4T 8051

8-bit Microcontroller

Nuvoton 4T 8051-based Microcontroller NuTiny-SDK-N79E715 User Manual

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www.nuvoton.com

NUTINY-SDK-N79E715 USER MANUAL

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1 OVERVIEW

NuTiny-SDK-N79E715 is the specific development tool for 8-bit high performance 4T 8051-based microcontroller N79E715 series. User can use NuTiny-SDK-N79E715 to develop and verify the application program easily.

NuTiny-SDK-N79E715 includes two portions. One is NuTiny-EVB-N79E715 and the other is Nu-Link-51. NuTiny-EVB-N79E715 is the evaluation board and Nu-Link-51 is its Debug Adaptor. Thus, user does not need other additional ICE or debug equipment.

The Nuvoton 4T 8051-based microcontroller N79E715 series is function compatible with the N79E81x, N79E85x and N79E84x series, the 8-bit high performance 4T 8051-based microcontroller. The instruction set is fully compatible with the standard 80C51 and performance enhanced. The N79E715 series can bridge the gap and replace the cost equivalent to traditional 4T, 6T and 12T 8-bit microcontroller by 4T 8-bit high performance and rich functions. With high performance CPU core and rich well-designed peripherals, the N79E715 benefits to meet a general purpose, home appliances, or motor control system accomplishment.

The N79E715 series can run up to 24 MHz, and operate at a wide voltage range of 2.4V ~ 5.5V and temperature range of -40℃ ~ +105℃. For the N79E715 series, the embedded program flash size is up to 18 Kbytes, SRAM is 256 bytes, and 256 Bytes of auxiliary RAM (XRAM). The N79E715 series also offers size configurable 4K/3K/2K/1K/0K bytes flash of LDROM for the ISP, which provides flexibility to user developed Boot Code.

The N79E715 series has many high-performance peripheral functions, such as 22.1184 MHz high-speed internal RC oscillator (trimmed to ±1% VDD = 5.0 V, TA = 25 ℃ , ±5% in all conditions), I/O port with up to 25 pins, four 16 bit timers, two full-duplex UARTs ports with frame error detection and automatic address recognition, one SPI interface, one I^{2}C interface, up to five enhanced 16 bit PWM output channels, 8 channels 10 bit ADC, Watchdog Timer, Self Wake-up Timer, and a Brown-out Detector. The peripherals are equipped with 18 sources with 4-level-priority interrupts capability. All these peripherals have been incorporated into the N79E715 series to reduce component count, board space and system cost.

Additionally, the N79E715 series is equipped with ISP (In-System Programming) and ICP (In-Circuit Programming) functions, which allow the user to update the program memory without removing the chip from the actual end product. The N79E715 series also supports In-Application-Programming (IAP) function, user switches the code executing without the chip reset after the embedded flash updated.

2 NUTINY-SDK-N79E715 INTRODUCTION

NuTiny-SDK-N79E715 uses the N79E85JALG as the target microcontroller. Figure 2-1 is NuTiny-SDK-N79E715 for the N79E715 series, the left portion is called NuTiny-EVB-N79E715 and the right portion is Debug Adaptor called Nu-Link-51.

