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NuTiny-SDK-NUC131SD2AE
User Manual

Des. 24, 2014 Rev. 1.00

Table of Contents

1 Overview

The NuTiny-SDK- NUC131SD2AE is a specific development tool for NuMicro™ M0518 series by which users can develop and verify the application program easily. The NuTiny-SDK-NUC131SD2AE includes two portions: NuTiny-EVB-NUC131SD2AE (an evaluation board) and Nu-Link-Me (Debug Adaptor). With the NuTiny-SDK-NUC131SD2AE, users do not need additional ICE or debug equipment.

2 Introduction to NuTiny-SDK- NUC131SD2AE

The following figure shows the NuTiny-SDK- NUC131SD2AE for NUC131SD2AE series, in which the left portion is called NuTiny-EVB- NUC131SD2AE and the right portion is Debug Adaptor called Nu-Link-Me.

The NuTiny-EVB- NUC131SD2AE 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 NUC131SD2AE is mounted on the board. The NuTiny-EVB- NUC131SD2AE 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.

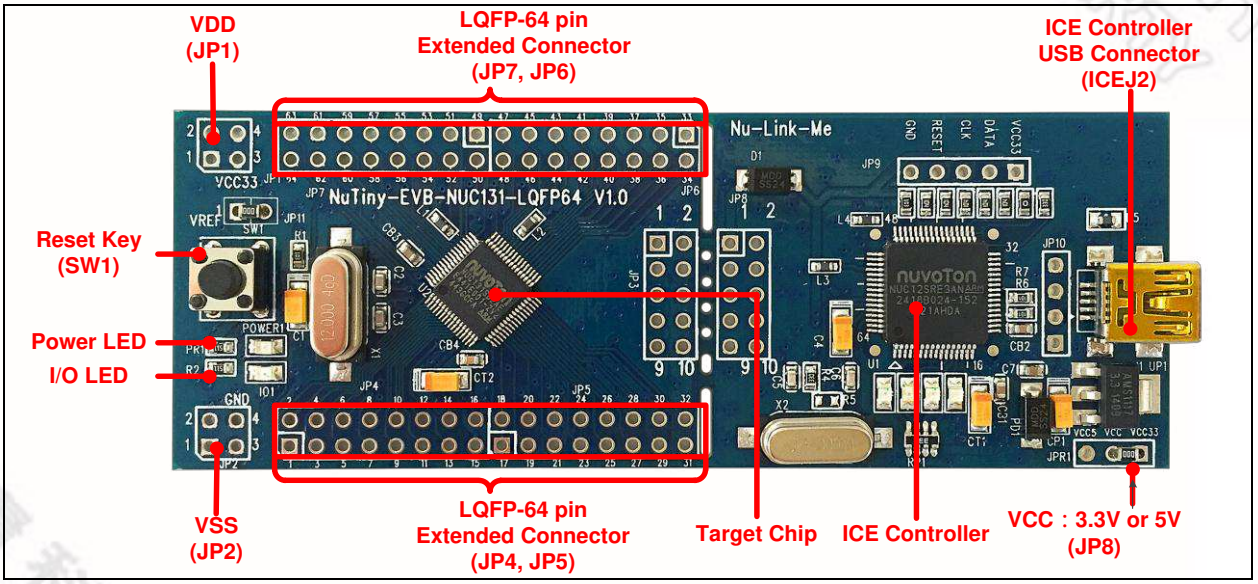


Figure 2-1 NuTiny-SDK- NUC131SD2AE (Green PCB Board)

1. NuTiny-SDK- NUC131SD2AE Jumper Description

2.1.1 Power Settings

- **JP1**: VDD Voltage connecter in NuTiny-EVB- NUC131SD2AE
- **J1**: USB port in Nu-Link-Me

Model	JPR1	J1 USB port	JP1 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 **JP1** input

X: Unused.

2.1.2 Debug Connectors

- **JP3**: Connector in target board (NuTiny-EVB- NUC131SD2AE) for connecting with Nuvoton ICE adaptor (Nu-Link-Me)
- **JP8**: Connector in ICE adaptor (Nu-Link-Me) for connecting with a target board (e.g. NuTiny-EVB- NUC131SD2AE)

2.1.3 USB Connectors

- **J1**: Mini USB Connector in Nu-Link-Me connected to a PC USB port

2.1.4 Extended Connectors

- **JP4**, **JP5**, **JP6** and **JP7**: Show all chip pins in NuTiny-EVB- NUC131SD2AE

2.1.5 Buttons

- **SW1**: Reset button in NuTiny-EVB- NUC131SD2AE

2.1.6 Power Connectors

- **JP1**: VDD connector in NuTiny-EVB- NUC131SD2AE
- **JP2**: VSS connector in NuTiny-EVB- NUC131SD2AE

2. Pin Assignment for Extended Connectors

The NuTiny-EVB- NUC131SD2AE provides the NUC131SD2AE target chip on board and the extended connectors (**JP4**, **JP5**, **JP6** and **JP7**) for LQFP48-pin. The following table is the pin assignment for NUC131SD2AE.

