NuMicro® Family

Based on Arm9™

NuMaker-LoRaG915-NUC980
NuMaker-LoRaG868-NUC980
User Manual

Evaluation Board for LoRa Ecosystem Gateway Design

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

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1 OVERVIEW

The NuMaker-LoRaG915/LoRaG868-NUC980 is an evaluation board for LoRa ecosystem gateway design based on NuMicro NUC980 series microprocessor. The NuMaker-LoRaG915/LoRaG868-NUC980 is designed for project evaluation, prototype development and function validation for LoRa gateway application.

The NuMaker-LoRaG915/LoRaG868-NUC980 evaluation board is used for 915 MHz and 868 MHz frequency band, respectively. Depending on the used frequency band, the NuMaker-LoRaG915/LoRaG868-NUC980 evaluation board can be combined with the NuMaker-LoRaG-NUC980 evaluation board, as shown in Figure 1-2.

The NuMaker-LoRaG915/LoRaG868-NUC980 is based on NUC98061DKY. For the development flexibility, the NuMaker-LoRaG915/LoRaG868-NUC980 provides the extension connectors of NUC98061DKY, LoRa module, one RJ45 Ethernet port, one USB Host, one USB Device/Host, two sets of RS485, and the capability of adopting multiple power supplies.

The NuMaker-LoRaG915/LoRaG868-NUC980 supports Nuvoton's development tool "NuWriter" for programming and virtual COM (VCOM) port for printing debug messages on PC.

In addition to Lora gateway, Nuvoton Lora ecosystem also has Lora end-devices. Please refer to NuMaker-LoRaD-M252 User Manual for more information.
For the Lora gateway and Lora device software setup manual, please refer to Constructing LoRaWAN Network User Manual for more information.

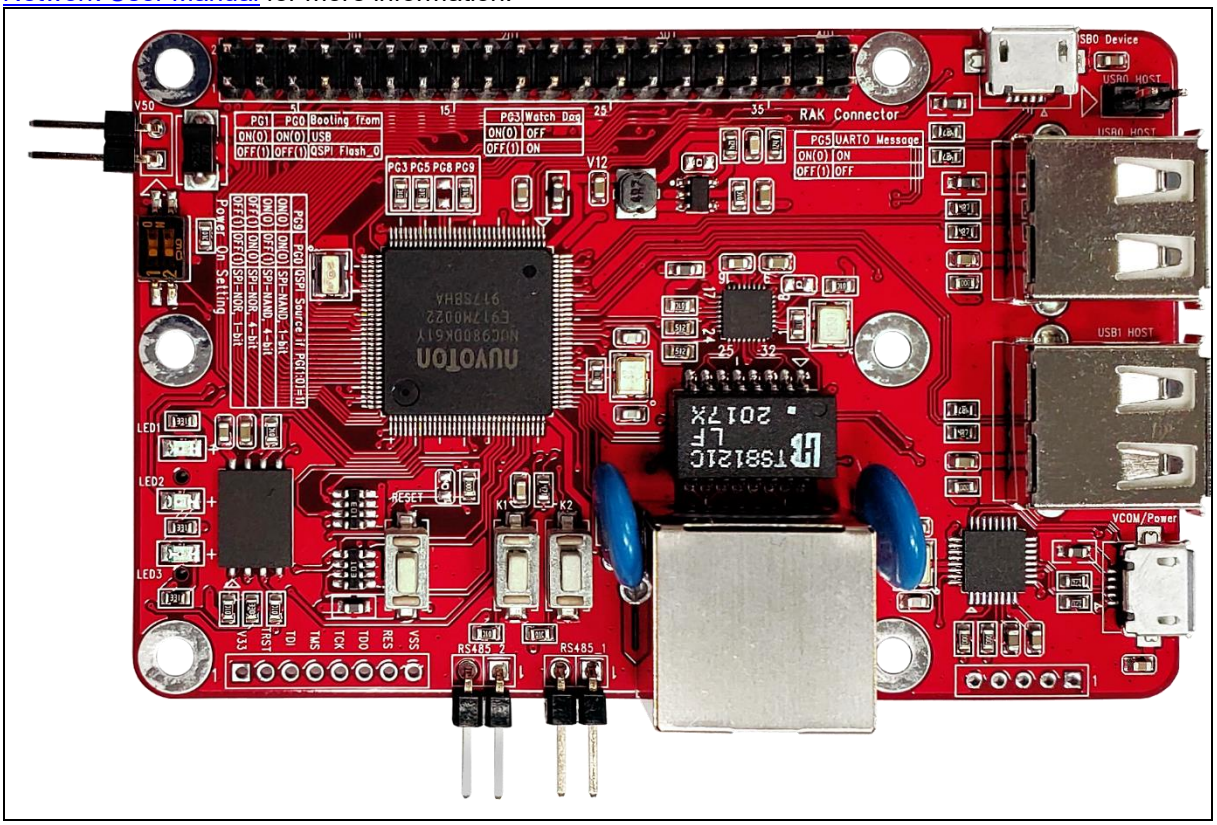


Figure 1-1 NuMaker-LoRaG-NUC980 Evaluation Board (Main Board)

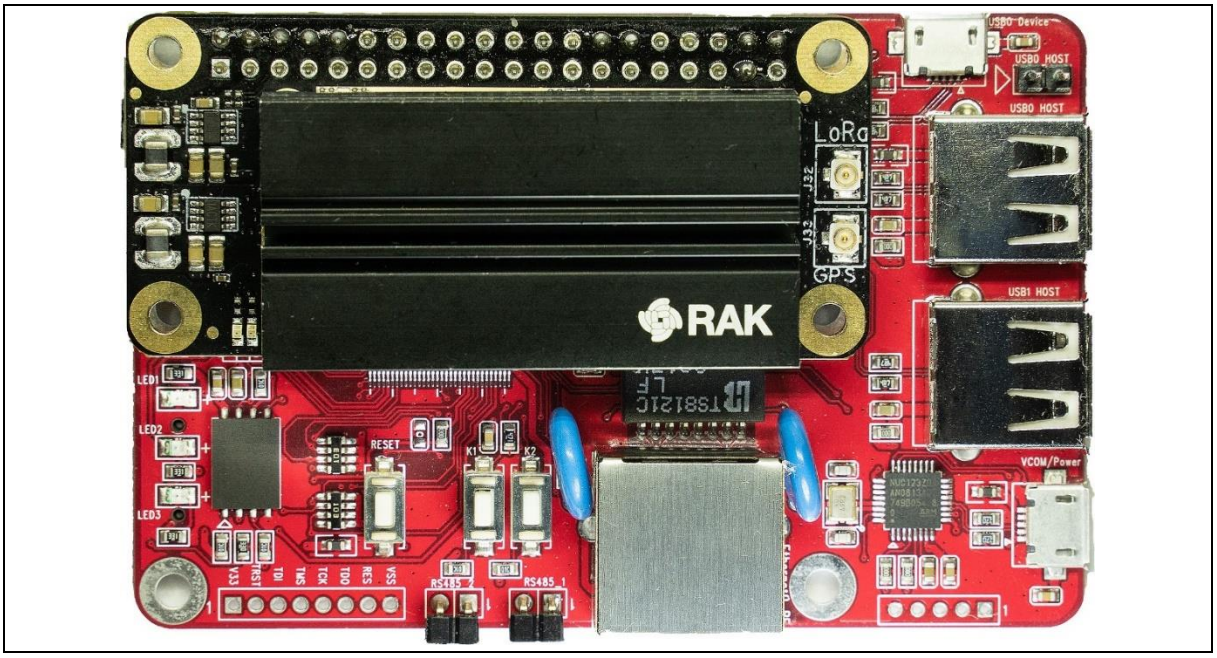


Figure 1-2 NuMaker-LoRaG915-NUC980 Evaluation Board
with NuMaker-LoRaG868-NUC980 Evaluation Board (Extension Board)

2 FEATURES

- Microprocessor: NUC980DK61Y with LQFP128 pin MCP package and DDR2 (64 MB), which can run up to 300 MHz
- SPI Flash: Quad mode system booting or data storage, using W25N01GVZE1G SPI-NAND (128 MB)
- SD1/eMMC1: Use SD/eMMC memory card for system booting, data storage or SDIO (Wi-Fi) device
- UART0: Connected to Virtual COM port for system development, debug message output
- JTAG interface provided for software development
- RAK and peripheral connector, including UART, SPI, I2C and RAK sensor interface
- RJ45 port (Ethernet0) connector
- UART1-RS485 header with transceiver controller interface
- UART2-RS485 header with transceiver controller interface
- 3 sets of LEDs for status indication
- 2 sets of user-configurable push button keys
- 1 set of system-reset push button key
- USB port-0 that can be used as Device/Host and USB port-1 that can be used as Host, supports pen drives, keyboards, mouse and printers
- 3.3V I/O power, 1.8V Memory power and 1.2V core power

3 HARDWARE CONFIGURATION

3.1 Front View

Figure 3-1 shows the main components from the front view of NuMaker-LoRaG-NUC980 board.

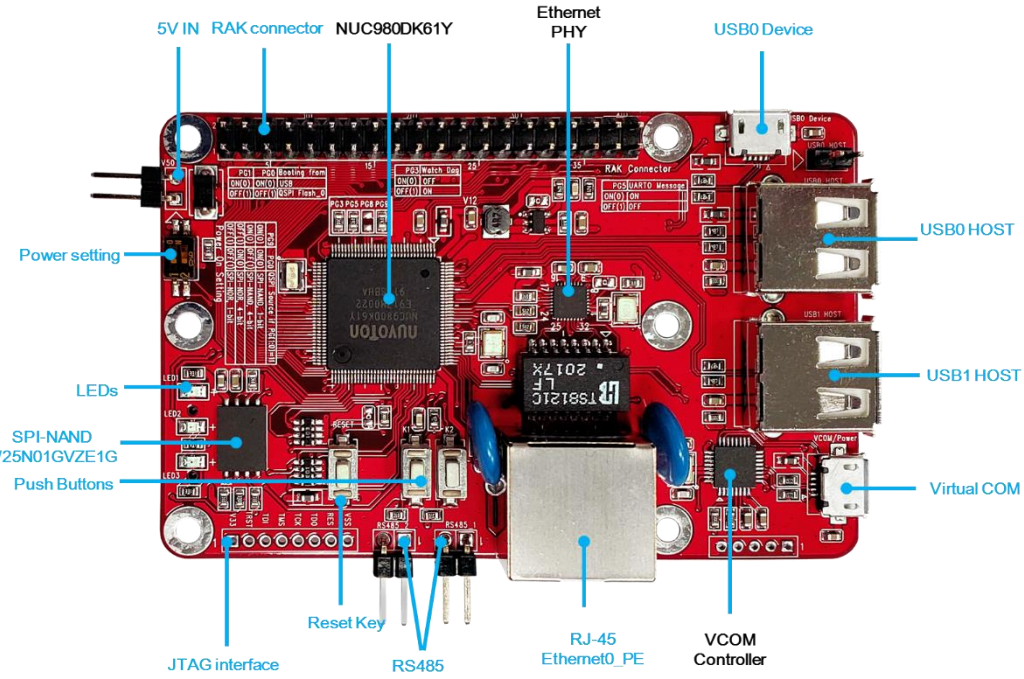


Figure 3-1 Front View of NuMaker-LoRaG-NUC980

- +5V In (J1): Power 5V input

Power Model	CON1 USB Port (Micro-B)	CON6 USB Port (Micro-B)	J1
Model 1	Connect to PC	-	-
Model 2	-	Connect to PC	-
Model 3	-	-	5V Input

- System Reset (SW4): System will be reset if the SW4 button is pressed.
- Virtual COM (CON1, U5): NUC123ZD4AN0 microcontroller (U5), USB micro-B connector (CON1) to PC, for debug message output.
- User indication LEDs (LED1, LED2):

LED	Color	GPIO pin of NUC980
LED1	Yellow	PB8
LED2	Green	PA6
LED3	Red	PB13

- SPI NAND Flash (U6): Use Winbond W25N01GVZE1G 128MB (U6) for system booting, supporting dual / quad mode.
- JTAG interface (J1/NC)

Connector	GPIO pin of NUC980	Function
J1.1	-	V_{DD33}
J1.2	PG15	nTRST
J1.3	PG14	TDI

J1.4	PG13	TMS
J1.5	PG12	TCK
J1.6	PG11	TDO
J1.7	-	nRESET
J1.8	-	V_{SS}

- RAK and peripheral connector (CON3)

Connector	GPIO pin of NUN980	Function
CON3.1	-	V_{DD33}
CON3.2	-	VIN
CON3.3	PD15	I2C3_SDA
CON3.4	-	VIN
CON3.5	PD14	I2C3_SCL
CON3.6	-	V_{SS}
CON3.7	-	V_{DD18}
CON3.8	PD12	UART4_TXD
CON3.9	-	V_{SS}
CON3.10	PD13	UART4_RXD
CON3.11	PC0	SX1308_RESET
CON3.12	PC8	S0_D0
CON3.13	PF3	S0_CLK
CON3.14	-	V_{SS}
CON3.15	PC4	S0_PCLK
CON3.16	PC9	S0_D1
CON3.17	PC5	S0_HSYNC
CON3.18	PC10	S0_D2
CON3.19	PD10	SPI0_DO
CON3.20	-	V_{SS}
CON3.21	PD11	SPI0_DI
CON3.22	PC11	S0_D3
CON3.23	PD9	SPI0_CLK
CON3.24	PD8	SPI0_SS0
CON3.25	-	V_{SS}
CON3.26	PC12	S0_D4
CON3.27	PB7	I2C2_SDA
CON3.28	PB5	I2C2_SCL
CON3.29	PC6	S0_VSYNC
CON3.30	-	V_{SS}
CON3.31	PC7	S0_FIELD
CON3.32	PC13	S0_D5
CON3.33	PC1	GPS_RESET
CON3.34	-	V_{SS}
CON3.35	PC2	GPS_STANDBY
CON3.36	PC14	S0_D6
CON3.37	PA0	S0_I2C0_SDA

CON3.38	PC15	S0_D7
CON3.39	-	V_{SS}
CON3.40	PA1	S0_I2C0_SCL

- Ethernet0_PE (CON2, U7): For Ethernet port, the NUC980 supports RMII interface that adds one Ethernet PHY IP101GR to RJ45 connector with LED indicator
- USB0 Device/Host (CON6, JP3): USB0 Device/Host Micro-B connector, By JP3 status or defined by the ID pin of the USB cable
- USB1 Host (CON7): USB1 for USB Host with type-A connector
- User Key SWs (K1 and K2)

Key	GPIO pin of NUC980
K1	PE10
K2	PE12

- Power on setting (SW1, R17~R20)

Switch	Status	Function	GPIO pin of NUC980
SW1.2/SW1.1	ON/ON	Boot from USB	PG1/PG0
SW1.2/SW1.1	ON/OFF	Boot from SD/eMMC	PG1/PG0
SW1.2/SW1.1	OFF/ ON	Boot from NAND Flash	PG1/PG0
SW1.2/SW1.1	OFF/OFF	Boot from QSPI0 Flash	PG1/PG0

Resistance	Status	Function	GPIO pin of NUC980
R17	Solder R	Watchdog Timer OFF	PG3
R17	Remove	Watchdog Timer ON	PG3

Resistance	Status	Function	GPIO pin of NUC980
R18	Solder R	UART0 debug message ON	PG5
R18	Remove	UART0 debug message OFF	PG5

Resistance	Status	Function	GPIO pin of NUC980
R20/R19	Solder R/ Solder R	SPI-NAND Flash boot with 1-bit mode	PG9/PG8
R20/R19	Solder R/ Remove	SPI-NAND Flash boot with 4-bit mode	PG9/PG8
R20/R19	Remove/ Solder R	SPI-NOR Flash boot with 4-bit mode	PG9/PG8
R20/R19	Remove/ Remove	SPI-NOR Flash boot with 1-bit mode	PG9/PG8

- SOC CPU: NUC980DK61Y (U4)

3.2 Rear View

Figure 3-2 shows the main components from the rear view of NuMaker-LoRaG-NUC980 board.