NuTiny-EVB-N79E715 is similar to other development boards. User can use it to develop and verify applications to emulate the real behavior. The on-board chip covers N79E715 series features. The NuTiny-EVB-N79E715 can be a real system controller to design user's target systems.
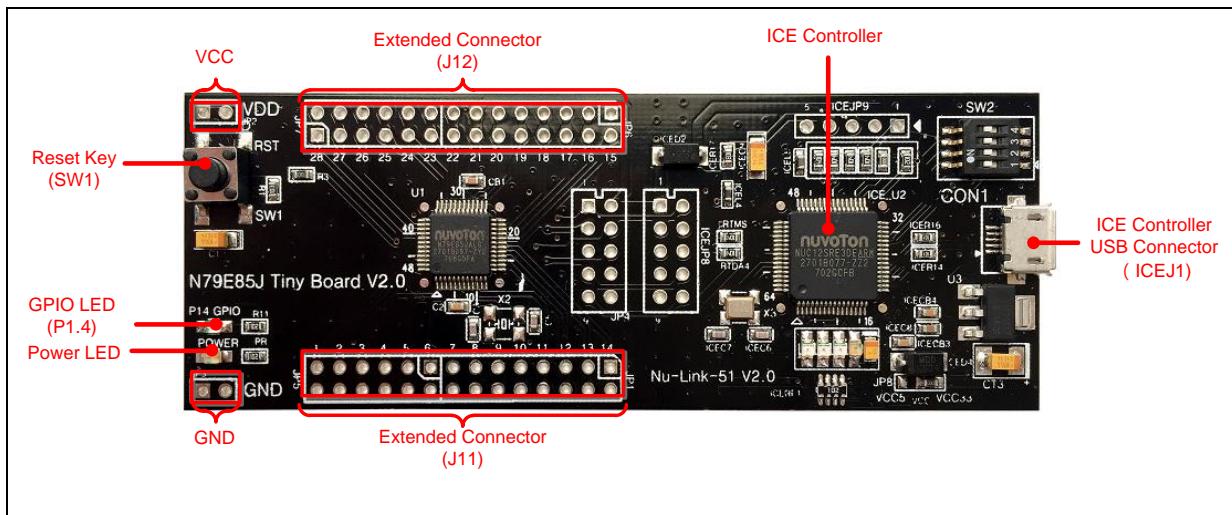

Figure 2-1 NuTiny-SDK-N79E715 (PCB Board)

2.1 Virtual COM Port Switch Description

The switch in Nu-Link-Me SW2, determines that the virtual COM port function is enabled or disabled. When user turns on all of the positions of switch, the virtual COM port function will be enabled. By using virtual COM port function, user can access the USB device in the same way as it would access a standard COM port to N79E85J UART. To use this function, user needs to install "VCOM Driver" at first. User can get "VCOM Driver" from NuMicroDVD www.nuvoton.com\NuMicroDVD in folder "Software Utilities". Or download from nuvoton website

Home > Products > Microcontrollers > 8bit 8051 MCUs > Software > Nu-Link_USB_Driver_V1.2

2.2 NuTiny-SDK-N79E715 Power Setting and Connector

2.2.1 Power Setting

- J1: USB port in Nu-Link-51

2.2.2 Debug Connector

- ICEJP8: Connector in target board (NuTiny-EVB-N79E715) for connecting with Nuvoton ICE adaptor (Nu-Link-51)
- JP4: Connector in ICE adaptor (Nu-Link-51) for connecting with a target board (for ICE chip N79E85J)

2.2.3 ICE USB Connector

- J1: Mini USB Connector in Nu-Link-51 connected to a PC USB port

2.2.4　Extended Connector

- J11 and J12: Show all chip pins in NuTiny-EVB-N79E715

2.2.5　Reset Button

- SW1: Reset button in NuTiny-EVB-N79E715

2.2.6　Power Connector

- JP11: VCC connector in NuTiny-EVB-N79E715
- JP12: GND connector in NuTiny-EVB-N79E715

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2.3 Pin Assignment for Extended Connector

NuTiny-EVB-N79E715 provides N79E85J on board and the extended connector for 28 pin. Table 2-1 is the pin assignment for N79E715.

Pin No	Pin Function	Pin No	Pin Function
01	P2.0	15	P2.4
02	P2.1	16	P2.5
03	P0.0	17	P1.1
04	P1.7	18	P1.0
05	P1.6	19	P0.7
06	/RST	20	P0.6
07	VSS	21	VDD
08	P3.1	22	P0.5
09	P3.0	23	P0.4
10	P1.4	24	P0.3
11	P1.3	25	P0.2
12	P1.2	26	P0.1
13	P2.2	27	P2.6
14	P2.3	28	P2.7

Table 2-1 Pin Assignment for N79E715AT28

3 HOW TO START NUTINY-SDK-N79E715 ON THE KEIL C-51 µVISION® IDE

3.1 Downloading and Installing Keil C-51 µVision® IDE Software

Please connect to the Keil company website (http://www.keil.com) to download the Keil C-51 µVision® IDE and install the RVMDK.