Pin No	Pin Name	Pin No	Pin Name
01	PB.14,INT0	33	PC.11,PWM1_BRAKE1
02	PB.13	34	PC.10,PWM1_BRAKE0
03	PB.12,CLKO,BPWM1_CH3	35	PC.9,PWM0_BRAKE1
04	PF.5,I2C0_SCL,PWM1_CH5	36	PC.8,PWM0_BRAKE0
05	PF.4,I2C0_SDA,PWM1_CH4	37	PA.15,PWM0_CH3
06	PA.11,I2C1_SCL,PWM1_CH3	38	PA.14,PWM0_CH2
07	PA.10,I2C1_SDA,PWM1_CH2	39	PA.13,PWM0_CH1,UART5_TXD
08	PA.9,I2C0_SCL,UART1_nCTS	40	PA.12,PWM0_CH0,UART5_RXD
09	PA.8,I2C0_SDA,UART1_nRTS	41	PF.7,ICE_DAT
10	PB.4,UART1_RXD	42	PF.6,ICE_CLK
11	PB.5,UART1_TXD	43	AVSS
12	PB.6,UART1_nRTS	44	PA.0,PWM0_CH4,ADC0,I2C1_SCL,UART5_TXD
13	PB.7,UART1_nCTS	45	PA.1,PWM0_CH5,ADC1,I2C1_SDA,UART5_RXD
14	LDO_CAP	46	PA.2,PWM1_CH0,ADC2,UART3_TXD
15	VDD	47	PA.3,PWM1_CH1,ADC3,UART3_RXD
16	VSS	48	PA.4,ADC4
17	PB.0,UART0_RXD	49	PA.5,UART3_RXD,ADC5
18	PB.1,UART0_TXD	50	PA.6,UART3_TXD,ADC6
19	PB.2,UART0_nRTS,TM2_EXT,TM2,PWM1_BRAKE1	51	PA.7,Vref,ADC7
20	PB.3,UART0_nCTS,TM3_EXT,TM3,PWM1_BRAKE0	52	AVDD
21	PD.6,BPWM1_CH1,CAN0	53	PC.7,PWM0_BRAKE1,I2C0_S

	_RXD		CL,UART4_RXD
22	PD.7,BPWM1_CH0,CAN0_TXD	54	PC.6,PWM0_BRAKE0,I2C0_SDA,UART4_TXD
23	PD.14,BPWM0_CH5,UART2_RXD	55	PC.15
24	PD.15,BPWM0_CH4,UART2_TXD	56	PC.14
25	PC.3,BPWM0_CH3,SPI0_MOSI0	57	PB.15, ,BPWM1_CH5TM0,TM0_EXT,INT1
26	PC.2,BPWM0_CH2,SPI0_MISO0	58	PF.0,XT1_OUT
27	PC.1,BPWM0_CH1,SPI0_CLK	59	PF.1,XT1_IN
28	PC.0,BPWM0_CH0,SPI0_SS0	60	nRESET
29	PE.5,PWM0_CH5,TM1_EXT,TM1	61	VSS
30	PB.11,TM3,PWM0_CH4	62	VDD
31	PB.10,TM2	63	PF.8, PWM1_CH4,CLKO
32	PB.9,TM1	64	PB.8,BPWM1_CH2,CLKO,TM0,STADC

Table 2-1 Pin Assignment for NUC131SD2AE

3. NuTiny-SDK- NUC131SD2AE PCB Placement

The following figure shows the NuTiny-SDK- NUC131SD2AE PCB placement.

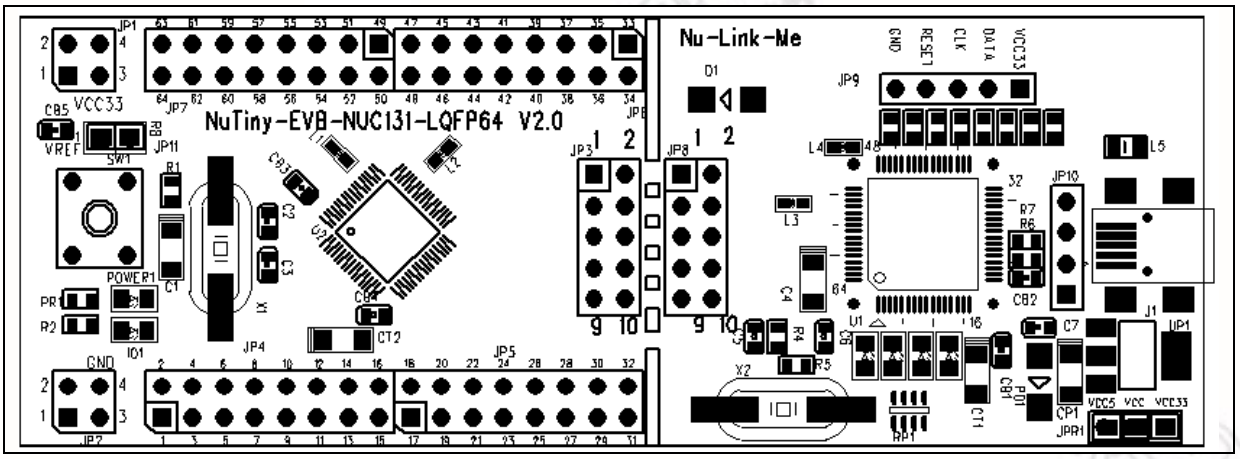


Figure 2-2 NuTiny-SDK- NUC131SD2AE PCB Placement

3 Starting to Use NuTiny-SDK- NUC131SD2AE on the Keil µVision® IDE

4. Downloading and Installing Keil µVision® IDE Software

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

5. Downloading and Installing Nuvoton Nu-Link Driver

Please connect to Nuvoton NuMicro™ website (http://www.nuvoton.com/NuMicro) to download the "*NuMicro™ Keil µVision® IDE drive*r" file. Please refer to *section 15* 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.

