

ARM® Cortex®-M
32-bit Microcontroller

NuMaker-M433SE
User Manual
NuMicro® M433 Series

The information described in this document is the exclusive intellectual property of Nuvoton Technology Corporation and shall not be reproduced without permission from Nuvoton.

Nuvoton is providing this document only for reference purposes of NuMicro microcontroller based system design. Nuvoton assumes no responsibility for errors or omissions.

All data and specifications are subject to change without notice.

For additional information or questions, please contact: Nuvoton Technology Corporation.

www.nuvoton.com

Table of Contents

1	Overview.....	6
1.1	NuMaker-M433SE Features	6
2	NuMaker-M433SE Overview	8
2.1	Front View	8
2.2	Rear View	9
2.3	Arduino UNO Compatible Extension Connectors	10
2.4	Pin Assignment for Extension Connectors	12
2.5	System Configuration	17
2.5.1	VIN Power Source	17
2.5.2	5 V Power Sources	17
2.5.3	3.3 V Power Sources	17
2.5.4	1.8V Power Sources	18
2.5.5	Power Connectors	18
2.5.6	USB Connectors	18
2.5.7	Power Switches	18
2.5.8	Power Supply Models	19
2.5.9	External Reference Voltage Connector	22
2.5.10	Ammeter Connector	22
2.5.11	Extension Connectors.....	22
2.5.12	Push-Buttons	23
2.5.13	LEDs	23
2.6	Nu-Link2-Me	23
3	Quick Start	24
3.1	Toolchains Supporting	24
3.2	Nuvoton Nu-Link Driver Installation	24
3.3	BSP Firmware Download.....	26
3.4	Hardware Setup	26
3.5	Find the Example Project.....	28
3.6	Execute the Project under Toolchains	28
3.6.1	Keil MDK	28
3.6.2	IAR EWARM	32
3.6.3	NuEclipse	33
4	NuMaker-M433SE Schematics	34

4.1 Nu-Link2-Me 34

4.2 M433 platform..... 35

4.3 Extension Connector 36

4.4 Advance Connector 37

5 REVISION HISTORY 38

List of Figures

Figure 1-1 NuMaker-M433SE Board	6
Figure 2-1 Front View of NuMaker-M433SE.....	8
Figure 2-2 Rear View of NuMaker-M433SE	9
Figure 2-3 Arduino UNO Compatible Extension Connectors.....	10
Figure 2-4 M433SE8AE Extension Connectors.....	12
Figure 2-5 External Power Supply Sources on Nu-Link2-Me	19
Figure 2-6 External Power Supply Sources on M433 platform.....	20
Figure 2-7 Separate the Nu-Link2-Me from NuMaker-M433SE	21
Figure 2-8 Wiring between Ammeter Connector and Ammeter	22
Figure 3-1 Nu-Link USB Driver Installation Setup.....	24
Figure 3-2 Nu-Link USB Driver Installation	25
Figure 3-3 Open VCOM Function	26
Figure 3-4 ICE USB Connector.....	26
Figure 3-5 Device Manger.....	27
Figure 3-6 PuTTY Session Setting.....	27
Figure 3-7 Template Project Folder Path.....	28
Figure 3-8 Warning Message of “Device not found”	28
Figure 3-9 Project File Migrate to Version 5 Format.....	29
Figure 3-10 Debugger Setting in Options Window.....	29
Figure 3-11 Programming Setting in Options Window.....	30
Figure 3-12 Compile and Download the Project	30
Figure 3-13 Keil MDK Debug Mode	31
Figure 3-14 Debug Message on Serial Port Terminal Windows.....	31
Figure 3-15 IAR EWARM Window	32
Figure 3-16 Compile and Download the Project	32
Figure 3-17 IAR EWARM Debug Mode	33
Figure 3-18 Debug Message on Serial Port Terminal Windows.....	33
Figure 4-1 Nu-Link2-Me Circuit.....	34
Figure 4-2 M433 platform Circuit.....	35
Figure 4-3 Extension Connectors Circuit	36
Figure 4-4 Advance Connectors Circuit	37

List of Tables

Table 2-1 Arduino UNO Extension Connectors and M433SE8AE Mapping GPIO List.....	11
Table 2-2 Extended Connector JP3 Interface with M433SE8AE GPIO	13
Table 2-3 Extended Connector JP4 Interface with M433SE8AE GPIO	14
Table 2-4 Extended Connector JP5 Interface with M433SE8AE GPIO	15
Table 2-5 Extended Connector JP6 Interface with M433SE8AE GPIO	16
Table 2-6 Vin Power Source	17
Table 2-7 5V Power Sources	17
Table 2-8 3.3 V Power Sources	17
Table 2-9 1.8V Power Sources	18
Table 2-10 Power Connectors	18
Table 2-11 USB Connectors	18
Table 2-12 Power Switches	18
Table 2-13 Supply External Power through Nu-Link2-Me	19
Table 2-14 Supply External Power for M433 platform	21
Table 2-15 External Reference Voltage Connector	22
Table 2-16 Ammeter Connector	22
Table 2-17 Extension Connectors.....	22
Table 2-18 Push-Buttons	23
Table 2-19 LEDs	23
Table 2-20 VCOM Function of Nu-Link2-Me.....	23

1 OVERVIEW

This user manual is aimed to give users a fast introduction to the use of NuMaker-M433SE board.

The NuMaker-M433SE consists of two parts, a M433 platform and an on-board Nu-Link2-Me debugger and programmer. The NuMaker-M433SE allows users to quickly develop and easily program and debug application.

The NuMaker-M433SE offers M433SE8AE full pins extension connectors and Arduino UNO compatible extension connectors. It is an easy-to-develop platform for user to expand the functionality and build the applications. The NuMaker-M433SE also provides an ammeter connector, allows user to monitor the microcontroller's power consumption during development.

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 able to off-line programming the target microcontroller. Nu-Link2-Me provides virtual COM port (VCOM) function to print out messages on PC. Nu-Link2-Me can be separated from NuMaker-M433SE, allowing user to use as a mass production programming tool.

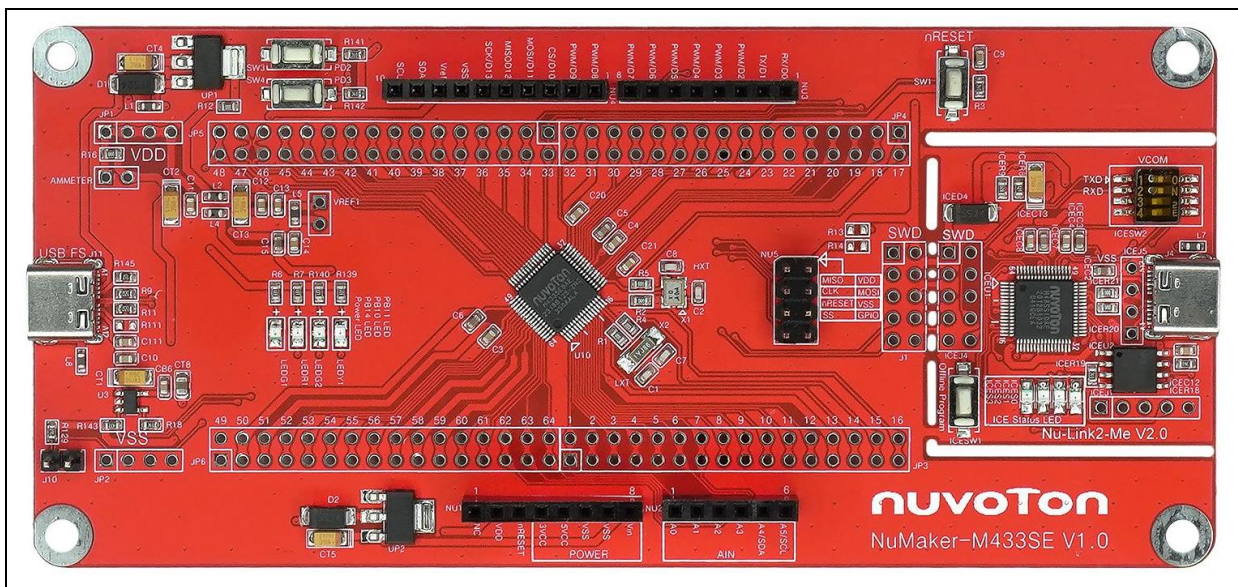


Figure 1-1 NuMaker-M433SE Board

1.1 NuMaker-M433SE Features

- NuMicro® M433SE8AE used as main microcontroller with function downward compatible with:
 - ◆ M433LE8AE
- M433SE8AE full pins extension connectors
- Arduino UNO compatible extension connectors
- Ammeter connector for measuring the microcontroller's power consumption
- Fixable board power supply:
 - ◆ External V_{DD} power connector
 - ◆ Arduino UNO compatible extension connector Vin
 - ◆ USB FS connector on M433 platform
 - ◆ ICE USB connector on Nu-Link2-Me

- On-board Nu-Link2-Me debugger and programmer:
 - ◆ Debug through SWD interface
 - ◆ On-line/off-line programming
 - ◆ Virtual COM port function

2 NUMAKER-M433SE OVERVIEW

2.1 Front View

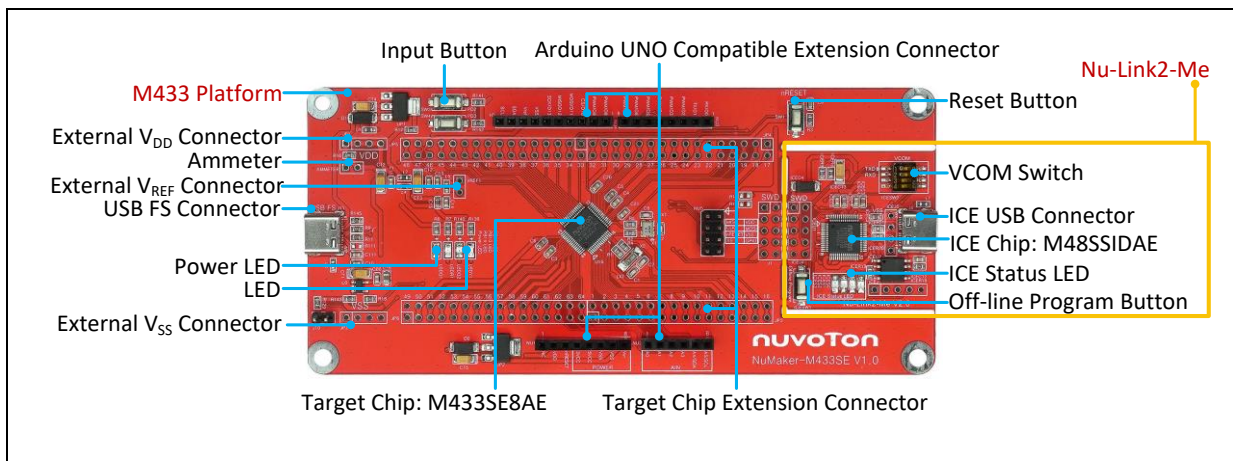


Figure 2-1 Front View of NuMaker-M433SE

Figure 2-1 shows the main components and connectors from the front side of NuMaker-M433SE. The following lists components and connectors from the front view:

- Target Chip: M433SE8AE(U10)
- USB FS Connector(J11)
- Arduino UNO Compatible Extension Connectors (NU1, NU2, NU3, NU4)
- M433 Extension Connectors (JP3, JP4, JP5 and JP6)
- External V_{DD} Power Connector(JP1)
- External V_{SS} Power Connector(JP2)
- External V_{REF} Connector(VREF1)
- Input Button(SW3 and SW4)
- Ammeter Connector(AMMETER)
- Reset Button(SW1)
- Power LED, PB14 LED, PB11 LED and PB10 LED(LEDG1, LEDR1, LEDY1 and LEDG2)
- Nu-Link2-Me
 - ◆ VCOM Switch
 - ◆ ICE Chip: M48SSIDAE(ICEU1)
 - ◆ ICE USB Connector(ICEJ5)
 - ◆ ICE Status LED(ICES0,ICES1, ICES2, ICES3)
 - ◆ Off-line Program Button(ICESW1)

2.2 Rear View

Figure 2-2 shows the main components and connectors from the rear side of NuMaker-M433SE.