3.2 Downloading and Installing Nuvoton Nu-Link Driver

Please connect to Nuvoton 8bit 8051 MCUs website (http://www.nuvoton.com/8bit-8051-mcus) to download the "*Nuvoton 8051 Keil uVision Driver*" file. Please refer to section 5.1 for the detailed download flow. After the Nu-Link driver is downloaded, please unzip the file and execute the "*Nuvoton_8051_Keil_uVision_Driver_v1.08.zip*" to install the driver.

3.3 Hardware Setup

The hardware setup is shown as Figure 3-1

Figure 3-1 NuTiny-SDK-N79E715 Hardware Setup

3.4 Example Program

This example demonstrates the ease of downloading and debugging an application on a NuTiny-SDK-N79E715 board. It can be found on Figure 3-2 list directory and downloaded from Nuvoton 8bit 8051 MCUs website.

The example file can be found in the directory list shown in Figure 3-2.
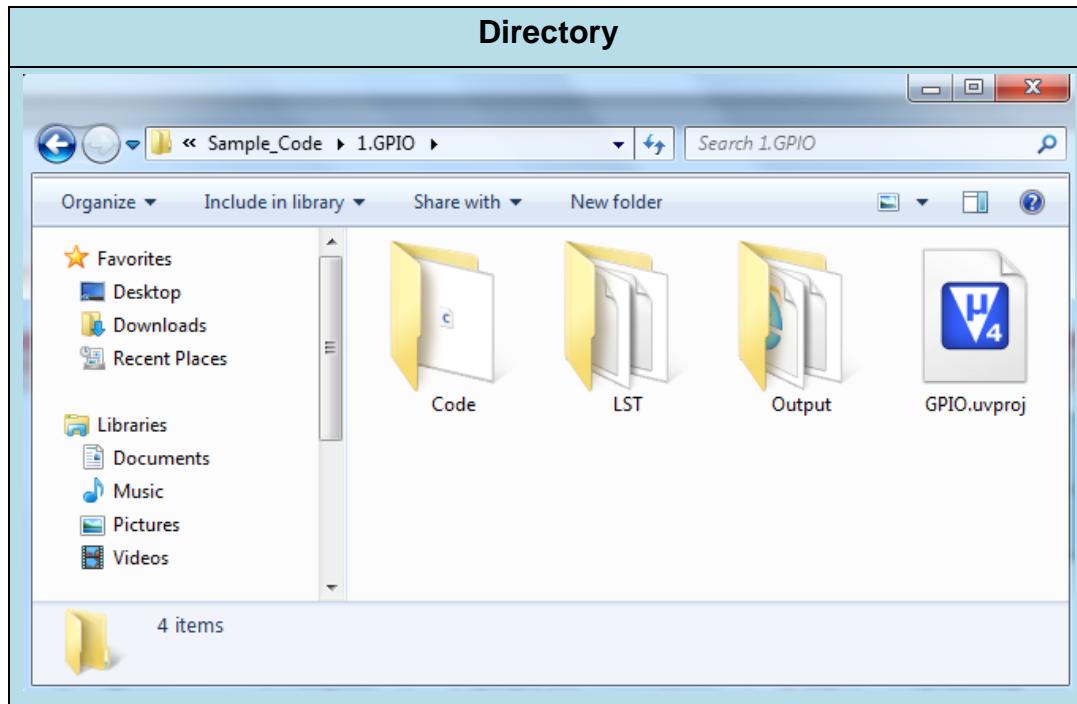
Directory

Figure 3-2 Example Directory

To use this example:

