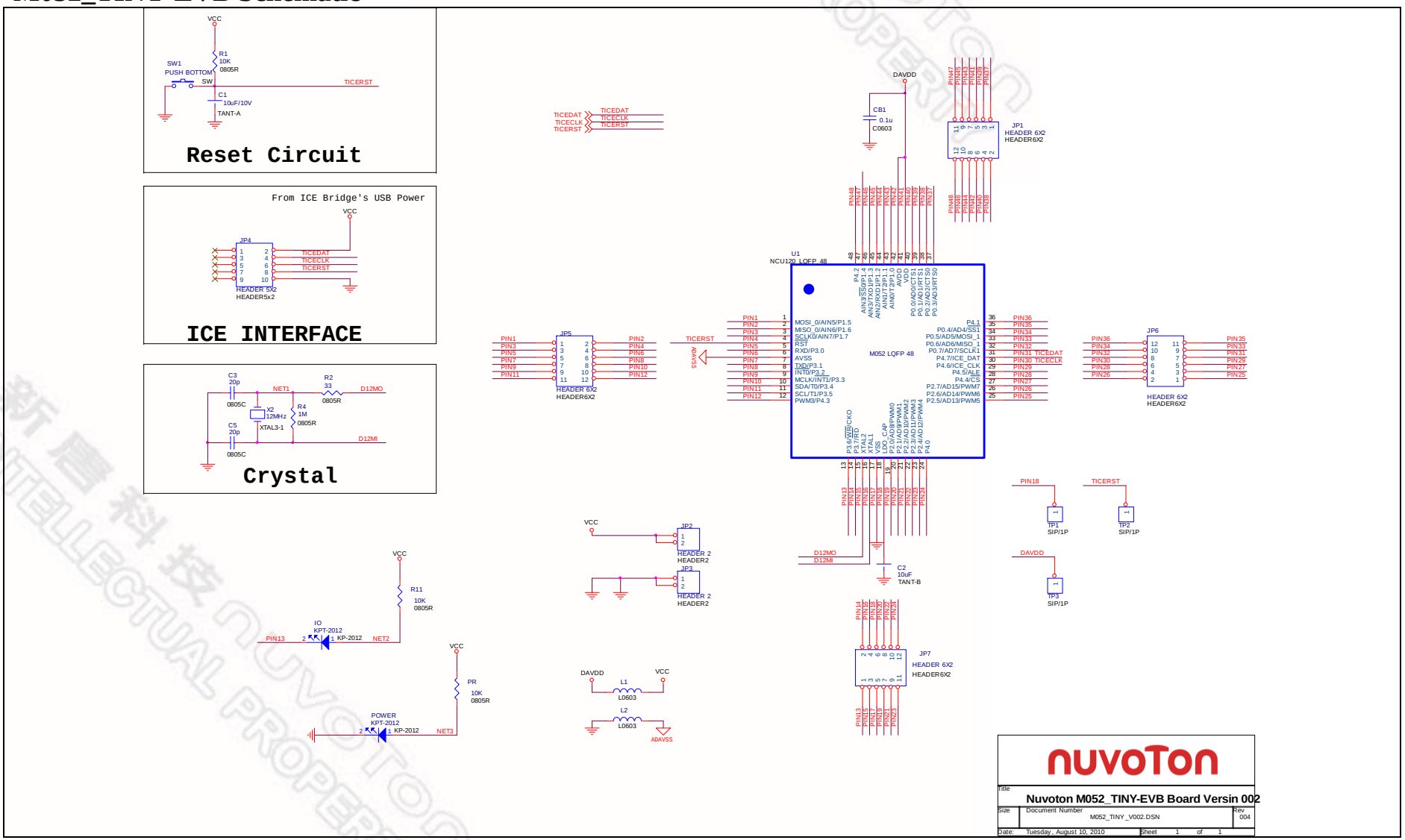
- Start IAR Embeded Workbench
- Open the Smpl_NuTiny-M051.eww workspace file
  File-Open-Workspace
- Compile and link the Smpl_NuTiny-M051 application

