

ARM[®] Cortex[®]-M
32-bit Microcontroller

NuMicro[®] Family
NuTiny-SDK-NUC029KGE
User Manual

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1 OVERVIEW

NuTiny-SDK-NUC029KGE is a specific development tool for NuMicro® NUC029KGE. With the NuTiny-SDK-NUC029KGE, user can develop and verify the application program easily.

The NuTiny-SDK-NUC029KGE includes two portions. One is NuTiny-EVB-NUC029KGE and the other is Nu-Link2-Me. NuTiny-EVB-NUC029KGE is the evaluation board and Nu-Link2-Me is its Debug Adaptor. Thus, user does not need other additional ICE or debug equipment.

The NUC029KGE can bridge the gap and replace the cost equivalent to traditional 8- and 16-bit microcontroller by 32-bit performance and rich functions. The NUC029KGE supports a wide range of applications from low-end, price sensitive designs to computing-intensive ones and provides advanced high-end features in economical products.

The NuMicro® NUC029xGE of NUC029 series microcontroller based on the Arm® Cortex®-M0 core operates at up to 72 MHz. With its crystal-less USB 2.0 FS interface, it is able to generate precise frequency required by USB protocol without the need of external crystal. It features adjustable VDDIO pins for specific I/O pins with a wide range of voltage from 1.8 V to 5.5 V for various operating voltages of external components, a unique high-speed PWM with clock frequency up to 144 MHz for precision control, and an integrated hardware divider to speed up the calculation for the control algorithms. Apart from that, the NUC029xGE also integrates SPROM (Security Protection ROM) which provides a secure code execution area to protect the intelligent property of developers. The NuMicro® NUC029xGE of NUC029 series is ideal for industrial control, motor control and metering applications.

The NuMicro® NUC029xGE of NUC029 series supports the wide voltage range from 2.5 V to 5.5 V and temperature ranging from -40°C to 105°C, up to 256 Kbytes of Flash memory, 20 Kbytes of SRAM, 4 Kbytes of ISP (In-System Programming) ROM as well as ICP (In-Circuit Programming) ROM and IAP (In-Application Programming) ROM in 48-, 64-, 128-pin packages. It also supports high immunity of 8KV ESD (HBM)/4KV EFT. It is also equipped with plenty of peripherals such as USB interface, Timers, Watchdog Timers, RTC, PDMA, EBI, UART, Smart Card Interface, SPI, I²S, I²C, GPIO, up to 12 channels of 16-bit PWM, up to 20 channels of 12-bit ADC, analog comparator, temperature sensor, low voltage reset, brown-out detector, 96-bit UID (Unique Identification), and 128-bit UCID (Unique Customer Identification).

Besides, the NUC029KGE 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 NUC029KGE also supports In-Application-Programming (IAP) function, user switches the code executing without the chip reset after the embedded flash updated.

2 NUTINY-SDK-NUC029KGE INTRODUCTION

The NuTiny-SDK-NUC029KGE uses the NUC029KGE as the target microcontroller. Figure 2-1 is NuTiny-SDK-NUC029KGE for the NUC029KGE, the left portion is called NuTiny-EVB-NUC029KGE and the right portion is Debug Adaptor called Nu-Link2-Me.

Nu-Link2-Me is a Debug Adaptor. The Nu-Link2-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. The Nu-Link2-Me also supports VCOM function, which gives users more flexibility when debugging. To use the Nu-Link2-Me Debug adaptor with IAR or Keil, please refer to "Nuvoton NuMicro® IAR ICE driver user manual" or Nuvoton NuMicro® Keil ICE driver user manual" in detail. These two documents will be stored in the local hard disk when the user installs each driver. To use Nu-Link2-Me VCOM function, please refer to Chapter 5.

2.1 Front View

Figure 2-1 shows the main components and connectors from the front side of NuTiny-SDK-NUC029KGE. The following lists components and connectors from the front view:

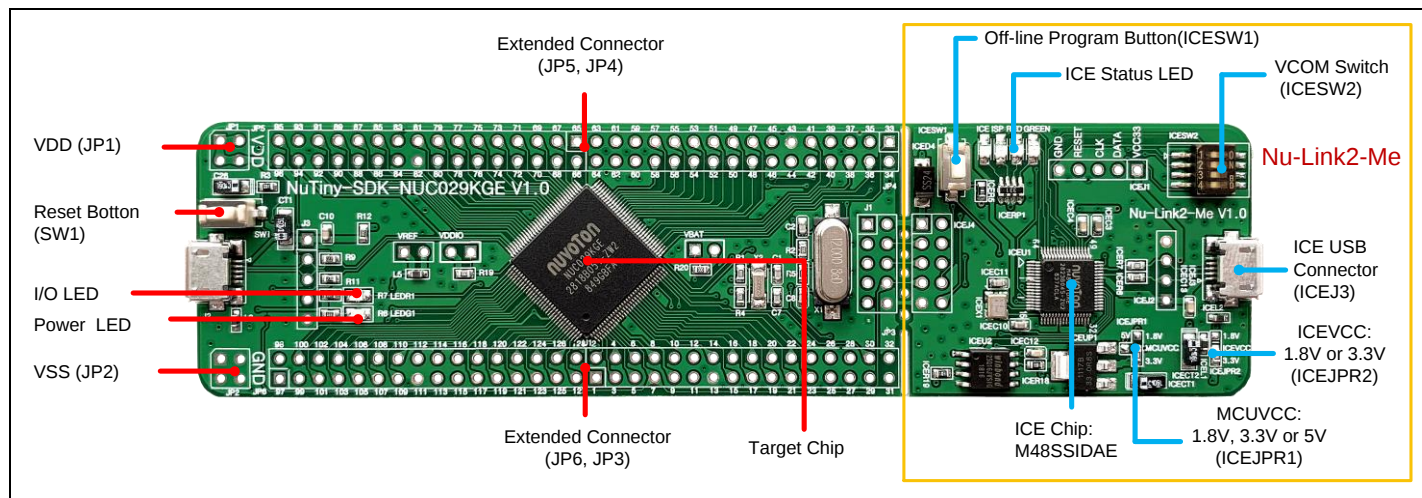


Figure 2-1 NuTiny-SDK-NUC029KGE (PCB Board)

- Target Chip: NUC029KGE(U1)
- USB Power Connector(J2)
- Extension Connectors (JP3, JP4, JP5, and JP6)
- External V_{DD} Power Connector(JP1)
- External V_{SS} (GND) Power Connector(JP2)
- Reset Button(SW1)
- Power LED (LEDG1) and I/O LED(LED1, PC5)
- Nu-Link2-Me
 - ◆ VCOM Switch (ICESW2)
 - ◆ ICE Chip: M48SSIDAE(ICEU1)
 - ◆ ICE USB Connector(ICEJ3)
 - ◆ ICE Status LED(ICE, ISP, RED, GREEN)
 - ◆ Off-line Program Button(ICESW2)
 - ◆ MCUVCC Power Switch (ICEJPR1)
 - ◆ ICEVCC Power Switch (ICEJPR2)

2.2 Pin Assignment for Extended Connector

The NuTiny-EVB-NUC029KGE provides NUC029KGE on board and the extended connector (**JP3, JP4, JP5 and JP6**) for LQFP-128 pin.

128Pin	Pin Name	Type	Description
1	PB.13	I/O	General purpose digital I/O pin.
	ADC0_CH10	A	ADC0 channel 10 analog input.
2	PB.14	I/O	General purpose digital I/O pin.
	ADC0_CH11	A	ADC0 channel 11 analog input.
3	PB.15	I/O	General purpose digital I/O pin.
	ADC0_CH12	A	ADC0 channel 12 analog input.
	ACMP0_P3	A	Analog comparator 0 positive input 3 pin.
	EBI_nCS1	O	EBI chip select 1 output pin.
4	PB.5	I/O	General purpose digital I/O pin.
	ADC0_CH13	A	ADC0 channel 13 analog input.
	SPI0_MOSI	I/O	SPI0 MOSI (Master Out, Slave In) pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	ACMP0_P2	A	Analog comparator 0 positive input 2 pin.
	SC1_RST	O	Smart Card 1 reset pin.
	EBI_AD6	I/O	EBI address/data bus bit 6.
	UART2_RXD	I	UART2 data receiver input pin.
5	PB.6	I/O	General purpose digital I/O pin.
	ADC0_CH14	A	ADC0 channel 14 analog input.
	SPI0_MISO	I/O	SPI0 MISO (Master In, Slave Out) pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	ACMP0_P1	A	Analog comparator 0 positive input 1 pin.
	SC1_PWR	O	Smart Card 1 power pin.
	EBI_AD5	I/O	EBI address/data bus bit 5.
6	PB.7	I/O	General purpose digital I/O pin.
	ADC0_CH15	A	ADC0 channel 15 analog input.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.

128Pin	Pin Name	Type	Description
	USCI2_CTL1	I/O	USCI2 control 1 pin.
	ACMP0_P0	A	Analog comparator 0 positive input 0 pin.
	SC1_DAT	I/O	Smart Card 1 data pin.
	EBI_AD4	I/O	EBI address/data bus bit 4.
7	nRESET	I	External reset input: active LOW, with an internal pull-up. Set this pin low reset to initial state.
8	PD.0	I/O	General purpose digital I/O pin.
	SPI0_I2SMCLK	I/O	SPI0 I2S master clock output pin
	SPI1_I2SMCLK	I/O	SPI1 I2S master clock output pin
	UART0_RXD	I	UART0 data receiver input pin.
	USCI2_CTL0	I/O	USCI2 control 0 pin.
	ACMP1_N	A	Analog comparator 1 negative input pin.
	SC1_CLK	O	Smart Card 1 clock pin.
	INT3	I	External interrupt 3 input pin.
9	AVSS	P	Ground pin for analog circuit.
10	NC	-	No connect pin, leave floating.
11	VDD	P	Power supply for I/O ports and LDO source for internal PLL and digital circuit.
12	NC	-	No connect pin, leave floating.
13	VSS	P	Ground pin for digital circuit.
14	PC.8	I/O	General purpose digital I/O pin.
	ADC0_CH16	A	ADC0 channel 16 analog input.
	UART0_nRTS	O	UART0 request to Send output pin.
15	PD.8	I/O	General purpose digital I/O pin.
	ADC0_CH17	A	ADC0 channel 17 analog input.
	UART0_nCTS	I	UART0 clear to Send input pin.
	USCI2_CTL1	I/O	USCI2 control 1 pin.
	TM2	I/O	Timer2 event counter input/toggle output pin.
	EBI_nCS0	O	EBI chip select 0 output pin.
16	PD.9	I/O	General purpose digital I/O pin.

128Pin	Pin Name	Type	Description
	ADC0_CH18	A	ADC0 channel 18 analog input.
	UART0_RXD	I	UART0 data receiver input pin.
	USCI2_CTL0	I/O	USCI2 control 0 pin.
	ACMP1_P3	A	Analog comparator 1 positive input 3 pin.
	TM3	I/O	Timer3 event counter input/toggle output pin.
	EBI_ALE	O	EBI address latch enable output pin.
17	PD.1	I/O	General purpose digital I/O pin.
	ADC0_CH19	A	ADC0 channel 19 analog input.
	PWM0_SYNC_IN	I	PWM0 counter synchronous trigger input pin.
	UART0_TXD	O	UART0 data transmitter output pin.
	USCI2_CLK	I/O	USCI2 clock pin.
	ACMP1_P2	A	Analog comparator 1 positive input 2 pin.
	TM0	I/O	Timer0 event counter input/toggle output pin.
	EBI_nRD	O	EBI read enable output pin.
18	PD.2	I/O	General purpose digital I/O pin.
	ADC0_ST	I	ADC0 external trigger input pin.
	TM0_EXT	I/O	Timer0 external capture input/toggle output pin.
	USCI2_DAT0	I/O	USCI2 data 0 pin.
	ACMP1_P1	A	Analog comparator 1 positive input 1 pin.
	PWM0_BRAKE0	I	PWM0 Brake 0 input pin.
	EBI_nWR	O	EBI write enable output pin.
	INT0	I	External interrupt 0 input pin.
19	PD.3	I/O	General purpose digital I/O pin.
	TM2	I/O	Timer2 event counter input/toggle output pin.
	SPI0_I2SMCLK	I/O	SPI0 I2S master clock output pin
	TM1_EXT	I/O	Timer1 external capture input/toggle output pin.
	USCI2_DAT1	I/O	USCI2 data 1 pin.
	ACMP1_P0	A	Analog comparator 1 positive input 0 pin.
	PWM0_BRAKE1	I	PWM0 Brake 1 input pin.
	EBI_MCLK	O	EBI external clock output pin.