1. Open a project from the N79E715 sample code installation folder (default as C:\Nuvoton) using the following path：

   \N79E715_SampleCode_Keil_C51_V1.0\Sample_Code\1.GPIO

2. Execute "**GPIO.uvproj**"

Enter compile mode interface
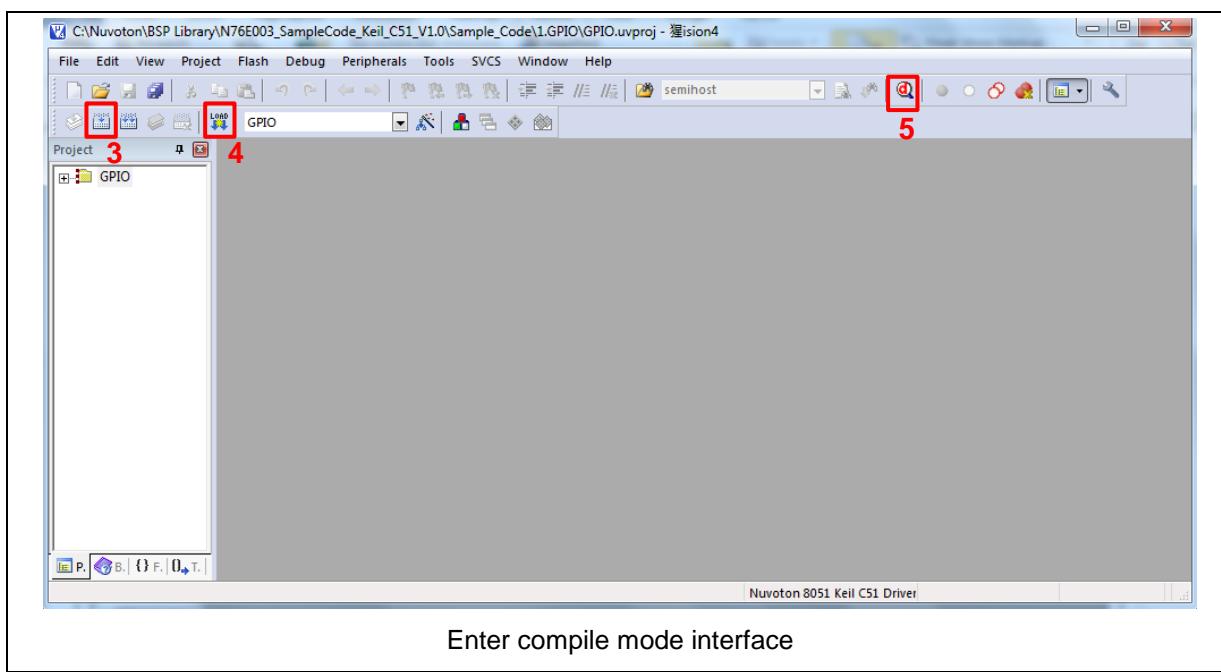
3. Compiler