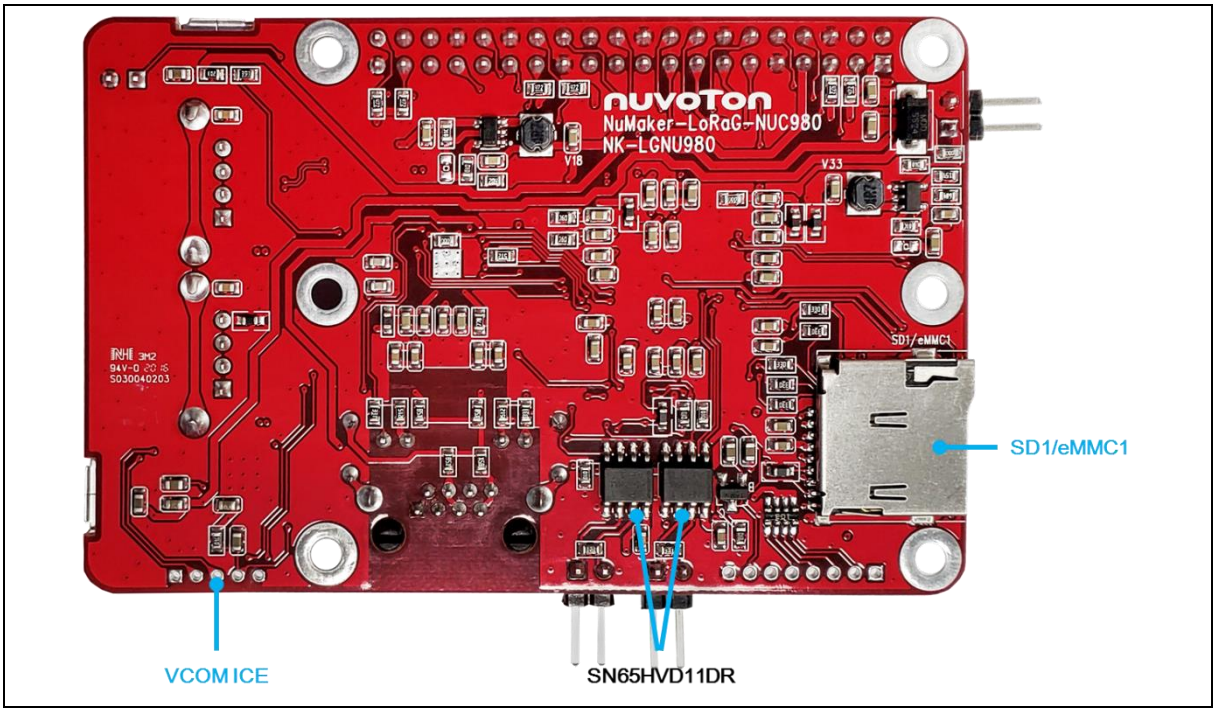


Figure 3-2 Rear View of NuMaker-LoRaG-NUC980

- VCOM ICE interface: ICE Controller NUC123ZD4AN0 (U5), USB connector (CON1) to PC Host

Connector	Pin Name	Functions
CON1.1	V_{DD33}	DC 3.3V
CON1.2	ICE_DAT	Serial Wired Debugger Data
CON1.3	ICE_CLK	Serial Wired Debugger Clock
CON1.4	RST#	VCOM Chip Reset, Active Low.
CON1.5	V_{SS}	Power Ground

- RS485 (JP1, U9): SN65HVD11DR transceiver controller of RS485(U9), RS485 header(JP1) connect to device for communication
- RS485 (JP2, U10): SN65HVD11DR transceiver controller of RS485(U10), RS485 header(JP2) connect to device for communication
- MicroSD Card Slot: T-Flash slot (CON4)

4 QUICK START

4.1 Preparation

The PC must install the relevant drivers to be able to communicate with the NuMaker-LoRaG915/LoRaG868-NUC980. The following sections will introduce the installation steps and how to run the platform.

4.2 NUC980 Linux BSP Introduction

The NUC980 Linux BSP provides cross compilation tools based on Linux operating system. The BSP has been tested in different x86 Linux distributions, including Ubuntu, CentOS, Debian, etc. Because there are so many distributions out there with different system configuration, it is sometimes necessary to change system setting or manually install some missing component in order to cross compile.
Linux development environment could either be native, or install in a virtual machine executed on top of other operating system.
For more details about NUC980 BSP, please refer to "*NUC980 Linux 4.4 BSP User Manual*" in the "Documents" directory.

4.3 BSP Download

The programming tool requires a NuWriter driver to be installed on PC first. Please visit Nuvoton official website to download the "NUC980_Linux-4.4_BSP".

4.4 Driver Installation

The programming tool requires a Nuvoton USB driver to be installed on PC first. Please follow the steps below to install the WinUSB driver.
Run the "WinUSB4NuVCOM.exe" before the USB cable is plugged in. The "WinUSB4NuVCOM.exe" can be found in the "Tool" directory. Power on the NUC980 Series MPU evaluation board (EVB) and plug the USB cable into PC, and the Windows shall find a new device and request to install the driver.

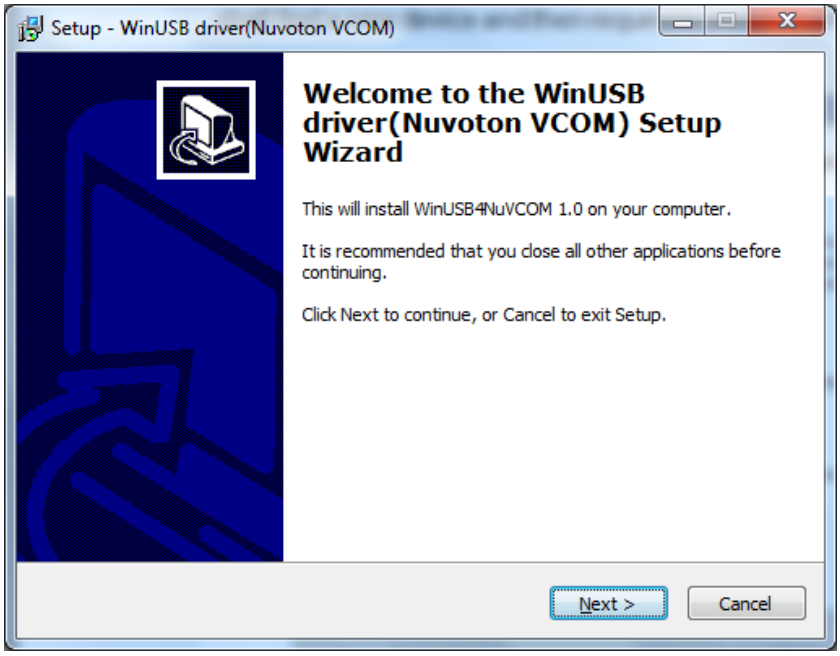
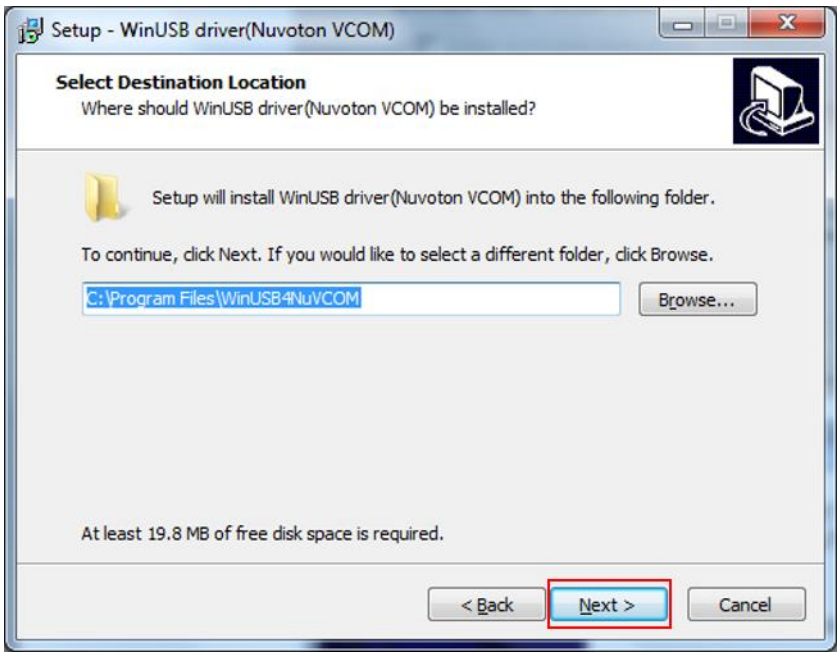
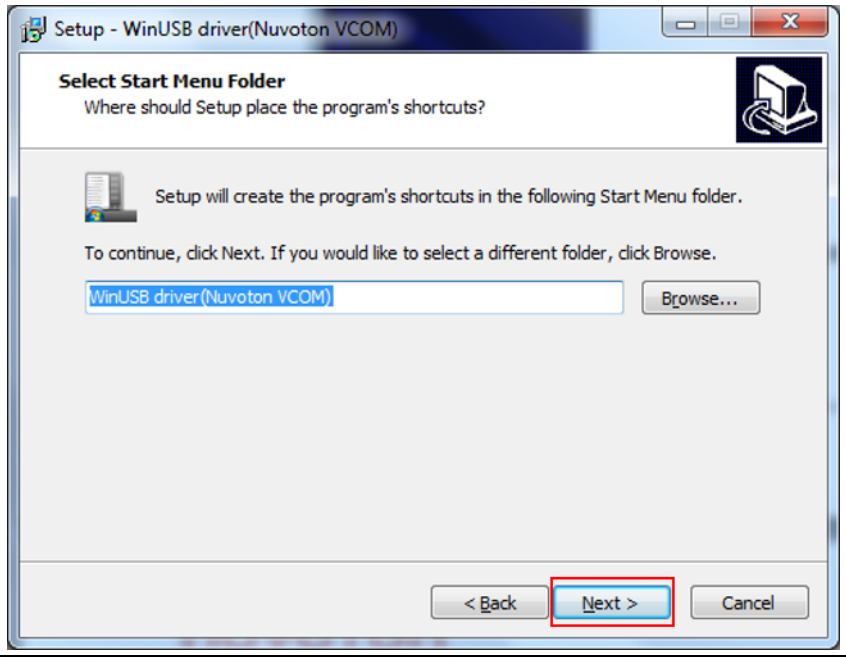


Figure 4-1 Nuvoton USB Driver Installation Setup

Click "**Next**". The WinUSB driver Setup Wizard will be started.


Setup - WinUSB driver(Nuvoton VCOM)
Select Destination Location
Where should WinUSB driver(Nuvoton VCOM) be installed?
Setup will install WinUSB driver(Nuvoton VCOM) into the following folder.
To continue, click Next. If you would like to select a different folder, click Browse.
C:\Program Files\WinUSB4NuVCOM
Browse...
At least 19.8 MB of free disk space is required.
< Back
Next >
Cancel


Setup - WinUSB driver(Nuvoton VCOM)
Select Start Menu Folder
Where should Setup place the program's shortcuts?
Setup will create the program's shortcuts in the following Start Menu folder.
To continue, click Next. If you would like to select a different folder, click Browse.
WinUSB driver(Nuvoton VCOM)
Browse...
< Back
Next >
Cancel

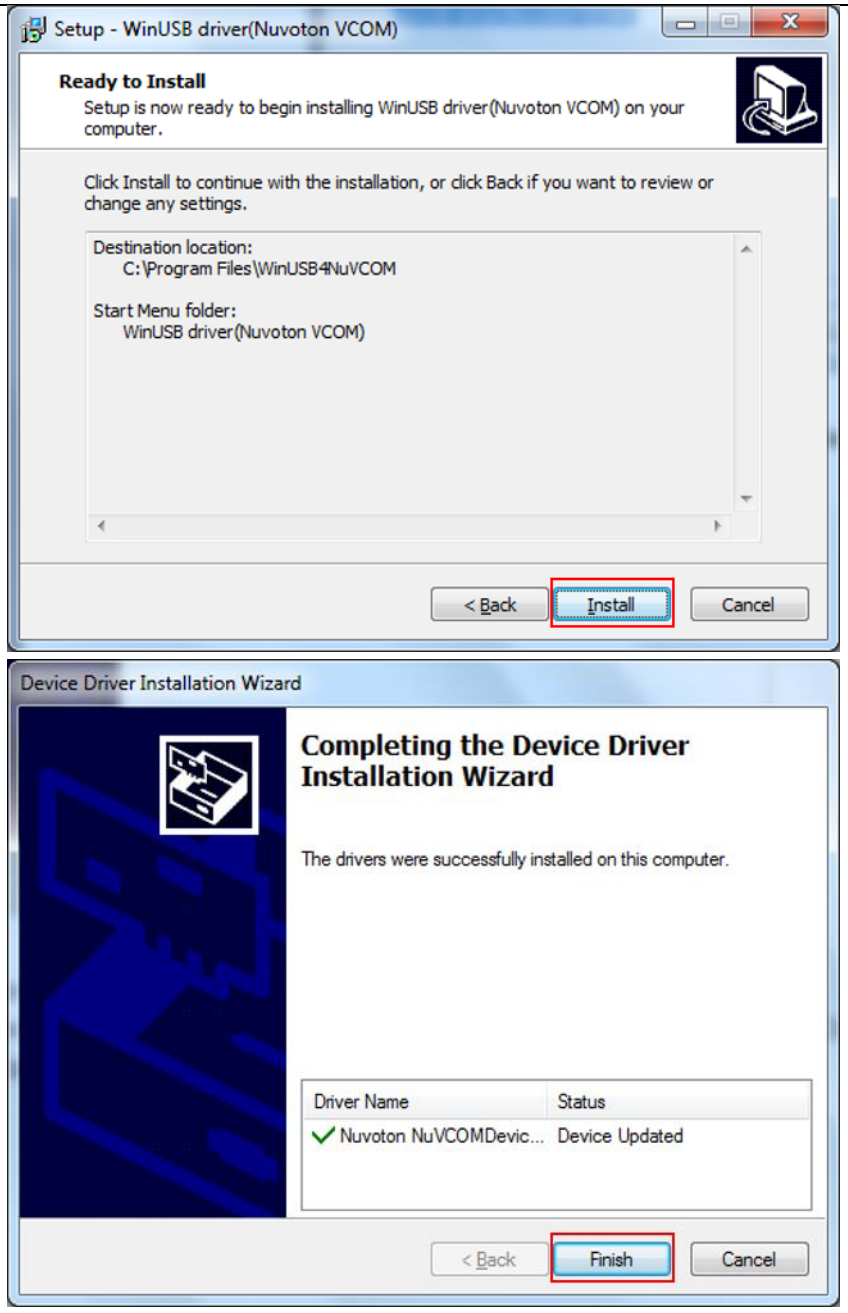


Figure 4-2 Nuvoton USB Driver Installation

The USB serial port function is used to print some messages on PC API, such as SecureCRT, through the standard UART protocol for debugging program.
Please download USB CDC driver from Nuvoton official website and executing the "NuvotonCDC_V1.00.001_Setup.exe" to install the driver:

4.5 Hardware Setting

The PC Host will supply 5V power to the NuMaker-LoRaG-NUC980 and will recognize the board as a USB composite device.
The VCOM port function is used to print some messages on some Terminal Tools, such as Tera Term, and PuTTY. The VCOM port function is based on the standard UART protocol and used as a

debugging function.