  Project - Make
- Program the application into on-chip Flash ROM

  Project – Download and Debug

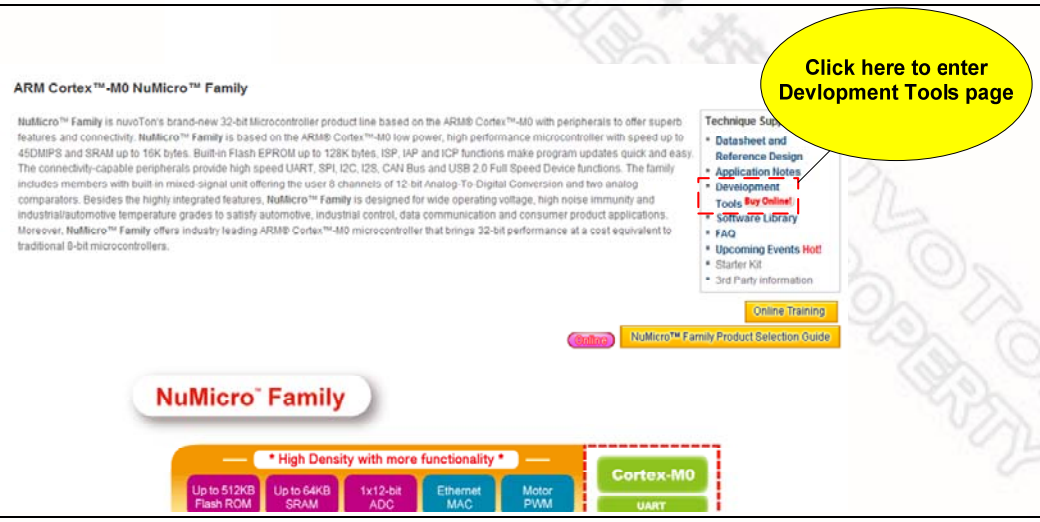
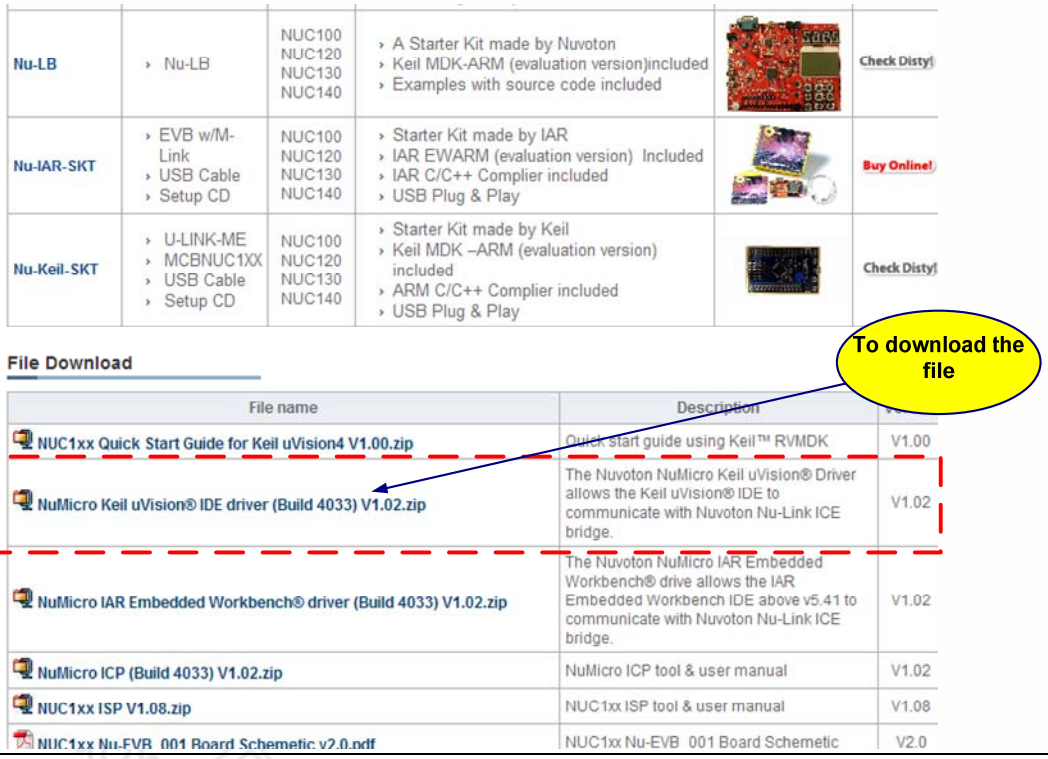
The I/O will toggle on the M052_TINY-EVB board.