4. Download the program code to Flash

5. Enter / Exit Debug mode

Enter Debug mode interface
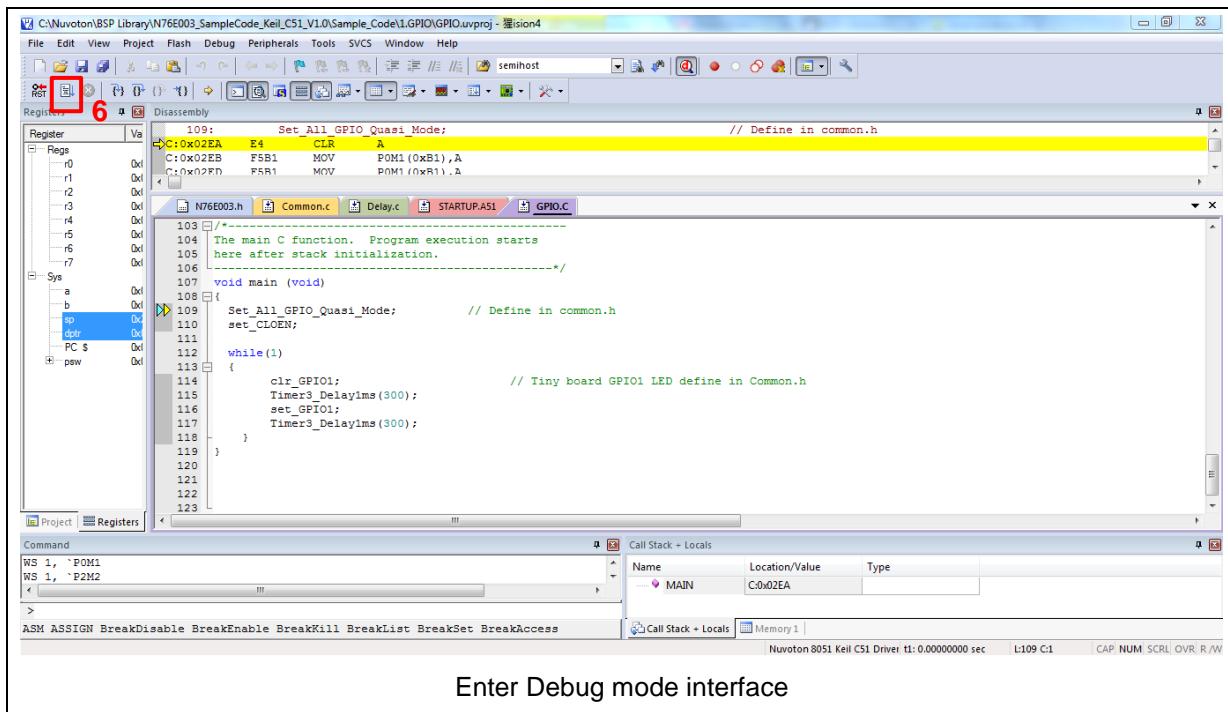
6. Execute the program