6. Hardware Setup

The hardware setup is shown in the following figure.

Figure 3-1 NuTiny-SDK- NUC131SD2AE Hardware Setup

7. Example Program

This example demonstrates how to download and debug an application on a NuTiny-SDK- NUC131SD2AE board.
The example file can be found in the directory list shown in the following figure.

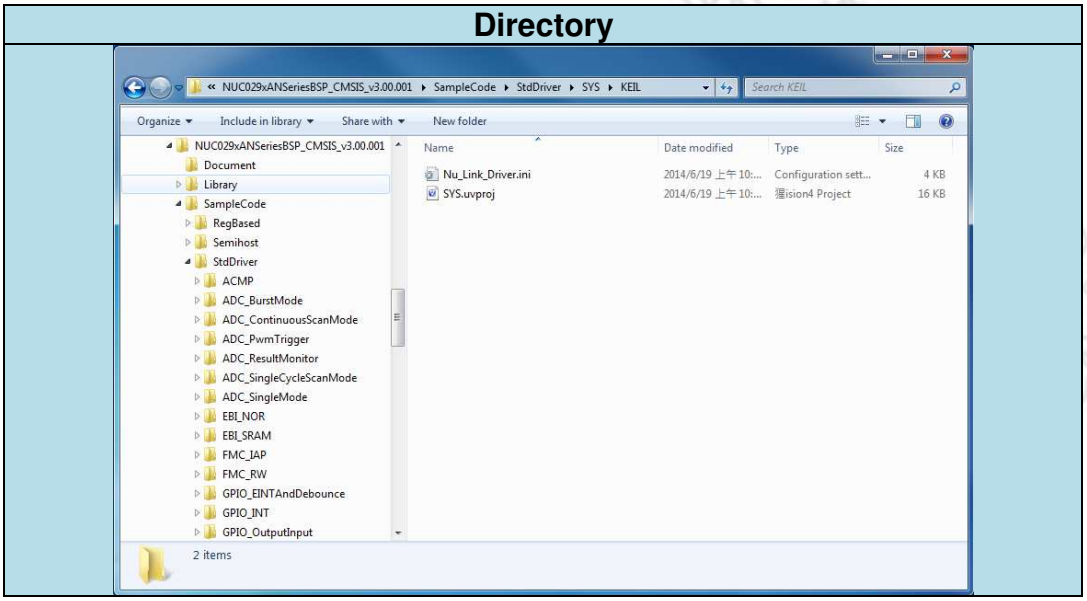


Figure 3-2 Example Directory

To use this example:
The I/O LED on the NuTiny-EVB- NUC131SD2AE 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- NUC131SD2AE on the IAR Embedded Workbench

8. 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.

9. 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 16* 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.

10. Hardware Setup

The hardware setup is shown in the following figure.

Figure 4-1 NuTiny-SDK- NUC131SD2AE Hardware Setup

11. Example Program

This example demonstrates how to download and debug an application on a NuTiny-SDK- NUC131SD2AE board.
The example file can be found in the directory list shown in the following figure.