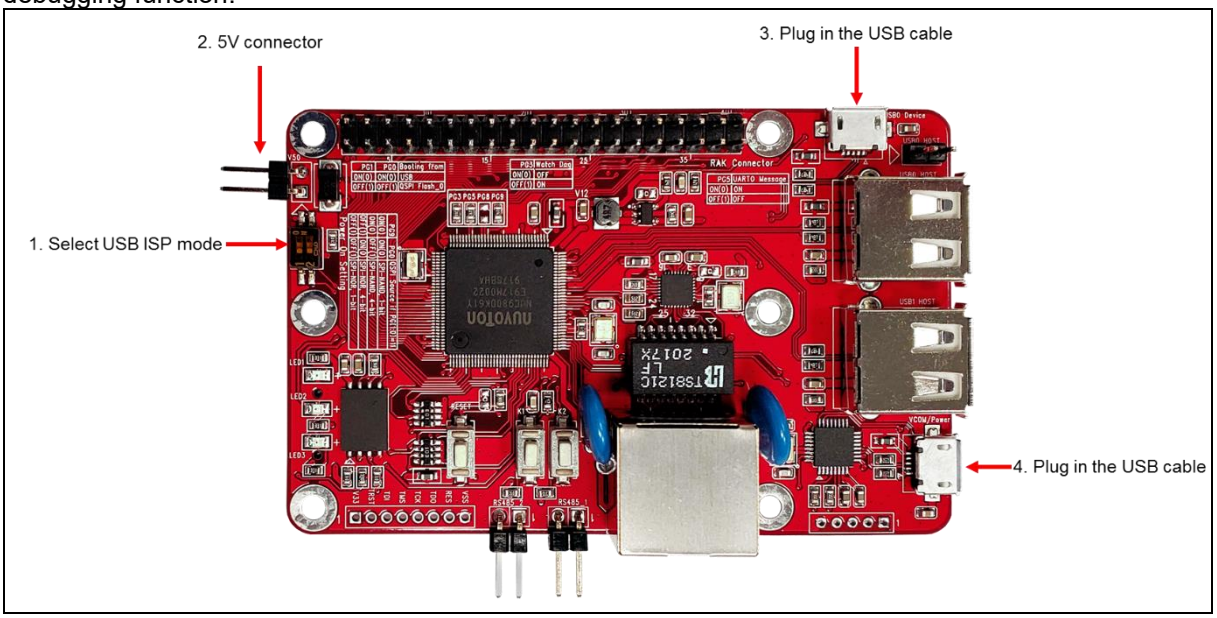


Figure 4-3 Hardware Setting (1)

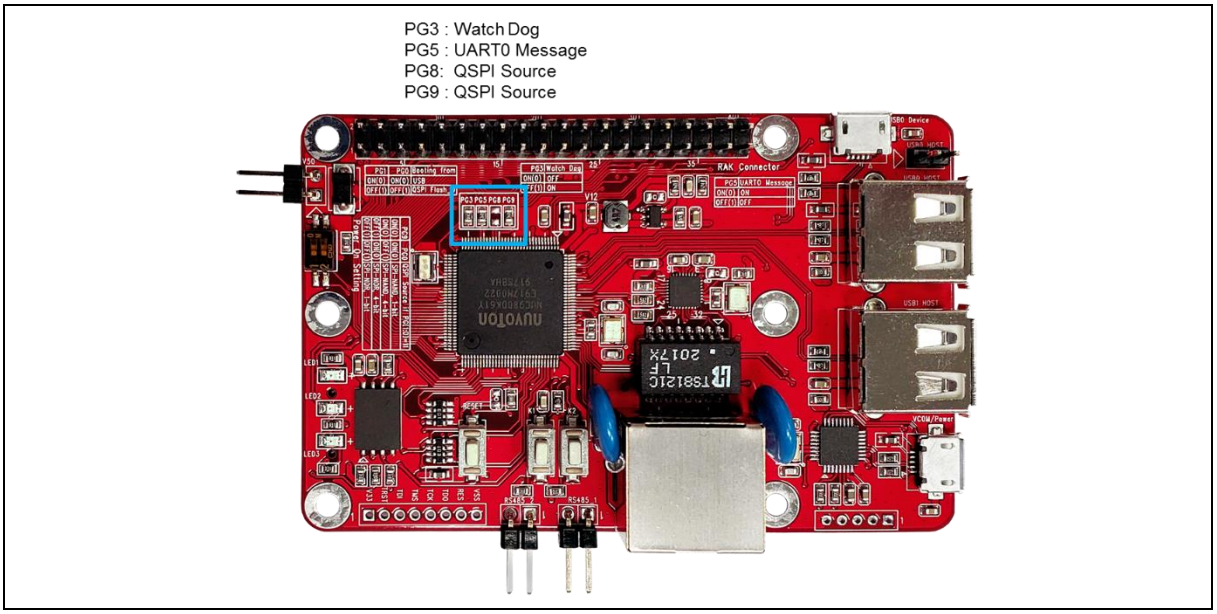


Figure 4-4 Hardware Setting (2)

To check all required drivers are installed successfully, please follow the steps below:

1. Select USB ISP mode and enable the UART_0 message.
   NuMaker-LoRaG-NUC980 provides jumpers (SW1) to select boot-up conditions. The jumpers (SW1) ON is used to select USB ISP mode.

Switch	Status	Function	GPIO pin of NUC980
SW1.2/SW1.1	ON/ON	Boot from USB	PG1/PG0
SW1.2/SW1.1	ON/OFF	Boot from SD/eMMC	PG1/PG0
SW1.2/SW1.1	OFF/ ON	Boot from NAND Flash	PG1/PG0
SW1.2/SW1.1	OFF/OFF	Boot from QSPI0 Flash	PG1/PG0

The NuMaker-LoRaG-NUC980 evaluation board defaults to enable the UART_0 message. If you

need to disable the NuMaker-LoRaG-NUC980 evaluation board UART_0 message, you must remove the resistor R25.

Switch	Status	Function	GPIO pin of NUC980
R24	ON/OFF	Watch Dog	PG3
R25	ON/OFF	UART0 Message	PG5
R27/R26	ON/ON	SPI NAND, 1 bit	PG9/PG8
R27/R26	ON/OFF	SPI NAND, 4 bit	PG9/PG8
R27/R26	OFF/ ON	SPI NOR, 4 bit	PG9/PG8
R27/R26	OFF/OFF	SPI NOR, 1 bit	PG9/PG8

2. Provide 5V power through 5V input connector or USB cable.
3. Plug in the USB cable and check the connection status**.**
   If the installation in section 4.3 Driver Installation is successful, a virtual COM port named "**WinUSB driver (Nuvoton VCOM)**" can be found by using "Device Manager" to check the ports devices.

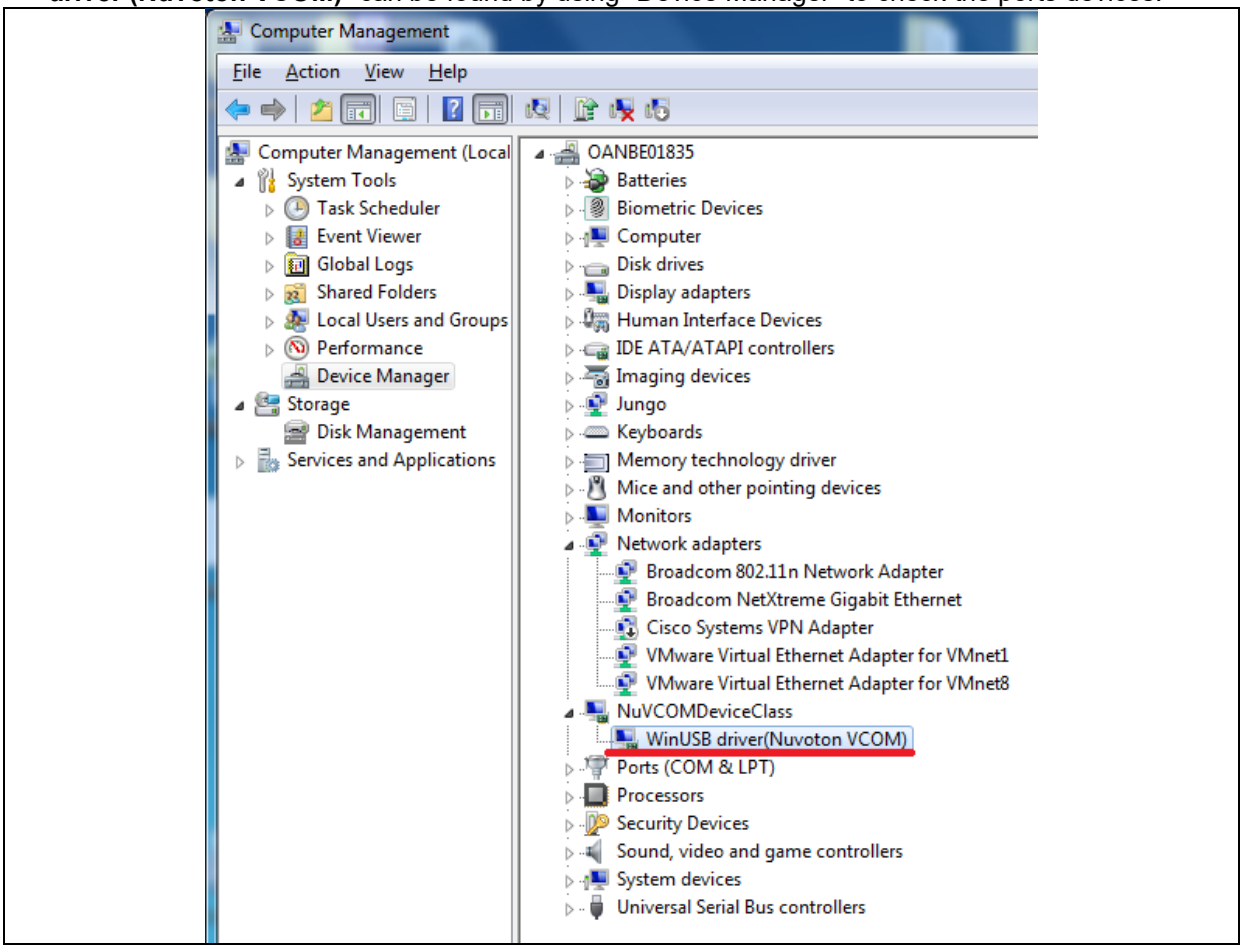
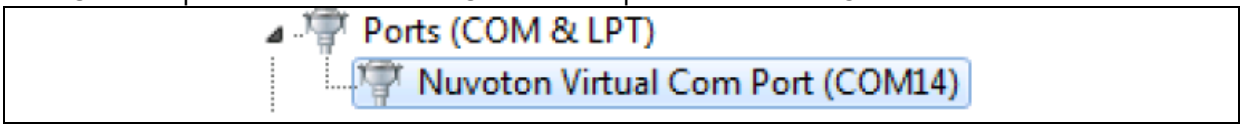
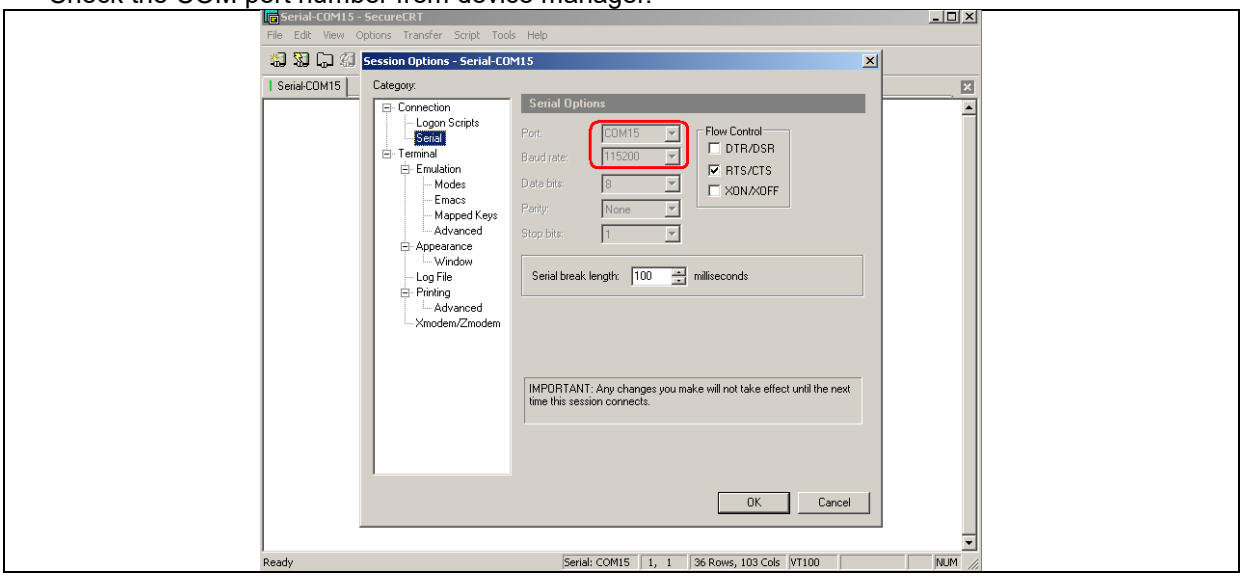


Figure 4-5 Nuvoton VCOM

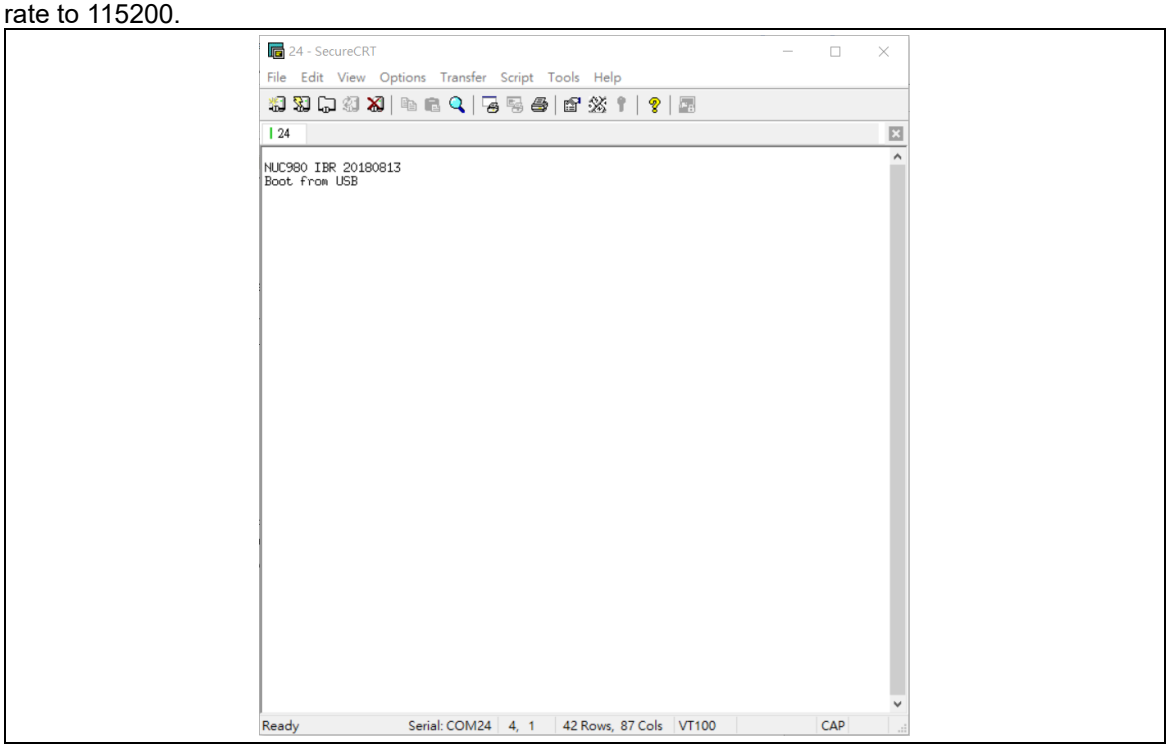
4. Plug in the USB cable
   The USB serial port function is used to print some messages on PC API, such as SecureCRT, through the standard UART protocol for debugging program.
   If the installation in section 4.3 Driver Installation is successful, the PC will recognize the board as a USB composite device when the USB micro-B port connect the PC host.



Check the COM port number from device manager.



Use SecureCRT, HyperTerminal, Putty or TeraTerm to open the serial COM port, and set the baud rate to 115200.