7. The I/O LED on the NuTiny-EVB-N79E715 board will be toggled on.

4   NUTINY-EVB-N79E715 SCHEMATIC

4.1   Nu-Link-51 Schematic
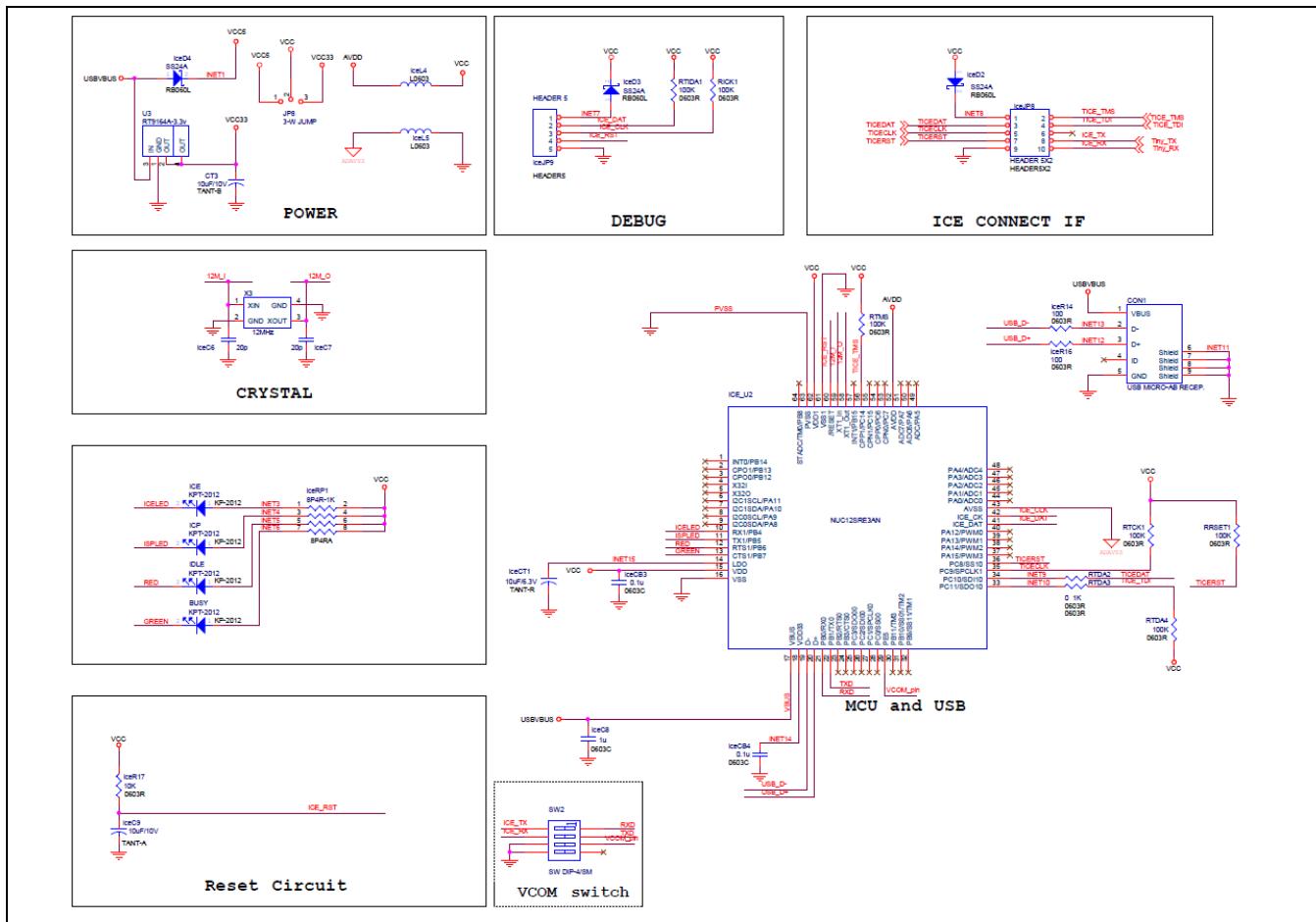