128Pin	Pin Name	Type	Description
	INT1	I	External interrupt 1 input pin.
20	PD.4	I/O	General purpose digital I/O pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.
	I2C0_SDA	I/O	I ² C0 data input/output pin.
	UART2_nRTS	O	UART2 request to Send output pin.
	PWM0_BRAKE0	I	PWM0 Brake 0 input pin.
	TM0	I/O	Timer0 event counter input/toggle output pin.
21	PD.5	I/O	General purpose digital I/O pin.
	CLKO	O	Clock Out
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	I2C0_SCL	I/O	I ² C0 clock pin.
	UART2_nCTS	I	UART2 clear to Send input pin.
	PWM0_BRAKE1	I	PWM0 Brake 1 input pin.
	TM1	I/O	Timer1 event counter input/toggle output pin.
22	PE.3	I/O	General purpose digital I/O pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	UART2_RXD	I	UART2 data receiver input pin.
	PWM0_CH3	I/O	PWM0 channel 3 output/capture input.
23	PD.6	I/O	General purpose digital I/O pin.
	CLKO	O	Clock Out
	SPI1_SS	I/O	SPI1 slave select pin.
	UART0_RXD	I	UART0 data receiver input pin.
	UART2_TXD	O	UART2 data transmitter output pin.
	ACMP0_O	O	Analog comparator 0 output pin.
	PWM0_CH5	I/O	PWM0 channel 5 output/capture input.
	EBI_nWR	O	EBI write enable output pin.
24	VBAT	P	Power supply by batteries for RTC.
25	NC	-	No connect pin, leave floating.
26	PF.0	I/O	General purpose digital I/O pin.
	X32_OUT	O	External 32.768 kHz crystal output pin.

128Pin	Pin Name	Type	Description
	USCI2_CTL1	I/O	USCI2 control 1 pin.
	INT5	I	External interrupt 5 input pin.
27	PF.1	I/O	General purpose digital I/O pin.
	X32_IN	I	External 32.768 kHz crystal input pin.
	USCI2_CTL0	I/O	USCI2 control 0 pin.
	PWM1_BRAKE0	I	PWM1 Brake 0 input pin.
28	NC	-	No connect pin, leave floating.
29	PF.2	I/O	General purpose digital I/O pin.
	USCI2_CLK	I/O	USCI2 clock pin.
	PWM1_BRAKE1	I	PWM1 Brake 1 input pin.
30	PD.10	I/O	General purpose digital I/O pin.
	TM2	I/O	Timer2 event counter input/toggle output pin.
	USCI2_DAT0	I/O	USCI2 data 0 pin.
31	PD.11	I/O	General purpose digital I/O pin.
	TM3	I/O	Timer3 event counter input/toggle output pin.
	USCI2_DAT1	I/O	USCI2 data 1 pin.
32	PD.12	I/O	General purpose digital I/O pin.
	USCI1_CTL0	I/O	USCI1 control 0 pin.
	SPI1_SS	I/O	SPI1 slave select pin.
	UART0_TXD	O	UART0 data transmitter output pin.
	PWM1_CH0	I/O	PWM1 channel 0 output/capture input.
	EBI_ADR16	O	EBI address bus bit 16.
33	PD.13	I/O	General purpose digital I/O pin.
	USCI1_DAT1	I/O	USCI1 data 1 pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	UART0_RXD	I	UART0 data receiver input pin.
	PWM1_CH1	I/O	PWM1 channel 1 output/capture input.
	EBI_ADR17	O	EBI address bus bit 17.
34	NC	-	No connect pin, leave floating.
35	PD.14	I/O	General purpose digital I/O pin.

128Pin	Pin Name	Type	Description
	USCI1_DAT0	I/O	USCI1 data 0 pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	UART0_nCTS	I	UART0 clear to Send input pin.
	PWM1_CH2	I/O	PWM1 channel 2 output/capture input.
	EBI_ADR18	O	EBI address bus bit 18.
36	PD.15	I/O	General purpose digital I/O pin.
	USCI1_CLK	I/O	USCI1 clock pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.
	UART0_nRTS	O	UART0 request to Send output pin.
	PWM1_CH3	I/O	PWM1 channel 3 output/capture input.
	EBI_ADR19	O	EBI address bus bit 19.
37	VDD	P	Power supply for I/O ports and LDO source for internal PLL and digital circuit.
38	PD.7	I/O	General purpose digital I/O pin.
	USCI1_CTL1	I/O	USCI1 control 1 pin.
	SPI0_I2SMCLK	I/O	SPI0 I2S master clock output pin
	PWM0_SYNC_IN	I	PWM0 counter synchronous trigger input pin.
	TM1	I/O	Timer1 event counter input/toggle output pin.
	ACMP0_O	O	Analog comparator 0 output pin.
	PWM0_CH5	I/O	PWM0 channel 5 output/capture input.
	EBI_nRD	O	EBI read enable output pin.
39	NC	-	No connect pin, leave floating.
40	PF.3	I/O	General purpose digital I/O pin.
	XT1_OUT	O	External 4~20 MHz (high speed) crystal output pin.
	I2C1_SCL	I/O	I ² C1 clock pin.
41	PF.4	I/O	General purpose digital I/O pin.
	XT1_IN	I	External 4~20 MHz (high speed) crystal input pin.
	I2C1_SDA	I/O	I ² C1 data input/output pin.
42	NC	-	No connect pin, leave floating.
43	VSS	P	Ground pin for digital circuit.

128Pin	Pin Name	Type	Description
44	NC	-	No connect pin, leave floating.
45	VDD	P	Power supply for I/O ports and LDO source for internal PLL and digital circuit.
46	NC	-	No connect pin, leave floating.
47	LDO_CAP	A	LDO output pin.
48	PC.9	I/O	General purpose digital I/O pin.
	SPI0_I2SMCLK	I/O	SPI0 I2S master clock output pin
	I2C1_SCL	I/O	I ² C1 clock pin.
	USCI2_CTL1	I/O	USCI2 control 1 pin.
	PWM1_CH0	I/O	PWM1 channel 0 output/capture input.
49	PC.10	I/O	General purpose digital I/O pin.
	SPI0_MOSI	I/O	SPI0 MOSI (Master Out, Slave In) pin.
	I2C1_SDA	I/O	I ² C1 data input/output pin.
	USCI2_DAT1	I/O	USCI2 data 1 pin.
	PWM1_CH1	I/O	PWM1 channel 1 output/capture input.
50	PC.11	I/O	General purpose digital I/O pin.
	SPI0_MISO	I/O	SPI0 MISO (Master In, Slave Out) pin.
	USCI2_CLK	I/O	USCI2 clock pin.
	PWM1_CH2	I/O	PWM1 channel 2 output/capture input.
51	PC.12	I/O	General purpose digital I/O pin.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	USCI2_CTL0	I/O	USCI2 control 0 pin.
	PWM1_CH3	I/O	PWM1 channel 3 output/capture input.
52	PC.13	I/O	General purpose digital I/O pin.
	SPI0_SS	I/O	SPI0 slave select pin.
	USCI2_DAT0	I/O	USCI2 data 0 pin.
	PWM1_CH4	I/O	PWM1 channel 4 output/capture input.
53	PC.14	I/O	General purpose digital I/O pin.
	PWM1_CH5	I/O	PWM1 channel 5 output/capture input.
54	PC.0	I/O	General purpose digital I/O pin.

128Pin	Pin Name	Type	Description
	SC0_DAT	I/O	Smart Card 0 data pin.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	UART2_nCTS	I	UART2 clear to Send input pin.
	USC10_DAT0	I/O	USC10 data 0 pin.
	ACMP0_WLAT	I	Analog comparator 0 window latch input pin
	PWM0_CH0	I/O	PWM0 channel 0 output/capture input.
	EBI_AD8	I/O	EBI address/data bus bit 8.
	INT2	I	External interrupt 2 input pin.
55	PC.1	I/O	General purpose digital I/O pin.
	CLKO	O	Clock Out
	SC0_CLK	O	Smart Card 0 clock pin.
	UART2_nRTS	O	UART2 request to Send output pin.
	USC10_DAT1	I/O	USC10 data 1 pin.
	ACMP1_WLAT	I	Analog comparator 1 window latch input pin
	PWM0_CH1	I/O	PWM0 channel 1 output/capture input.
	EBI_AD9	I/O	EBI address/data bus bit 9.
56	PC.2	I/O	General purpose digital I/O pin.
	SC0_RST	O	Smart Card 0 reset pin.
	SPI0_SS	I/O	SPI0 slave select pin.
	UART2_TXD	O	UART2 data transmitter output pin.
	USC10_CTL1	I/O	USC10 control 1 pin.
	ACMP1_O	O	Analog comparator 1 output pin.
	PWM0_CH2	I/O	PWM0 channel 2 output/capture input.
	EBI_AD10	I/O	EBI address/data bus bit 10.
57	PC.3	I/O	General purpose digital I/O pin.
	SC0_PWR	O	Smart Card 0 power pin.
	SPI0_MOSI	I/O	SPI0 MOSI (Master Out, Slave In) pin.
	UART2_RXD	I	UART2 data receiver input pin.
	USC10_CTL0	I/O	USC10 control 0 pin.
	PWM0_CH3	I/O	PWM0 channel 3 output/capture input.

128Pin	Pin Name	Type	Description
	EBI_AD11	I/O	EBI address/data bus bit 11.
58	PC.4	I/O	General purpose digital I/O pin.
	SC0_nCD	I	Smart Card 0 card detect pin.
	SPI0_MISO	I/O	SPI0 MISO (Master In, Slave Out) pin.
	I2C1_SCL	I/O	I ² C1 clock pin.
	USCI0_CLK	I/O	USCI0 clock pin.
	PWM0_CH4	I/O	PWM0 channel 4 output/capture input.
	EBI_AD12	I/O	EBI address/data bus bit 12.
59	NC	-	No connect pin, leave floating.
60	NC	-	No connect pin, leave floating.
61	NC	-	No connect pin, leave floating.
62	NC	-	No connect pin, leave floating.
63	NC	-	No connect pin, leave floating.
64	NC	-	No connect pin, leave floating.
65	PE.0	I/O	General purpose digital I/O pin.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	I2C1_SDA	I/O	I ² C1 data input/output pin.
	TM2_EXT	I/O	Timer2 external capture input/toggle output pin.
	SC0_nCD	I	Smart Card 0 card detect pin.
	PWM0_CH0	I/O	PWM0 channel 0 output/capture input.
	EBI_nCS1	O	EBI chip select 1 output pin.
	INT4	I	External interrupt 4 input pin.
66	PC.5	I/O	General purpose digital I/O pin.
	SPI0_I2SMCLK	I/O	SPI0 I2S master clock output pin
	I2C1_SDA	I/O	I ² C1 data input/output pin.
	USCI0_DAT0	I/O	USCI0 data 0 pin.
	PWM0_CH5	I/O	PWM0 channel 5 output/capture input.
	EBI_AD13	I/O	EBI address/data bus bit 13.
67	PC.6	I/O	General purpose digital I/O pin.
	USCI0_DAT1	I/O	USCI0 data 1 pin.

128Pin	Pin Name	Type	Description
	ACMP1_O	O	Analog comparator 1 output pin.
	PWM1_CH0	I/O	PWM1 channel 0 output/capture input.
	EBI_AD14	I/O	EBI address/data bus bit 14.
68	PC.7	I/O	General purpose digital I/O pin.
	USC10_CTL1	I/O	USC10 control 1 pin.
	PWM1_CH1	I/O	PWM1 channel 1 output/capture input.
	EBI_AD15	I/O	EBI address/data bus bit 15.
69	PE.4	I/O	General purpose digital I/O pin.
	I2C0_SCL	I/O	I ² C0 clock pin.
	I2C1_SCL	I/O	I ² C1 clock pin.
	USC10_CTL0	I/O	USC10 control 0 pin.
	SC0_PWR	O	Smart Card 0 power pin.
	PWM1_BRAKE0	I	PWM1 Brake 0 input pin.
	EBI_nCS0	O	EBI chip select 0 output pin.
	INT0	I	External interrupt 0 input pin.
70	PE.5	I/O	General purpose digital I/O pin.
	I2C0_SDA	I/O	I ² C0 data input/output pin.
	I2C1_SDA	I/O	I ² C1 data input/output pin.
	USC10_CLK	I/O	USC10 clock pin.
	SC0_RST	O	Smart Card 0 reset pin.
	PWM1_BRAKE1	I	PWM1 Brake 1 input pin.
	EBI_ALE	O	EBI address latch enable output pin.
	INT1	I	External interrupt 1 input pin.
71	PE.6	I/O	General purpose digital I/O pin.
	ICE_CLK	I	Serial wired debugger clock pin.
	I2C0_SCL	I/O	I ² C0 clock pin.
	UART0_RXD	I	UART0 data receiver input pin.
72	PE.7	I/O	General purpose digital I/O pin.
	ICE_DAT	O	Serial wired debugger data pin.
	I2C0_SDA	I/O	I ² C0 data input/output pin.