The following lists components and connectors from the rear view:

- Nu-Link2-Me
- ◆ MCUVCC Power Switch (ICEJPR1)
- ◆ ICEVCC Power Switch (ICEJPR2)

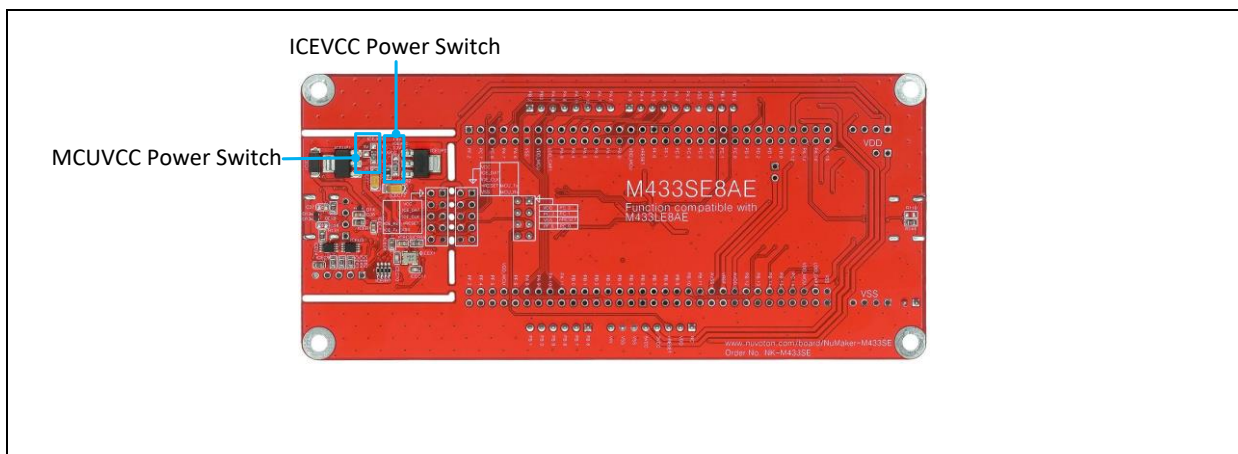


Figure 2-2 Rear View of NuMaker-M433SE

2.3 Arduino UNO Compatible Extension Connectors

Figure 2-3 shows the Arduino UNO compatible extension connectors.

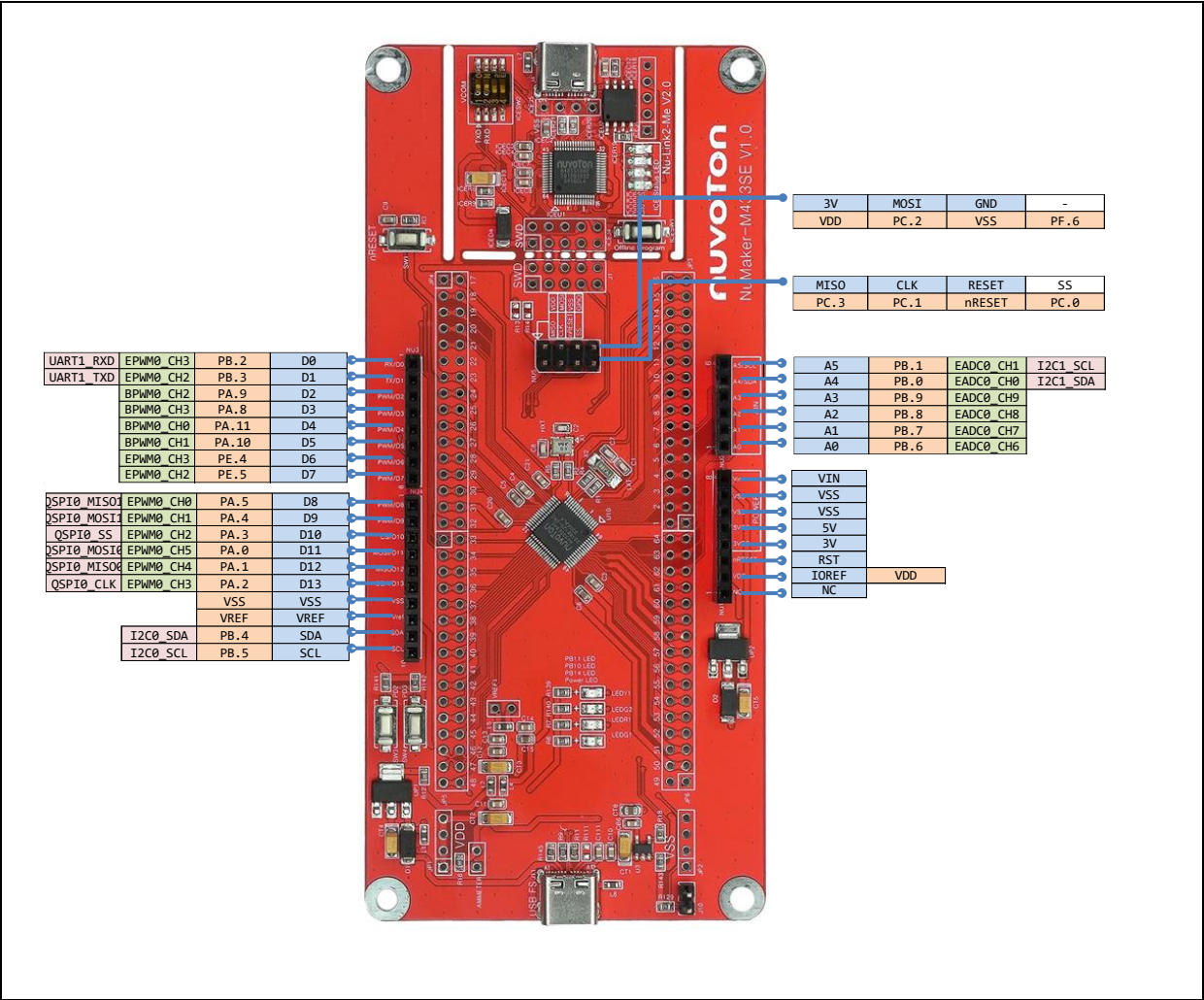


Figure 2-3 Arduino UNO Compatible Extension Connectors

Header		NuMaker-M433SE		Header		NuMaker-M433SE	
		Compatible to Arduino UNO	GPIO Pin of M433			Compatible to Arduino UNO	GPIO Pin of M433
N U 3	NU3.1	D0	PB.2	N U 2	NU2.6	A5	PB.1
	NU3.2	D1	PB.3		NU2.5	A4	PB.0
	NU3.3	D2	PA.9		NU2.4	A3	PB.9
	NU3.4	D3	PA.8		NU2.3	A2	PB.8
	NU3.5	D4	PA.11		NU2.2	A1	PB.7
	NU3.6	D5	PA.10		NU2.1	A0	PB.6
	NU3.7	D6	PE.4	N U 1	NU1.8	VIN	-
	NU3.8	D7	PE.5		NU1.7	VSS	
N U 4	NU4.1	D8	PA.5		NU1.6	VSS	
	NU4.2	D9	PA.4		NU1.5	5V	
	NU4.3	D10	PA.3		NU1.4	3V	nRESET
	NU4.4	D11	PA.0		NU1.3	RST	
	NU4.5	D12	PA.1		NU1.2	IOREF	V _{DD}
	NU4.6	D13	PA.2		NU1.1	NC	-
	NU4.7	VSS	V _{SS}				
	NU4.8	VREF	V _{REF}				
	NU4.9	SDA	PB.4				
	NU4.10	SCL	PB.5				

Header		NuMaker-M433SE		Header		NuMaker-M433SE	
		Extension Connectors	GPIO Pin of M433			Extension Connectors	GPIO Pin of M433
N U 5	NU5.1	SPI1_MISO	PC.3	N U 5	NU5.2	VCC	
	NU5.3	SPI1_CLK	PC.1		NU5.4	SPI1_MOSI	PC.2
	NU5.5	RST			NU5.6	GND	
	NU5.7	SPI1_SS	PC.0		NU5.8	GPIO	PF.6

Table 2-1 Arduino UNO Extension Connectors and M433SE8AE Mapping GPIO List

2.4 Pin Assignment for Extension Connectors

The NuMaker-M433SE provides the M433SE8AE target chip onboard and full pins extension connectors (JP3, JP4, JP5 and JP6). The Figure 2-4 shows the M433SE8AE extension connectors.

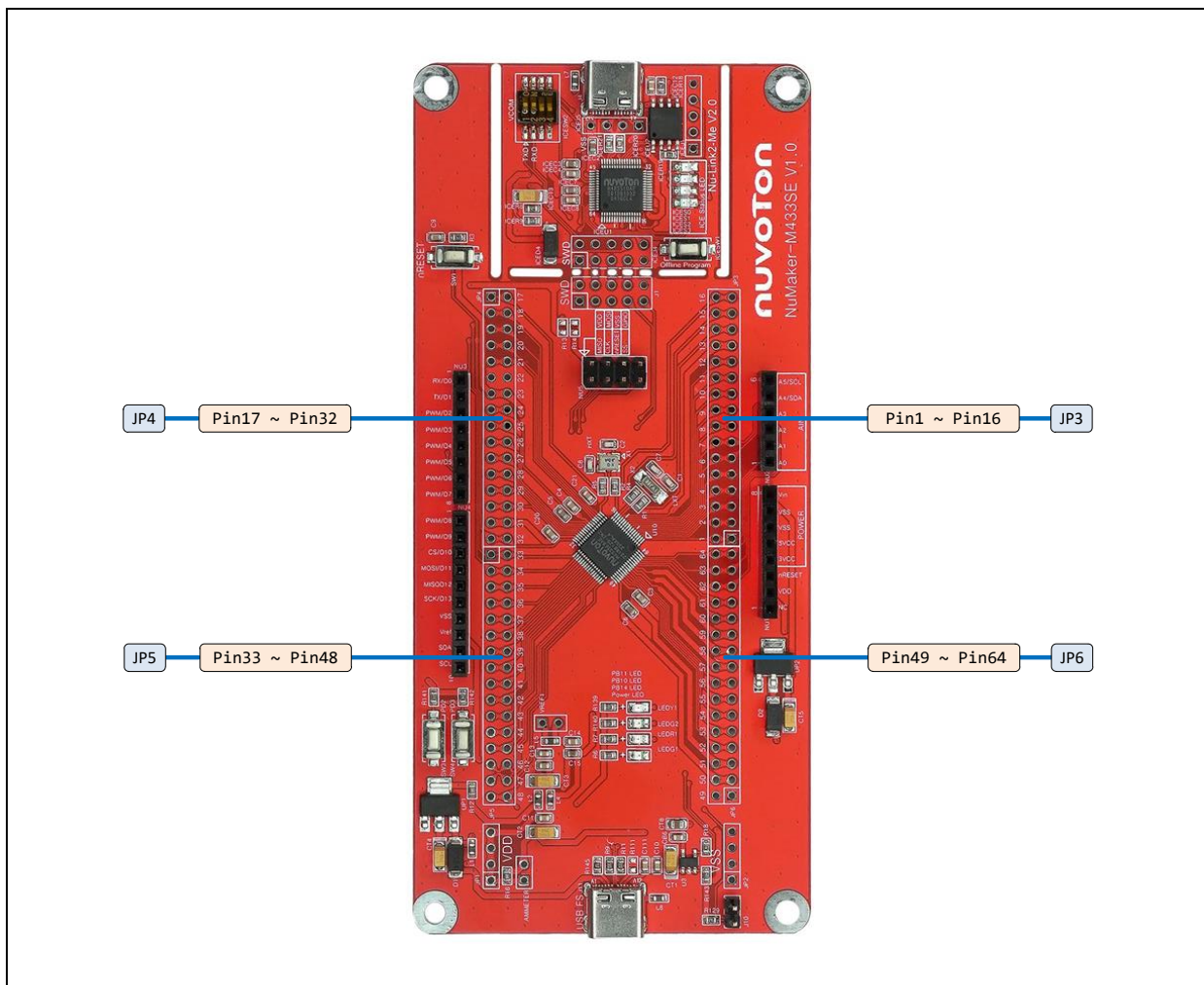


Figure 2-4 M433SE8AE Extension Connectors

Header		M433SE8AE		Header		M433SE8AE	
		Pin No.	Function			Pin No	Function
JP3	JP3.1	1	PB.6	JP3	JP3.2	1	PB.6
	JP3.3	2	PB.5		JP3.4	2	PB.5
	JP3.5	3	PB.4		JP3.6	3	PB.4
	JP3.7	4	PB.3		JP3.8	4	PB.3
	JP3.9	5	PB.2		JP3.10	5	PB.2
	JP3.11	6	PB.1		JP3.12	6	PB.1
	JP3.13	7	PB.0		JP3.14	7	PB.0
	JP3.15	8	PA.11		JP3.16	8	PA.11
	JP3.17	9	PA.10		JP3.18	9	PA.10
	JP3.19	10	PA.9		JP3.20	10	PA.9
	JP3.21	11	PA.8		JP3.22	11	PA.8
	JP3.23	12	PF.6		JP3.24	12	PF.6
	JP3.25	13	3VCC		JP3.26	13	3VCC
	JP3.27	14	XT32_IN		JP3.28	14	XT32_IN
	JP3.29	15	XT32_OUT		JP3.30	15	XT32_OUT
	JP3.31	16	XT1_IN		JP3.32	16	XT1_IN