4.2 NuTiny-SDK-N79E715 Schematic
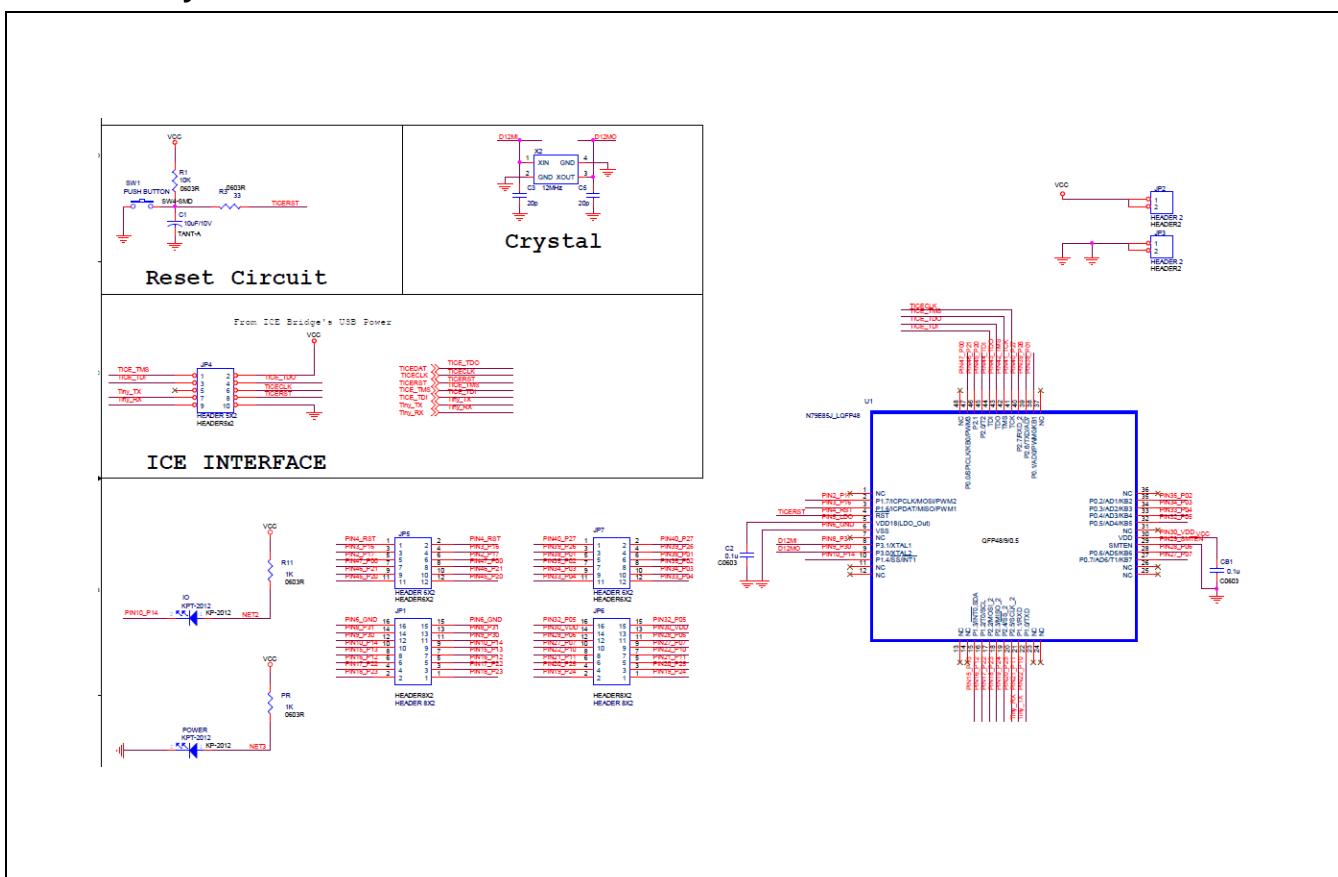
5   DOWNLOADING NUVOTON 8BIT 8051 MCUS RELATED FILES FROM NUVOTON WEBSITE