128Pin	Pin Name	Type	Description
	UART0_TXD	O	UART0 data transmitter output pin.
73	PA.8	I/O	General purpose digital I/O pin.
	CLKO	O	Clock Out
	I2C1_SCL	I/O	I ² C1 clock pin.
	UART1_TXD	O	UART1 data transmitter output pin.
	SC0_PWR	O	Smart Card 0 power pin.
	SC1_RST	O	Smart Card 1 reset pin.
	TM_BRAKE0	I	TM_BRAKE0 I Timer Brake * input pin.
	PWM0_BRAKE0	I	PWM0 Brake 0 input pin.
	TM1	I/O	Timer1 event counter input/toggle output pin.
74	PA.9	I/O	General purpose digital I/O pin.
	SPI1_I2SMCLK	I/O	SPI1 I2S master clock output pin
	I2C1_SDA	I/O	I ² C1 data input/output pin.
	UART1_RXD	I	UART1 data receiver input pin.
	SC0_RST	O	Smart Card 0 reset pin.
	SC1_PWR	O	Smart Card 1 power pin.
	TM_BRAKE1	I	TM_BRAKE1 I Timer Brake * input pin.
	PWM1_BRAKE1	I	PWM1 Brake 1 input pin.
	TM2	I/O	Timer2 event counter input/toggle output pin.
75	PA.10	I/O	General purpose digital I/O pin.
	UART1_nCTS	I	UART1 clear to Send input pin.
	SC1_DAT	I/O	Smart Card 1 data pin.
76	PA.11	I/O	General purpose digital I/O pin.
	UART1_nRTS	O	UART1 request to Send output pin.
	SC1_CLK	O	Smart Card 1 clock pin.
77	PF.5	I/O	General purpose digital I/O pin.
	TM3_EXT	I/O	Timer3 external capture input/toggle output pin.
	SC1_nCD	I	Smart Card 1 card detect pin.
	TM_BRAKE0	I	TM_BRAKE0 I Timer Brake * input pin.
78	PA.7	I/O	General purpose digital I/O pin.

128Pin	Pin Name	Type	Description
	SPI1_CLK	I/O	SPI1 serial clock pin.
	TM0_EXT	I/O	Timer0 external capture input/toggle output pin.
	TM_BRAKE1	I	TM_BRAKE1 I Timer Brake * input pin.
	EBI_AD7	I/O	EBI address/data bus bit 7.
79	PA.6	I/O	General purpose digital I/O pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	TM1_EXT	I/O	Timer1 external capture input/toggle output pin.
	TM_BRAKE2	I	TM_BRAKE2 I Timer Brake * input pin.
	EBI_AD6	I/O	EBI address/data bus bit 6.
80	PA.5	I/O	General purpose digital I/O pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	TM2_EXT	I/O	Timer2 external capture input/toggle output pin.
	TM_BRAKE3	I	TM_BRAKE3 I Timer Brake * input pin.
	EBI_AD5	I/O	EBI address/data bus bit 5.
81	PA.4	I/O	General purpose digital I/O pin.
	SPI1_SS	I/O	SPI1 slave select pin.
	TM3_EXT	I/O	Timer3 external capture input/toggle output pin.
	EBI_AD4	I/O	EBI address/data bus bit 4.
82	VSS	P	Ground pin for digital circuit.
83	NC	-	No connect pin, leave floating.
84	VDD	P	Power supply for I/O ports and LDO source for internal PLL and digital circuit.
85	PE.1	I/O	General purpose digital I/O pin.
	TM3_EXT	I/O	Timer3 external capture input/toggle output pin.
	SC0_nCD	I	Smart Card 0 card detect pin.
	PWM0_CH1	I/O	PWM0 channel 1 output/capture input.
86	PE.8	I/O	General purpose digital I/O pin.
	UART1_TXD	O	UART1 data transmitter output pin.
	TM0	I/O	Timer0 event counter input/toggle output pin.
	I2C1_SCL	I/O	I ² C1 clock pin.

128Pin	Pin Name	Type	Description
	SC0_PWR	O	Smart Card 0 power pin.
87	PE.9	I/O	General purpose digital I/O pin.
	UART1_RXD	I	UART1 data receiver input pin.
	TM1	I/O	Timer1 event counter input/toggle output pin.
	I2C1_SDA	I/O	I ² C1 data input/output pin.
	SC0_RST	O	Smart Card 0 reset pin.
88	PE.10	I/O	General purpose digital I/O pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	SPI0_MISO	I/O	SPI0 MISO (Master In, Slave Out) pin.
	UART1_nCTS	I	UART1 clear to Send input pin.
	SC0_DAT	I/O	Smart Card 0 data pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.
	EBI_AD7	I/O	EBI address/data bus bit 7.
	TM0_EXT	I/O	Timer0 external capture input/toggle output pin.
89	PE.11	I/O	General purpose digital I/O pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	SPI0_MOSI	I/O	SPI0 MOSI (Master Out, Slave In) pin.
	UART1_nRTS	O	UART1 request to Send output pin.
	SC0_CLK	O	Smart Card 0 clock pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	EBI_AD6	I/O	EBI address/data bus bit 6.
	TM1_EXT	I/O	Timer1 external capture input/toggle output pin.
90	PE.12	I/O	General purpose digital I/O pin.
	SPI1_SS	I/O	SPI1 slave select pin.
	SPI0_SS	I/O	SPI0 slave select pin.
	UART1_TXD	O	UART1 data transmitter output pin.
	I2C0_SCL	I/O	I ² C0 clock pin.
	SPI1_MOSI	I/O	SPI1 MOSI (Master Out, Slave In) pin.
	EBI_AD5	I/O	EBI address/data bus bit 5.
	TM2_EXT	I/O	Timer2 external capture input/toggle output pin.

128Pin	Pin Name	Type	Description
91	PE.13	I/O	General purpose digital I/O pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	UART1_RXD	I	UART1 data receiver input pin.
	I2C0_SDA	I/O	I ² C0 data input/output pin.
	SPI1_SS	I/O	SPI1 slave select pin.
	EBI_AD4	I/O	EBI address/data bus bit 4.
	TM3_EXT	I/O	Timer3 external capture input/toggle output pin.
92	VDDIO	P	Power supply for PE.1, PE.8~PE.13.
94	USB_VBUS	P	Power supply from USB host or HUB.
95	USB_D-	A	USB differential signal D-.
96	USB_D+	A	USB differential signal D+.
97	PF.7	I/O	General purpose digital I/O pin.
98	USB_VDD33_CAP	A	Internal power regulator output 3.3V decoupling pin.
99	PF.6	I/O	General purpose digital I/O pin.
100	PC.15	I/O	General purpose digital I/O pin.
	PWM1_CH0	I/O	PWM1 channel 0 output/capture input.
101	PB.12	I/O	General purpose digital I/O pin.
	PWM1_CH1	I/O	PWM1 channel 1 output/capture input.
102	PA.3	I/O	General purpose digital I/O pin.
	UART0_RXD	I	UART0 data receiver input pin.
	UART0_nRTS	O	UART0 request to Send output pin.
	I2C0_SCL	I/O	I ² C0 clock pin.
	SC0_PWR	O	Smart Card 0 power pin.
	PWM1_CH2	I/O	PWM1 channel 2 output/capture input.
	EBI_AD3	I/O	EBI address/data bus bit 3.
	USCI1_CLK	I/O	USCI1 clock pin.
103	PA.2	I/O	General purpose digital I/O pin.
	UART0_TXD	O	UART0 data transmitter output pin.
	UART0_nCTS	I	UART0 clear to Send input pin.

128Pin	Pin Name	Type	Description
	I2C0_SDA	I/O	I ² C0 data input/output pin.
	SC0_RST	O	Smart Card 0 reset pin.
	PWM1_CH3	I/O	PWM1 channel 3 output/capture input.
	EBI_AD2	I/O	EBI address/data bus bit 2.
	USCI1_CTL0	I/O	USCI1 control 0 pin.
104	PA.1	I/O	General purpose digital I/O pin.
	UART1_nRTS	O	UART1 request to Send output pin.
	UART1_RXD	I	UART1 data receiver input pin.
	USCI1_CTL1	I/O	USCI1 control 1 pin.
	SC0_DAT	I/O	Smart Card 0 data pin.
	PWM1_CH4	I/O	PWM1 channel 4 output/capture input.
	EBI_AD1	I/O	EBI address/data bus bit 1.
105	PA.0	I/O	General purpose digital I/O pin.
	UART1_nCTS	I	UART1 clear to Send input pin.
	UART1_TXD	O	UART1 data transmitter output pin.
	USCI1_CTL0	I/O	USCI1 control 0 pin.
	SC0_CLK	O	Smart Card 0 clock pin.
	PWM1_CH5	I/O	PWM1 channel 5 output/capture input.
	EBI_AD0	I/O	EBI address/data bus bit 0.
	INT0	I	External interrupt 0 input pin.
105	PA.0	I/O	General purpose digital I/O pin.
	UART1_nCTS	I	UART1 clear to Send input pin.
	UART1_TXD	O	UART1 data transmitter output pin.
	USCI1_CTL0	I/O	USCI1 control 0 pin.
	SC0_CLK	O	Smart Card 0 clock pin.
	PWM1_CH5	I/O	PWM1 channel 5 output/capture input.
	EBI_AD0	I/O	EBI address/data bus bit 0.
	INT0	I	External interrupt 0 input pin.
106	VDD	P	Power supply for I/O ports and LDO source for internal PLL and digital circuit.

128Pin	Pin Name	Type	Description
107	PA.12	I/O	General purpose digital I/O pin.
	SPI1_I2SMCLK	I/O	SPI1 I2S master clock output pin
	UART2_RXD	I	UART2 data receiver input pin.
	UART1_RXD	I	UART1 data receiver input pin.
	TM_BRAKE2	I	TM_BRAKE2 I Timer Brake * input pin.
108	PA.13	I/O	General purpose digital I/O pin.
	UART2_TXD	O	UART2 data transmitter output pin.
	UART1_TXD	O	UART1 data transmitter output pin.
	TM_BRAKE3	I	TM_BRAKE3 I Timer Brake * input pin.
109	PA.14	I/O	General purpose digital I/O pin.
	UART2_nCTS	I	UART2 clear to Send input pin.
	USCI1_CTL1	I/O	USCI1 control 1 pin.
	TM2	I/O	Timer2 event counter input/toggle output pin.
110	PA.15	I/O	General purpose digital I/O pin.
	UART2_nRTS	O	UART2 request to Send output pin.
	USCI1_CLK	I/O	USCI1 clock pin.
	TM3	I/O	Timer3 event counter input/toggle output pin.
111	VSS	P	Ground pin for digital circuit.
112	NC	-	No connect pin, leave floating.
113	VDD	P	Power supply for I/O ports and LDO source for internal PLL and digital circuit.
114	NC	-	No connect pin, leave floating.
115	AVDD	P	Power supply for internal analog circuit.
116	NC	-	No connect pin, leave floating.
117	VREF	A	ADC reference voltage input. Note: This pin needs to be connected with a 1uF capacitor.
118	PB.0	I/O	General purpose digital I/O pin.
	ADC0_CH0	A	ADC0 channel 0 analog input.
	VDET_P0	A	Voltage detector positive input 0 pin.
	UART2_RXD	I	UART2 data receiver input pin.

128Pin	Pin Name	Type	Description
	TM2	I/O	Timer2 event counter input/toggle output pin.
	USCI1_DAT0	I/O	USCI1 data 0 pin.
	EBI_nWRL	O	EBI low byte write enable output pin.
	INT1	I	External interrupt 1 input pin.
	TM1_EXT	I/O	Timer1 external capture input/toggle output pin.
119	PB.1	I/O	General purpose digital I/O pin.
	ADC0_CH1	A	ADC0 channel 1 analog input.
	VDET_P1	A	Voltage detector positive input 1 pin.
	UART2_TXD	O	UART2 data transmitter output pin.
	TM3	I/O	Timer3 event counter input/toggle output pin.
	SC0_RST	O	Smart Card 0 reset pin.
	PWM0_SYNC_OUT	O	PWM0 counter synchronous trigger output pin.
	EBI_nWRH	O	EBI high byte write enable output pin
	USCI1_DAT1	I/O	USCI1 data 1 pin.
120	PB.2	I/O	General purpose digital I/O pin.
	ADC0_CH2	A	ADC0 channel 2 analog input.
	SPI0_CLK	I/O	SPI0 serial clock pin.
	SPI1_CLK	I/O	SPI1 serial clock pin.
	UART1_RXD	I	UART1 data receiver input pin.
	SC0_nCD	I	Smart Card 0 card detect pin.
	TM_BRAKE0	I	TM_BRAKE0 I Timer Brake * input pin.
	EBI_nCS0	O	EBI chip select 0 output pin.
	USCI0_DAT0	I/O	USCI0 data 0 pin.
	TM2_EXT	I/O	Timer2 external capture input/toggle output pin.
121	PB.3	I/O	General purpose digital I/O pin.
	ADC0_CH3	A	ADC0 channel 3 analog input.
	SPI0_MISO	I/O	SPI0 MISO (Master In, Slave Out) pin.
	SPI1_MISO	I/O	SPI1 MISO (Master In, Slave Out) pin.
	UART1_TXD	O	UART1 data transmitter output pin.