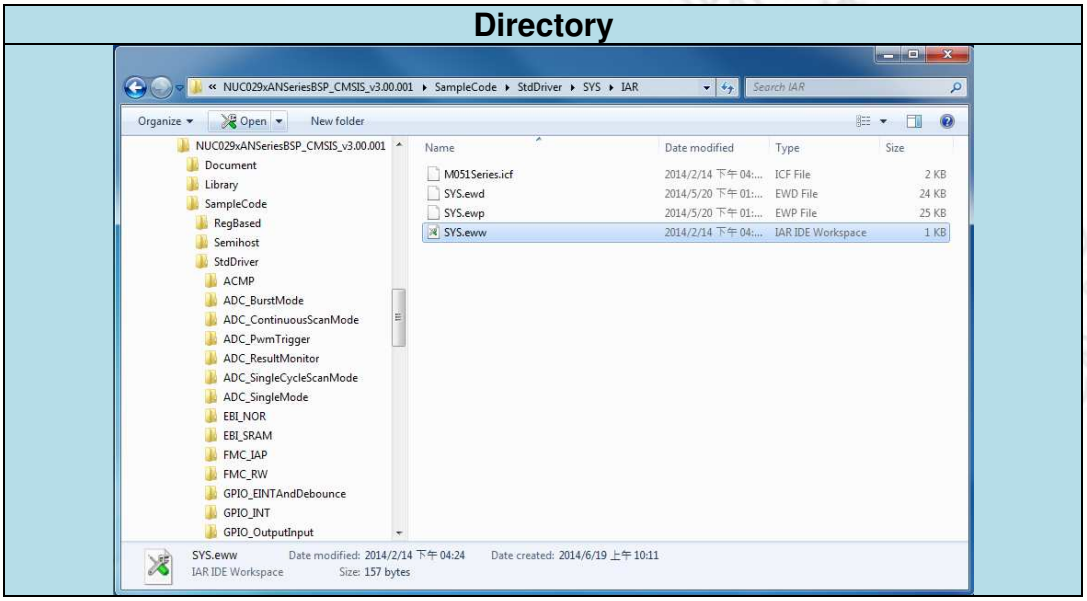


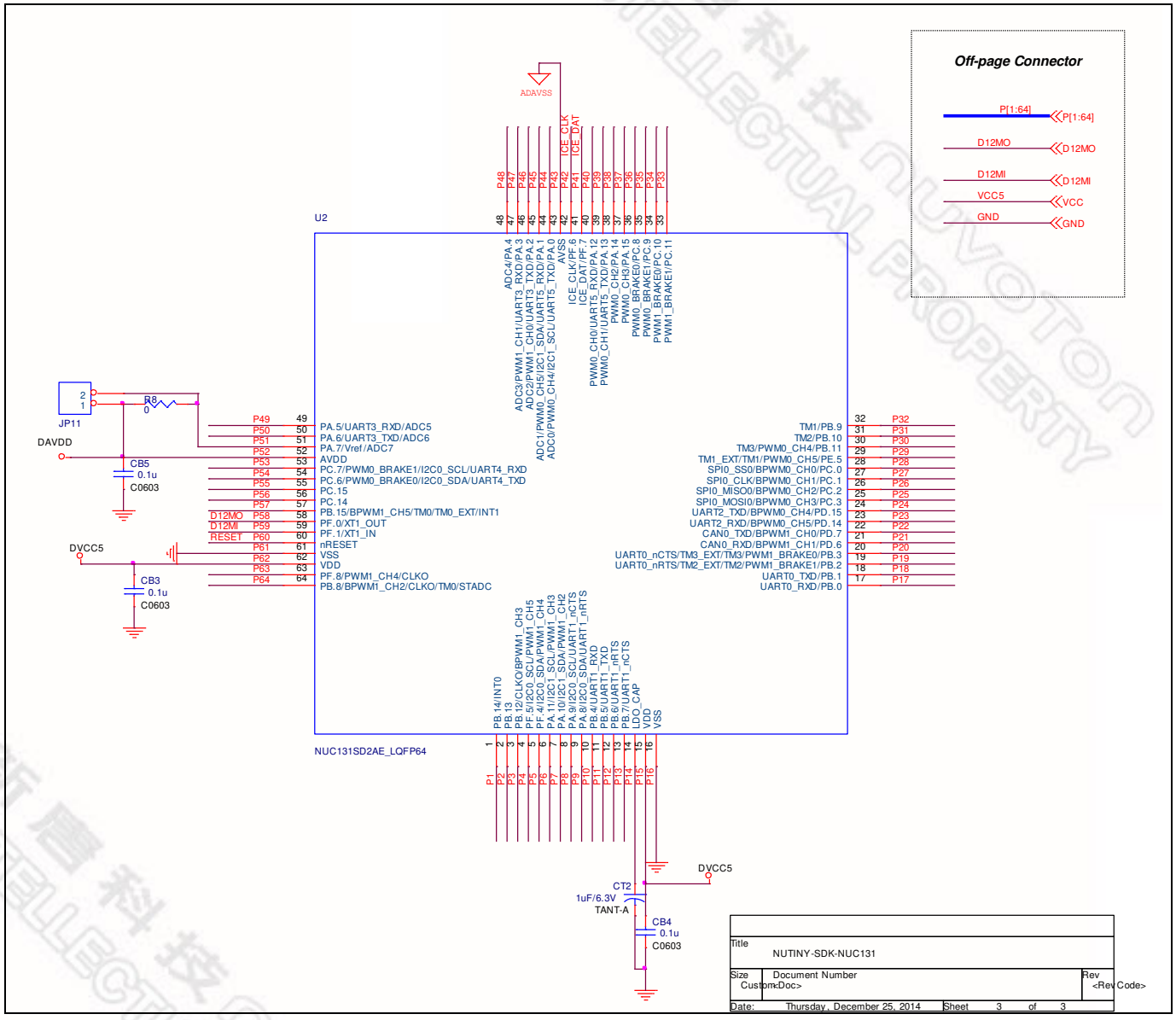
Figure 4-2 Example Directory

To use this example:
The I/O LED on the NuTiny-EVB- NUC131SD2AE board will turn on.