5 M052_TINY-EVB Schematic

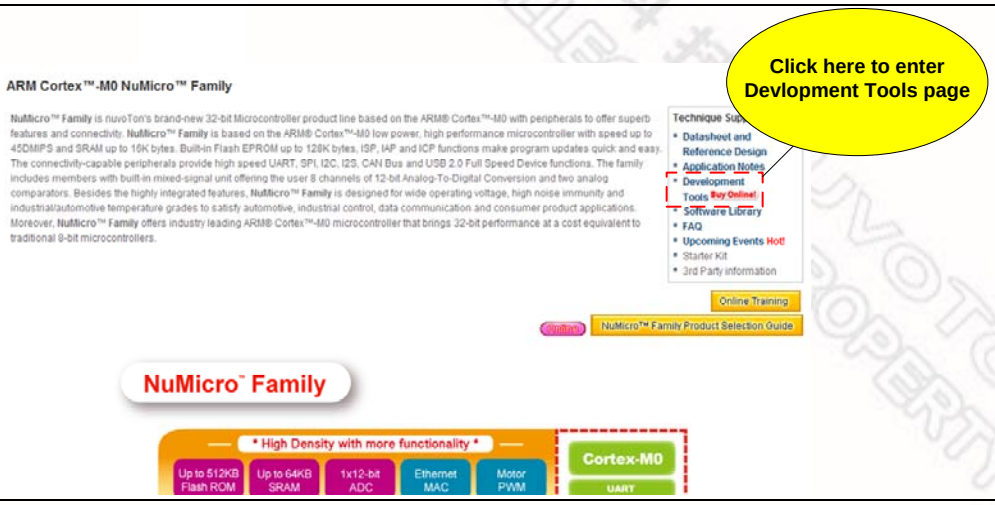
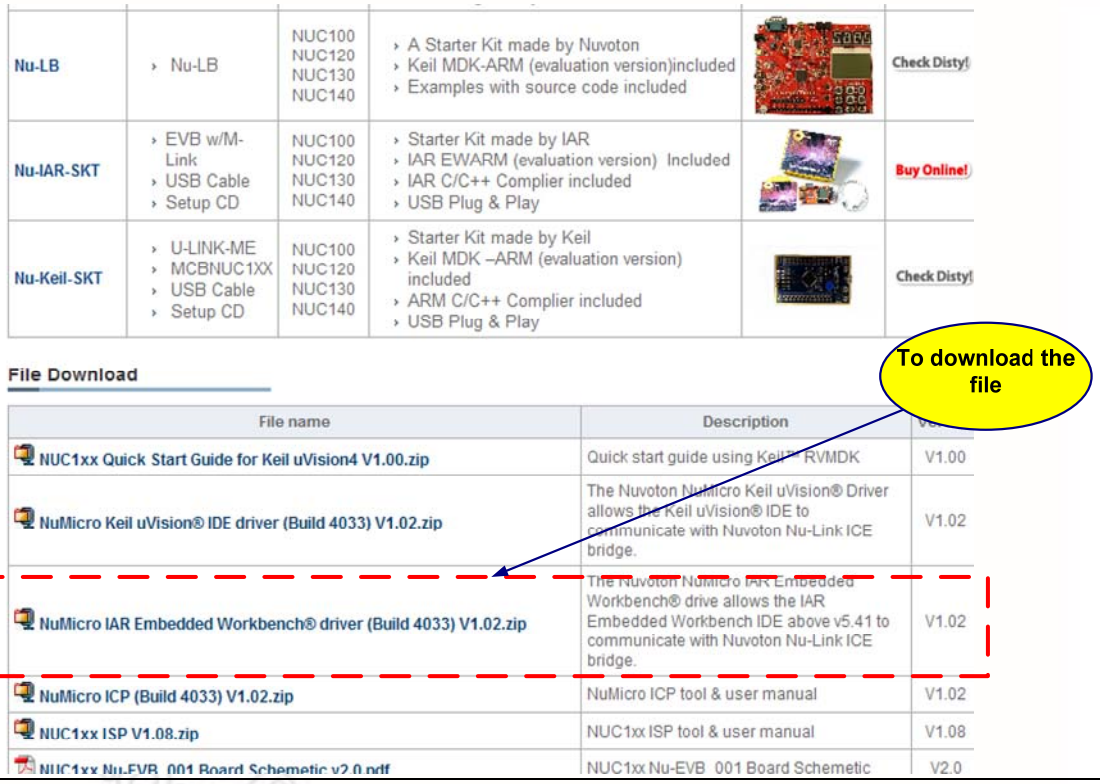