128Pin	Pin Name	Type	Description
	TM_BRAKE1	I	TM_BRAKE1 I Timer Brake * input pin.
	EBI_ALE	O	EBI address latch enable output pin.
	USC10_DAT1	I/O	USC10 data 1 pin.
	TM0_EXT	I/O	Timer0 external capture input/toggle output pin.
122	PB.4	I/O	General purpose digital I/O pin.
	ADC0_CH4	A	ADC0 channel 4 analog input.
	SPI0_SS	I/O	SPI0 slave select pin.
	SPI1_SS	I/O	SPI1 slave select pin.
	UART1_nCTS	I	UART1 clear to Send input pin.
	ACMP0_N	A	Analog comparator 0 negative input pin.
	SC1_nCD	I	Smart Card 1 card detect pin.
	EBI_AD7	I/O	EBI address/data bus bit 7.
	USC10_CTL1	I/O	USC10 control 1 pin.
	UART2_RXD	I	UART2 data receiver input pin.
	TM1_EXT	I/O	Timer1 external capture input/toggle output pin.
123	PB.8	I/O	General purpose digital I/O pin.
	ADC0_CH5	A	ADC0 channel 5 analog input.
	UART1_nRTS	O	UART1 request to Send output pin.
	TM_BRAKE2	I	TM_BRAKE2 I Timer Brake * input pin.
	PWM0_CH2	I/O	PWM0 channel 2 output/capture input.
	USC10_CTL0	I/O	USC10 control 0 pin.
124	PB.9	I/O	General purpose digital I/O pin.
	ADC0_CH6	A	ADC0 channel 6 analog input.
	USC10_CLK	I/O	USC10 clock pin.
125	PB.10	I/O	General purpose digital I/O pin.
	ADC0_CH7	A	ADC0 channel 7 analog input.
126	PB.11	I/O	General purpose digital I/O pin.
	ADC0_CH8	A	ADC0 channel 8 analog input.
127	PE.2	I/O	General purpose digital I/O pin.
	ADC0_CH9	A	ADC0 channel 9 analog input.

128Pin	Pin Name	Type	Description
	UART1_nRTS	O	UART1 request to Send output pin.
	TM_BRAKE3	I	TM_BRAKE3 I Timer Brake * input pin.
	PWM0_CH2	I/O	PWM0 channel 2 output/capture input.
	USC10_CTL0	I/O	USC10 control 0 pin.
128	NC	-	No connect pin, leave floating.

Note: Pin Type I = Digital Input, O = Digital Output; AI = Analog Input; P = Power Pin; AP = Analog Power

Table 2-1 Pin Assignment for NUC029KGE

2.3 System Configuration

2.3.1 5 V Power Sources

Table 2-2 presents the 5 V power sources.

Connector	Net Name in Schematic	Comment
ICEJ3	USB_HS_VBUS	ICE USB connector supplies 5 V power from PC to NUC029KGE platform and Nu-Link2-Me.
J2	USB_VBUS	USB connector on NuTiny-SDK-NUC029KGE supplies 5 V power from PC to NUC029KGE platform and Nu-Link2-Me.

Table 2-2 5 V Power Sources

2.3.2 3.3 V Power Sources

Table 2-3 presents the 3.3 V power sources.

Voltage Regulator	5V Source	Comment
ICEUP1	USB_HS_VBUS	ICEUP1 converts USB_HS_VBUS to 3.3 V and supplies 3.3V to NUC029KGE platform or ICE chip.

Table 2-3 3.3 V Power Sources

2.3.3 1.8 V Power Sources

Table 2-4 presents the 1.8 V power source.

Voltage Regular	5V Source	Comment
ICEUP2	USB_HS_VBUS	ICEUP2 converts USB_HS_VBUS to 1.8V and supplies 1.8V to NUC029KGE platform or ICE chip. Note: NUC029KGE operating voltage range is from 2.5 V to 5.5 V. Please do not switch to 1.8V power source.

Table 2-4 1.8 V Power Sources

2.3.4 Power Connectors

Table 2-5 presents the power connectors.

Connector	Comment
JP1	V _{DD} (2.5 V ~ 5.5 V) connector on the NuTiny-SDK-NUC029KGE.
JP2	V _{SS} (GND) connector on the NuTiny-SDK-NUC029KGE.

Table 2-5 Power Connectors

2.3.5 USB Connectors

Table 2-6 presents the USB connectors.

Connector	Comment
ICEJ3	ICE USB connector on Nu-Link2-Me for power supply, debugging and programming from PC.
J2	USB power connector on NuTiny-SDK-NUC029KGE for power supply.

Table 2-6 USB Connectors

2.3.6 Power Switches

Table 2-7 presents the power switches.

Switch	Comment
ICEJPR1	Configures the target chip operating voltage at 1.8 V / 3.3 V / 5 V.
ICEJPR2	Configures the ICE chip operating voltage at 1.8 V / 3.3 V.

Table 2-7 Power Switches

2.3.7 Power Supply Models

2.3.7.1 External Power Supply through Nu-Link2-Me to Target Chip

The external power supply source on Nu-Link2-Me is shown in Figure 2-2.

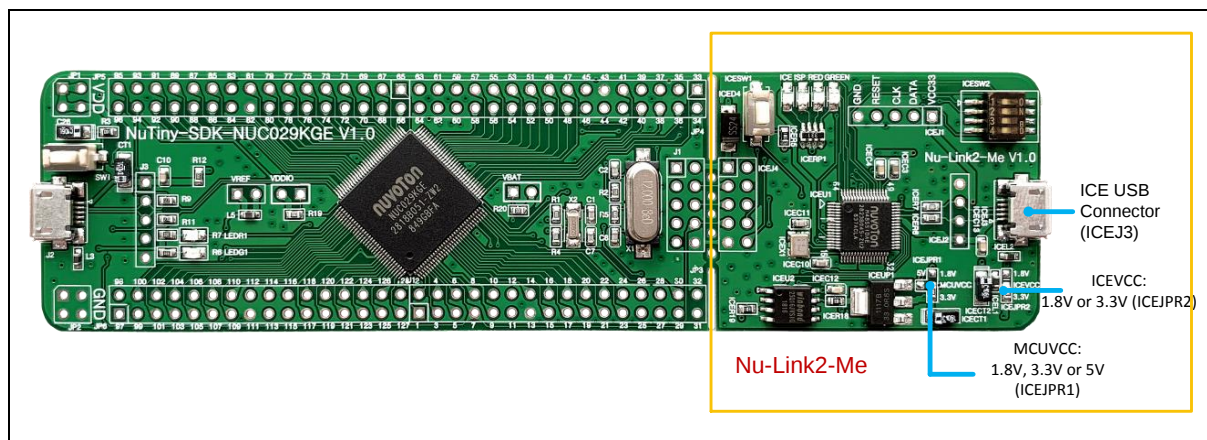


Figure 2-2 External Power Supply Sources on Nu-Link2-Me

To use ICEJ3 as external power supply source with Nu-Link2-Me, please follow the below steps:

1. Solder the resistor on ICEJPR1 (MCUVCC) depends on the target chip operating voltage.
2. Solder the resistor on ICEJPR2 (ICEVCC) depends on the ICE chip operating voltage.
3. Connect the external power supply to JP1.

Table 2-8 presents all power models when supplies external power through Nu-Link2-Me. The Nu-Link2-Me external power sources are highlight in yellow.

Model	Target Chip Voltage	ICEJ3	ICEJPR1 (MCUVCC) Selection ^[1]	ICEJPR2 (ICEVCC) Selection ^[2]	ICE Chip Voltage	J2	JP1
1	1.8 V	Connect to PC	1.8 V	1.8 V	1.8 V	Ignore	1.8 V output
2	3.3 V	Connect to PC	3.3 V (default)	3.3 V (default)	3.3 V	Ignore	3.3 V output
3	5 V	Connect to PC	5V	3.3 V (default)	3.3 V	Ignore	5 V output
Note: 0 Ω should be soldered between ICEJPR1's MCVCC and 1.8 V / 3.3 V / 5 V. 0 Ω should be soldered between ICEJPR2's ICEVCC and 1.8 V / 3.3 V. - NUC029KGE operating voltage range is from 2.5 V to 5.5 V. Please do not switch to 1.8V power source.							

Table 2-8 Supply External Power through Nu-Link2-Me

2.3.7.2 External Power Supply through NUC029KGE platform to Target Chip

The external power supply sources on NUC029KGE platform are shown in Figure 2-3.

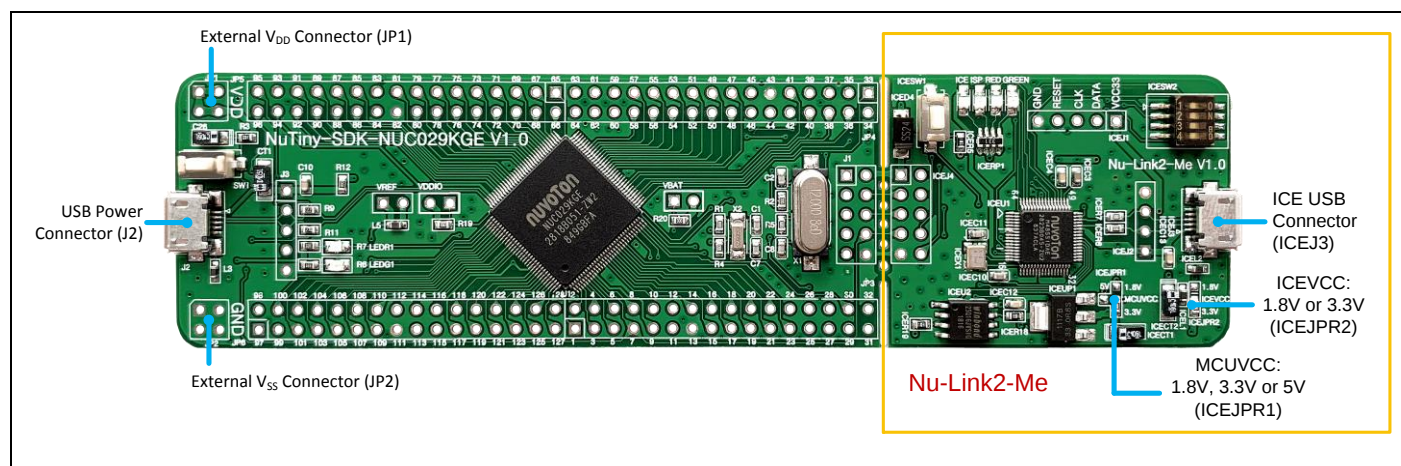


Figure 2-3 External Power Supply Sources on NUC029KGE Platform

To use J2 as external power supply source, please follow the below steps:

1. Remove the resistor on ICEJPR1 (MCUVCC).
2. Solder the resistor on ICEJPR2 (ICEVCC) depends on the ICE chip operating voltage.
3. Connect ICEJ3 to PC.
4. Connect the external power supply to J2.

To use JP1 as external power supply source, please follow the below steps:

1. Remove the resistor on ICEJPR1 (MCUVCC).
2. Solder the resistor on ICEJPR2 (ICEVCC) depends on the ICE chip operating voltage.