Table 2-2 Extended Connector JP3 Interface with M433SE8AE GPIO

Header		M433SE8AE		Header		M433SE8AE	
		Pin No.	Function			Pin No	Function
JP4	JP4.1	17	XT1_OUT	JP4	JP4.2	17	XT1_OUT
	JP4.3	18	PC.7		JP4.4	18	PC.7
	JP4.5	19	PC.6		JP4.6	19	PC.6
	JP4.7	20	PA.7		JP4.8	20	PA.7
	JP4.9	21	PA.6		JP4.10	21	PA.6
	JP4.11	22	GND		JP4.12	22	GND
	JP4.13	23	3VCC		JP4.14	23	3VCC
	JP4.15	24	LDO_CAP1		JP4.16	24	LDO_CAP1
	JP4.17	25	PA.5		JP4.18	25	PA.5
	JP4.19	26	PA.4		JP4.20	26	PA.4
	JP4.21	27	PA.3		JP4.22	27	PA.3
	JP4.23	28	PA.2		JP4.24	28	PA.2
	JP4.25	29	PA.1		JP4.26	29	PA.1
	JP4.27	30	PA.0		JP4.28	30	PA.0
	JP4.29	31	3VCC		JP4.30	31	3VCC
	JP4.31	32	nRESET		JP4.32	32	nRESET

Table 2-3 Extended Connector JP4 Interface with M433SE8AE GPIO

Header		M433SE8AE		Header		M433SE8AE	
		Pin No.	Function			Pin No.	Function
JP5	JP5.1	33	ICEDAT	JP5	JP5.2	33	ICEDAT
	JP5.3	34	ICECLK		JP5.4	34	ICECLK
	JP5.5	35	PC.5		JP5.6	35	PC.5
	JP5.7	36	PC.4		JP5.8	36	PC.4
	JP5.9	37	PC.3		JP5.10	37	PC.3
	JP5.11	38	PC.2		JP5.12	38	PC.2
	JP5.13	39	PC.1		JP5.14	39	PC.1
	JP5.15	40	PC.0		JP5.16	40	PC.0
	JP5.17	41	PD.3		JP5.18	41	PD.3
	JP5.19	42	PD.2		JP5.20	42	PD.2
	JP5.21	43	PD.1		JP5.22	43	PD.1
	JP5.23	44	PD.0		JP5.24	44	PD.0
	JP5.25	45	PA.12		JP5.26	45	PA.12
	JP5.27	46	PA.13		JP5.28	46	PA.13
	JP5.29	47	PA.14		JP5.30	47	PA.14
	JP5.31	48	PA.15		JP5.32	48	PA.15

Table 2-4 Extended Connector JP5 Interface with M433SE8AE GPIO

Header		M433SE8AE		Header		M433SE8AE	
		Pin No.	Pin Name			Pin No	Pin Name
JP6	JP6.1	49	GND	JP6	JP6.2	49	GND
	JP6.3	50	LDO_CAP2		JP6.4	50	LDO_CAP2
	JP6.5	51	3Vcc		JP6.6	51	3Vcc
	JP6.7	52	PC.14		JP6.8	52	PC.14
	JP6.9	53	PB.15		JP6.10	53	PB.15
	JP6.11	54	PB.14		JP6.12	54	PB.14
	JP6.13	55	PB.13		JP6.14	55	PB.13
	JP6.15	56	PB.12		JP6.16	56	PB.12
	JP6.17	57	AVDD		JP6.18	57	AVDD
	JP6.19	58	VREF		JP6.20	58	VREF
	JP6.21	59	AVSS		JP6.22	59	AVSS
	JP6.23	60	PB.11		JP6.24	60	PB.11
	JP6.25	61	PB.10		JP6.26	61	PB.10
	JP6.27	62	PB.9		JP6.28	62	PB.9
	JP6.29	63	PB.8		JP6.30	63	PB.8
	JP6.31	64	PB.7		JP6.32	64	PB.7

Table 2-5 Extended Connector JP6 Interface with M433SE8AE GPIO

2.5 System Configuration

2.5.1 VIN Power Source

Table 2-6 presents the Vin power source.

Connector	Net Name in Schematic	Comment
NU1 pin8	NU1_VIN	Board external power source, with voltage range from 7 V to 12 V. The voltage regulator UP2 converts the NU1 pin8 input voltage to 5 V and supplies it to NuMaker-M433SE.

Table 2-6 Vin Power Source

2.5.2 5 V Power Sources

Table 2-7 presents the 5 V power sources.

Connector	Net Name in Schematic	Comment
ICEJ5	USB_HS_VBUS	ICE USB connector supplies 5 V power from PC to M433 platform and Nu-Link2-Me.
J11	USB_VBUS	USB connector on NuMaker-M433SE supplies 5 V power from PC to M433 platform and Nu-Link2-Me.
NU1 pin5	NU1_5VCC	ICEJ5, J11 or NU1 pin8 supplies 5 V power to NU1 pin5. NU1 pin5 supplies 5 V power to target chip or Arduino adapter board. Note: M433 operating voltage range is from 1.8 V to 3.6 V. Do not connect 5V to VDD.

Table 2-7 5V Power Sources

2.5.3 3.3 V Power Sources

Table 2-8 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 M433 platform or ICE chip.
UP1	USB_VBUS	UP1 converts USB_VBUS to 3.3 V and supplies 3.3 V to M433 platform. Note: R12 should be connected.
UP1	NU1_5VCC	UP1 converts NU1_5VCC to 3.3 V and supplies 3.3 V to M433 platform. Note: R12 should be connected.

Table 2-8 3.3 V Power Sources

2.5.4 1.8V Power Sources

Table 2-9 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 M433 platform or ICE chip.

Table 2-9 1.8V Power Sources

2.5.5 Power Connectors

Table 2-10 presents the power connectors.

Connector	Comment
JP1	V _{DD} (1.8 V ~ 3.6 V) connector on the NuMaker-M433SE.
JP2	V _{SS} connector on the NuMaker-M433SE.

Table 2-10 Power Connectors

2.5.6 USB Connectors

Table 2-11 presents the USB connectors.

Connector	Comment
ICEJ5	ICE USB connector on Nu-Link2-Me for power supply, debugging and programming from PC.
J11	USB FS connector on NuMaker-M433SE for power supply.

Table 2-11 USB Connectors

2.5.7 Power Switches

Table 2-12 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 2-12 Power Switches

2.5.8 Power Supply Models

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

The external power supply source on Nu-Link2-Me is shown in Figure 2-5.

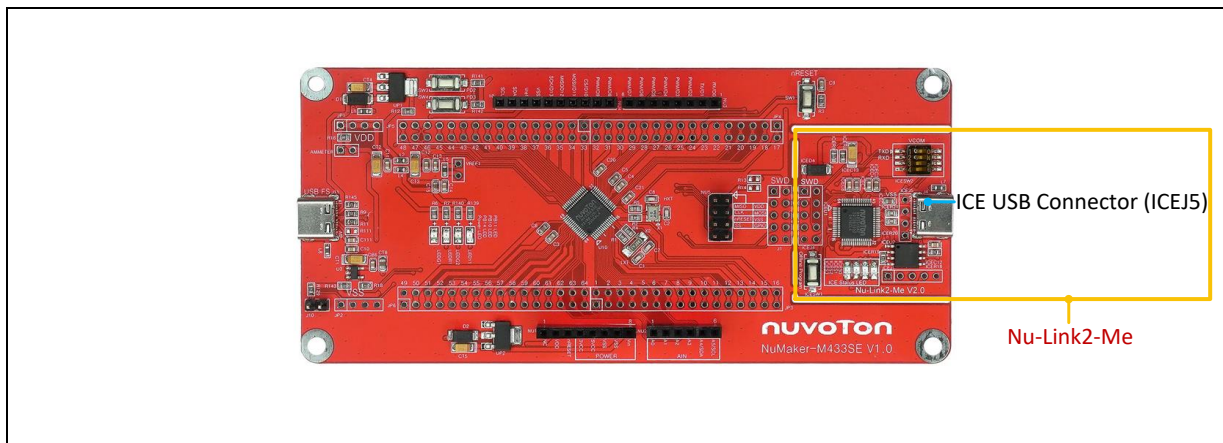


Figure 2-5 External Power Supply Sources on Nu-Link2-Me

To use ICEJ5 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 2-13 presents all power models when supplies external power through Nu-Link2-Me. The Nu-Link2-Me external power sources are highlighted in yellow.

Model	Target Chip Voltage	ICEJ5	ICEJPR1 (MCUVCC) Selection ^[1]	ICEJPR2 (ICEVCC) Selection ^[2]	ICE Chip Voltage	J11	Vin	JP1
1	1.8 V	Connect to PC	1.8 V	1.8 V	1.8 V	Ignore	Ignore	1.8 V output
2	3.3 V	Connect to PC	3.3 V (default)	3.3 V (default)	3.3 V	Ignore	Ignore	3.3 V output
3	5 V	Connect to PC	5V	3.3 V (default)	3.3 V	Ignore	Ignore	5 V output
X: Unused. Note: 1. 0 Ω should be soldered between ICEJPR1's MCVCC and 1.8 V / 3.3 V / 5 V. 2. 0 Ω should be soldered between ICEJPR2's ICEVCC and 1.8 V / 3.3 V.								

Table 2-13 Supply External Power through Nu-Link2-Me

2.5.8.2 External Power Supply through M433 platform to Target Chip

The external power supply sources on M433 platform are shown in Figure 2-6.

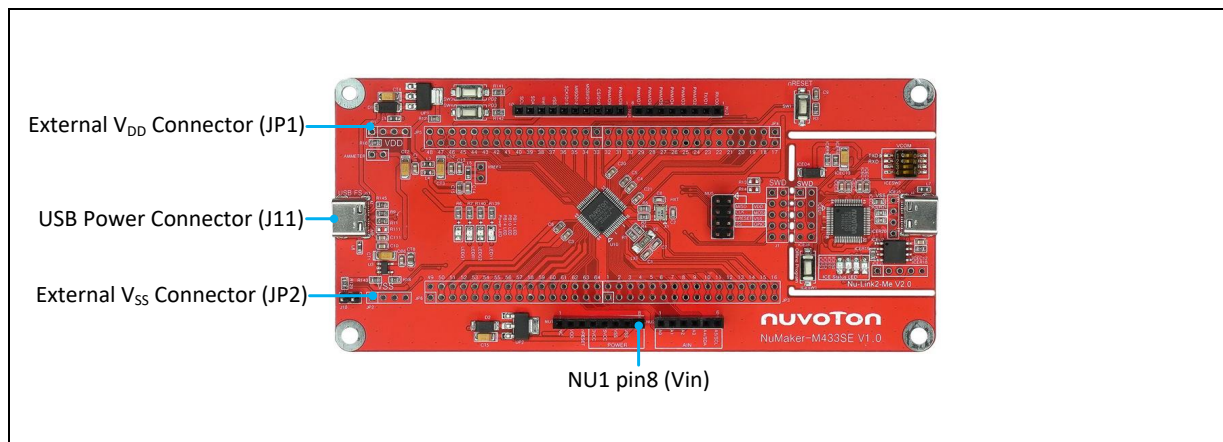


Figure 2-6 External Power Supply Sources on M433 platform

To use Vin or J11 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 the external power supply to Vin or J11.