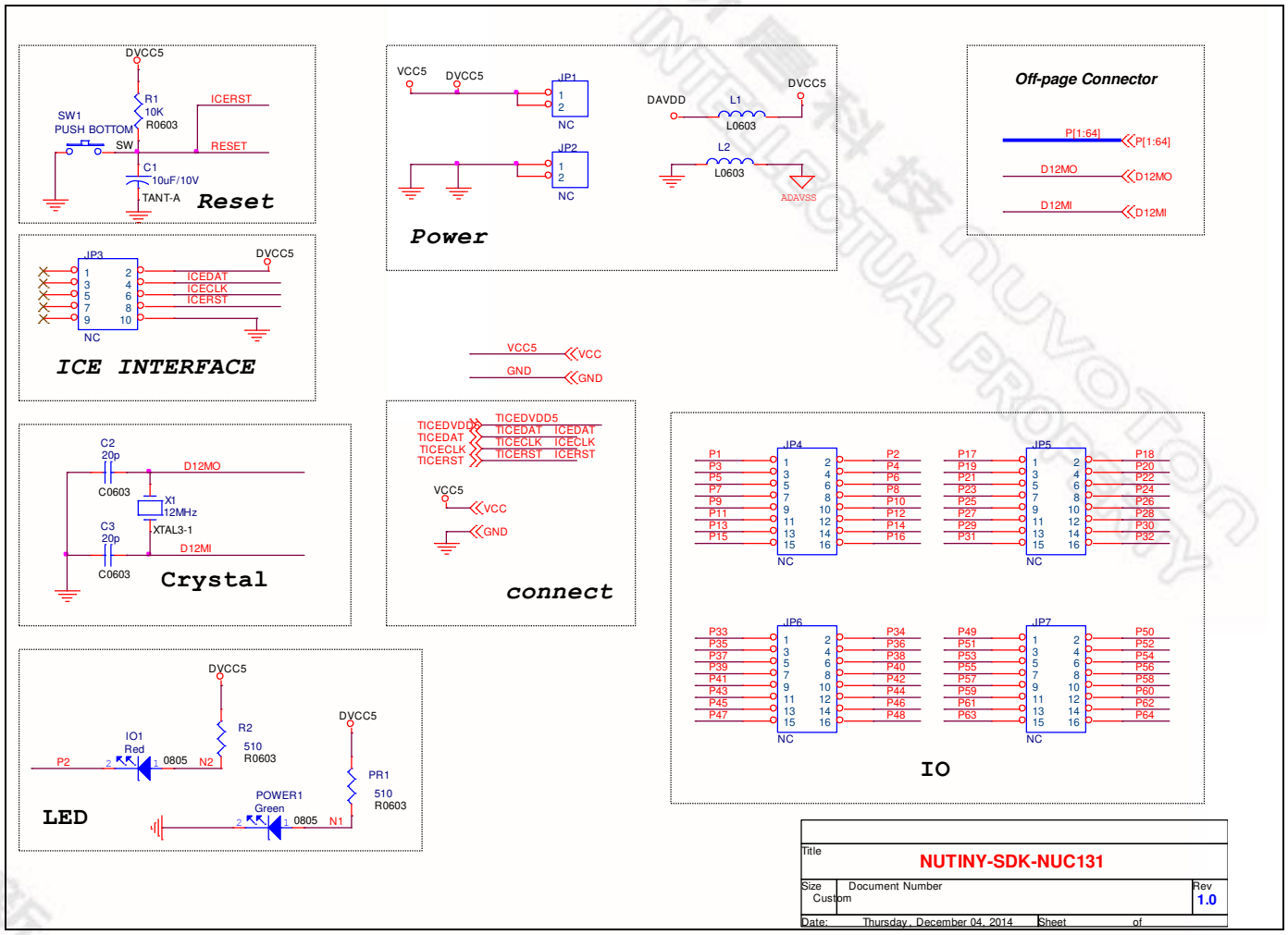
- **Start IAR Embedded Workbench**
- **File-Open-Workspace**
  Open the SYS.eww workspace file
- **Project - Make**
  Compile and link the SYS application
- **Project – Download and Debug**
  Program the application code into on-chip Flash ROM
  - Single step through code
  - Reset the device
  - Run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