3. Connect ICEJ3 to PC.
4. Connect the external power supply to JP1.

To use JP1 as external power supply source with Nu-Link2-Me separated from NuTiny-SDK-NUC029KGE, please follow the below steps:

1. Separate the Nu-Link2-Me from NuTiny-SDK-NUC029KGE.
2. Connect the external power supply to JP1.

To use J2 as external power supply source with Nu-Link2-Me separated from NuTiny-SDK-NUC029KGE, please follow the below steps:

1. Separate the Nu-Link2-Me from NuTiny-SDK-NUC029KGE.
2. Connect the external power supply to J2.

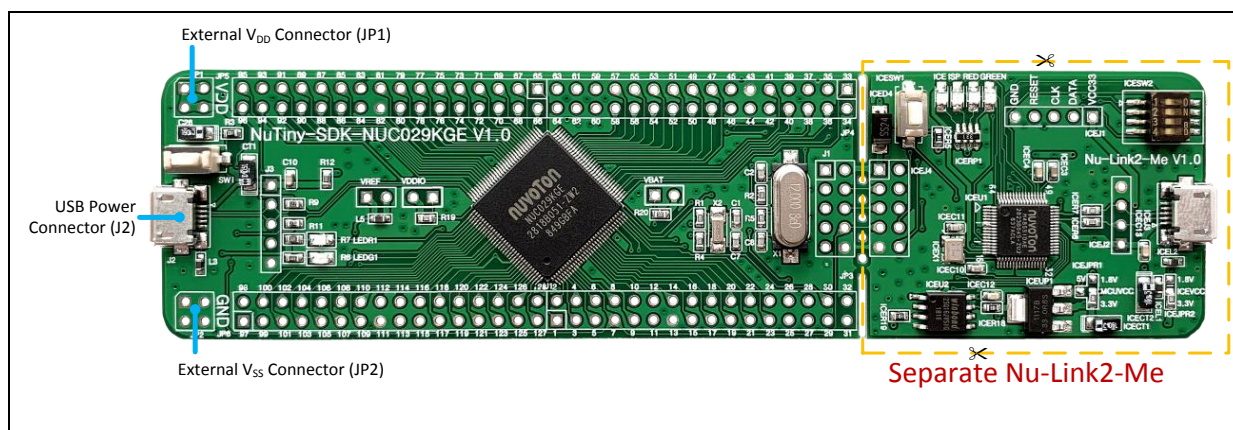


Table 2-9 presents all power models when supplies external power through NUC029KGE platform. The NUC029KGE platform external power sources is highlight in yellow.

Model	Target Chip Voltage	J2	R12 0 Ohm	ICEJ3	JP1	ICEJPR1 (MCUVCC) Selection ^[2]	ICEJPR2 (ICEVCC) Selection ^[3]	ICE Chip Voltage ^[4]
4	3.3 V	Connect to PC	Open	Ignore	3.3 V output	Remove resistor	3.3 V	3.3 V
5	5 V	Connect to PC	Short	Ignore	5 V output	Remove resistor	3.3 V	3.3 V
6	5 V	Connect to PC	X	Ignore	5 V output	Remove resistor	3.3 V	3.3 V
7	2.5 ~ 5.5 V	Ignore ^[5]	X	Connect to PC	DC Input 2.5 ~ 5.5 V	Remove resistor	1.8 V / 3.3 V	1.8 V / 3.3 V
8	2.5 ~ 5.5 V	Ignore ^[5]	X	Nu-Link2-Me removed	DC Input 2.5 ~ 5.5 V	X	X	X

Table 2-9 Supply External Power for NUC029KGE platform

2.3.8 Extension Connectors

Table 2-10 presents the extension connectors.

Connector	Comment
JP3, JP4, JP5 and JP6	Full pins extension connectors on the NuTiny-SDK-NUC029KGE.

Table 2-10 Extension Connectors

2.3.9 Push-Buttons

Table 2-11 presents the push buttons.

Component	Comment
ICESW1	Off-line program button to start off-line programming the target chip.
SW1	Reset button to reset the target chip.

Table 2-11 Push-Buttons

2.3.10 LEDs

Table 2-12 presents the LEDs.

Component	Comment
Power LED	The power LED indicates that the NuTiny-SDK-NUC029KGE is powered.
PC.5 I/O LED	The LED is connected to the target chip PC.5.
ICE, ISP, RED, and GREEN	Nu-Link2-Me status LED.

Table 2-12 LEDs

2.4 Nu-Link2-Me

The Nu-Link2-Me is a debugger and programmer that supports on-line programming and debugging through SWD interface. The on-board 16 Mbit SPI Flash allows it to off-line program the target microcontroller. Additionally, the Nu-Link2-Me provides virtual COM port (VCOM) function to print out messages on PC. Table 2-13 presents how to set the VCOM function by ICESW2.

ICESW2		
Pin	Function	Comment
1	TXD	On: Connect target chip PA.2 (UART0_TXD) to Nu-Link2-Me. Off: Disconnect target chip PA.2 (UART0_TXD) to Nu-Link2-Me.
2	RXD	On: Connect target chip PA.3 (UART0_RXD) to Nu-Link2-Me. Off: Disconnect target chip PA.3 (UART0_RXD) to Nu-Link2-Me.
Note: Pin 3 and 4 is unused.		

Table 2-13 VCOM Function of Nu-Link2-Me

2.5 NuTiny-SDK-NUC029KGE PCB Placement

Figure 2-4 shows the NuTiny-SDK-NUC029KGE PCB placement.

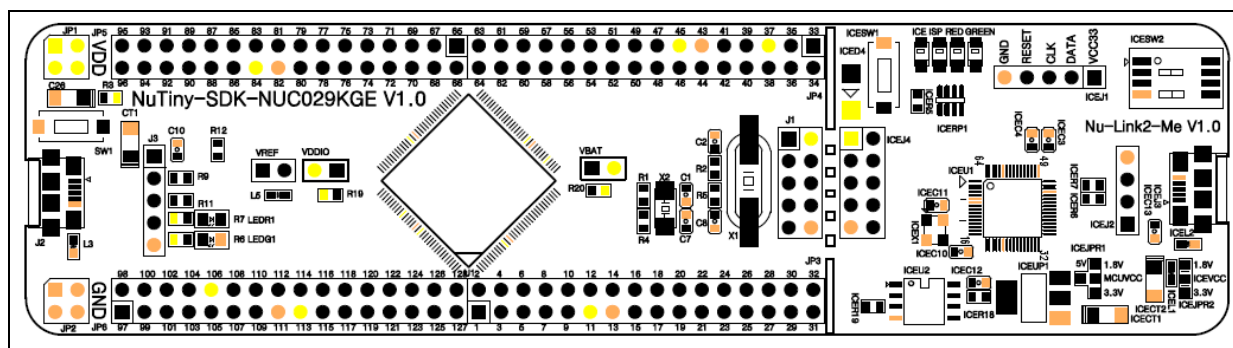


Figure 2-4 NuTiny-SDK-NUC029KGE PCB Placement

3 HOW TO START NUTINY-SDK-NUC029KGE ON THE KEIL MDK ENVIRONMENT

3.1 Downloading and Installing Keil MDK Software

Please visit the Keil company website (<http://www.keil.com>) to download and install the Keil MDK.

3.2 Downloading and Installing Nuvoton Nu-Link Driver

Please visit the official Nuvoton NuMicro® website (<http://www.nuvoton.com/NuMicro>) to download “NuMicro® Keil µVision® IDE driver” file. 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 as Figure 3-1.

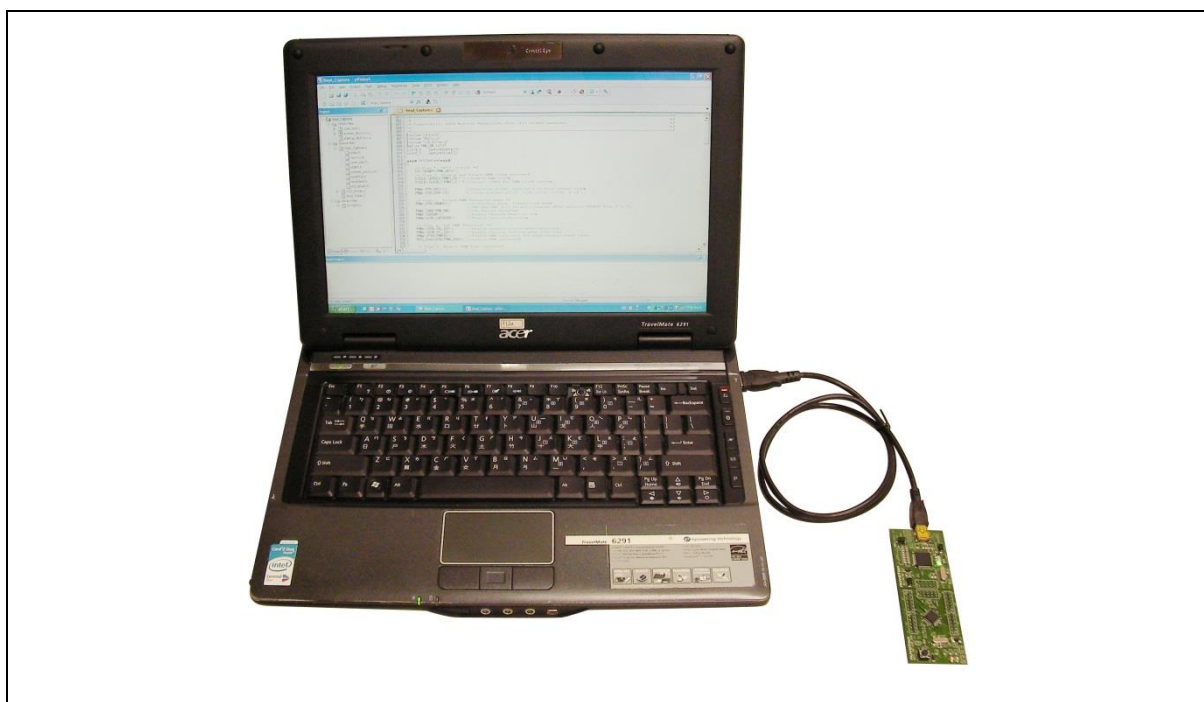


Figure 3-1 NuTiny-SDK-NUC029KGE Hardware Setup

3.4 Example Program

This example demonstrates downloading and debugging an application on a NuTiny-SDK-NUC029KGE board. It can be found on the list directory and downloaded from Nuvoton NuMicro® website.

Directory	..\NUC029xGE_BSPv3.00.001\SampleCode\Template\Keil
-----------	--

This sample code will show some functions about system manager controller and clock controller.

-  Start uVision®
- 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 HOW TO START NUTINY-SDK-NUC029KGE 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 visit the official Nuvoton NuMicro® website (<http://www.nuvoton.com/NuMicro>) to download the “NuMicro® IAR EWARM Driver” file. 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.

4.3 Hardware Setup

The hardware setup is shown as Figure 4-1.

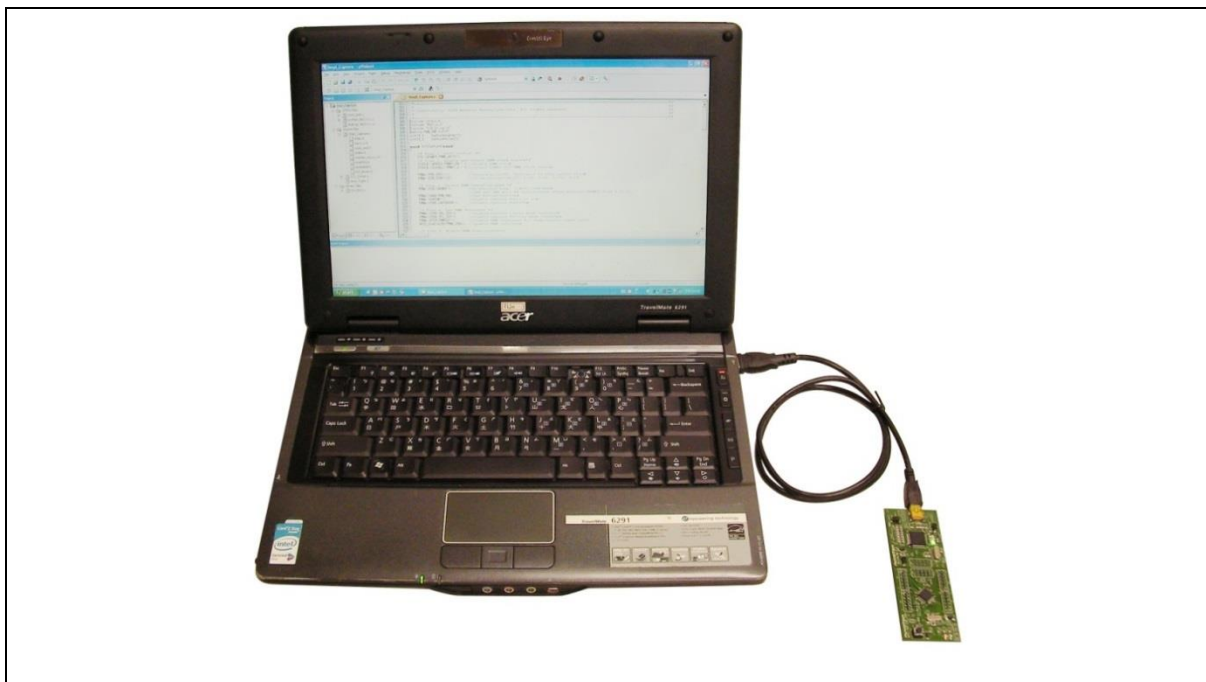


Figure 4-1 NuTiny-SDK-NUC029KGE Hardware Setup

4.4 Example Program

This example demonstrates downloading and debugging an application on a NuTiny-SDK-NUC029KGE board. It can be found on the list directory and downloaded from Nuvoton NuMicro® website.