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 Vin or J11 as external power supply source with Nu-Link2-Me separated from NuMaker-M433SE, please follow the below steps:

1. Separate the Nu-Link2-Me from NuMaker-M433SE.
2. Connect the external power supply to Vin or J11.

To use JP1 as external power supply source with Nu-Link2-Me separated from NuMaker-M433SE, please follow the below steps:

1. Separate the Nu-Link2-Me from NuMaker-M433SE.
2. Connect the external power supply to JP1.

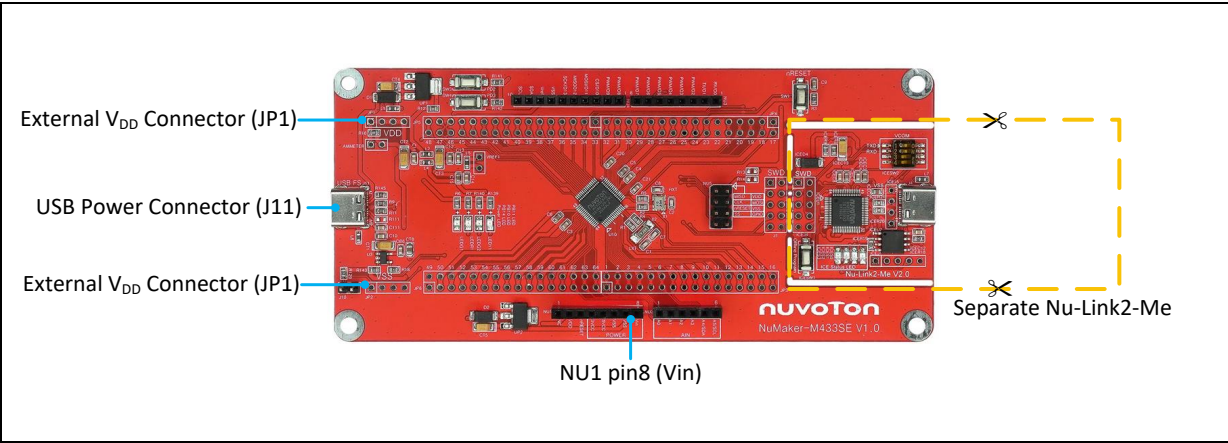


Figure 2-7 Separate the Nu-Link2-Me from NuMaker-M433SE

Table 2-14 presents all power models when supplies external power through M433 platform. The M433 platform external power sources are highlighted in yellow.

Model	Target Chip Voltage	Vin ^[1]	J11	ICEJ5	R12	JP1	ICEJPR1 (MCUVCC) Selection ^[2]	ICEJPR2 (ICEVCC) Selection ^[3]	ICE Chip Voltage ^[4]
4	3.3 V	7 V ~ 12 V Input	X	Ignore	ON	3.3 V output	Remove resistor	3.3 V	3.3 V
5	3.3 V	X	Connect to PC	Ignore	ON	3.3 V output	Remove resistor	3.3 V	3.3 V
8	1.8 V ~ 3.6 V	Ignore ^[5]	Ignore ^[5]	Connect to PC	OFF	DC Input 1.8 V ~ 3.6 V	Remove resistor	1.8 V / 3.3 V	1.8 V / 3.3 V
9	1.8 V ~ 3.6 V	Ignore ^[5]	Ignore ^[5]	Nu-Link2-Me removed	OFF	DC Input 1.8 V ~ 3.6 V	X	X	X

X: Unused.

Note:

- The Vin input voltage will be converted by voltage regulator UP2 to 5 V.
- 0Ω should be removed from ICEJPR1's MCVCC and 1.8 V / 3.3 V / 5 V.
- 0Ω should be soldered between ICEJPR2's ICEVCC and 1.8 V / 3.3 V.
- The ICE chip voltage should be close to the target chip voltage.
- JP1 external power input only provides voltage to target chip. Supply external power to Vin or J11 can provide 5V to NU1 pin5 (5V) and 3.3V to NU1 pin4 (3VCC).

Table 2-14 Supply External Power for M433 platform

2.5.9 External Reference Voltage Connector

Table 2-15 presents the external reference voltage connector.

Connector	Comment
VREF1	Connector for user to easily connect to the external reference voltage pin of the target chip. User needs to remove the L5 ferrite bead.

Table 2-15 External Reference Voltage Connector

2.5.10 Ammeter Connector

Table 2-16 presents the ammeter connector.

Connector	Comment
AMMETER	Connector for user to easily measure the target chip power consumption. User needs to remove the R16 and R12 resistor.

Table 2-16 Ammeter Connector

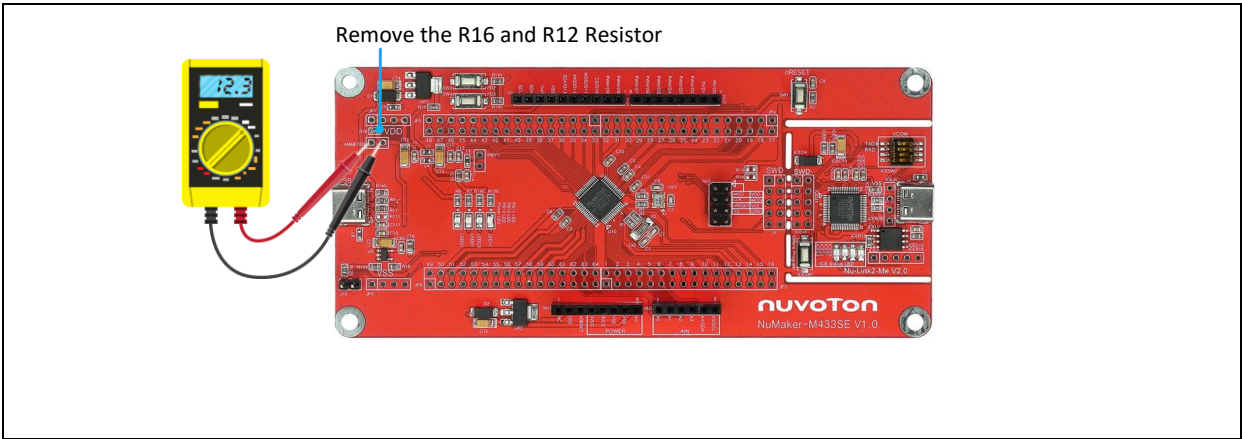


Figure 2-8 Wiring between Ammeter Connector and Ammeter

2.5.11 Extension Connectors

Table 2-17 presents the extension connectors.

Connector	Comment
JP3, JP4, JP5 and JP6	Full pins extension connectors on the NuMaker-M433SE.
NU1, NU2, NU3 and NU4	Arduino UNO compatible pins on the NuMaker-M433SE.

Table 2-17 Extension Connectors

2.5.12 Push-Buttons

Table 2-18 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.
SW3	GPIO input button for PD.2.
SW4	GPIO input button for PD.3.

Table 2-18 Push-Buttons

2.5.13 LEDs

Table 2-19 presents the LEDs.

Component	Comment
Power LED	The power LED indicates that the NuMaker-M433SE is powered.
PB14 LED	The LED is connected to the target chip PB.14.
PB11 LED	The LED is connected to the target chip PB.11.
PB10 LED	The LED is connected to the target chip PB.10.
ICES0, ICES1, ICES2 and ICES3	Nu-Link2-Me status LED.

Table 2-19 LEDs

2.6 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 2-20 presents how to set the VCOM function by ICESW2.

ICESW2		
Pin	Function	Comment
1	TXD	On: Connect target chip PB.13 (UART0_TXD) to Nu-Link2-Me. Off: Disconnect target chip PB.13 (UART0_TXD) to Nu-Link2-Me.
2	RXD	On: Connect target chip PB.12 (UART0_RXD) to Nu-Link2-Me. Off: Disconnect target chip PB.12 (UART0_RXD) to Nu-Link2-Me.
Note: Pin 3 and 4 is unused.		

Table 2-20 VCOM Function of Nu-Link2-Me

3 QUICK START

3.1 Toolchains Supporting

Install the preferred toolchain. Please make sure at least one of the toolchains has been installed.

- [KEIL MDK Nuvoton edition M0/M23](#)
- [IAR EWARM](#)
- [NuEclipse \(GCC\)\(Windows\)](#)
- [NuEclipse \(GCC\)\(Linux\)](#)

3.2 Nuvoton Nu-Link Driver Installation

Download and install the latest Nuvoton Nu-Link Driver.

- Download and install [Nu-Link Keil Driver](#) when using Keil MDK.
- Download and install [Nu-Link IAR Driver](#) when using IAR EWARM.
- Skip this step when using NuEclipse.

Please install the Nu-Link USB Driver as well at the end of the installation. The installation is presented in Figure 3-1 and Figure 3-2.

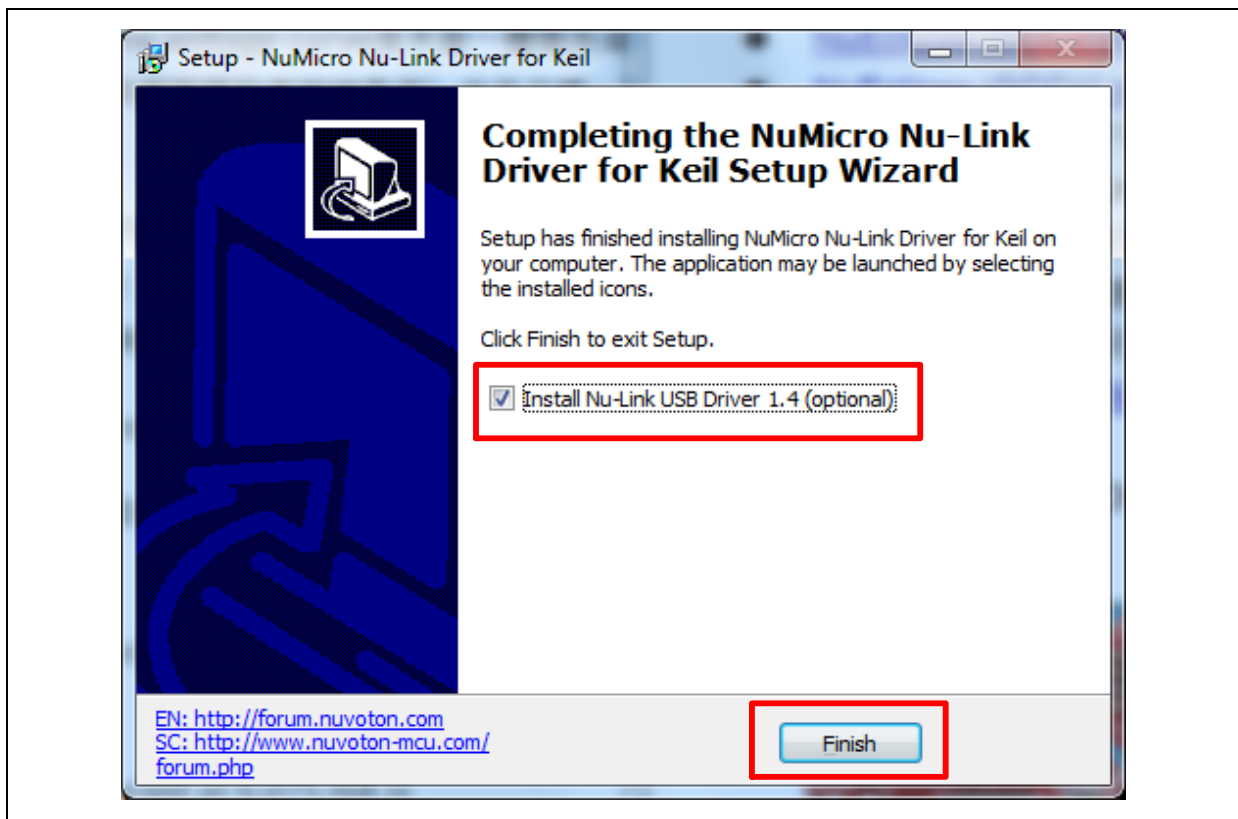


Figure 3-1 Nu-Link USB Driver Installation Setup



Figure 3-2 Nu-Link USB Driver Installation

3.3 BSP Firmware Download

Download and unzip the M433 [Board Support Package \(BSP\)](#).