5 NuTiny-SDK- NUC131SD2AE Schematics

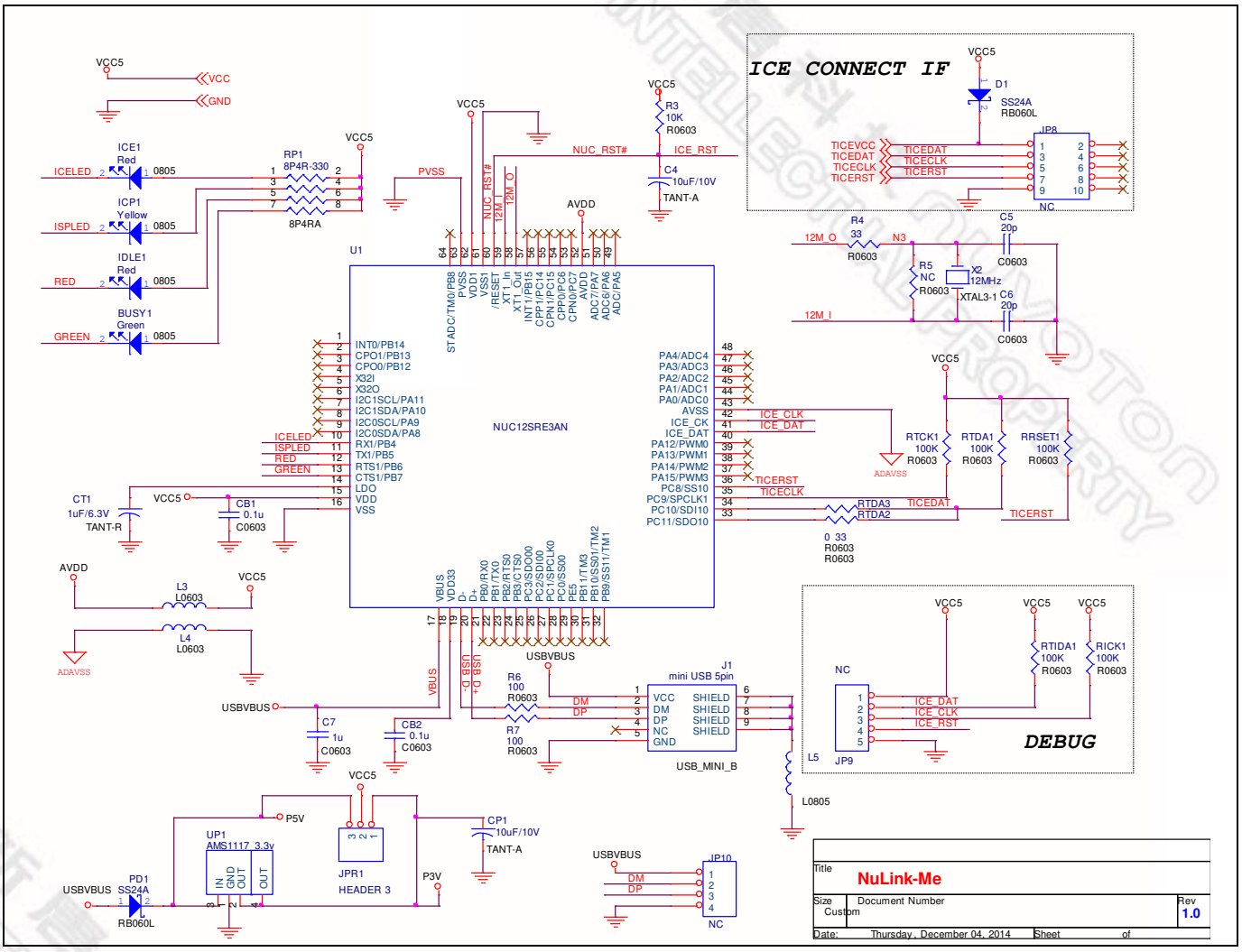
12. NuTiny-EVB- NUC131SD2AE Schematic



13. NuTiny-EVB- NUC131SD2AE Schematic

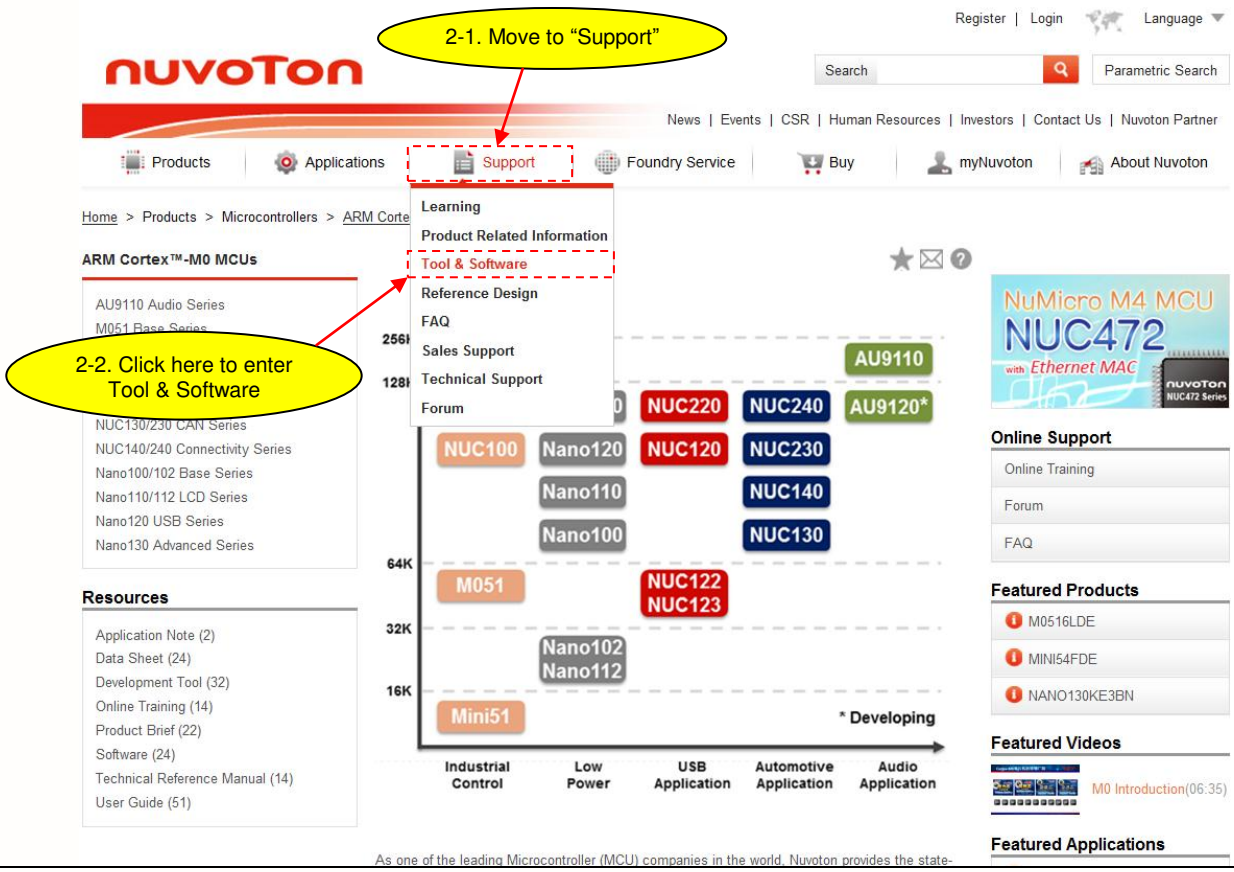


14. Nu-Link-Me Schematic



6 Downloading NuMicro™ Related Files from Nuvoton Website

15. Downloading NuMicro™ Keil µVision® IDE Driver

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

Step3

Step4

Programmer Software Tools Package

File name	Description	Version	Date
ICP Programming Tool V1.27.6340.zip Revision History	NuMicro ICP tool & user manual	V1.27.6340	2014-10-30
ISP Programming Tool V1.44.zip Revision History	NuMicro ISP Programming Tool & user manual	V1.44	2014-09-01