Directory	..\NUC029xGE_BSPv3.00.001\SampleCode\Template\IAR
-----------	---

This sample code will show some functions about system manager controller and clock controller.

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

5 STARTING TO USE NU-LINK2-ME VCOM FUNCTION

5.1 Downloading and Installing VCOM Driver

Please connect to Nuvoton NuMicro® website (<http://www.nuvoton.com/NuMicro>) to download the “NuMicro® ICP Programming Tool” file. After the ICP Programming Tool driver is downloaded, please unzip the file and execute the “ICP Programming Tool.exe”. Simply follow the installation and optional steps to install ICP Programming Tool and Nu-Link USB Driver, which included VCOM driver.

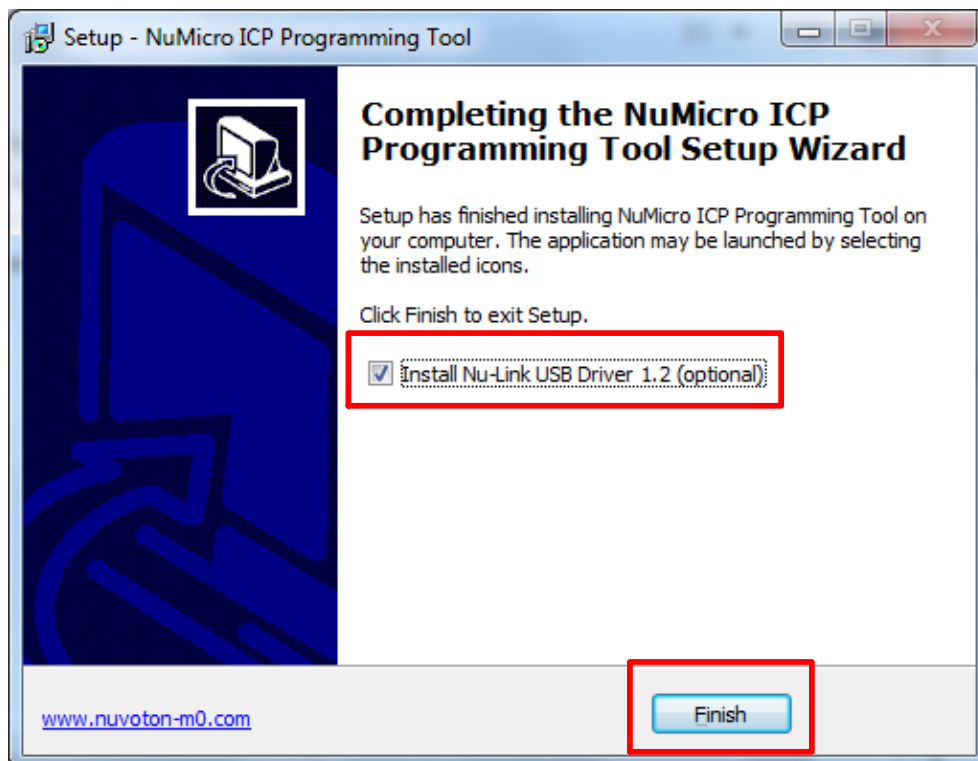


Figure 5-1 Optional Step after ICP Programming Tool Installation

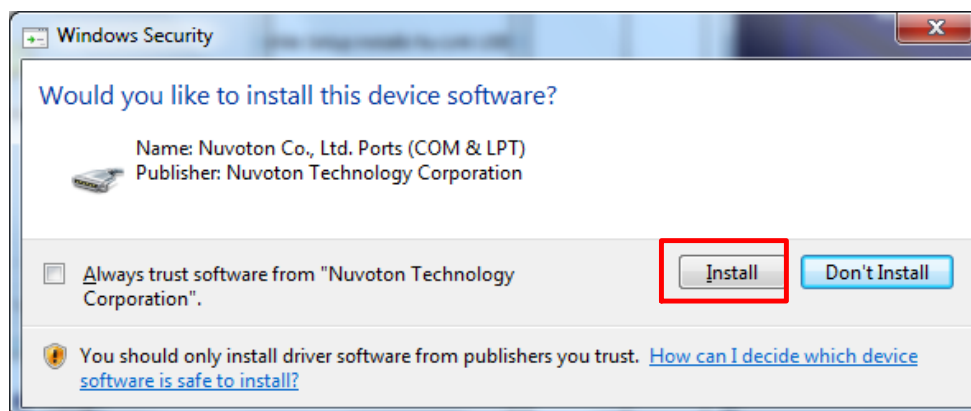


Figure 5-2 Install Nuvoton COM&LPT Driver

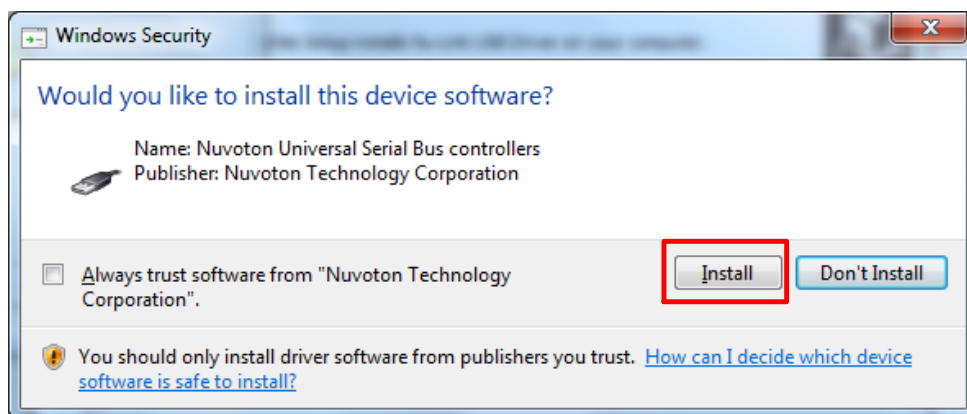


Figure 5-3 Install Nuvoton Universal Serial Bus Controllers

5.2 VCOM Mode Setting on NuTiny-SDK-NUC029KGE

Before the NuTiny-SDK-NUC029KGE is connected to the PC, please enable VCOM function by switching on ICESW2. The NuTiny-EVB-NUC029KGE transmits through UART0 to VCOM to send out data. Switch ICESW2 off when using UART0 function without VCOM function.

5.3 Development Tool Setup

The example is demonstrated on the Keil μ Vision[®] IDE.

5.3.1 Check the Using UART on the Keil μ Vision[®] IDE

Please open the project and find system_NUC029xGE.h to check the using UART in DEBUG_PORT, which has to be the same as the using UART in the NuTiny-EVB-NUC029KGE.

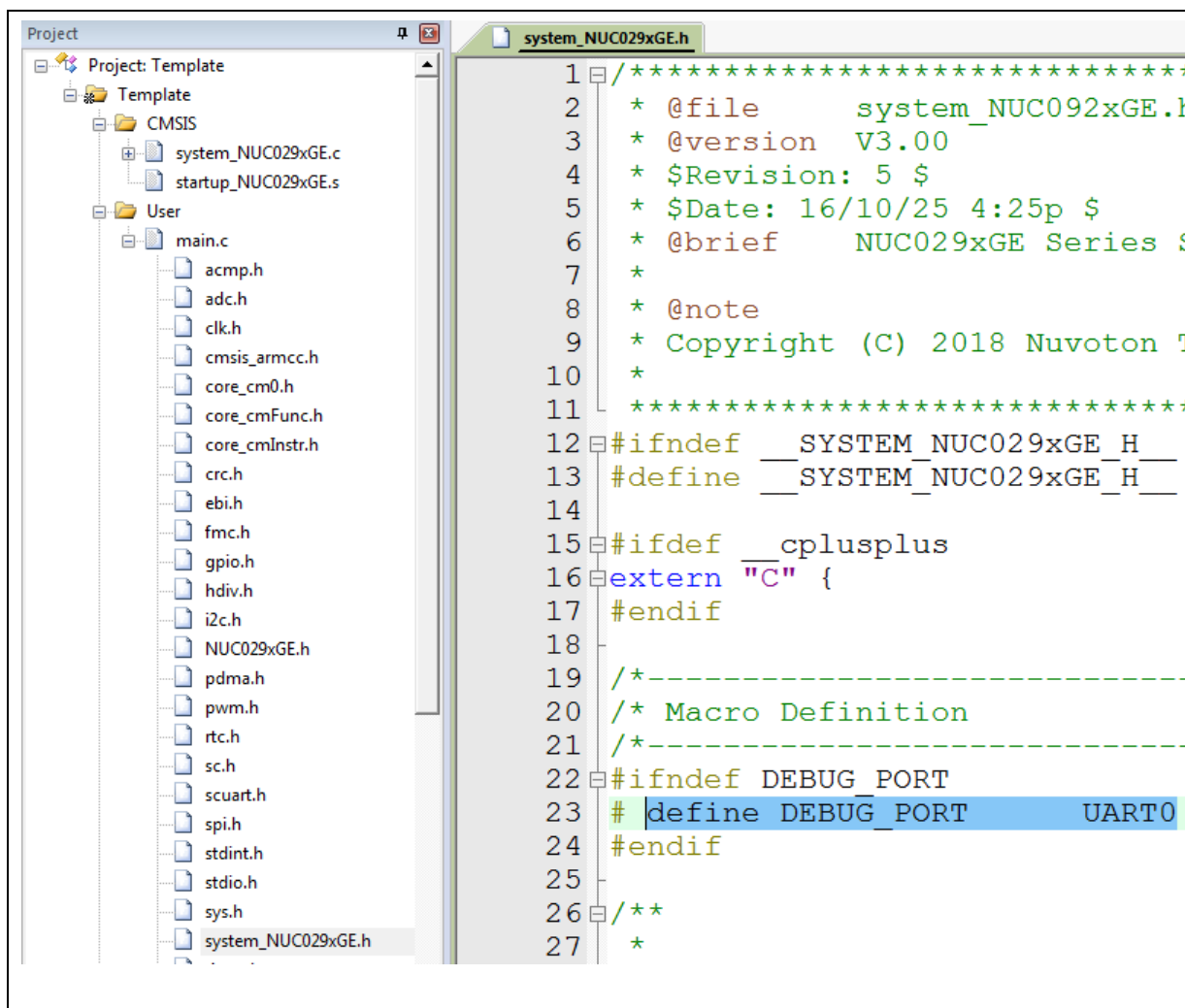
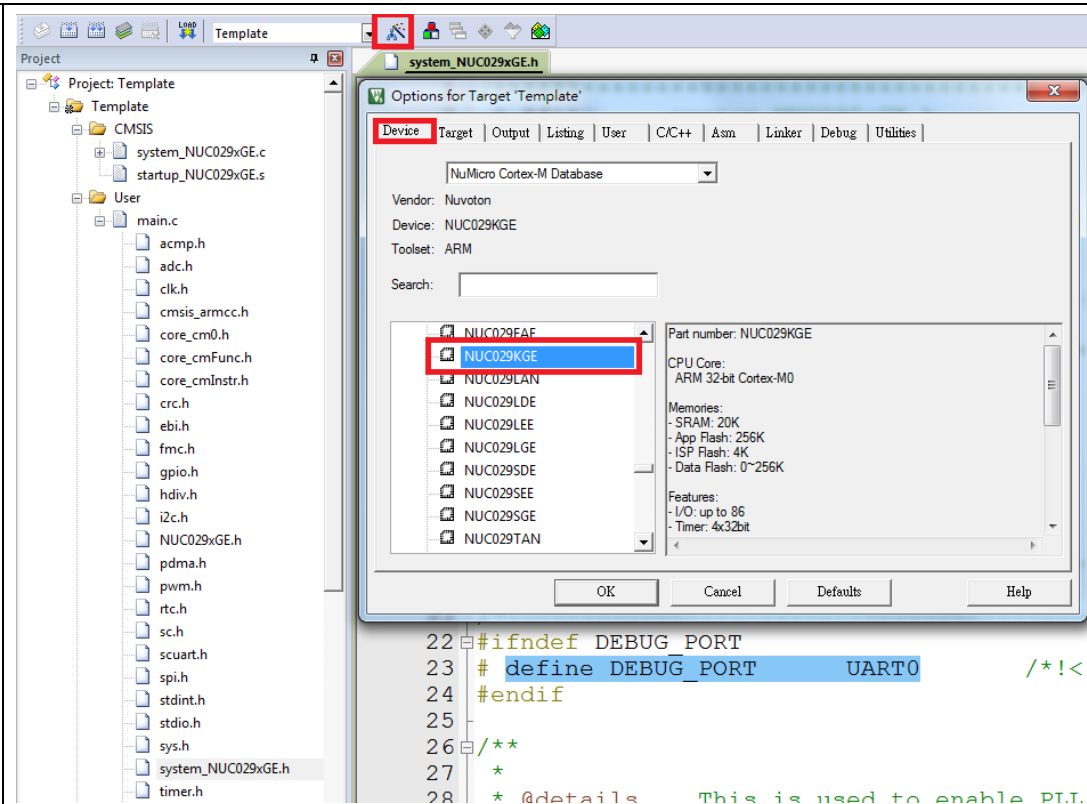


Figure 5-4 Using UART on Keil μ Vision[®] IDE

5.3.2 Check the Target Device and Debug Setting

The target device has to be the same as the setting in Debug. Please click “Target Option” to open the Option windows, and find the setting in “Device”, “Debug”, and “Utilities” page. Please follow the steps below to check the setting.