5.1   Downloading Nuvoton Keil C-51 µVision® IDE Driver
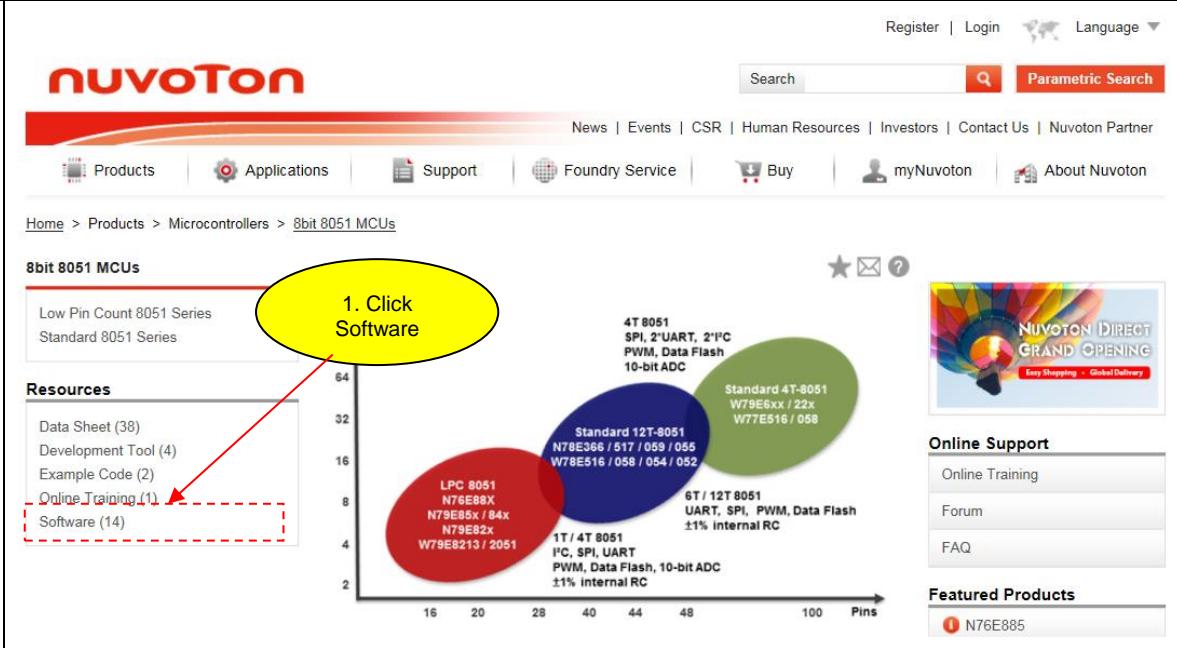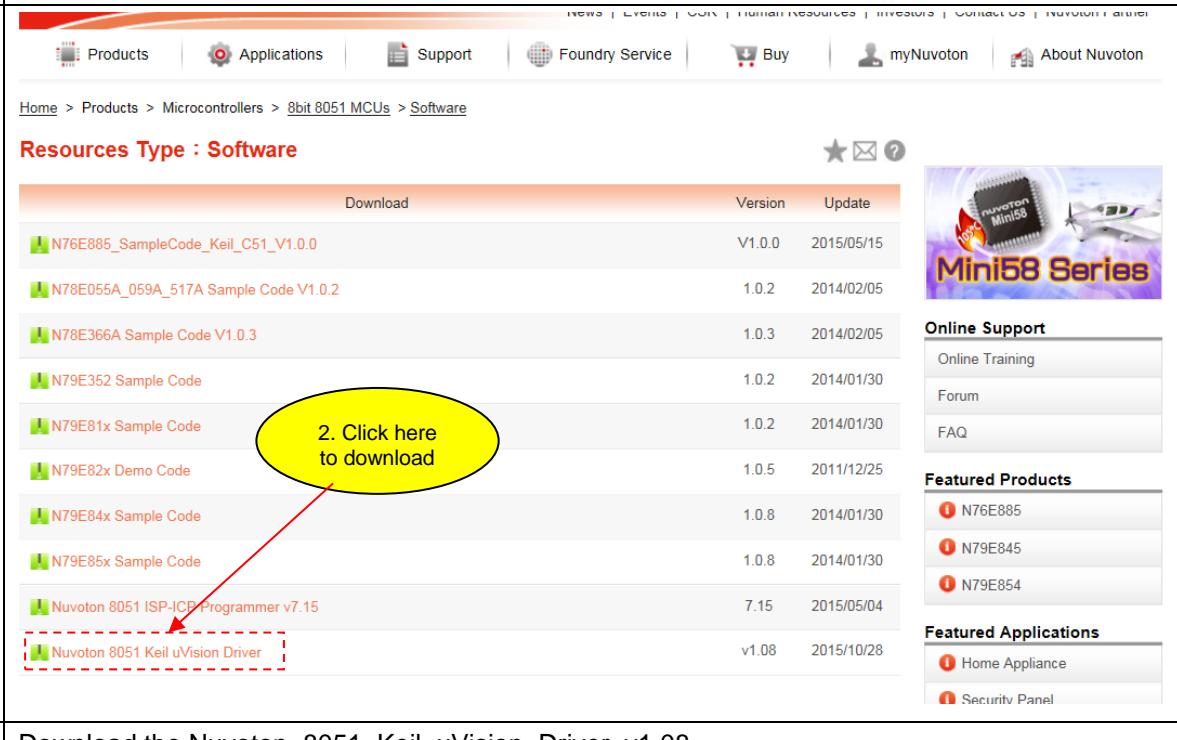
Step1	Visit the Nuvoton 8bit 8051 MCUs website: **http://www.nuvoton.com/8bit-8051-mcus**
Step2	
Step3	
Step4	Download the Nuvoton_8051_Keil_uVision_Driver_v1.08

5.2 Downloading Nuvoton 8bit 8051 MCUs N79E715 Series Sample Code

Step1	Visit the Nuvoton 8bit 8051 MCUs website: http://www.nuvoton.com/8bit-8051-mcus
Step2	
Step3	
Step4	Download the N79E715_SampleCode_Keil_C51_V1.0.0

6   REVISION HISTORY

Date	Revision	Description
2017.04.9	1.00	1. Preliminary version.
2017.9.7	2.00	1. Modify PCB picture to V2.0 2. Add VCOM function description
2018.3.1	2.01	1. Add Sample code download page step.

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