NuGang Programmer V6.23.zip Revision History	user manual	V6.23	2014-12-17

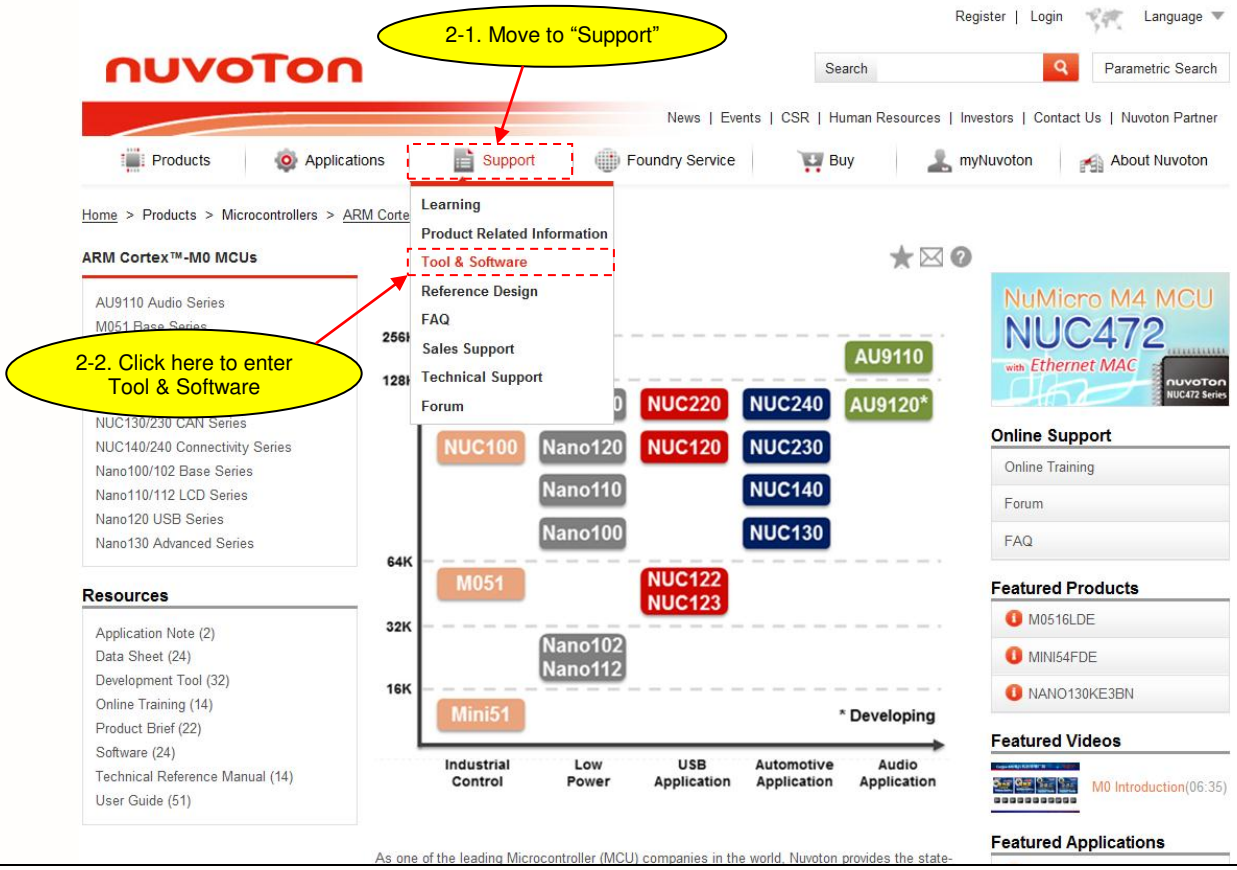
Click here to download the file.

Nu-Link Driver

File name	Description	Version	Date
Nu-Link Driver for Keil RVMDK V1.27.6340.zip Revision History	This driver is to support Nu-Link to work under Keil RVMDK Development Environment for all NuMicro Family Devices.	V1.27.6340	2014-10-30
Nu-Link Driver for IAR EWARM V1.27.6340.zip Revision History	This driver is to support Nu-Link to work under IAR EWARM Development Environment for all NuMicro Family Devices.	V1.27.6340	2014-10-30

Step5 Download the NuMicro™ Keil µVision® IDE driver.