Step 1



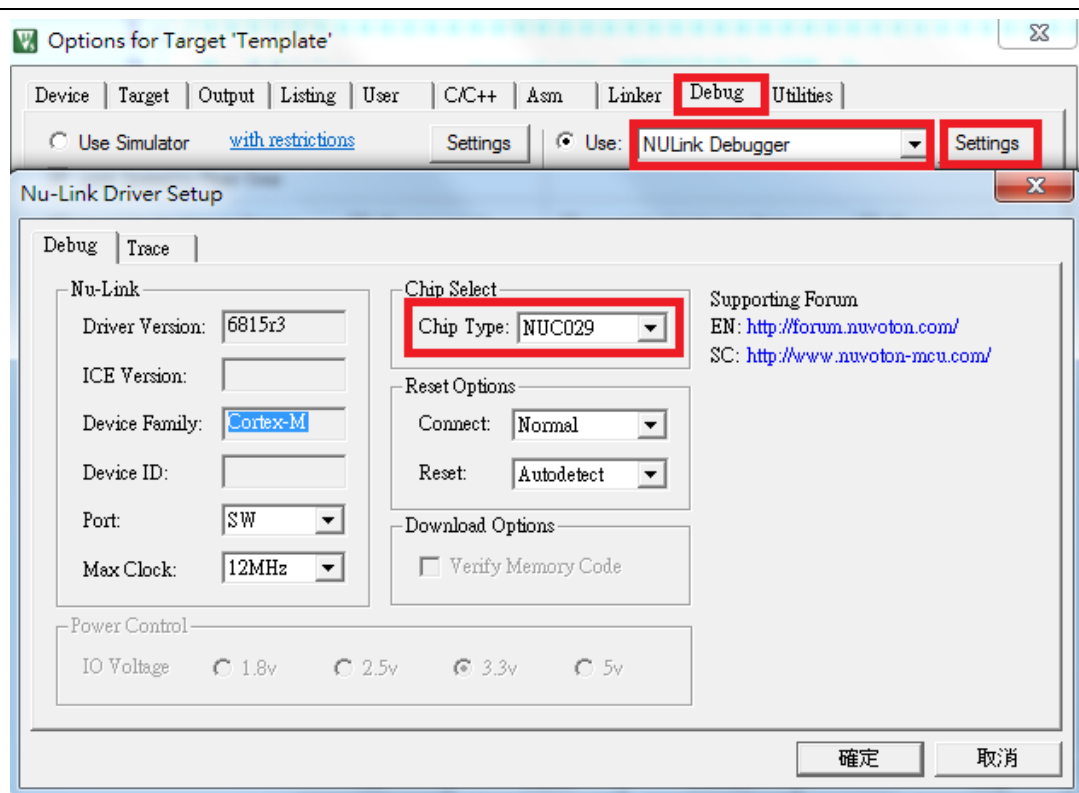
The screenshot shows the 'Options for Target' dialog box in the IDE. The 'Device' tab is active, and 'NUC029KGE' is selected from the list of devices. The background shows a project tree on the left and a code editor at the bottom with the following code:

```

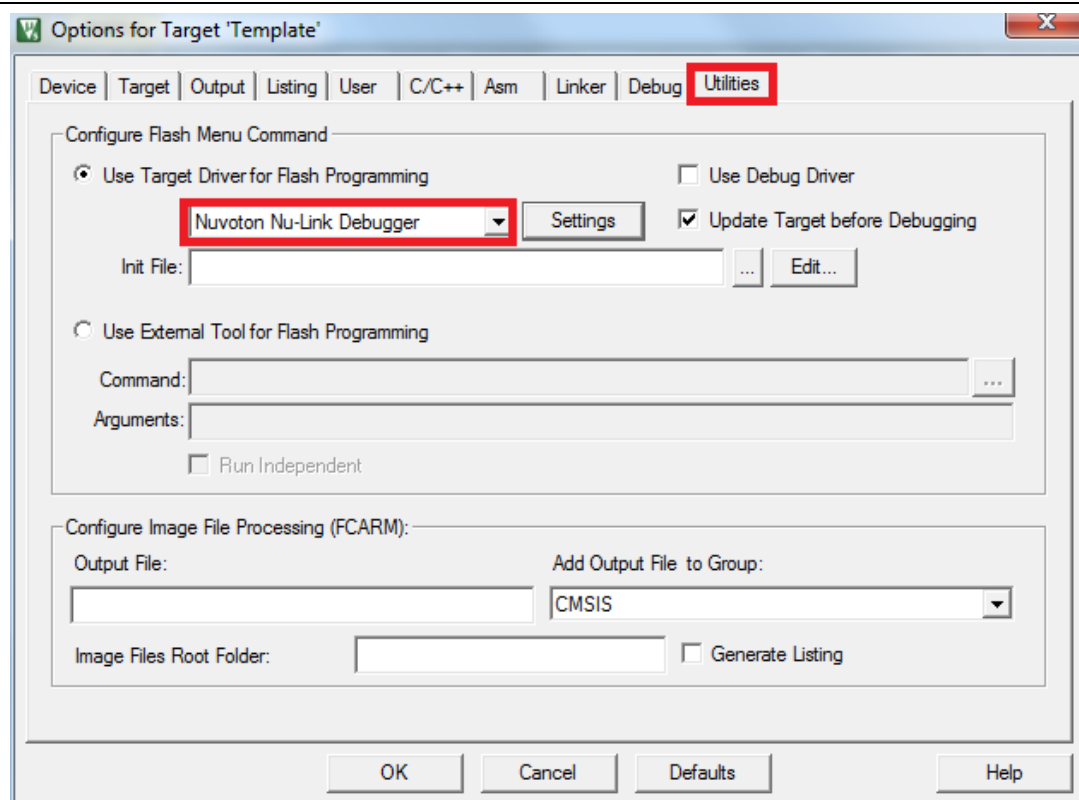
22 #ifndef DEBUG_PORT
23 # define DEBUG_PORT    UART0          /*!<
24 #endif
25
26 /**
27  *
28  * @details    This is used to enable P.I.T.

```

Step 2



Step 3



5.3.3 Build and Download Code to NuTiny-SDK-NUC029KGE

Please build the project and download code to the NuTiny-SDK-NUC029KGE.

5.3.4 Open the Serial Port Terminal

User can use serial port terminal, PuTTY for example, to print out debug message.

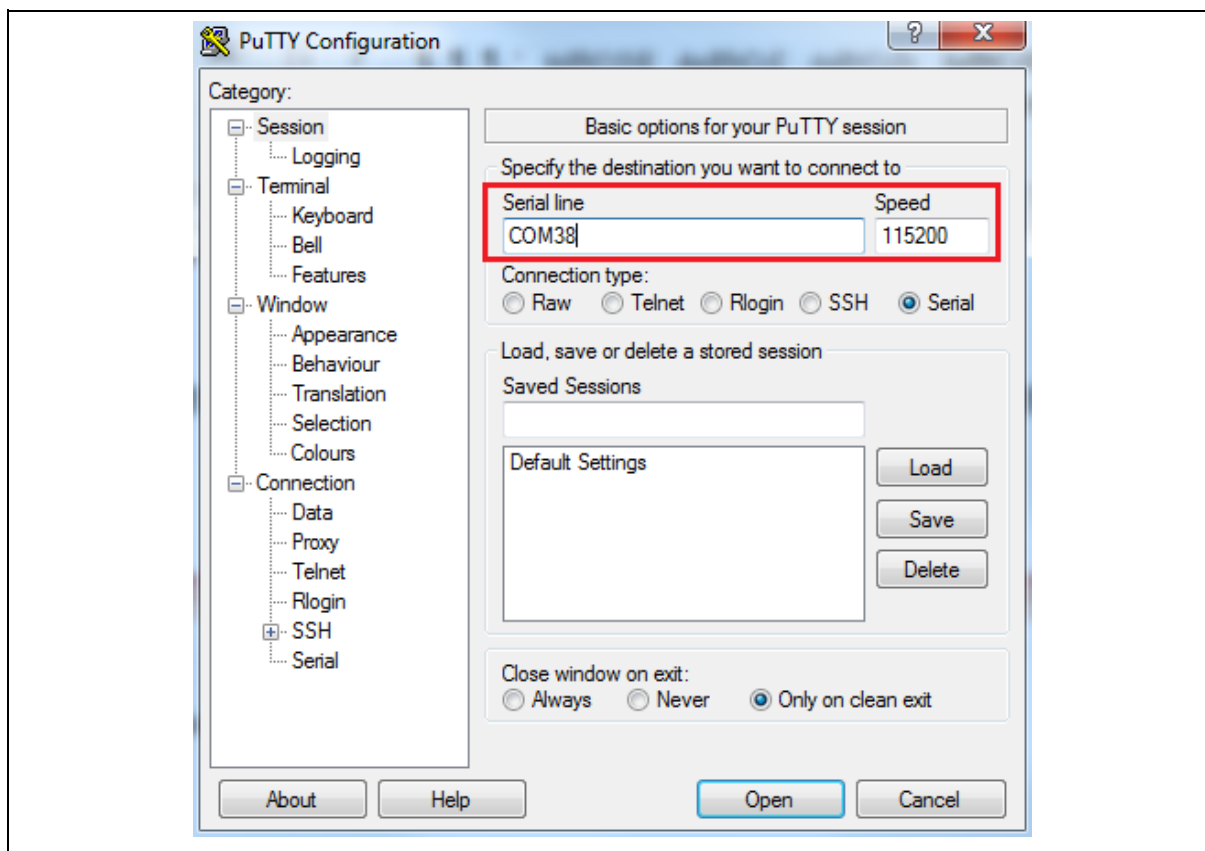


Figure 5-5 Set Baud Rate

5.3.5 Reset Chip

After pushing the reset button, the chip will reprogram application and print out debug message.