3.4 Hardware Setup

1. Open the virtual COM (VCOM) function by changing Nu-Link2-Me VCOM Switch No. 1 and 2 to ON.

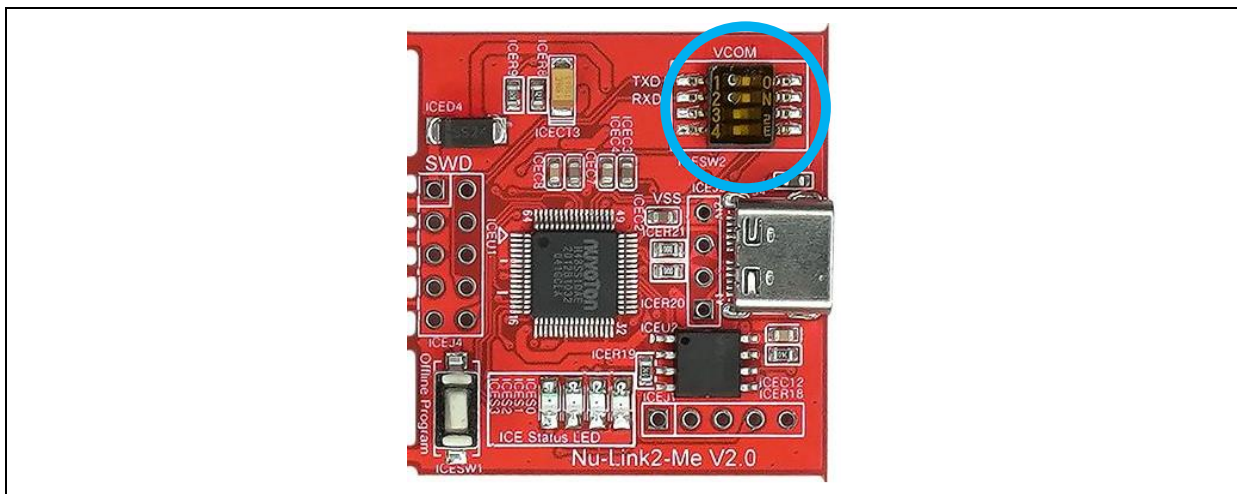


Figure 3-3 Open VCOM Function

2. Connect the ICE USB connector shown in Figure 3-4 to the PC USB port through USB cable.

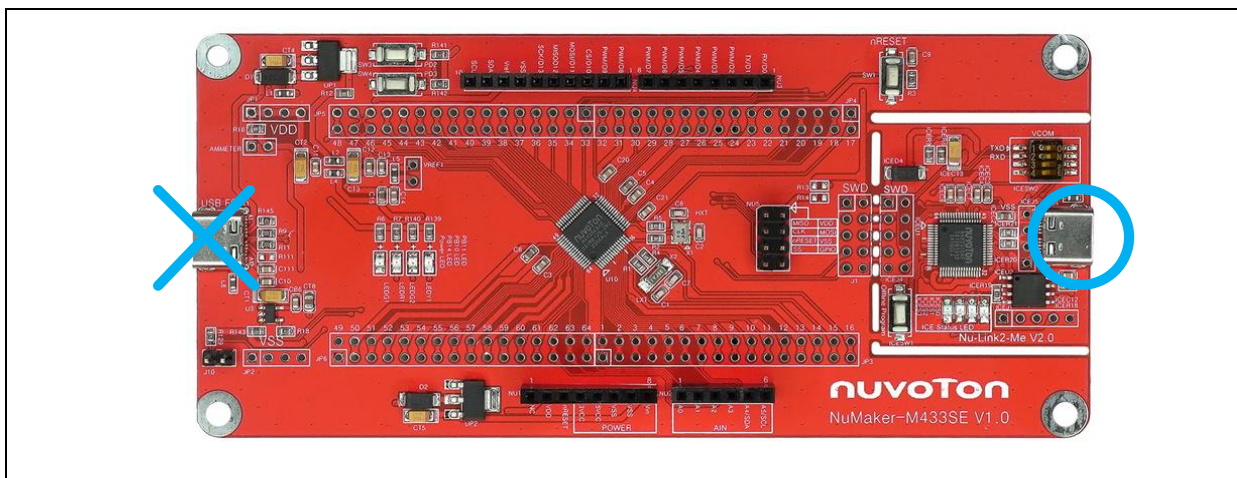


Figure 3-4 ICE USB Connector

3. Find the “Nuvoton Virtual COM Port” on the Device Manager as Figure 3-5.

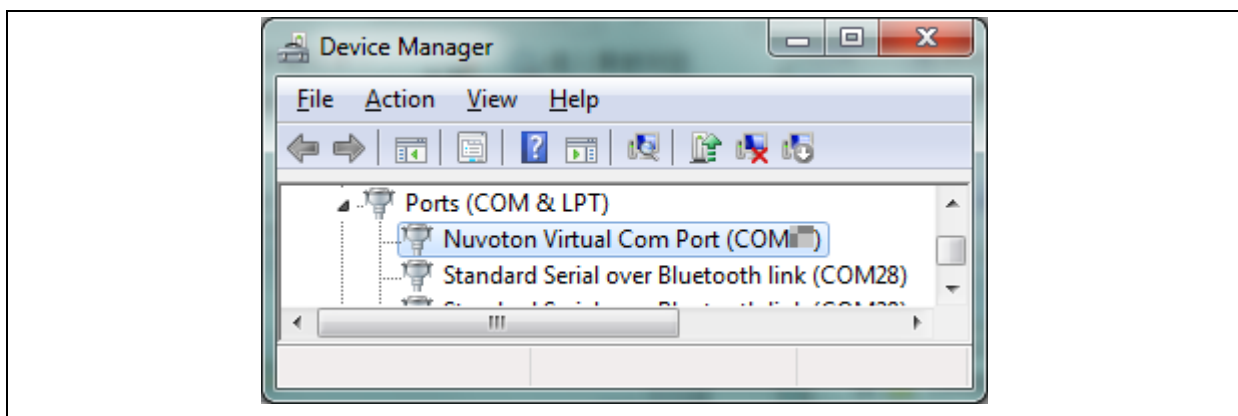


Figure 3-5 Device Manger

4. Open a serial port terminal, PuTTY for example, to print out debug message. Set the speed to 115200. Figure 3-6 presents the PuTTY session setting.

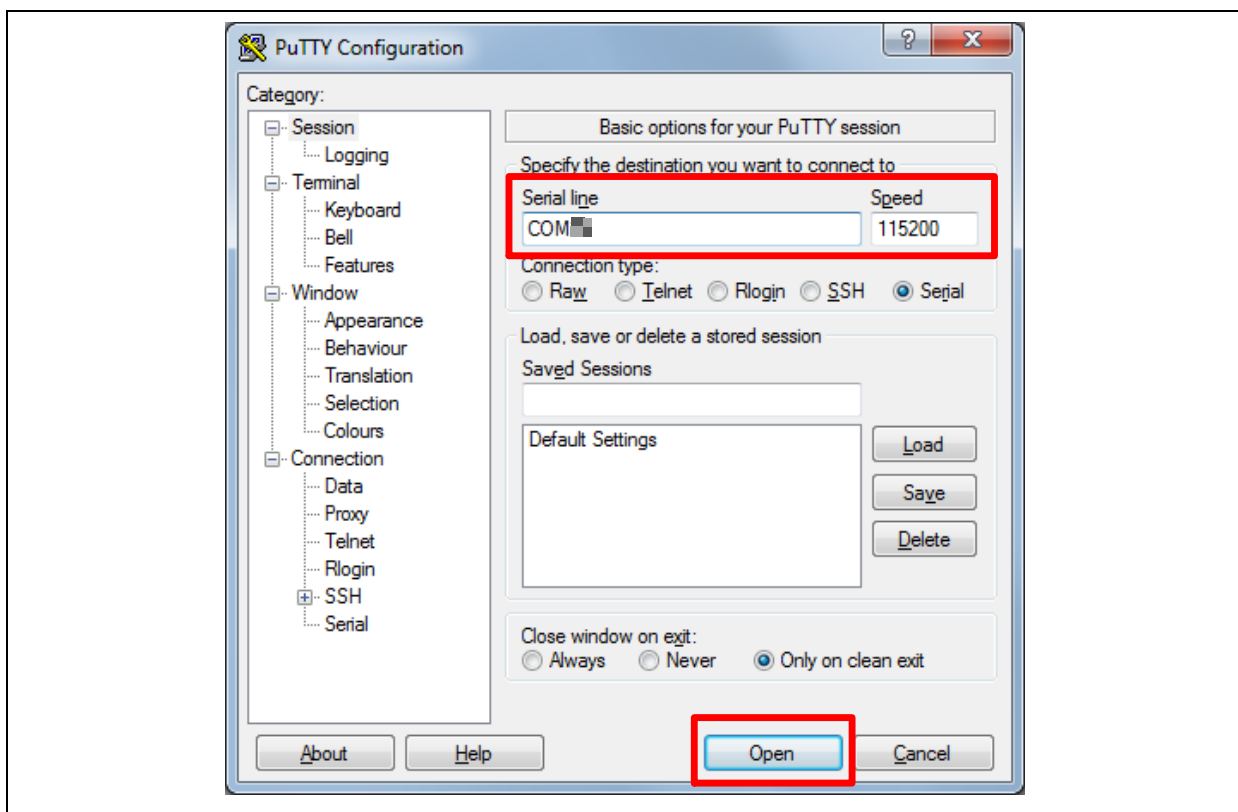


Figure 3-6 PuTTY Session Setting

3.5 Find the Example Project

Use the “Template” project as an example. The project can be found under the BSP folder as shown in Figure 3-7.

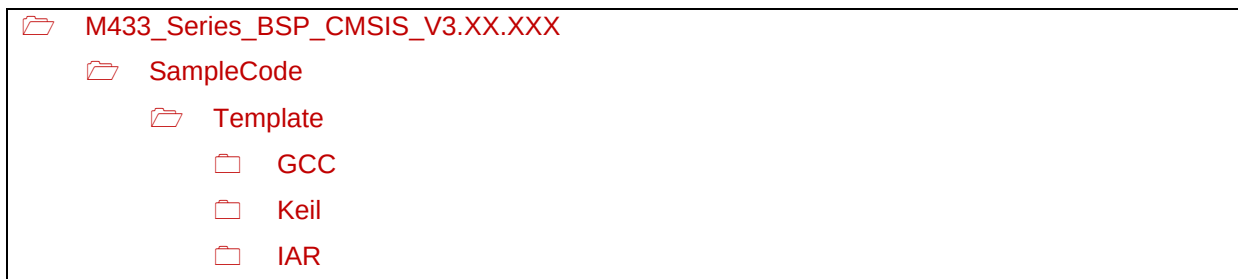


Figure 3-7 Template Project Folder Path

3.6 Execute the Project under Toolchains

Open and execute the project under the toolchain. The section 3.6.1, 0, and 3.6.3 describe the steps of executing project in Keil MDK, IAR EWARM and NuEclipse, respectively.

3.6.1 Keil MDK

This section provides steps to beginners on how to run a project by using Keil MDK.

1. Double click the “Template.uvproj” to open the project.

Note: If Figure 3-8 warning message jumps out, please migrate to version 5 formats as shown in Figure 3-9. The “.uvproj” filename extension will change to “.uvprojx”.