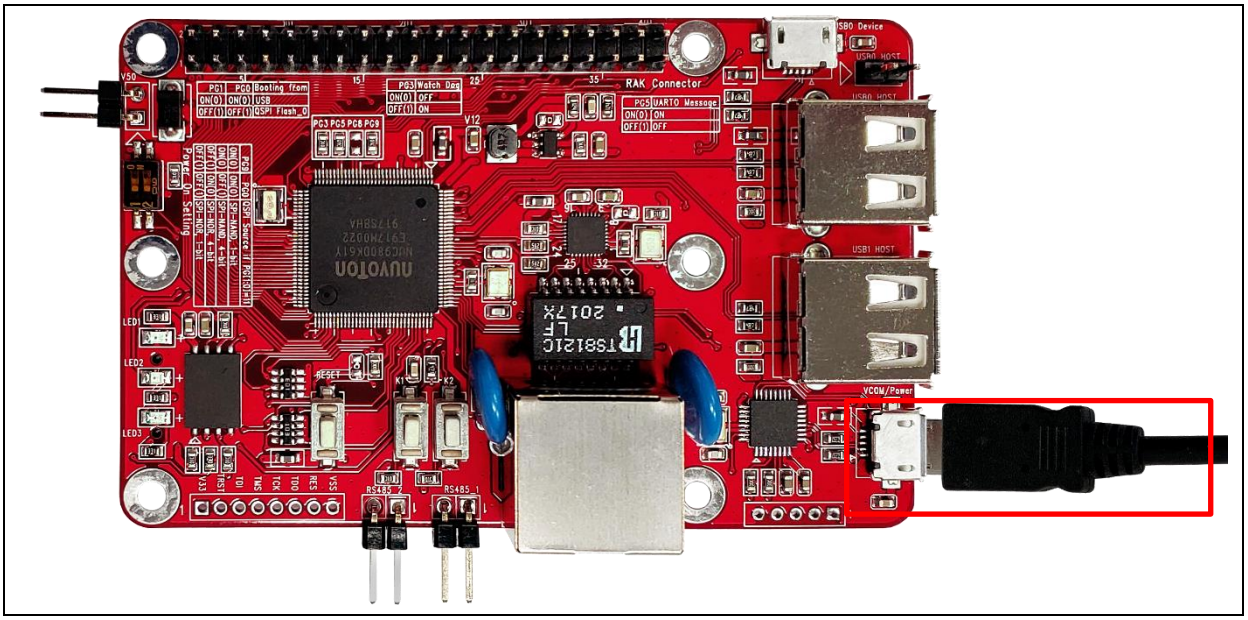


After pressing the reset button (SW1), the chip will reprogram application and print out debug message.

4.6 Run Default Linux Kernel

To run the Linux OS in EVB, please follow the steps below:

1. Set the board to boot from QSPI0 Flash by switching SW1.2/SW1.1 to OFF/OFF.
2. Plug in the USB cable to VCOM.



3. Press the RESET button, and the board will start the default Linux kernel.

4.7 Make Your Own Embedded Linux

VMWare Linux development environment:

- A packaged Linux platform to develop applications on NUC980/NUC970 series EVBs. It is integrated with relevant kits of NUC980/NUC970 development environment. It simplifies the installation process and speeds up development time.
- Links:
  NUC980/NUC970 Linux Environment on VMware User Manual
  NUC980/NUC970 Linux Environment on VMware

If it is your first time to use the NUC980/NUC970 Linux Environment on VMware, you must update the buildroot, kernel and uboot first (refer to section 2.4 in the *NUC980/NUC970 Linux Environment on VMware User Manual*) and choose the corresponding board configuration (refer to section 2.5 in the *NUC980/NUC970 Linux Environment on VMware User Manual*).

5 NUWRITER TOOL

The NuWriter can download images to SPI NAND Flash while the NUC980 is in USB ISP mode. This chapter shows how to use this tool to boot-up from SPI NAND Flash.
The NUC980 Series MPU EVB provides jumpers to select boot-up conditions. To select USB ISP mode, the statuses of SW1.1 and SW1.2 are ON. For other boot selection, refer to the following table:

Power-on setting	SW1.2	SW1.1
USB ISP	ON	ON
Boot from eMMC/SD	ON	OFF
Boot from NAND	OFF	ON
Boot from SPI	OFF	OFF

Table 5-1 Power-on Setting Table

To use NuWriter, please follow the steps below:

1. Power-on NUC980 Series MPU EVB.
2. Double-click "**NuWriter.exe**" on PC. NuWriter will start and a window appears. Select target chip to NUC980 series and select DDR parameter to DDR initial files. Note that the tool cannot work if the WinUSB4NuVCOM driver is not found.
3. Click "**Continue**" to use NuWriter tool.

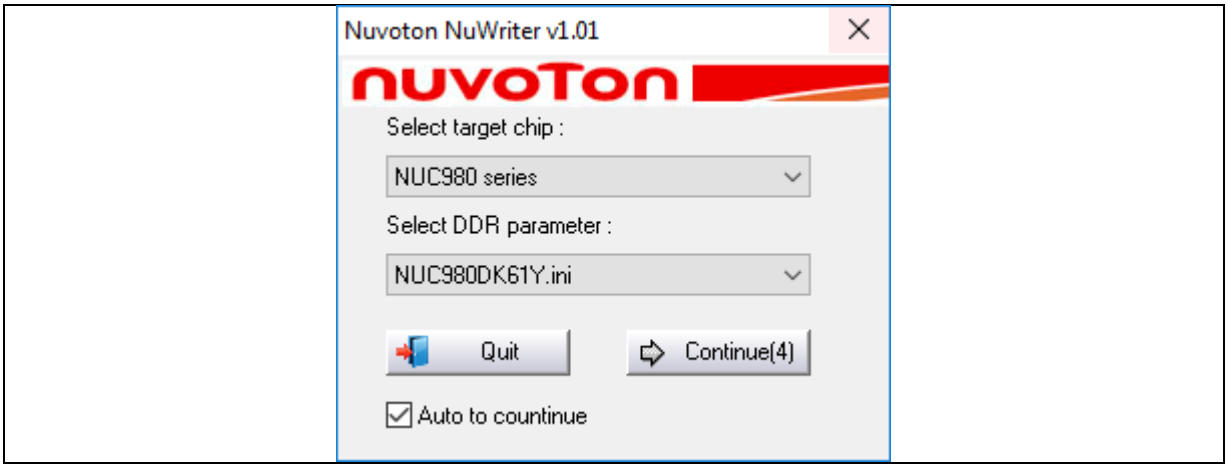


Figure 5-1 Set Chip

The NuWriter provides seven types of to be downloaded images including DDR/SRAM, SPI, NAND, eMMC/SD, SPI NAND, PACK and Mass Production. This chapter shows how to download images to SPI NAND Flash. If you want to choose others types to download images, please refer to "*NUC980 NuWriter User Manual*" in the "Documents" directory.

5.1 SPI NAND Mode

This mode can write a new image to SPI NAND Flash and specify the type of the image. The types can be recognized by uboot or Linux. The Image type is set as Loader, Data, Environment or Pack.

5.2 Operation Steps

According to Figure 5-2, follow the steps below to add image to SPI NAND Flash:

1. Select the "**SPI NAND**" type, which will not list the pre-burned images in the SPI NAND Flash ROM.
2. Fill in the image information:
   - **Image Name**: Browse the image file
   - **Image Type**: Select the image type (only one type can be selected)
   - **Image execute address**: Enter image execute address. Only is Loader Type is vaild.
   - **Image start offset**: Enter image start offset.
3. Click "**Program**".
4. Wait for progress bar to be finished.
5. After "Program" the image, click the "**Verify**" button to read back the image data to make sure the burning status.

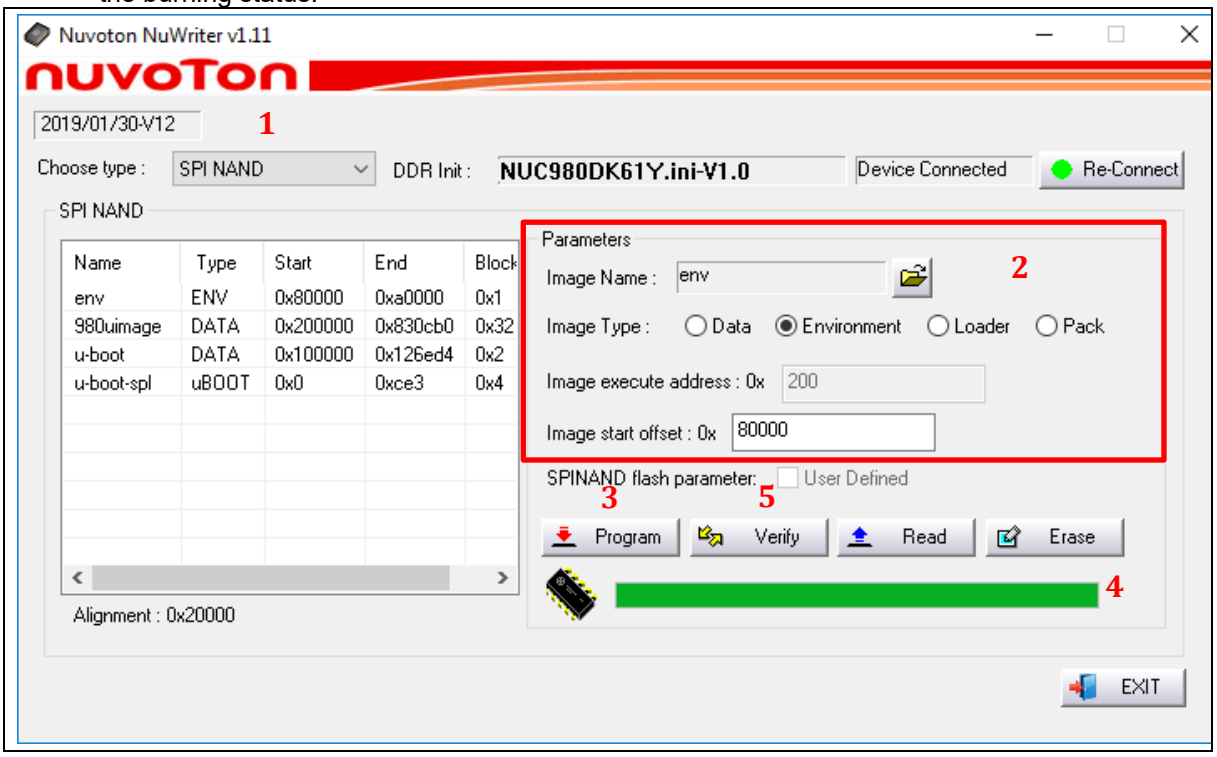


Figure 5-2 SPI NAND – New Image

SPI NAND – u-boot spl

For the Linux system, Loader Type is used to boot the Linux kernel. Compile NUC980 U-Boot to get Main U-Boot and SPL U-Boot. The SPL U-Boot is a small binary, which will move Main U-Boot into DDR execution. The SPL U-Boot is only for NAND/SPI NAND boot. The default link address of SPL U-Boot is 0x200. For the details of Loader Type format, please refer to "*NUC980 NuWriter User Manual*" in the "Documents" directory.

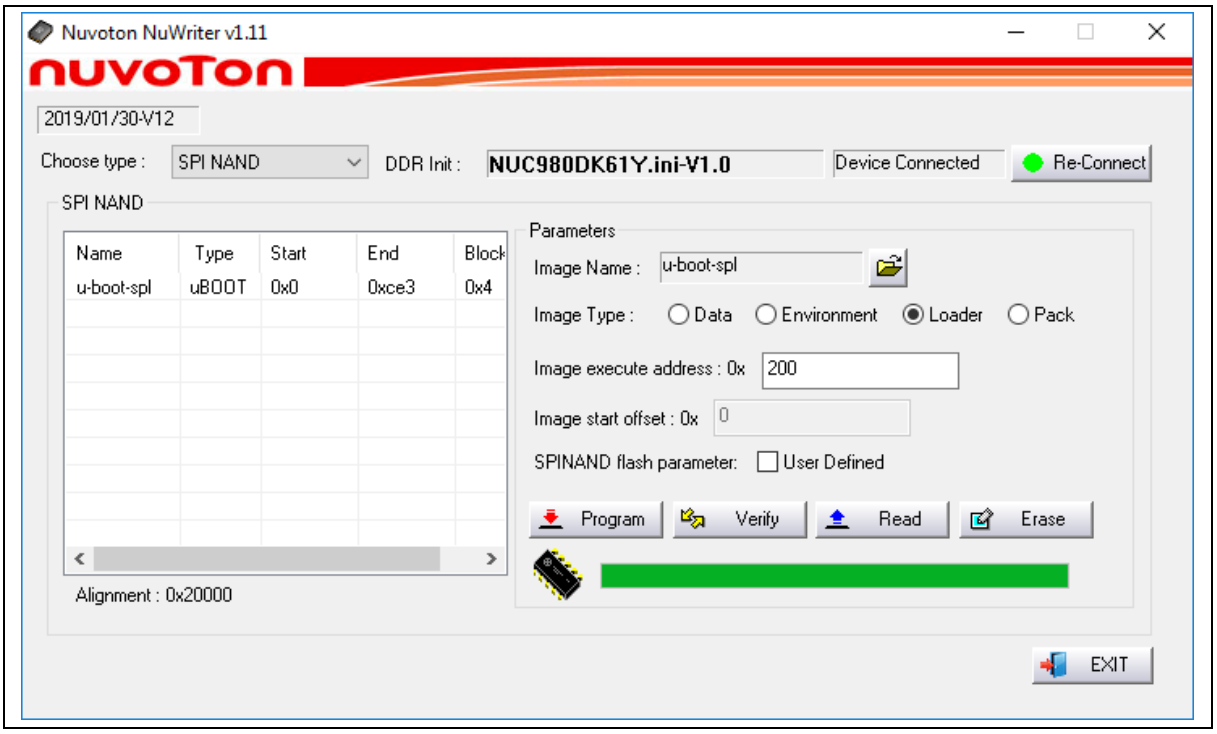


Figure 5-3 SPI NAND – u-boot spl

SPI NAND – u-boot

For the Linux system, Loader Type is used to boot the Linux kernel. Compile NUC980 U-Boot to get Main U-Boot and SPL U-Boot. The Main U-Boot is a fully featured version of U-Boot. In this case, the Main U-Boot needs to set the address at 0x100000 address.

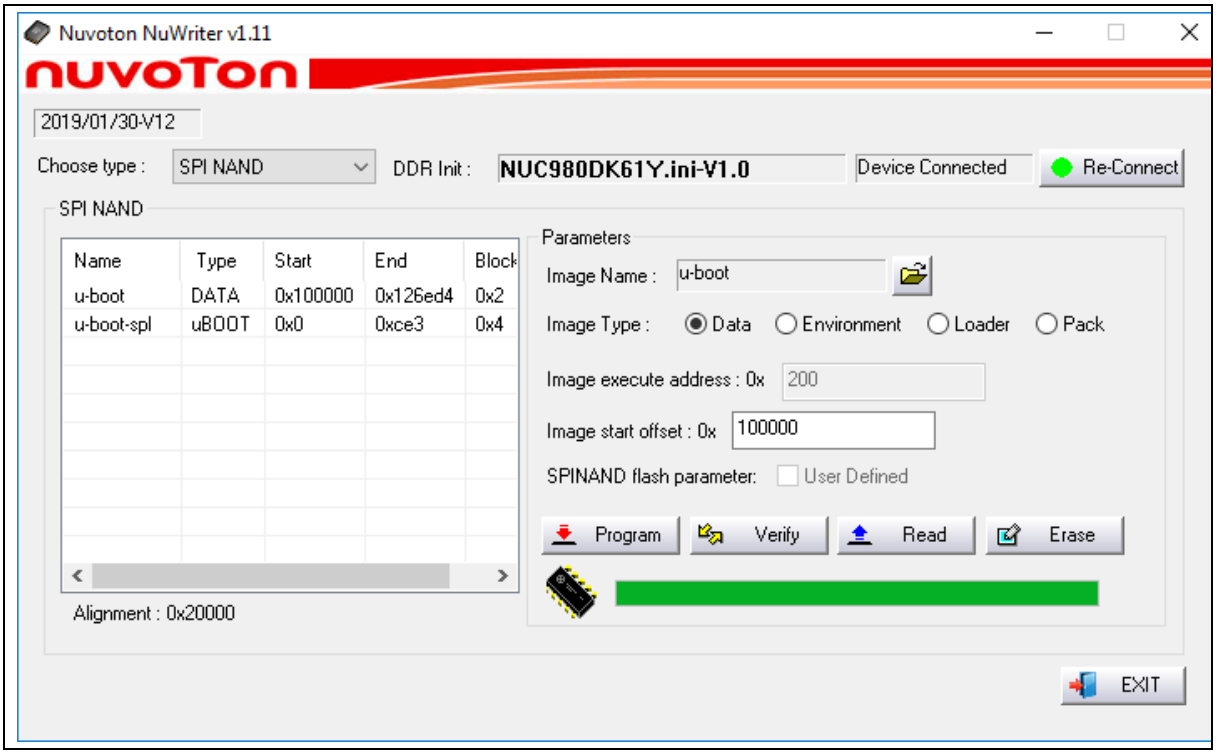


Figure 5-4 SPI NAND – u-boot

SPI NAND – 980uimage

Set the main image of data type into SPI NAND Flash in the specified address based on the value of image start offset (aligned on block size boundary, block size is based on SPI NAND specifications). If the image start offset is 0x200000, it means that the image of data is downloaded into SPI NAND Flash in the 0x200000 address.