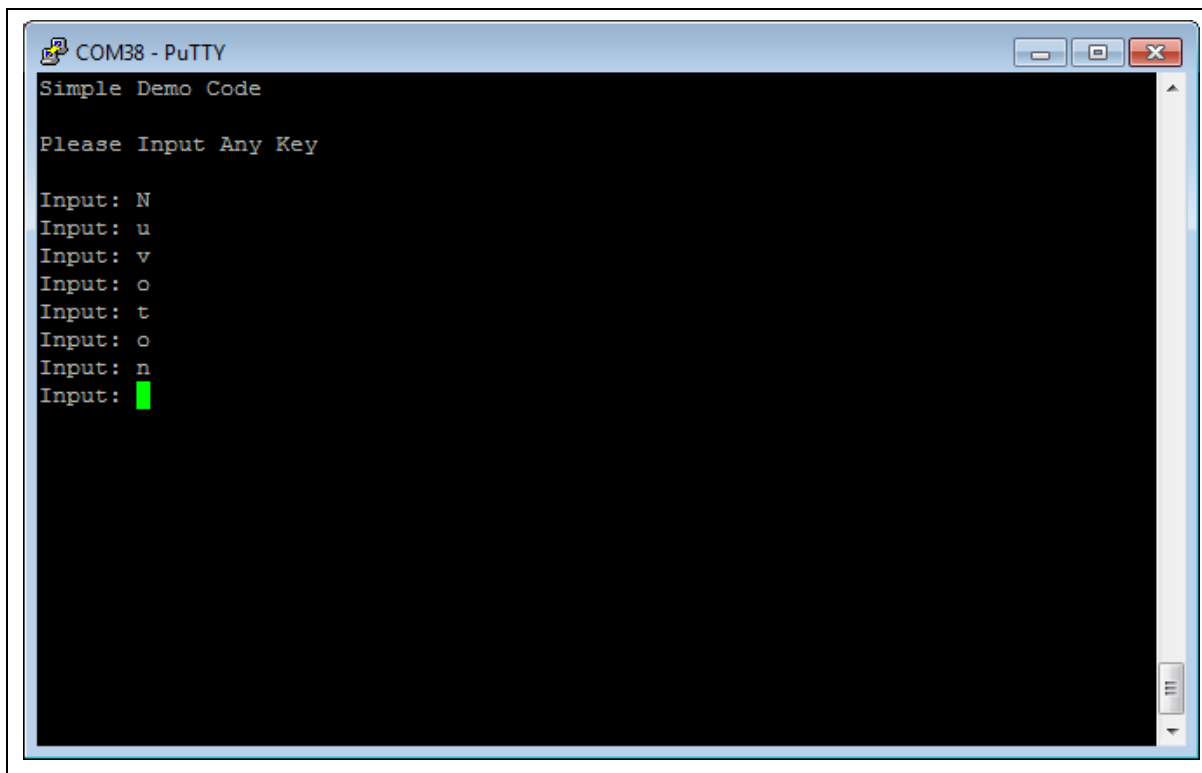
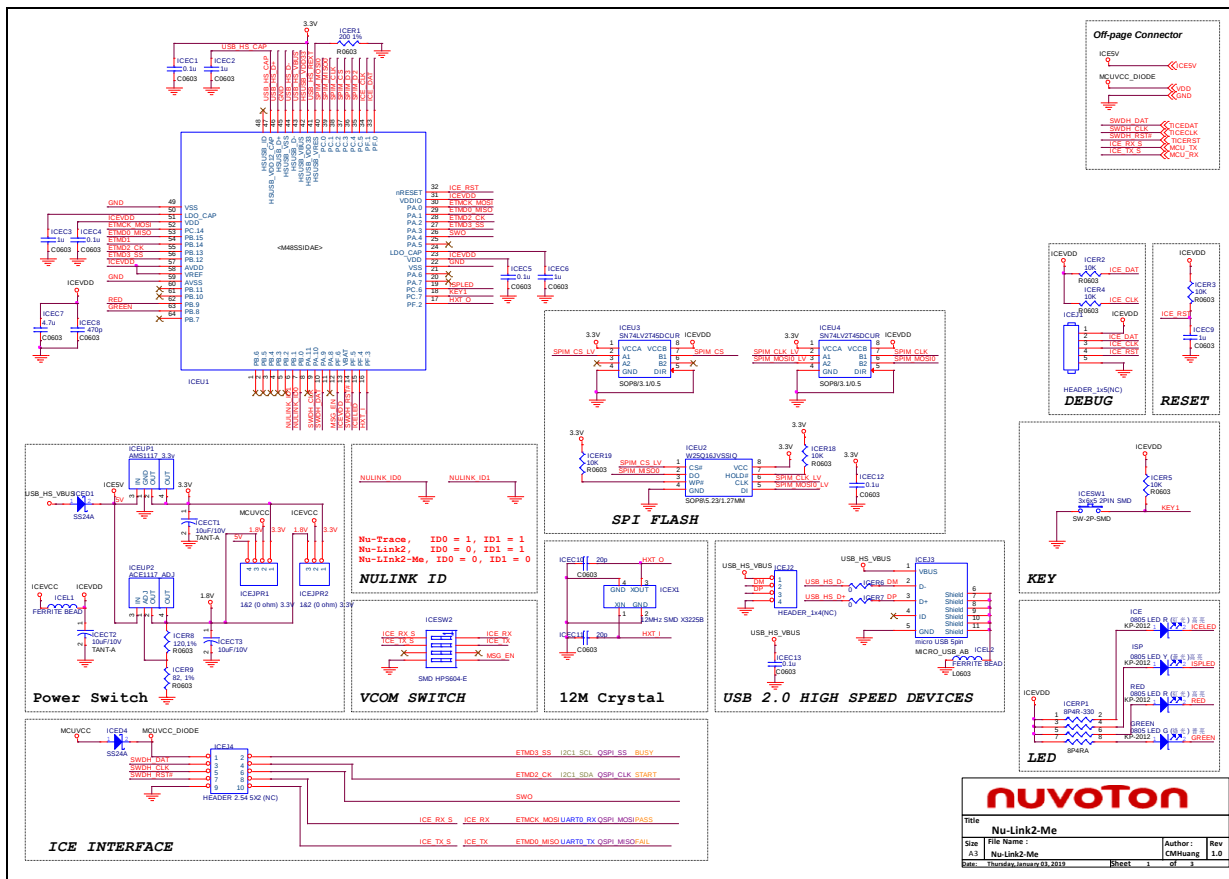


Figure 5-6 Serial Port Terminal Windows

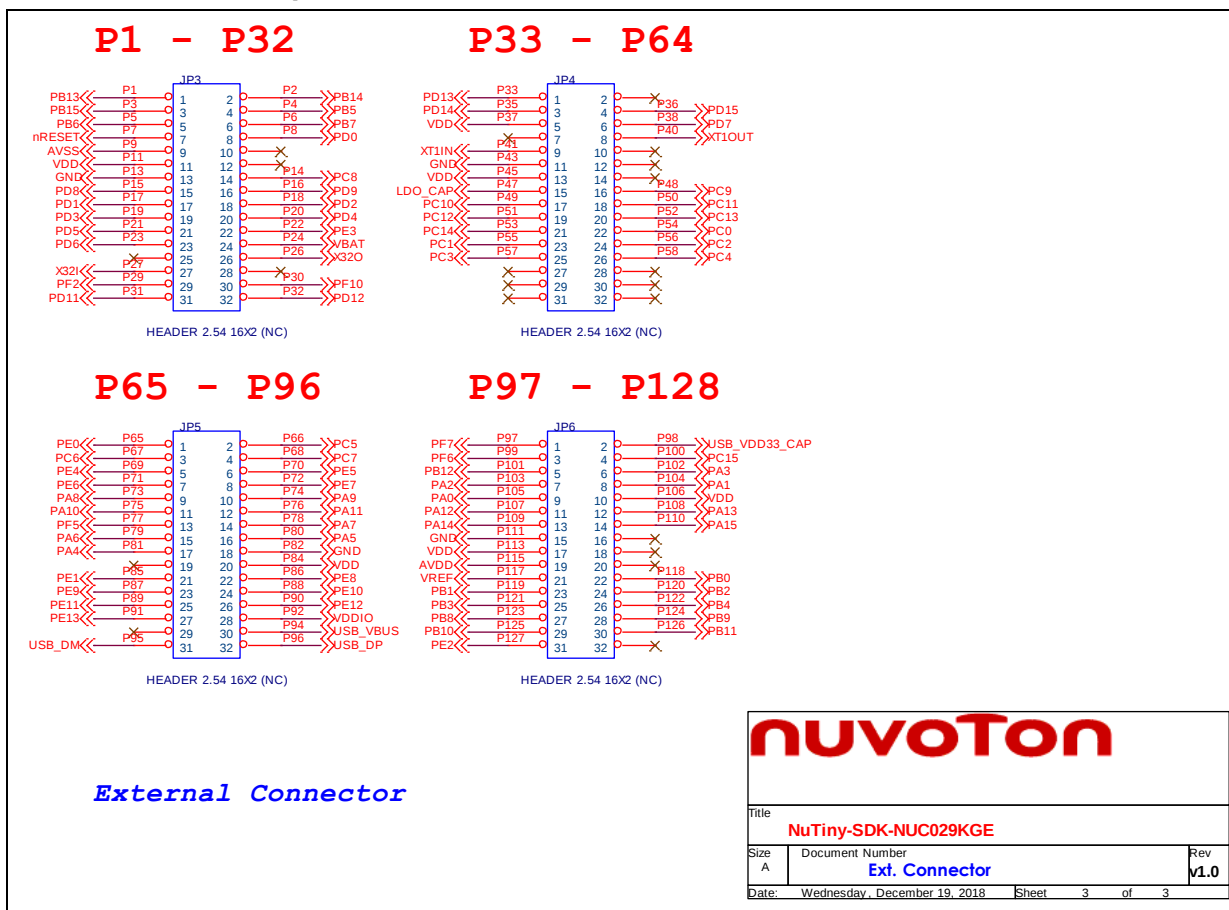
Note: Please switch ICESW2 on before the NuTiny-SDK-NUC029KGE is connected to the PC. When the NuTiny-SDK-NUC029KGE is connected to the PC with ICESW2 switch on, PC will detect VCOM as a USB device and the detection will only be processed once. VCOM will not function if ICESW2 switched on after the connection.

6 NUTINY-SDK-NUC029KGE SCHEMATICS

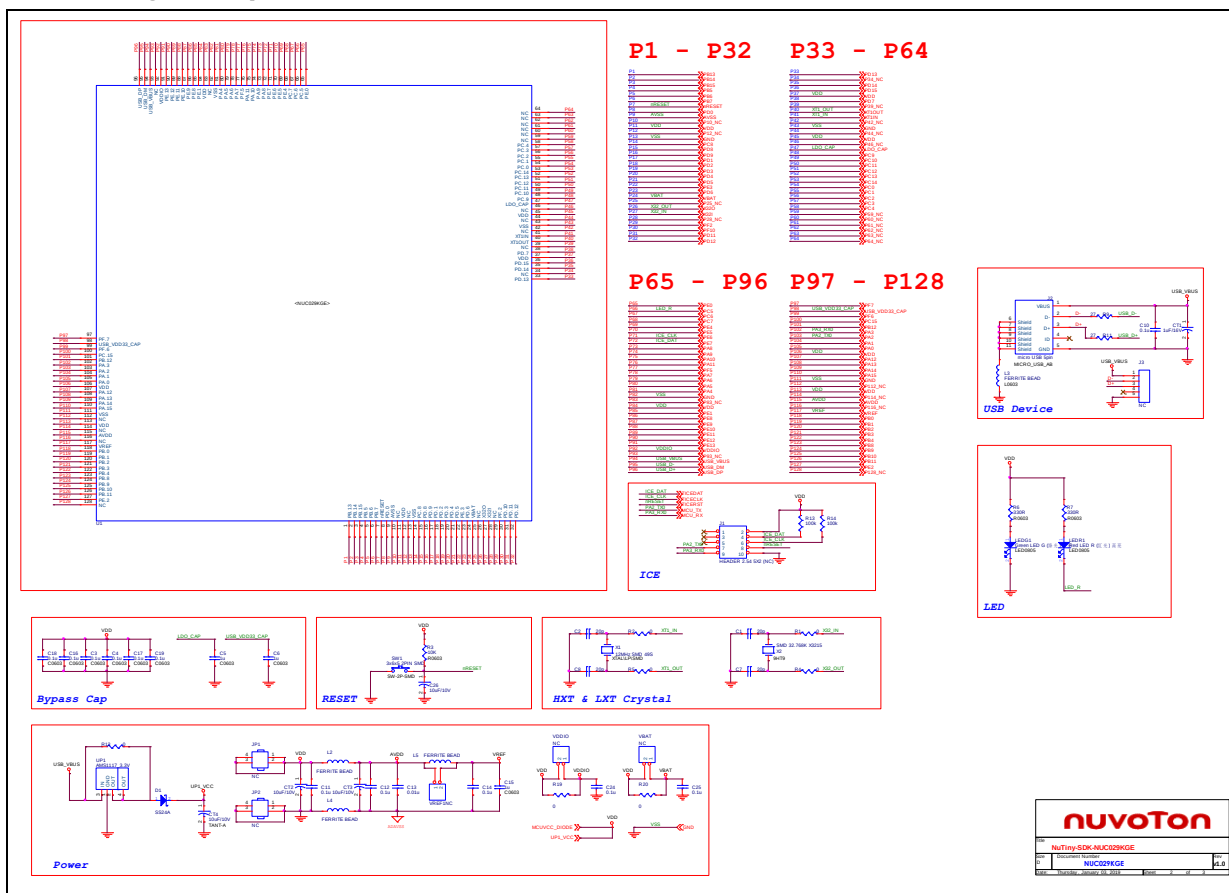
6.1 Nu-Link2-Me Schematic



6.2 GPIO for 128 pin Schematic



6.3 Target Chip and SDK Circuit Schematic



7 REVISION HISTORY

Date	Revision	Description
2019.03.04	1.00	1. Initially issued.

Important Notice

Nuvoton Products are neither intended nor warranted for usage in systems or equipment, any malfunction or failure of which may cause loss of human life, bodily injury or severe property damage. Such applications are deemed, "Insecure Usage".

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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