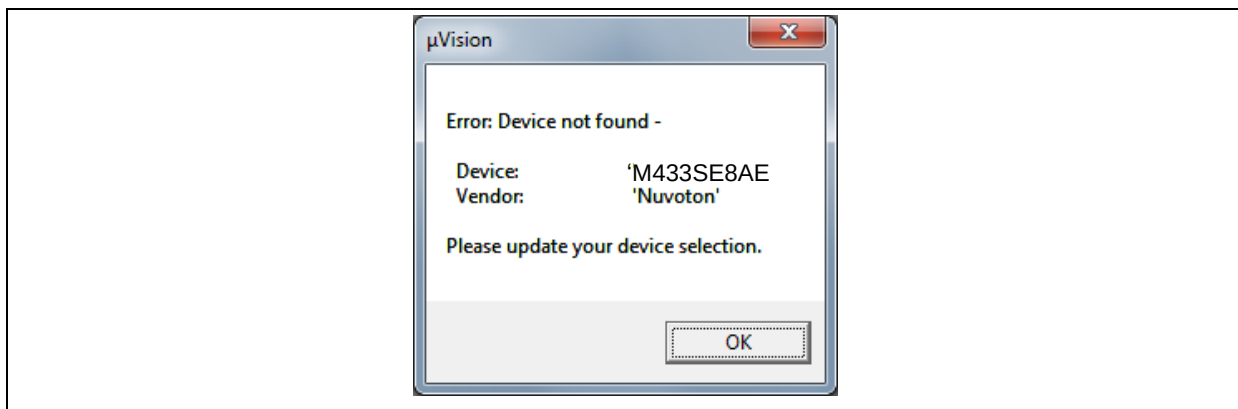


Figure 3-8 Warning Message of “Device not found”

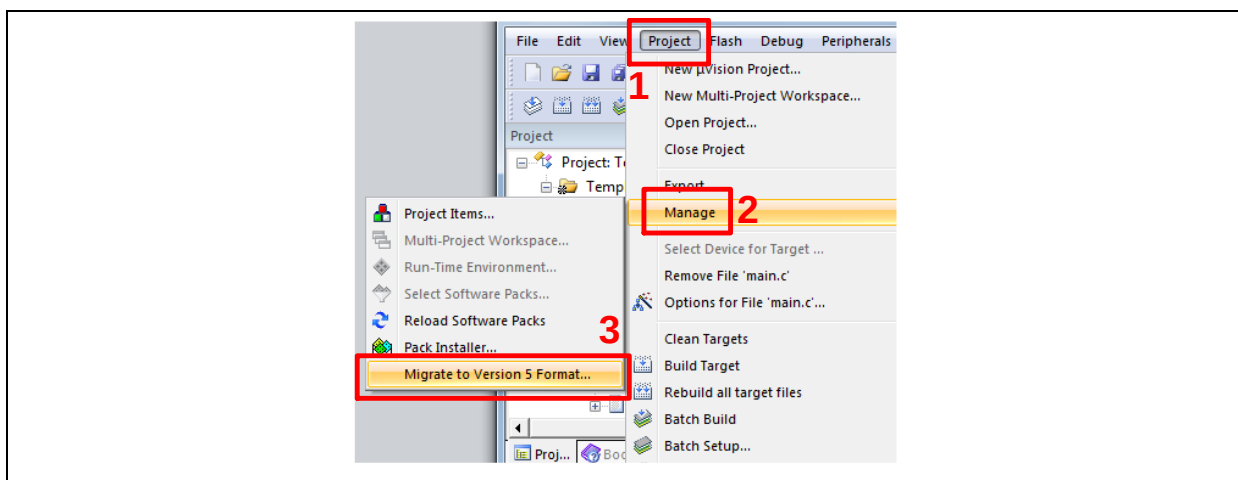


Figure 3-9 Project File Migrate to Version 5 Format

2. Make sure the debugger is “Nuvoton Nu-Link Debugger” as shown in Figure 3-10 and Figure 3-11.

Note: If the dropdown menu in Figure 3-10 does not contain “Nuvoton Nu-Link Debugger” item, please rework section 3.2.

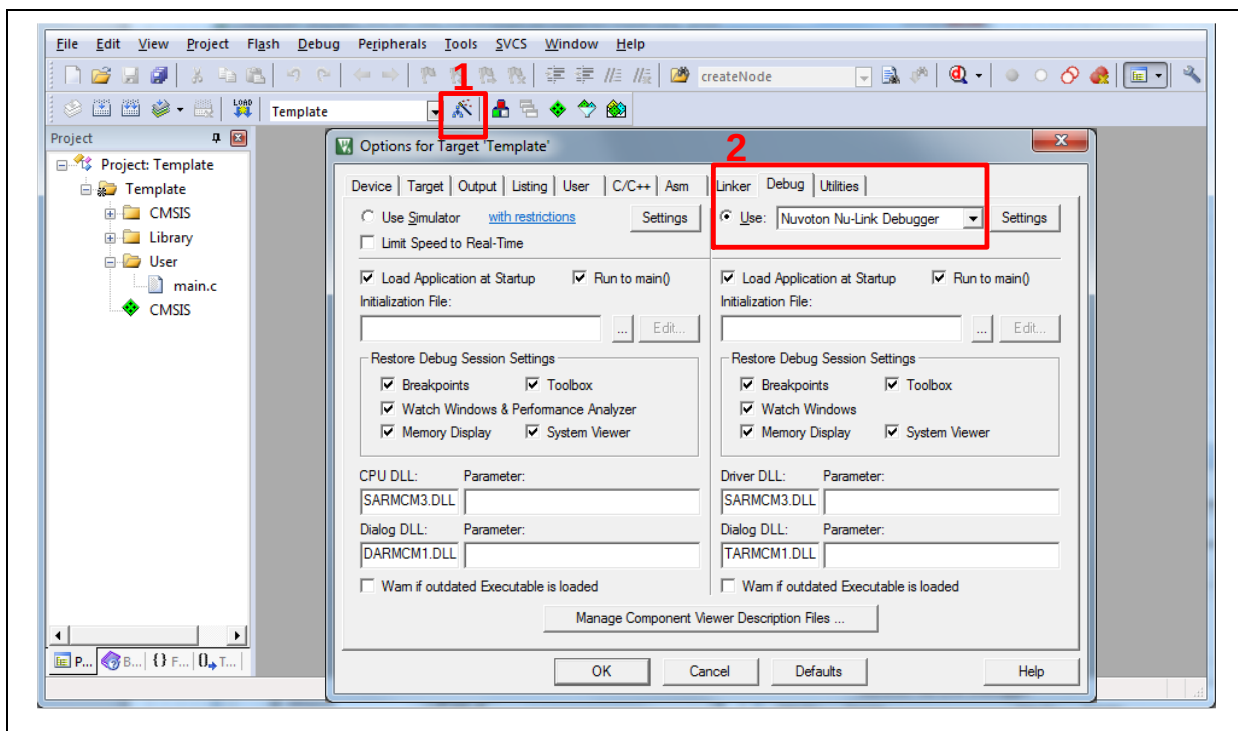


Figure 3-10 Debugger Setting in Options Window

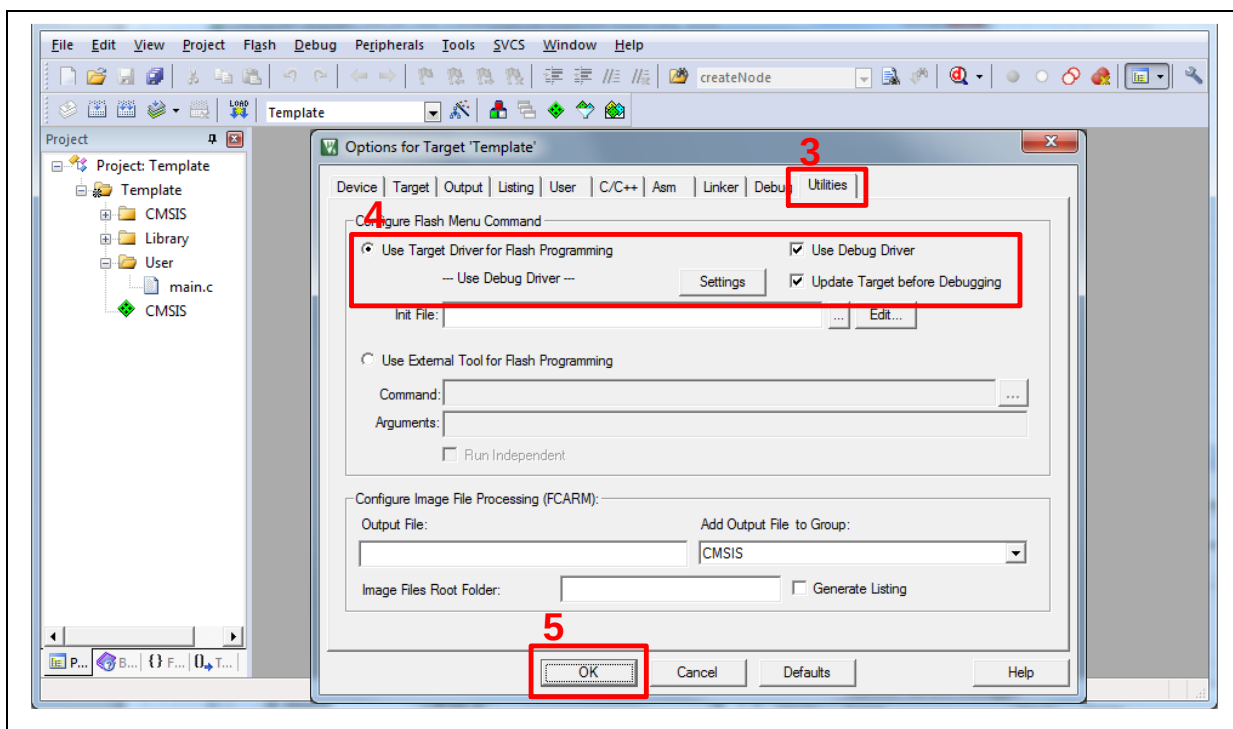


Figure 3-11 Programming Setting in Options Window

3. Rebuild all target files. After successfully compile the project, download code to the flash memory. Click "Start/Stop Debug Section" button can enter debug mode.

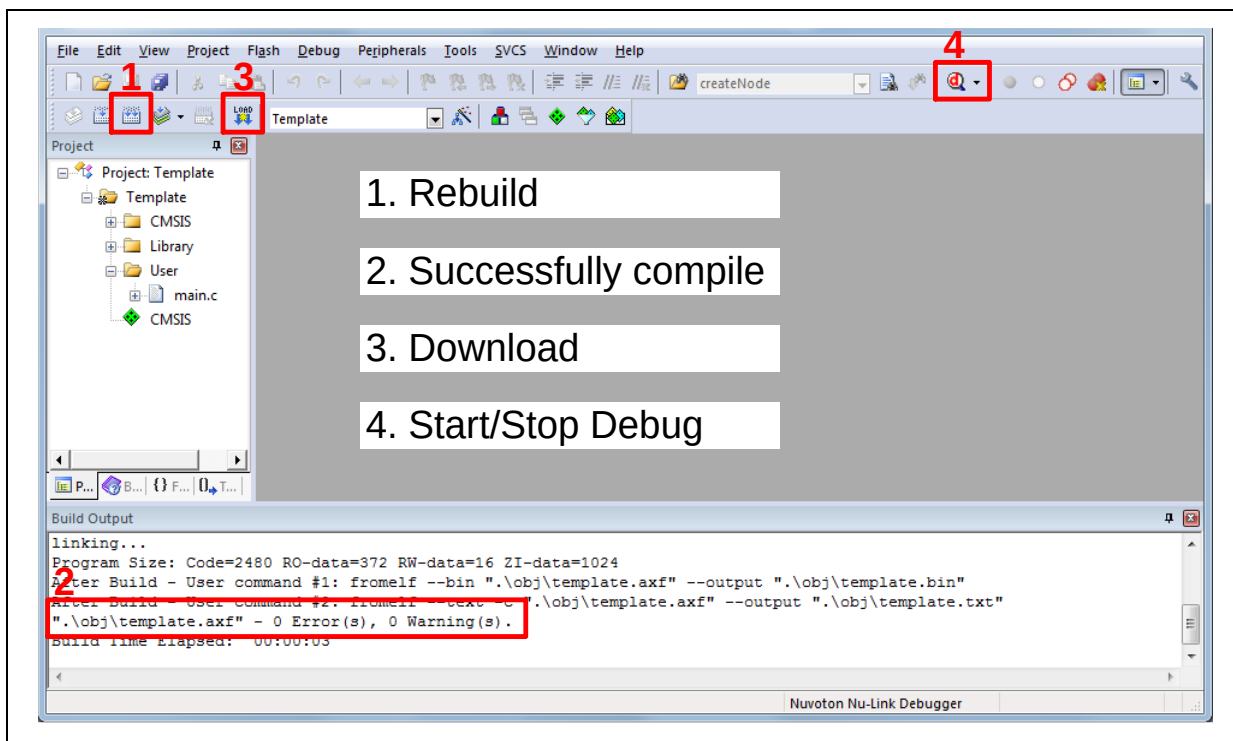


Figure 3-12 Compile and Download the Project

4. Figure 3-13 shows the debug mode under Keil MDK. Click "Run" and the debug message will be printed out as shown in Figure 3-14. User can debug the project under debug mode by checking

source code, assembly language, peripherals' registers, and setting breakpoint, step run, value monitor, etc.