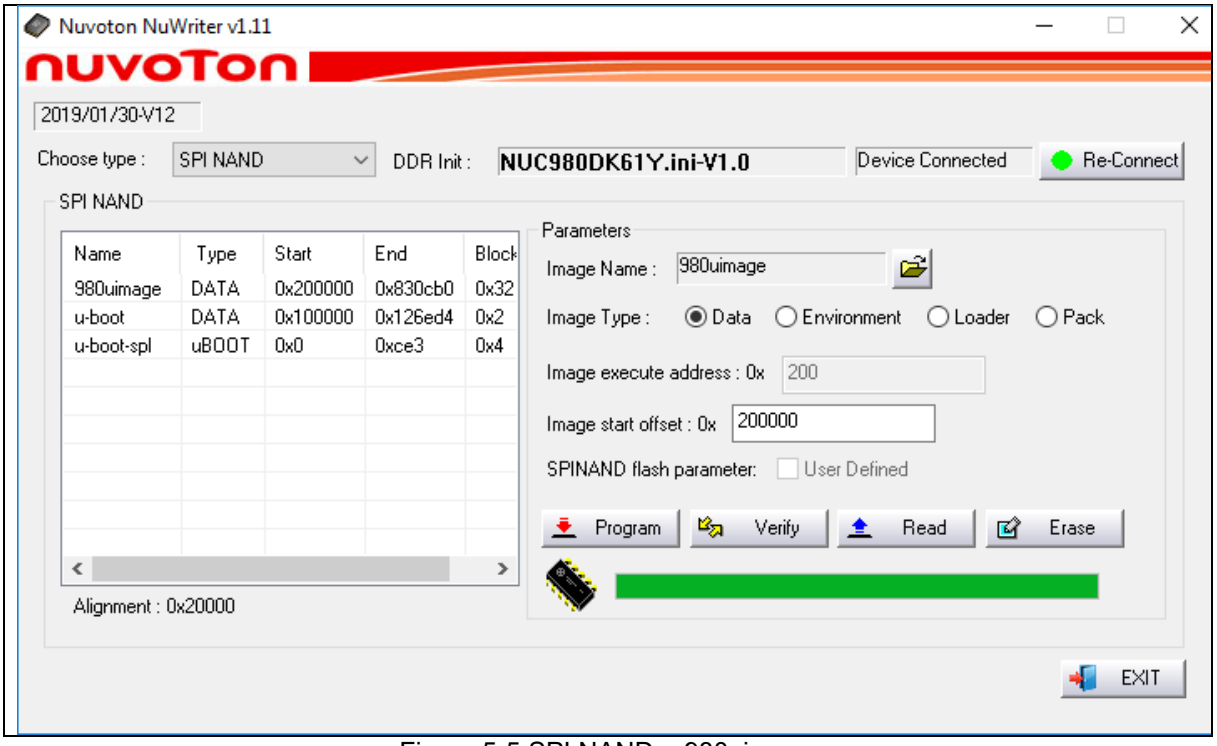


Figure 5-5 SPI NAND – 980uimage

SPI NAND – environment

Loader Type is used to set uboot environment variables, the image of environment type into SPI NAND Flash in the specified address. U-Boot reads environment variables file to set the environment. If the image start offset is 0x80000, it means that the image of data is downloaded into SPI NAND Flash in the 0x80000 address.

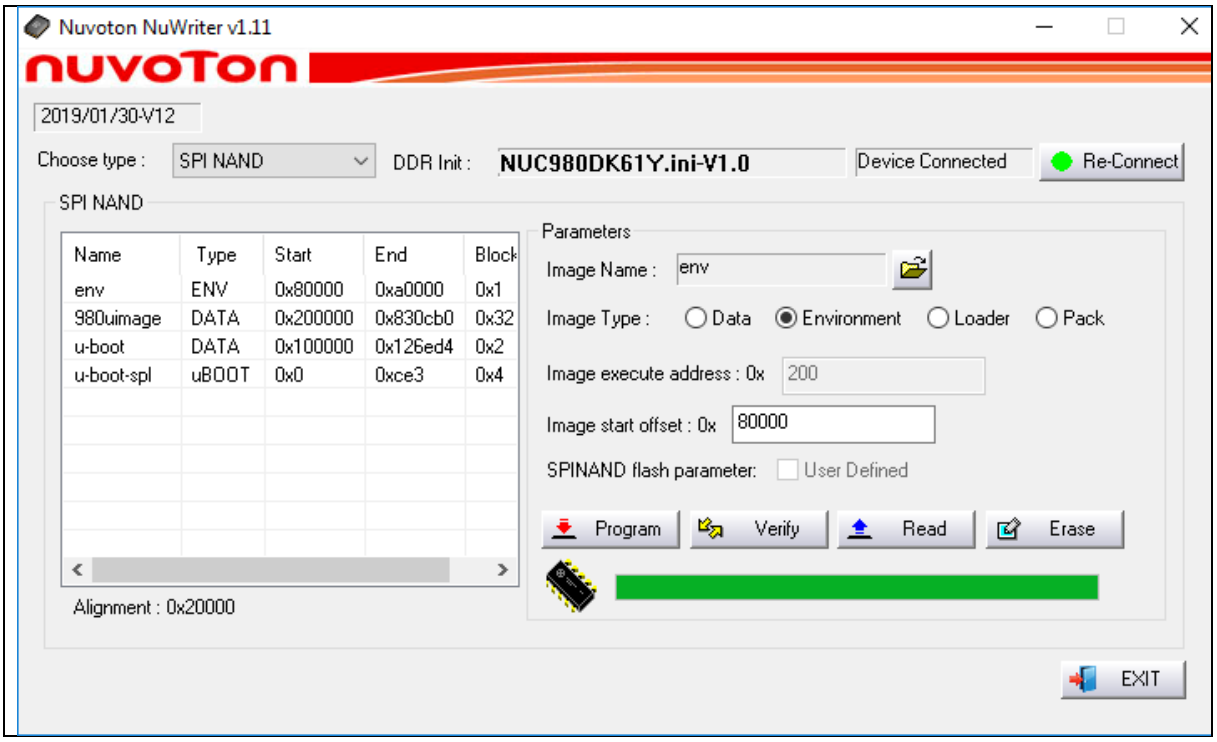


Figure 5-6 SPI NAND – Environment

For more details of NuWriter tool, please refer to "*NUC980 NuWriter User Manual*" in the "Documents" directory.

6 NUMAKER-LORAG915/LORAG868-NUC980 SCHEMATICS

6.1 Block Diagram Schematic

Figure 6-1 shows the Block diagram Schematic.

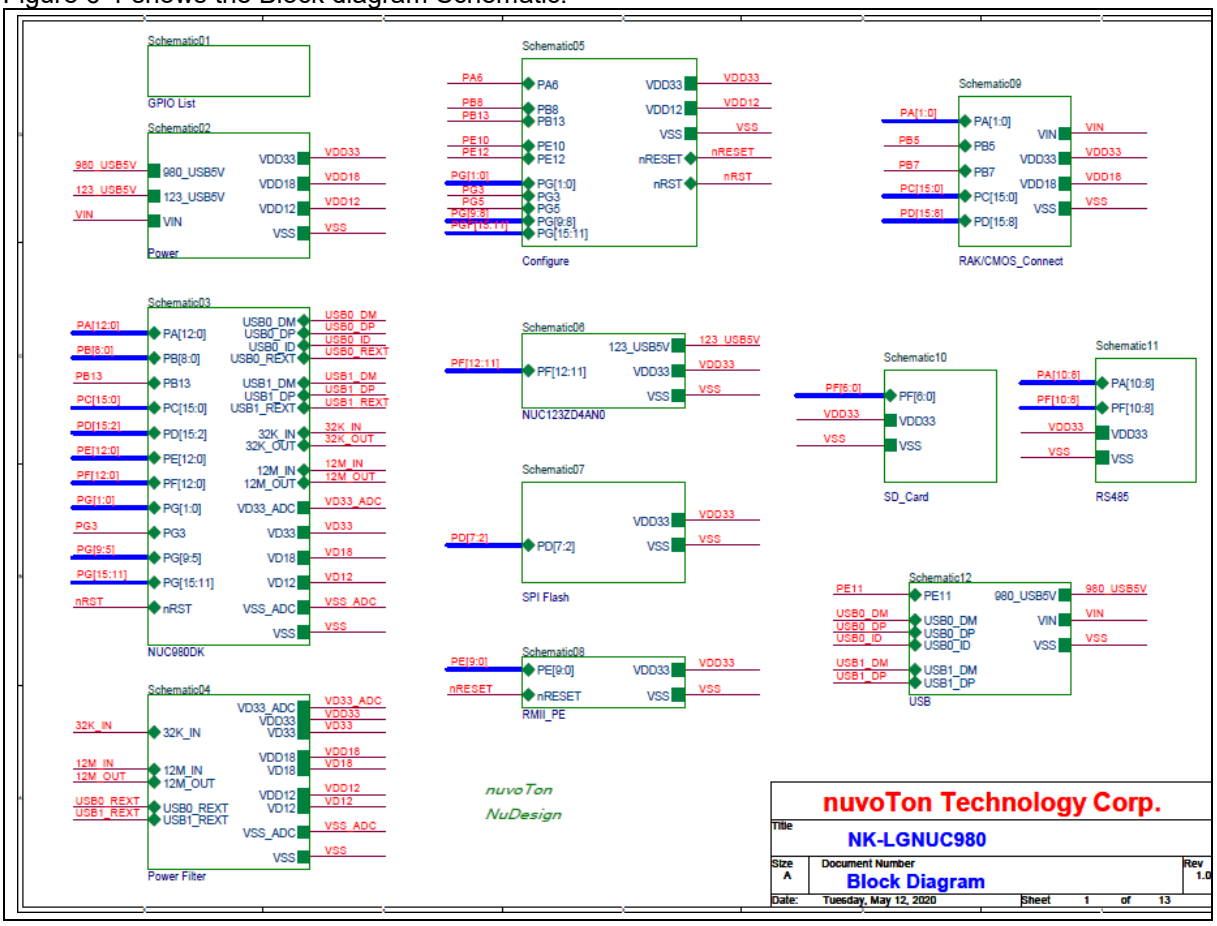
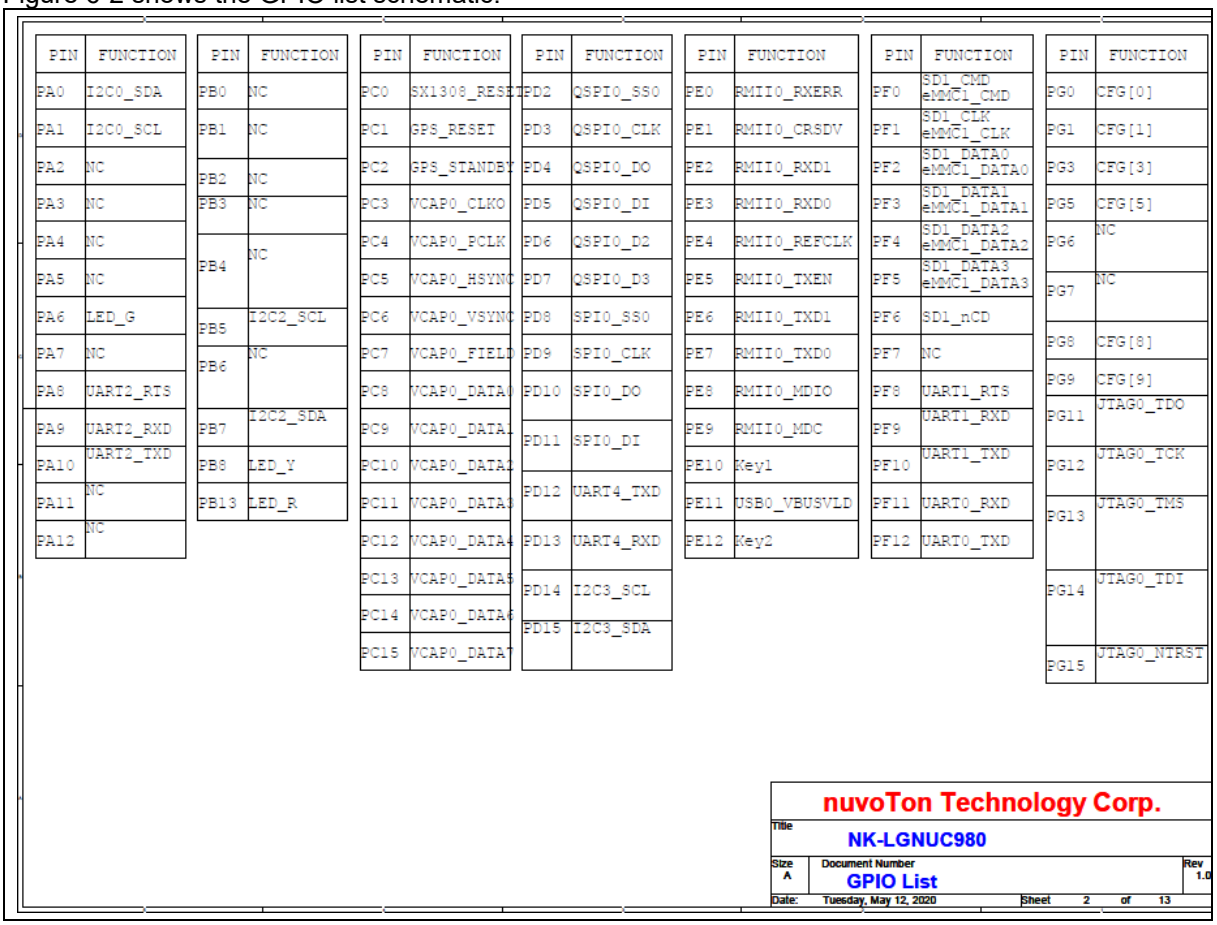


Figure 6-1 Block Diagram Schematic

6.2 GPIO List Schematic

Figure 6-2 shows the GPIO list schematic.



PIN	FUNCTION
PA0	I2C0_SDA
PA1	I2C0_SCL
PA2	NC
PA3	NC
PA4	NC
PA5	NC
PA6	LED_G
PA7	NC
PA8	UART2_RTS
PA9	UART2_RXD
PA10	UART2_TXD
PA11	NC
PA12	NC

PIN	FUNCTION
PB0	NC
PB1	NC
PB2	NC
PB3	NC
PB4	NC
PB5	I2C2_SCL
PB6	NC
PB7	I2C2_SDA
PB8	LED_Y
PB13	LED_R

PIN	FUNCTION
PC0	SX1308_RESET
PC1	GPS_RESET
PC2	GPS_STANDBY
PC3	VCAP0_CLKO
PC4	VCAP0_PCLK
PC5	VCAP0_HSYNC
PC6	VCAP0_VSYNC
PC7	VCAP0_FIELD
PC8	VCAP0_DATA0
PC9	VCAP0_DATA1
PC10	VCAP0_DATA2
PC11	VCAP0_DATA3
PC12	VCAP0_DATA4
PC13	VCAP0_DATA5
PC14	VCAP0_DATA6
PC15	VCAP0_DATA7

PIN	FUNCTION
PD2	QSPI0_SS0
PD3	QSPI0_CLK
PD4	QSPI0_DO
PD5	QSPI0_DI
PD6	QSPI0_D2
PD7	QSPI0_D3
PD8	SPI0_SS0
PD9	SPI0_CLK
PD10	SPI0_DO
PD11	SPI0_DI
PD12	UART4_TXD
PD13	UART4_RXD
PD14	I2C3_SCL
PD15	I2C3_SDA

PIN	FUNCTION
PE0	RMII0_RXERR
PE1	RMII0_CRSDV
PE2	RMII0_RXD1
PE3	RMII0_RXD0
PE4	RMII0_REFCLK
PE5	RMII0_TXEN
PE6	RMII0_TXD1
PE7	RMII0_TXD0
PE8	RMII0_MDIO
PE9	RMII0_MDC
PE10	Key1
PE11	USB0_VBUSVLD
PE12	Key2

PIN	FUNCTION
PF0	SD1_CMD eMMC1_CMD
PF1	SD1_CLK eMMC1_CLK
PF2	SD1_DATA0 eMMC1_DATA0
PF3	SD1_DATA1 eMMC1_DATA1
PF4	SD1_DATA2 eMMC1_DATA2
PF5	SD1_DATA3 eMMC1_DATA3
PF6	SD1_nCD
PF7	NC
PF8	UART1_RTS
PF9	UART1_RXD
PF10	UART1_TXD
PF11	UART0_RXD
PF12	UART0_TXD

PIN	FUNCTION
PG0	CFG[0]
PG1	CFG[1]
PG3	CFG[3]
PG5	CFG[5]
PG6	NC
PG7	NC
PG8	CFG[8]
PG9	CFG[9]
PG11	JTAG0_TDO
PG12	JTAG0_TCK
PG13	JTAG0_TMS
PG14	JTAG0_TDI
PG15	JTAG0_NTRST

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Title: NK-LGNUC980

Size: A | Document Number: GPIO List | Rev: 1.0

Date: Tuesday, May 12, 2020 | Sheet 2 of 13

Figure 6-2 GPIO List Schematic

6.3 Power Schematic

Figure 6-3 shows the power Schematic.