16. Downloading NuMicro™ IAR EWARM Driver

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

Step3

Step4

Programmer Software Tools Package

File name	Description	Version	Date
ICP Programming Tool V1.27.6340.zip Revision History	NuMicro ICP tool & user manual	V1.27.6340	2014-10-30
ISP Programming Tool V1.44.zip Revision History	NuMicro ISP Programming Tool & user manual	V1.44	2014-09-01
NuGang Programmer V6.23.zip Revision History	NuGang Programmer software & user manual	V6.23	2014-12-17

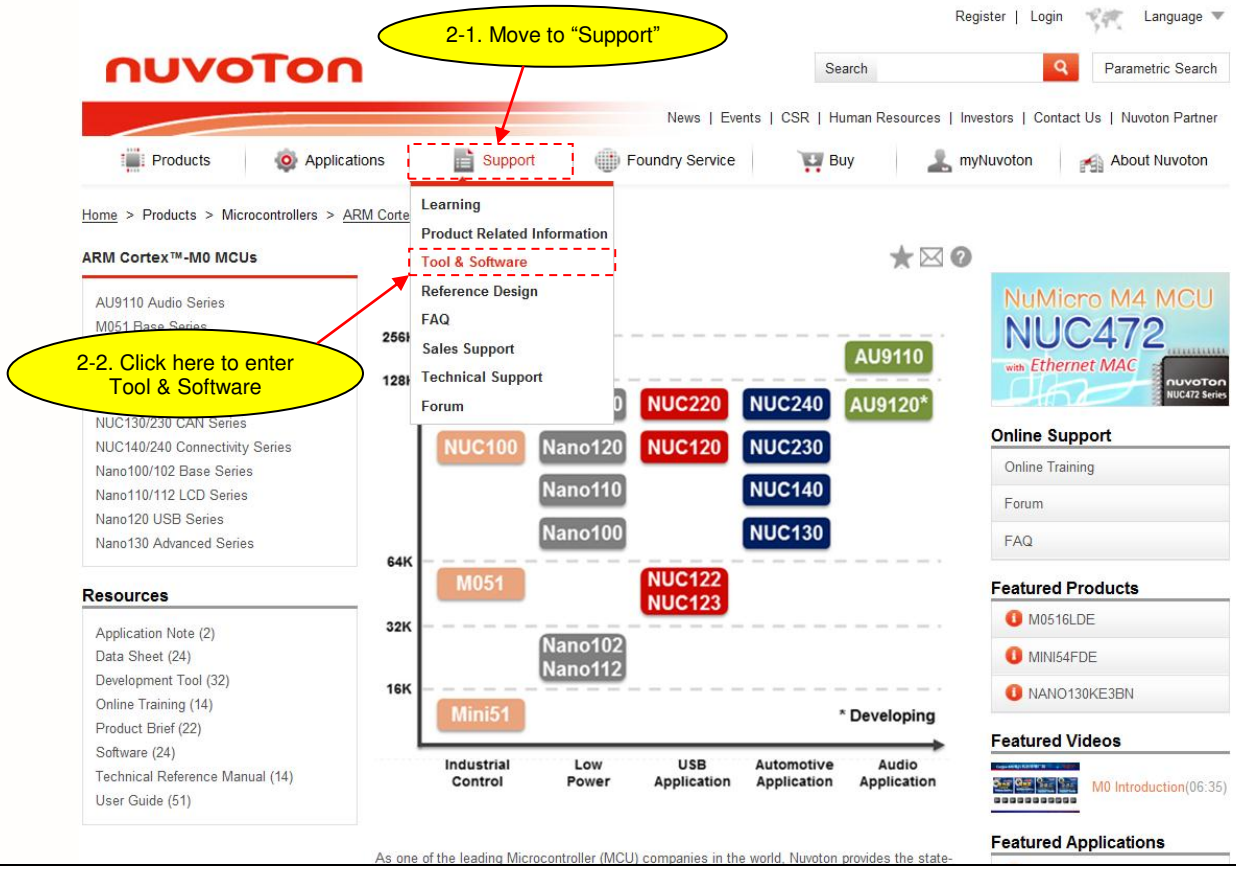
Nu-Link Driver

Click here to download the file.

File name	Description	Version	Date
Nu-Link Driver for Keil RVMDK V1.27.6340.zip Revision History	This driver is to support Nu-Link to work under Keil RVMDK Development Environment for all NuMicro Family Devices.	V1.27.6340	2014-10-30
Nu-Link Driver for IAR EWARM V1.27.6340.zip Revision History	This driver is to support Nu-Link to work under IAR EWARM Development Environment for all NuMicro Family Devices.	V1.27.6340	2014-10-30

Step5 Download the NuMicro™ IAR EWARM driver.

17. Downloading NuMicro™ NUC131SD2AE Series BSP Software Library

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

Step3	
Step4	Download the NuMicro™ NUC131 Series CMSIS BSP.

7 Revision History

Revision	Date	Description
1.00	Des. 25, 2014	Preliminary version.

Important Notice

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