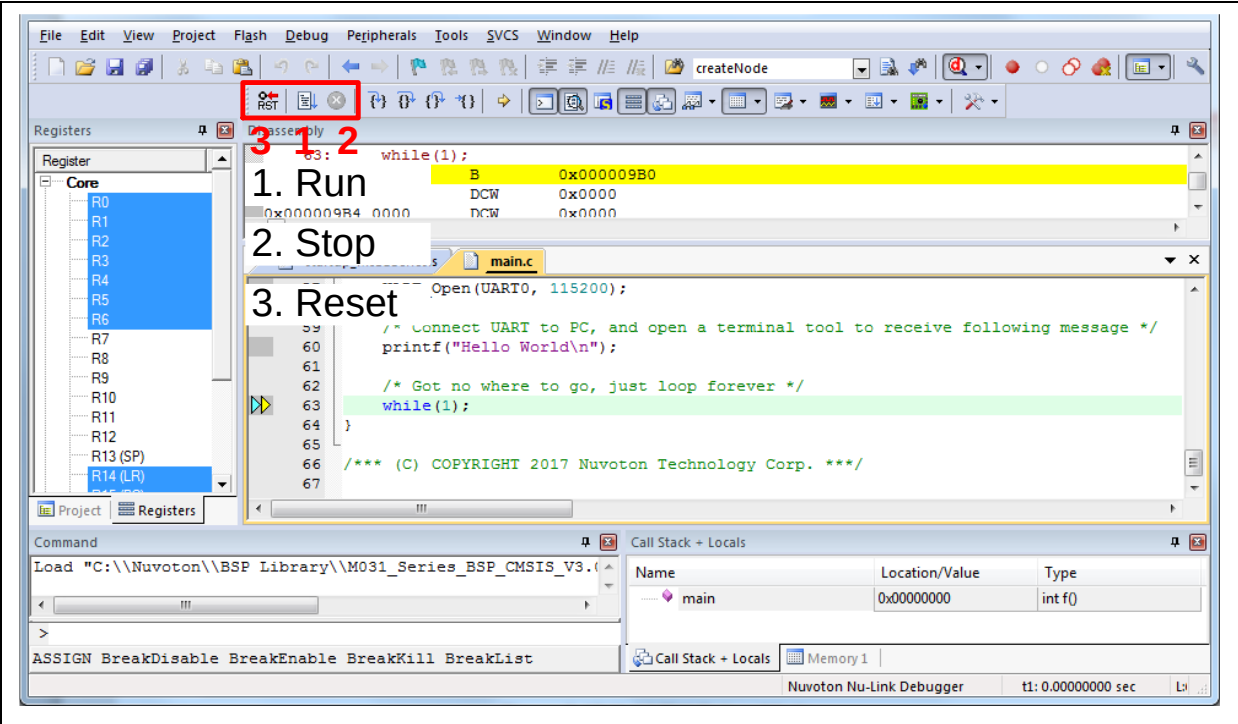


Figure 3-13 Keil MDK Debug Mode

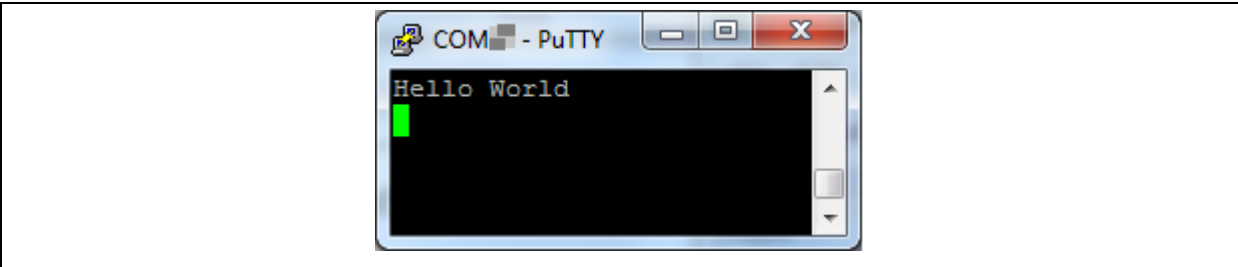


Figure 3-14 Debug Message on Serial Port Terminal Windows

3.6.2 IAR EWARM

This section provides steps to beginners on how to run a project by using IAR EWARM.

1. Double click the “Template.eww” to open the project.
2. Make sure the toolbar contain “Nu-Link” item as shown in Figure 3-15.

Note: If the toolbar does not contain “Nu-Link” item, please rework section 3.2.

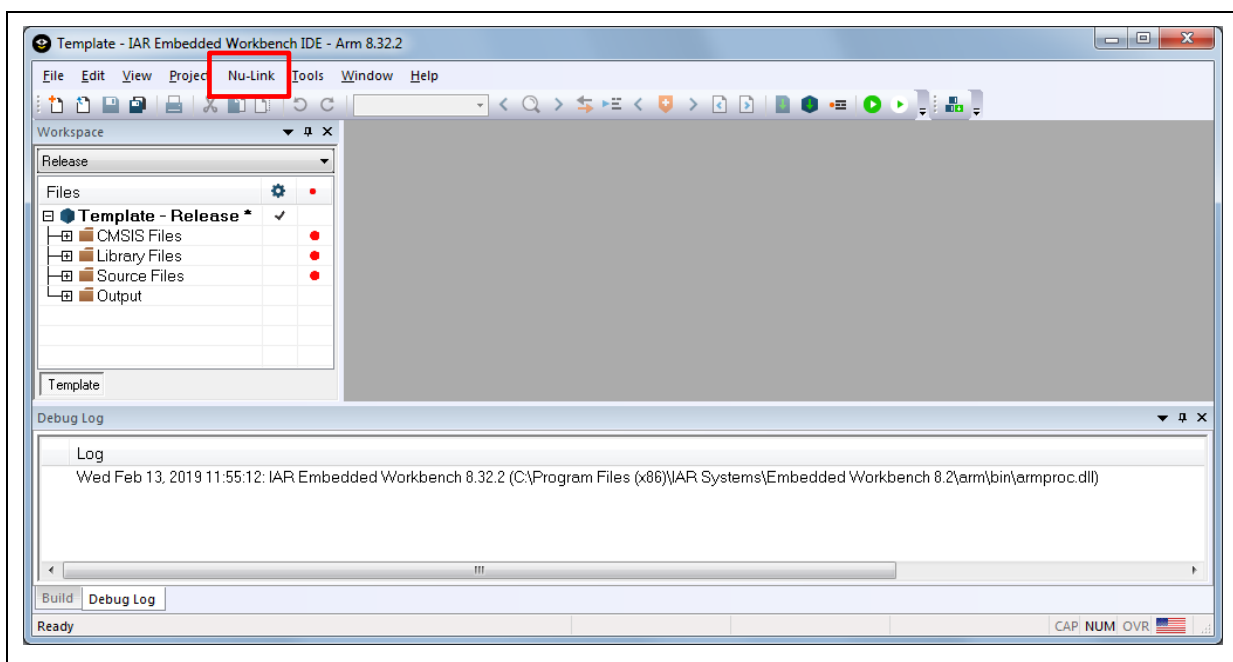


Figure 3-15 IAR EWARM Window

3. Make target file as presented in Figure 3-16. After successfully compile the project, download code to the flash memory and enter debug mode.

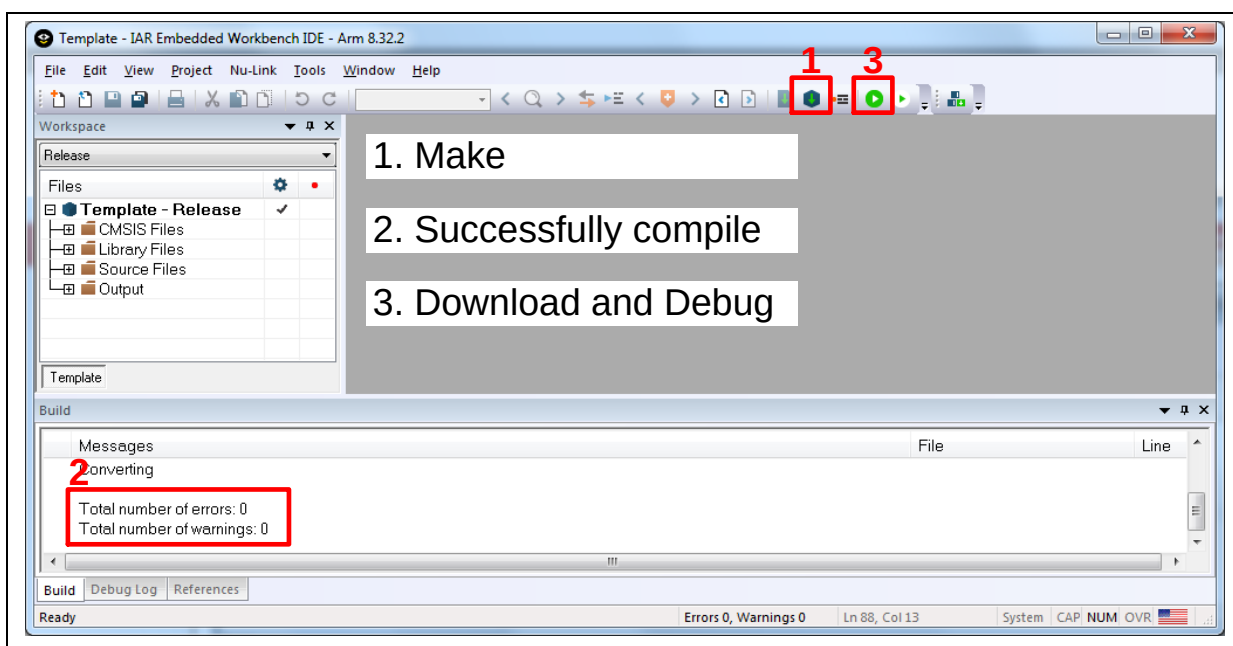


Figure 3-16 Compile and Download the Project

4. Figure 3-17 shows the debug mode under IAR EWARM. Click “Go” and the debug message will be printed out as shown in Figure 3-18. User can debug the project under debug mode by checking source code, assembly language, peripherals’ registers, and setting breakpoint, step run, value monitor, etc.