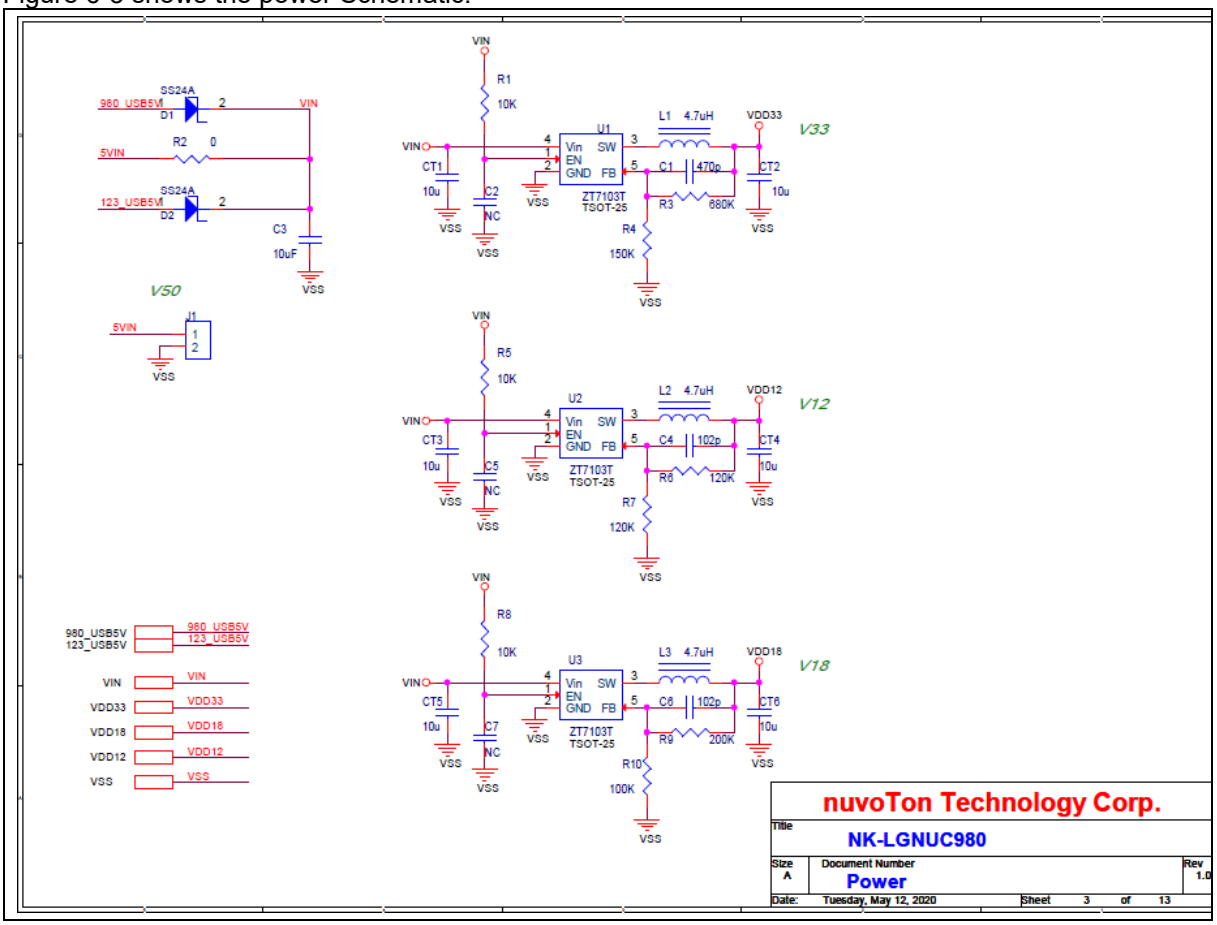

Figure 6-3 Power Schematic

6.4 NUC980DK Schematic

Figure 6-4 shows the NUC980DK schematic.

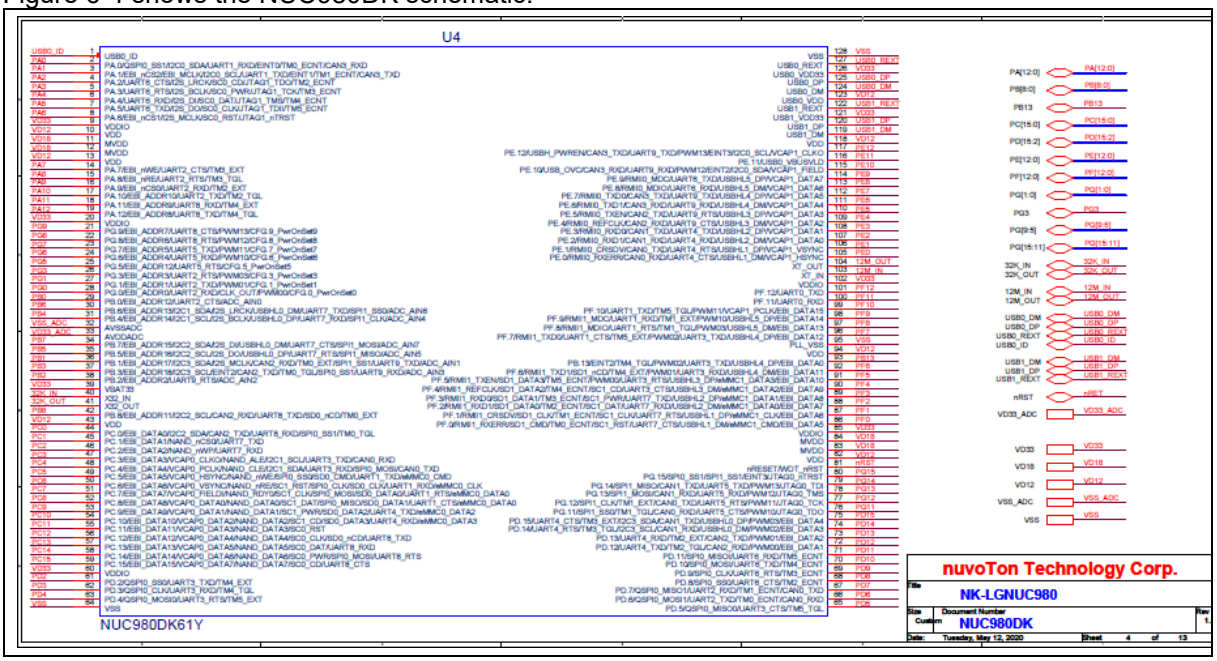

Figure 6-4 NUC980DK Schematic

6.5 Power Filter Schematic

Figure 6-5 shows the power filter schematic.

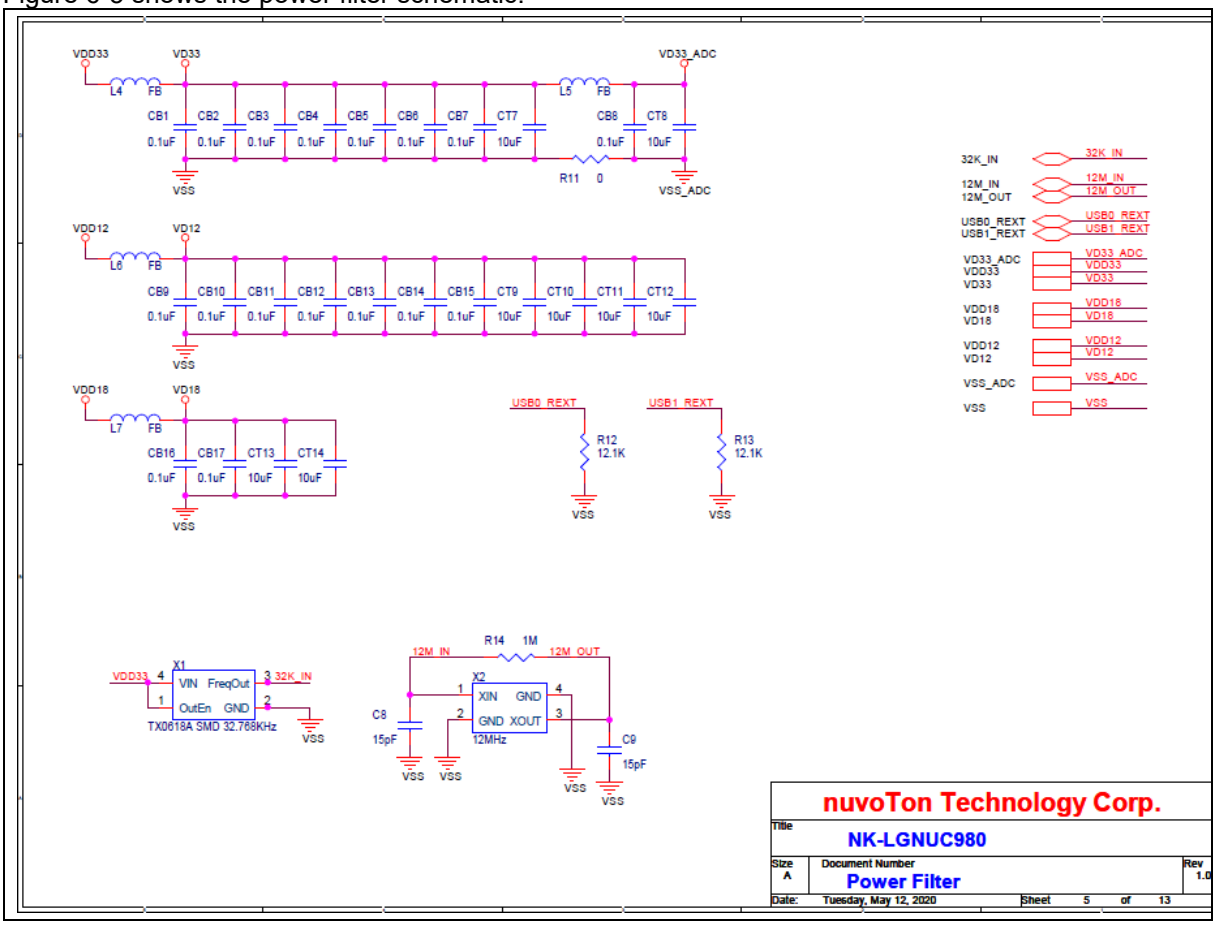

Figure 6-5 Power Filter Schematic

6.6 Configure Schematic

Figure 6-6 shows the configure schematic.

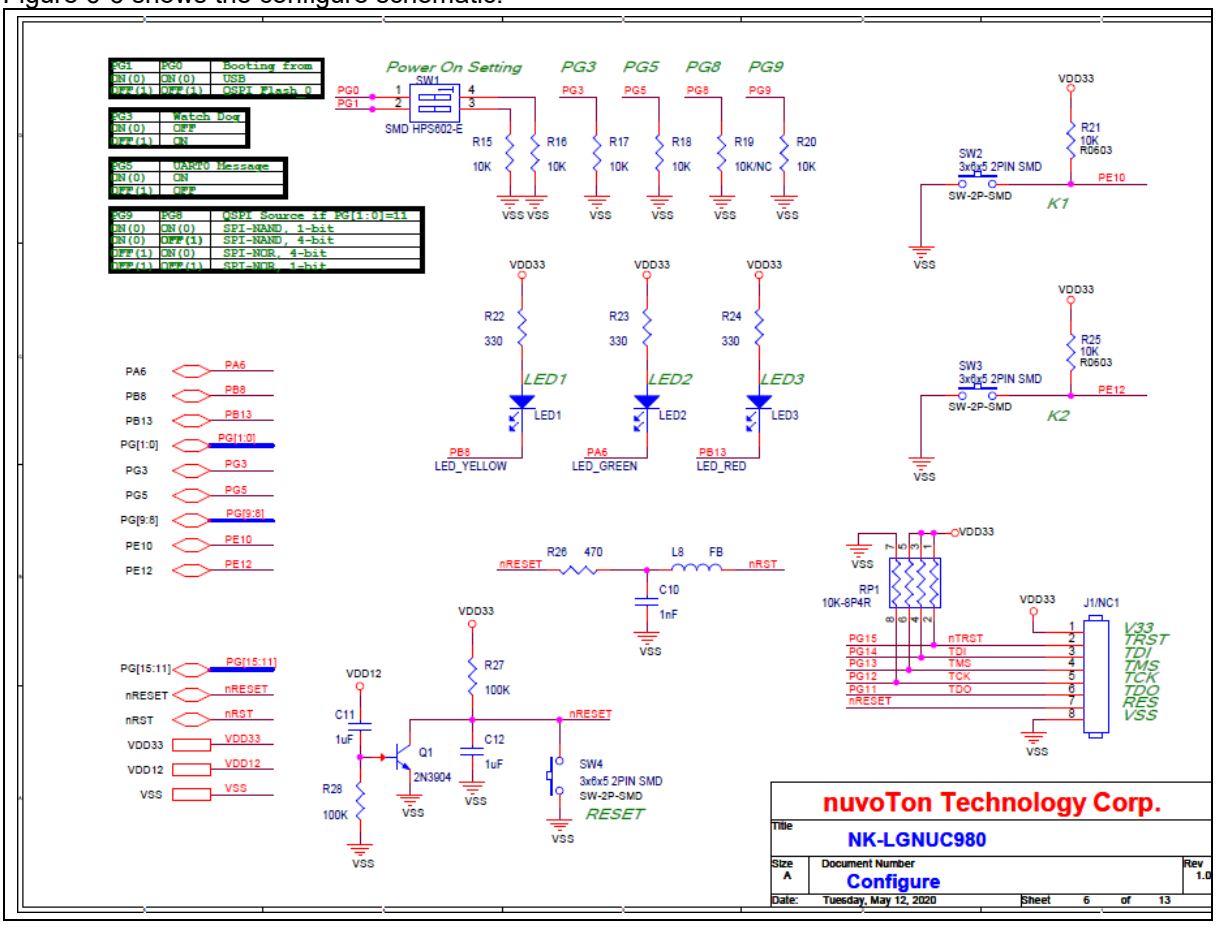

Figure 6-6 Configure Schematic

6.7 NUC123ZD4AN0 Schematic

Figure 6-7 shows the NUC123ZD4AN0 schematic.