6 To Download NuMicro™ Family Releated Files From Nuvoton Company

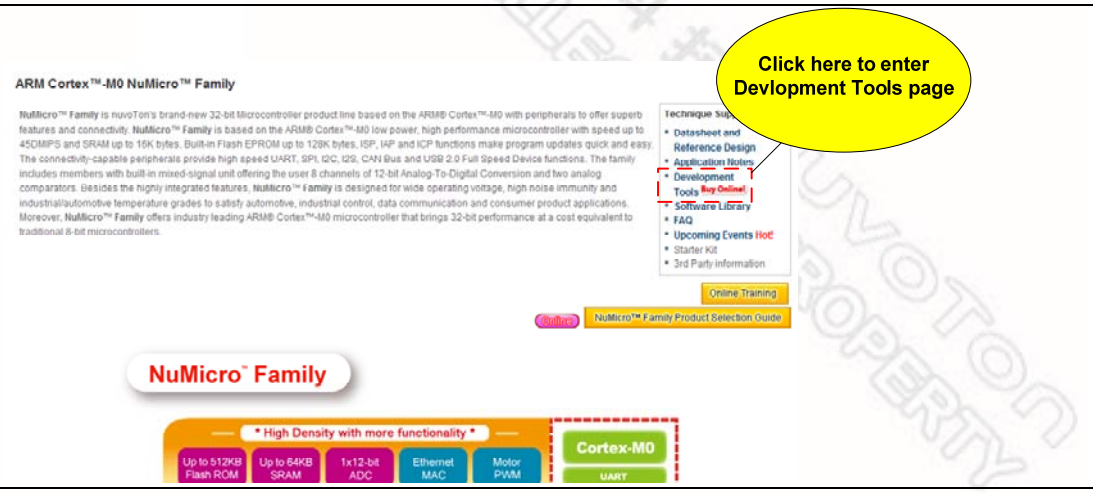
6.1 To Download NuMicro™ Keil uVision® IDE driver

Step1	To connect to the Nuvoton NuMicro™ Website: http://www.nuvoton.com/NuMicro
Step2	
Step 3	
Step 4	To download the :uMicro Keil uVision® IDE driver

6.2 To Download NuMicro™ IAR EWARM driver

Step1	To connect to the Nuvoton NuMicro™ Website: **http://www.nuvoton.com/NuMicro**
Step2	
Step 3	
Step 4	To download the NuMicro™ IAR Embeded Workbench® driver

6.3 To Download NuMicro™ M051 series BSP Software Library

Step1	To connect to the Nuvoton NuMicro™ Website: **http://www.nuvoton.com/NuMicro**
Step2	
Step 3	To download the NuMicro M051™ series software library

7 Revision History

Version	Date	Page	Description
1.0	Aug. 20, 2010	--	Initial Issued

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