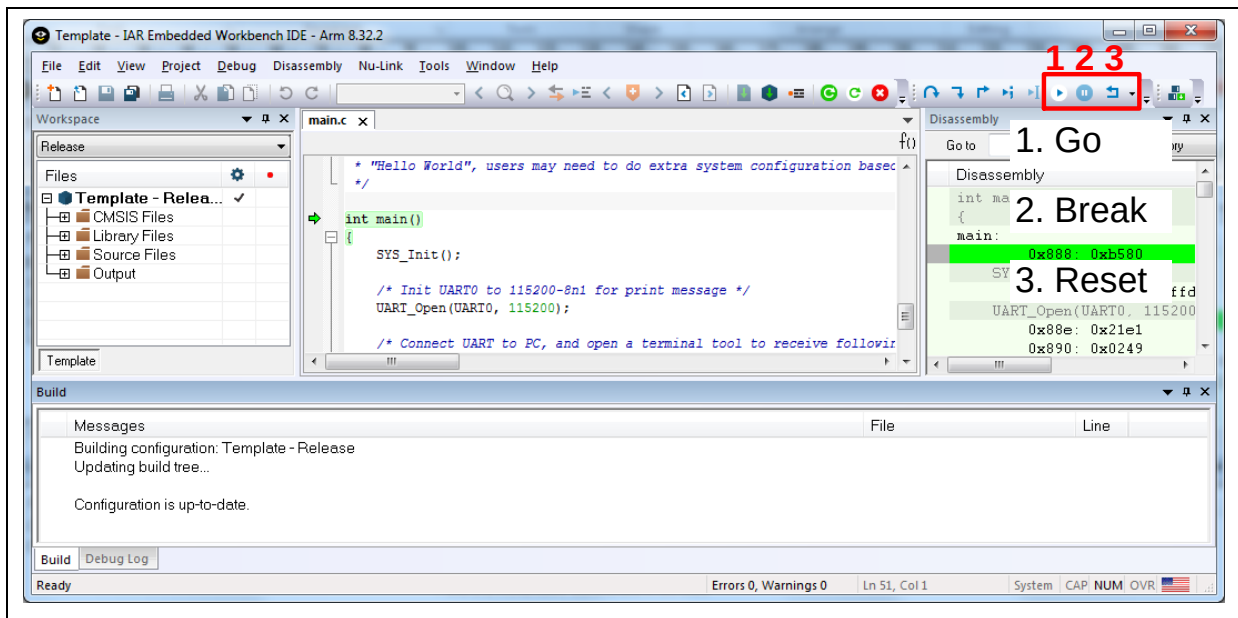


Figure 3-17 IAR EWARM Debug Mode

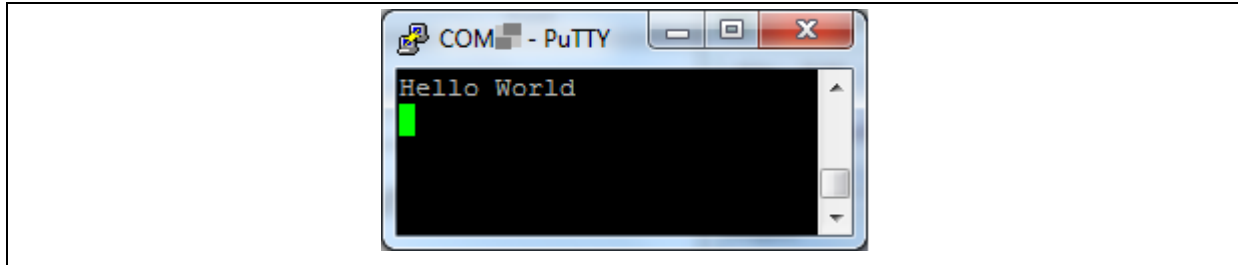
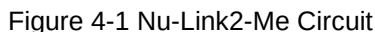


Figure 3-18 Debug Message on Serial Port Terminal Windows

3.6.3 NuEclipse

For more information about how to use NuEclipse, please refer to the NuEclipse User Manual.

4.1 Nu-Link2-Me



4.2 M433 platform

Figure 4-2 shows the M433 platform circuit.

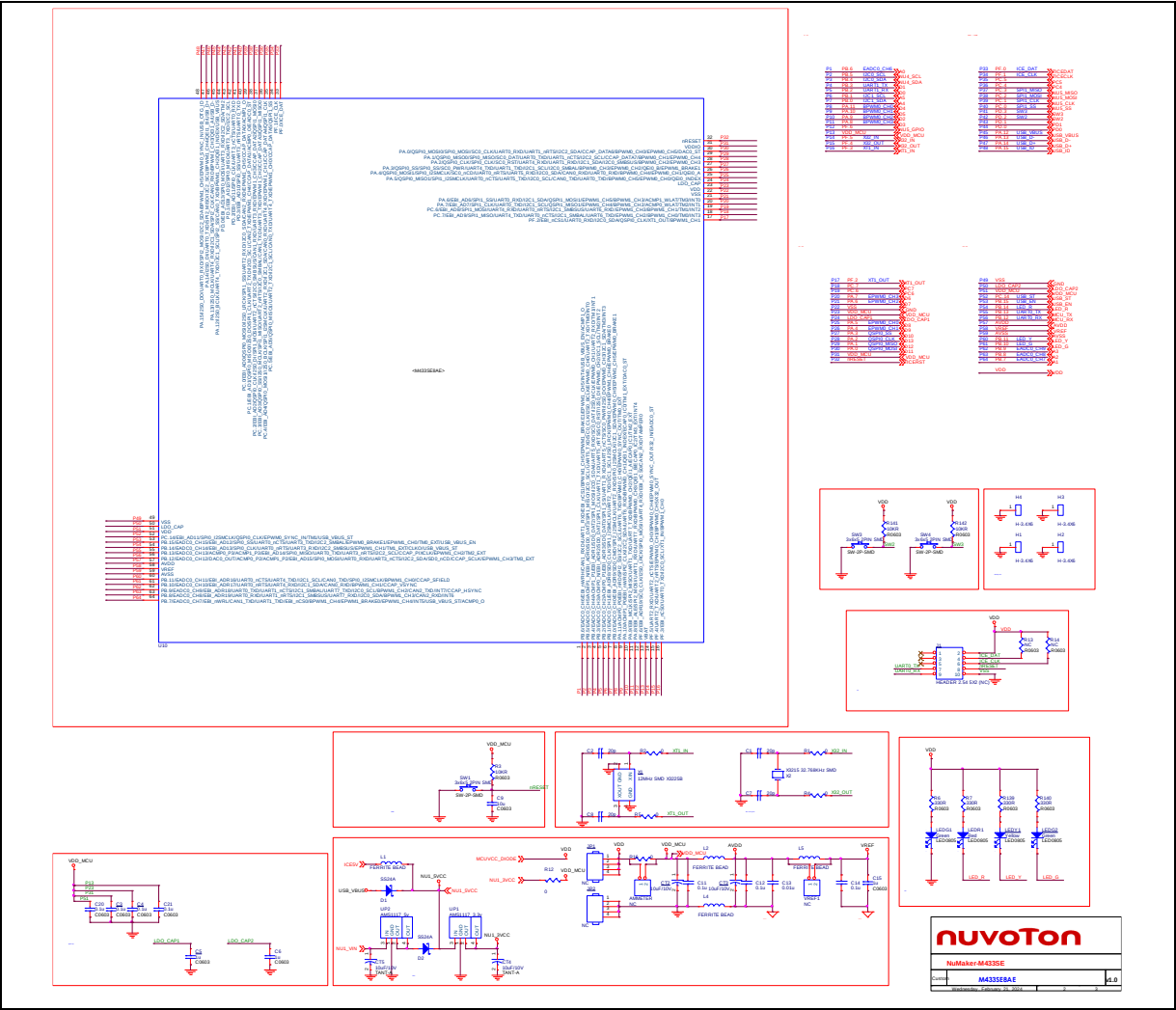


Figure 4-2 M433 platform Circuit

4.3 Extension Connector

Figure 4-3 shows extension connectors of NuMaker-M433SE.

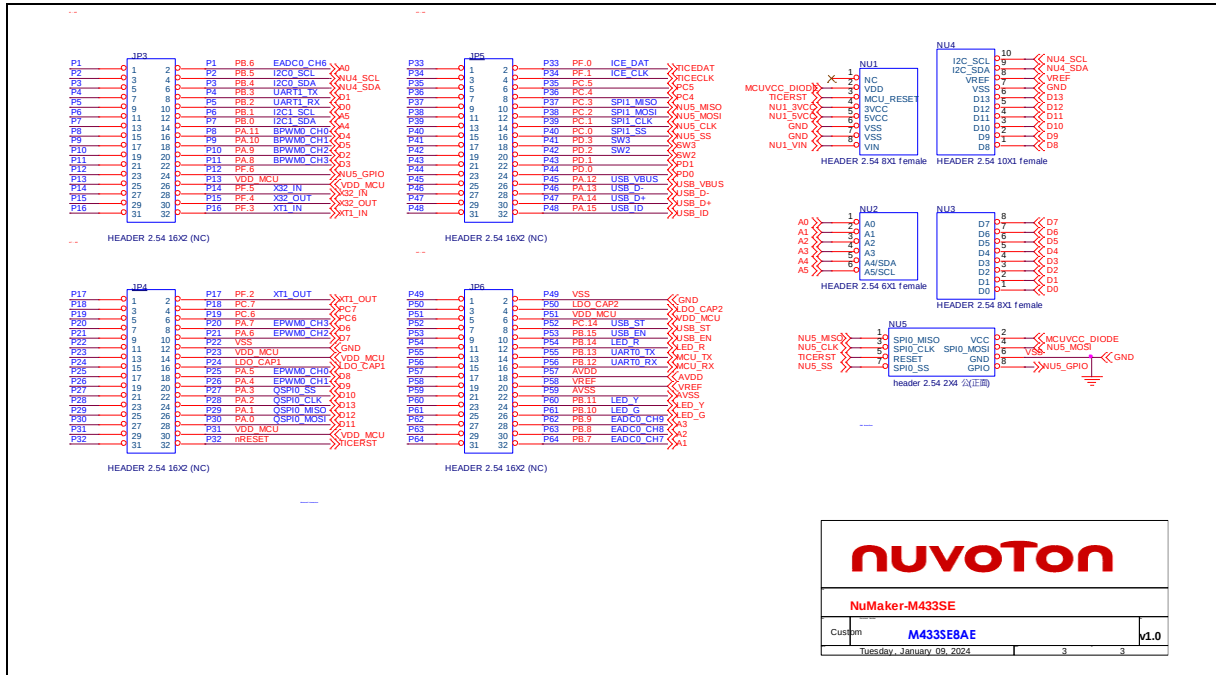


Figure 4-3 Extension Connectors Circuit

4.4 Advance Connector

Figure 4-3 shows advance connectors of NuMaker-M433SE.

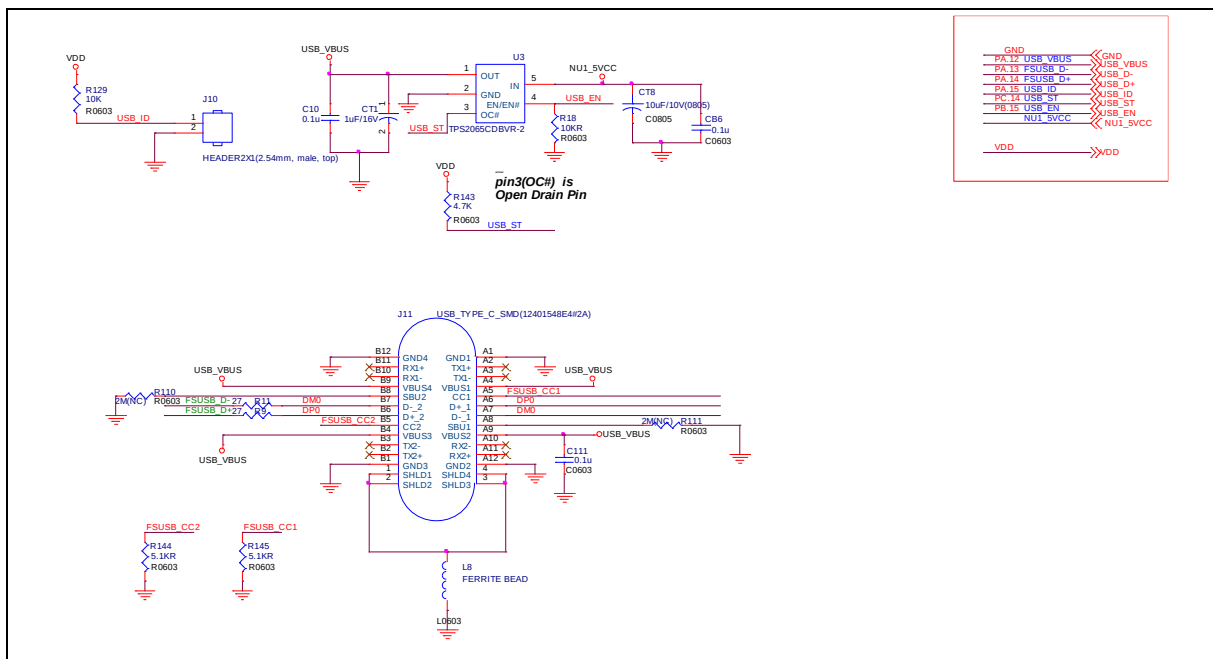


Figure 4-4 Advance Connectors Circuit

5 REVISION HISTORY

Date	Revision	Description
2024.02.06	1.00	● 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.

All Insecure Usage shall be made at customer's risk, and in the event that third parties lay claims to Nuvoton as a result of customer's Insecure Usage, customer shall indemnify the damages and liabilities thus incurred by Nuvoton.

*Please note that all data and specifications are subject to change without notice.
All the trademarks of products and companies mentioned in this datasheet belong to their respective owners.*

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Nuvoton:](#)

[NK-M433SE](#)