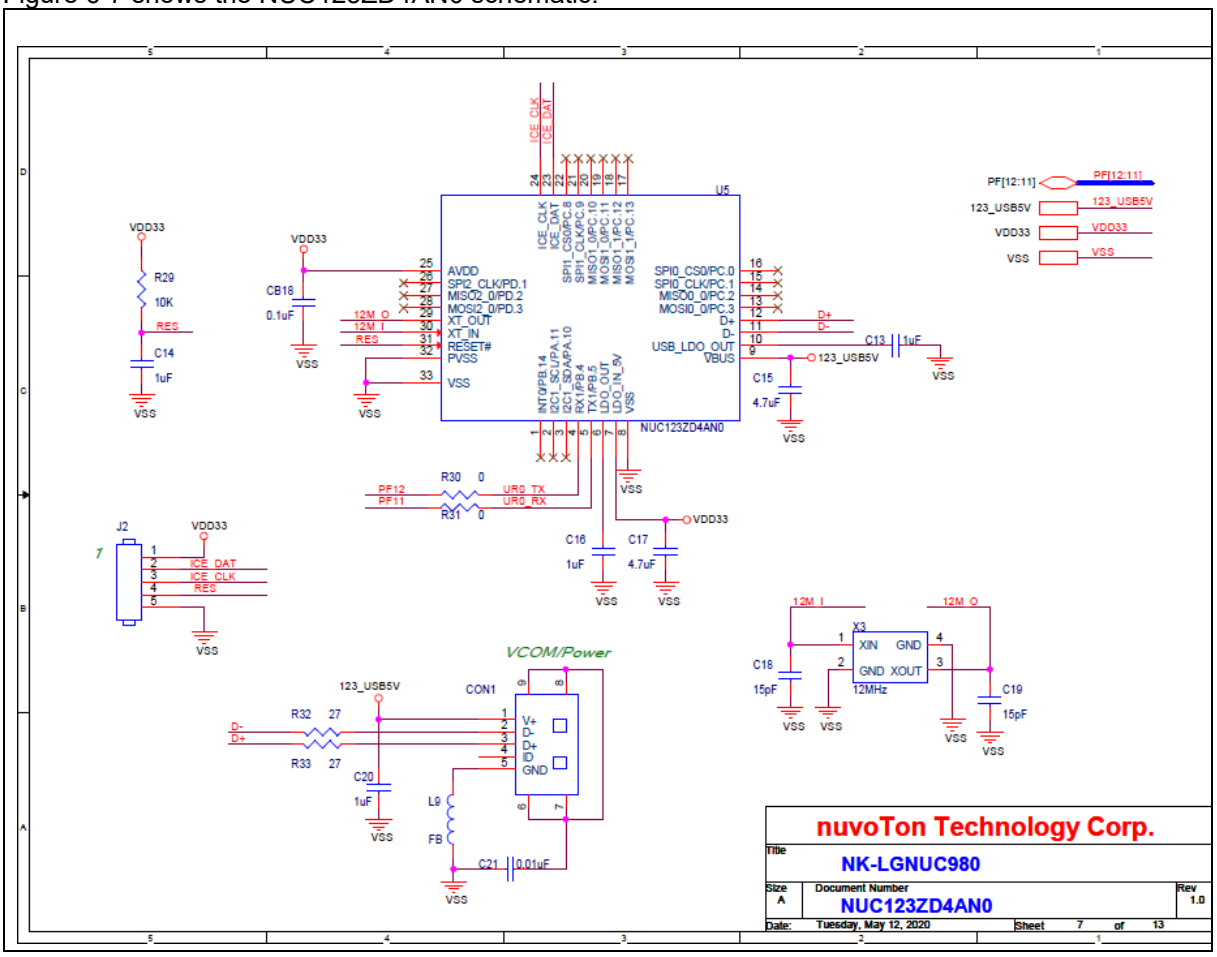

Figure 6-7 NUC123ZD4AN0 Schematic

6.8 Memory Schematic

Figure 6-8 shows the memory schematic.

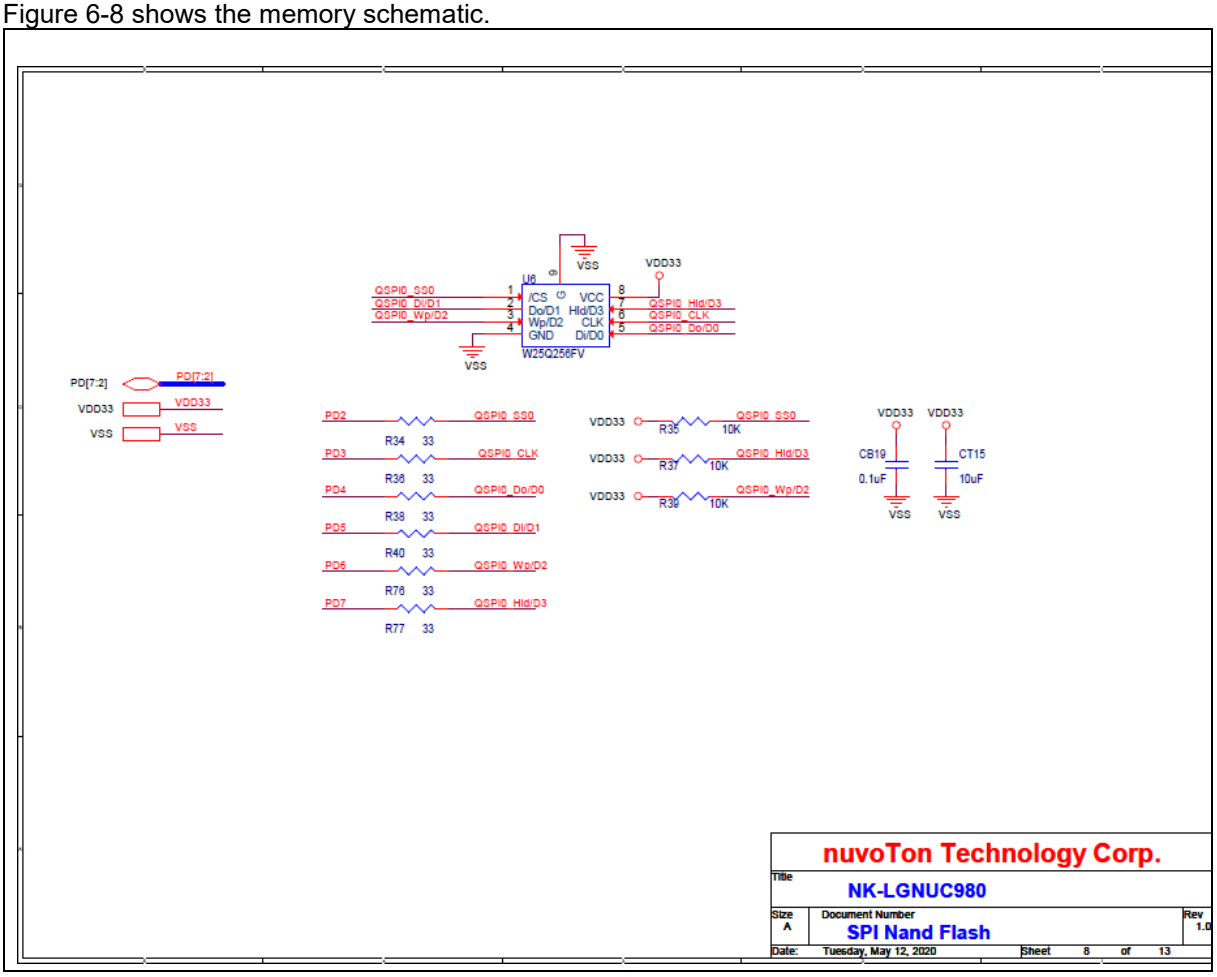

Figure 6-8 Memory Schematic

6.9 RMII_PE Schematic

Figure 6-9 shows the RMII_PE schematic.

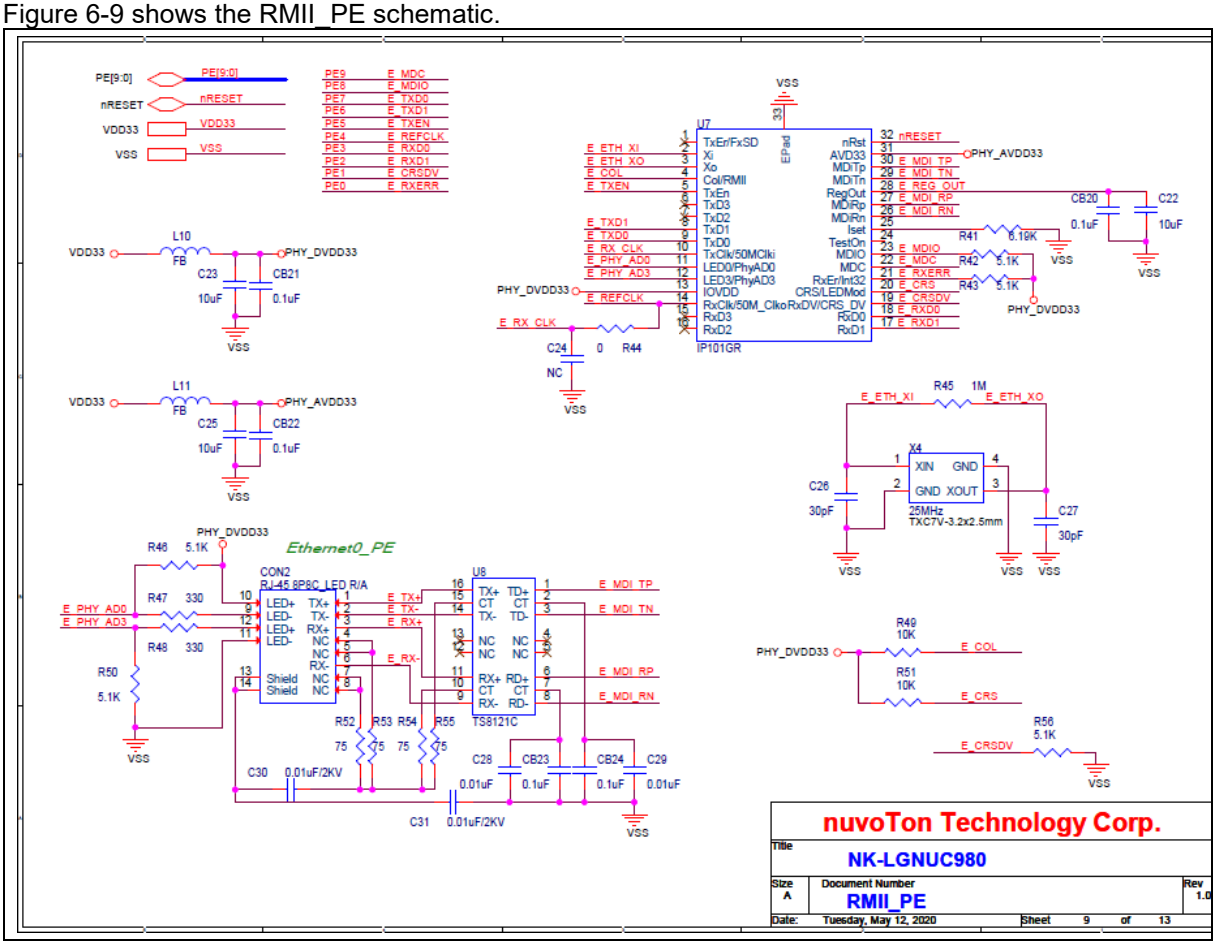

Figure 6-9 RMII_PE Schematic

6.10 RAK Sensor Connecter Schematic

Figure 6-10 shows the RAK sensor connector schematic.

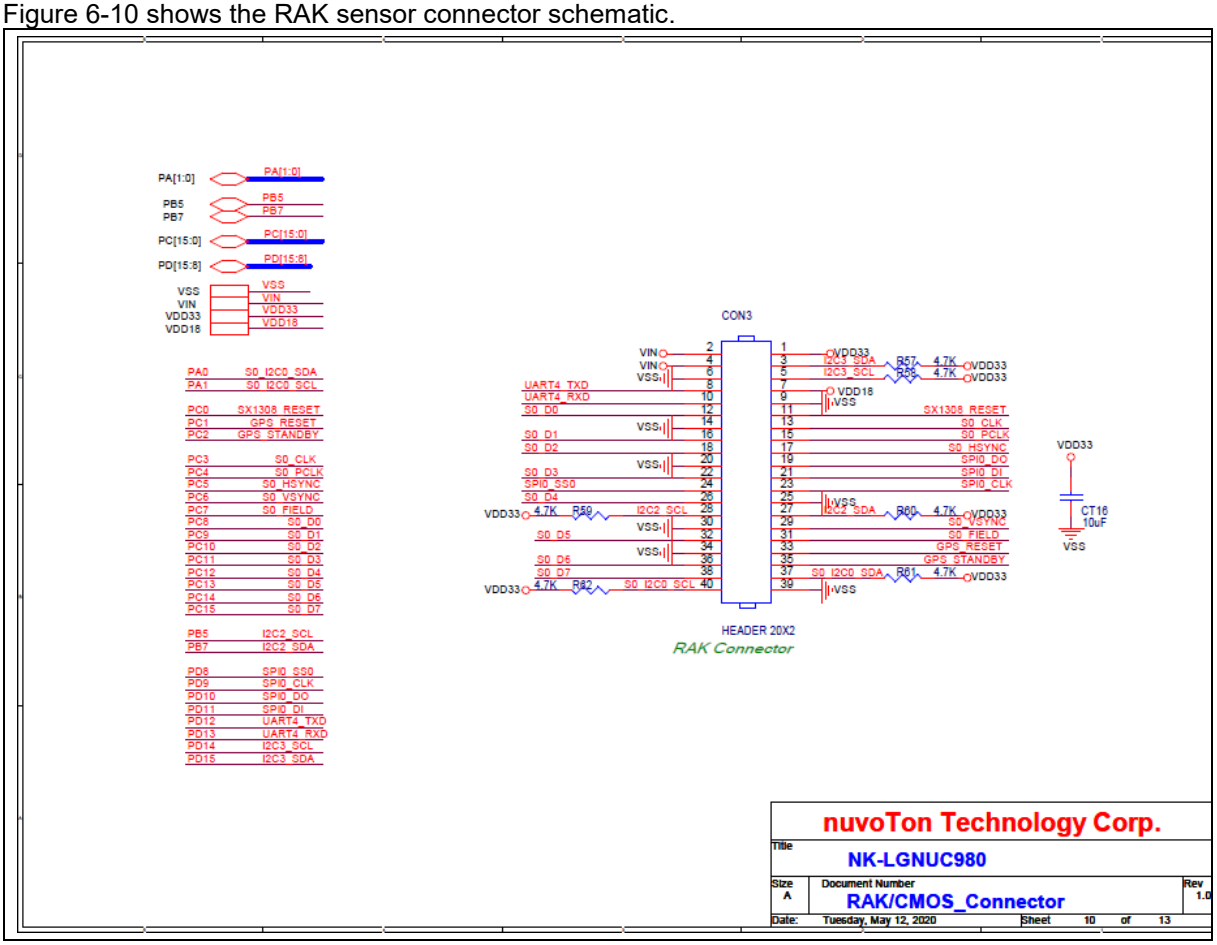

Figure 6-10 RAK Sensor Connecter Schematic

6.11 SD1/eMMC1 Schematic

Figure 6-11 shows the SD1/eMMC1 schematic.

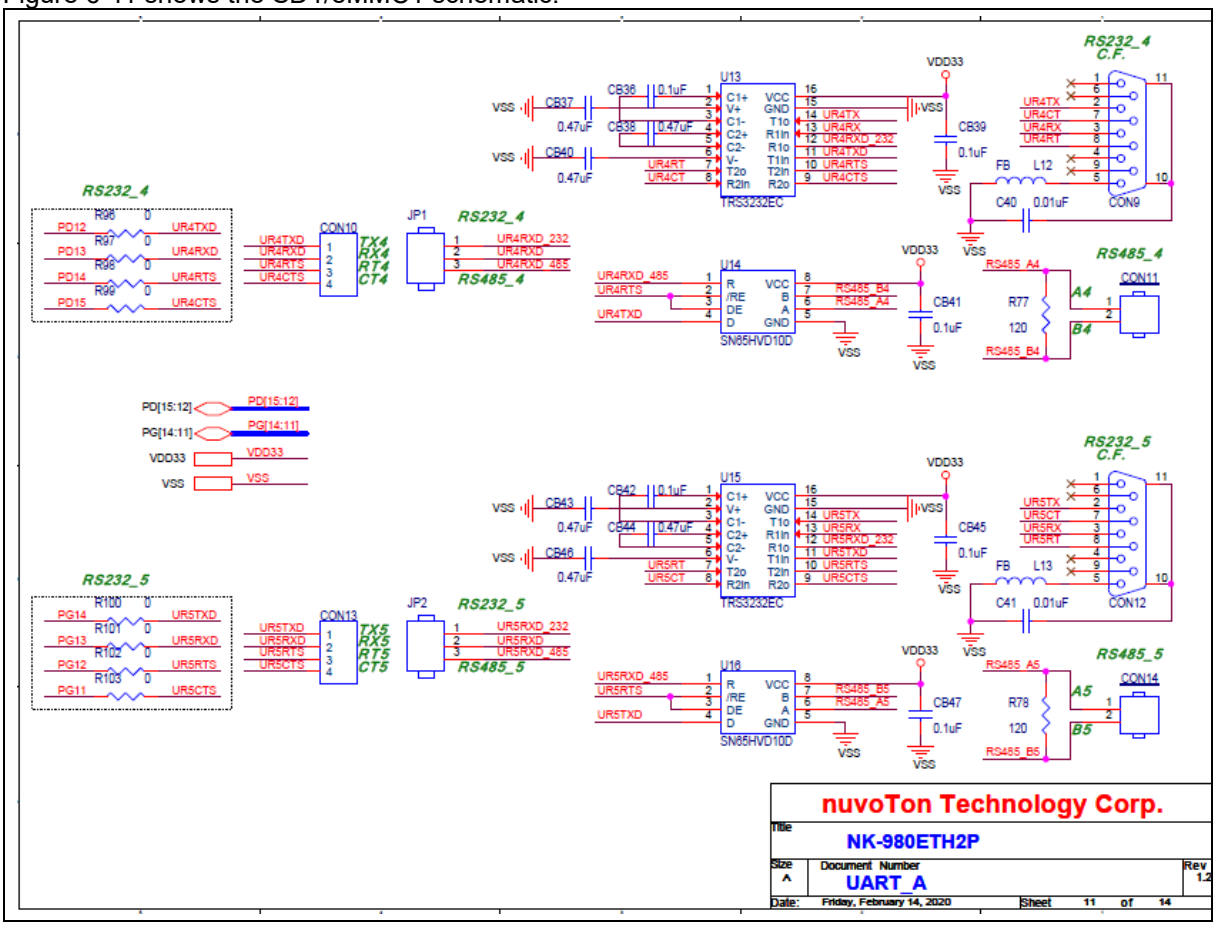

Figure 6-11 SD1/eMMC1 Schematic

6.12 RS485 Schematic

Figure 6-12 shows the RS485 schematic.

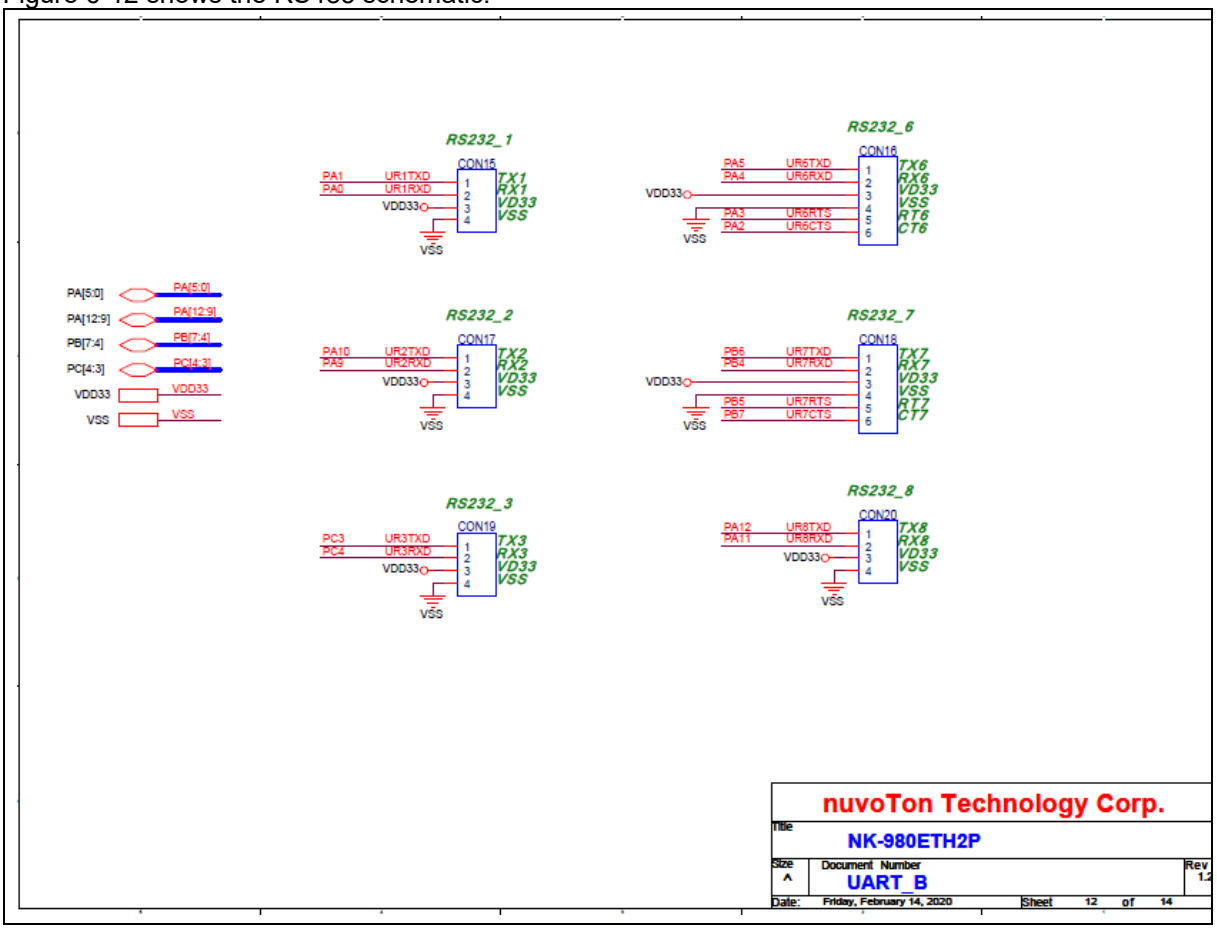

Figure 6-12 RS485 Schematic

6.13 USB Schematic

Figure 6-13 shows the USB schematic.

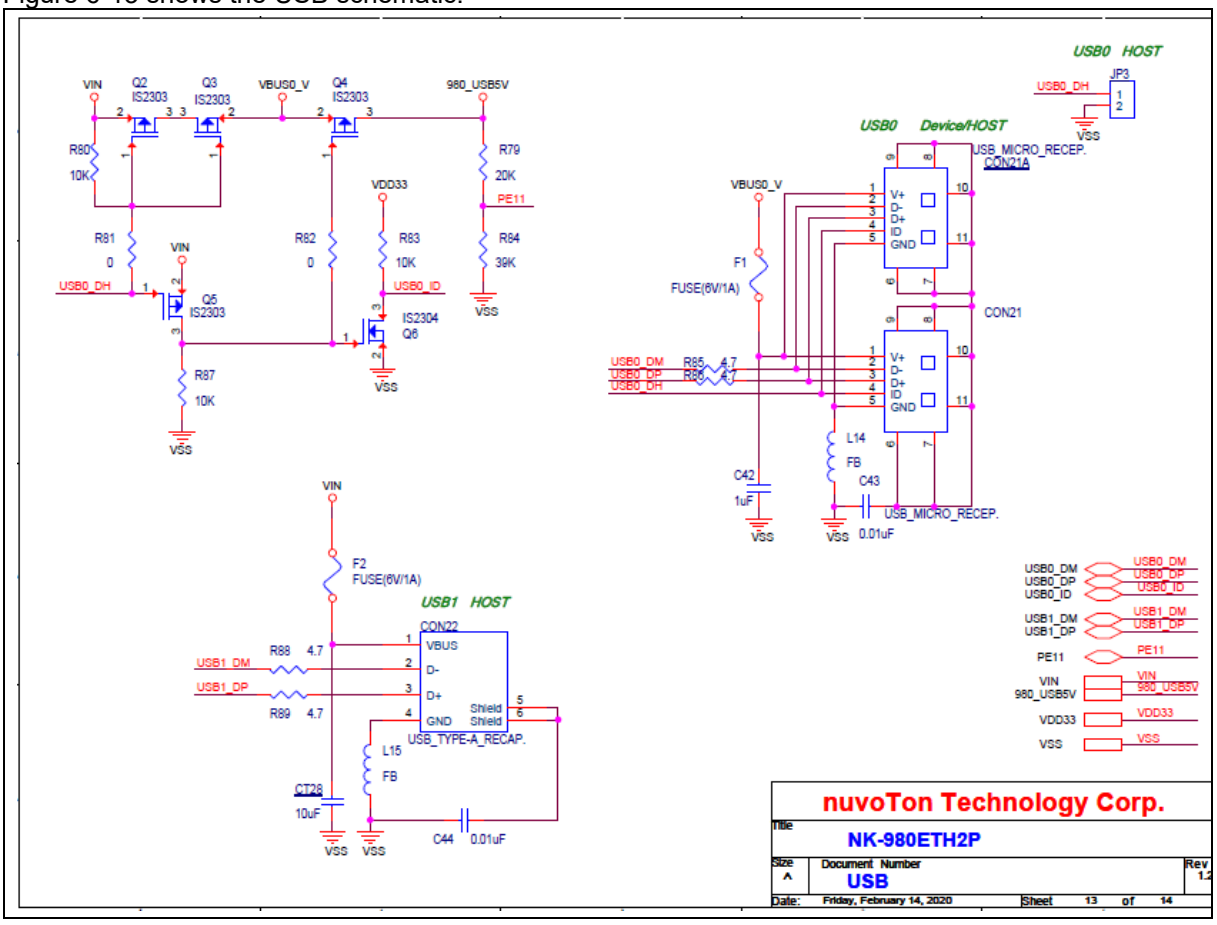

Figure 6-13 USB Schematic

6.14 PCB Placement

Figure 6-14 shows the front PCB placement.

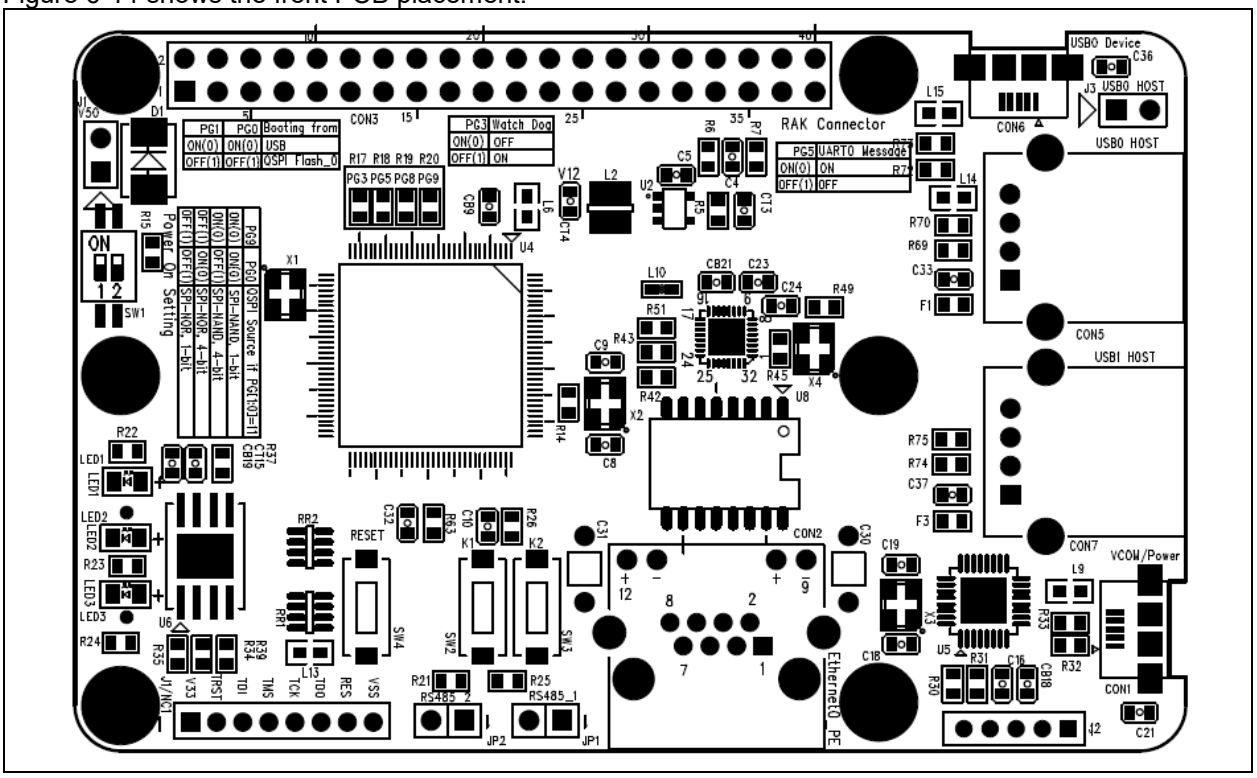

Figure 6-14 Front PCB Placement

Figure 6-15 shows the back PCB placement.

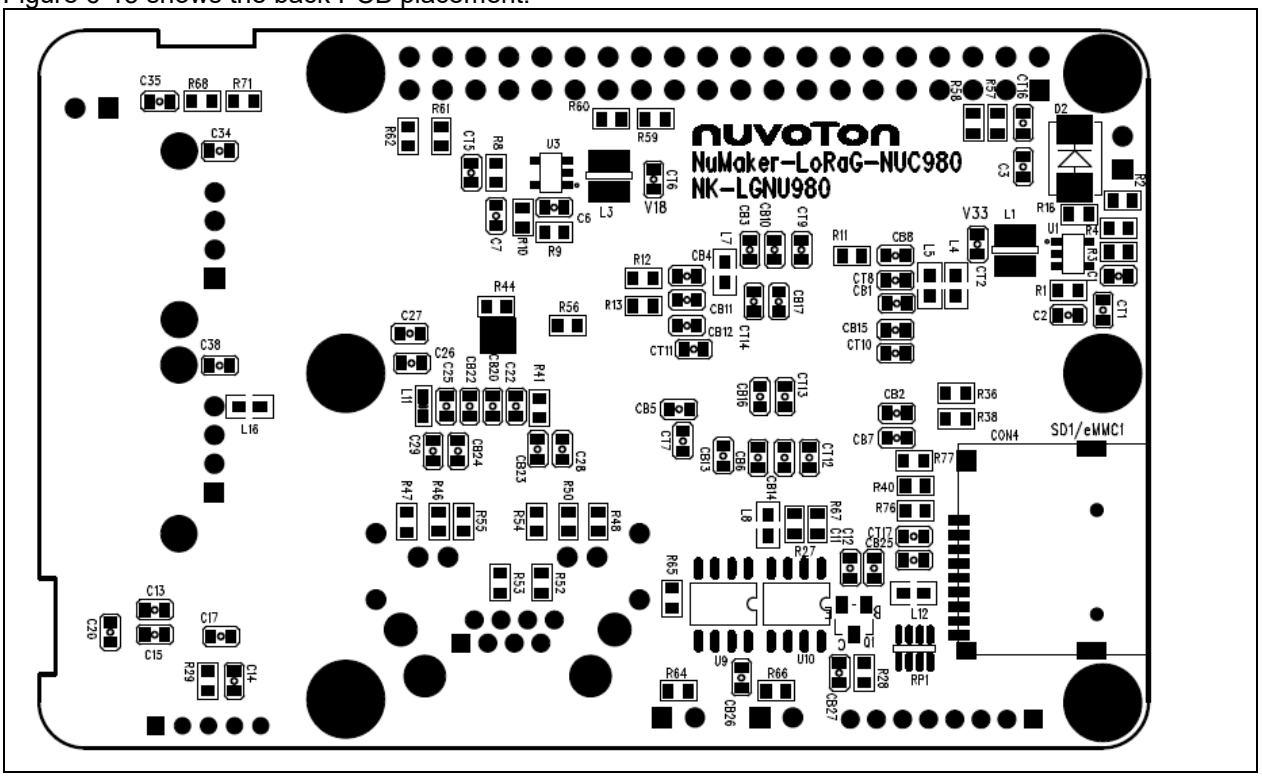

Figure 6-15 Back PCB Placement

7 REVISION HISTORY

Date	Revision	Description
2020.10.23	1.00	1. Initial version

Important Notice

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