

## ARM® ARM926EL-S Based 32-bit Microprocessor

# NK-NUC980 User Manual NUC980DF61YC

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## 1 OVERVIEW

The user's guide describes the operation and use of the NK-NUC980 development board.

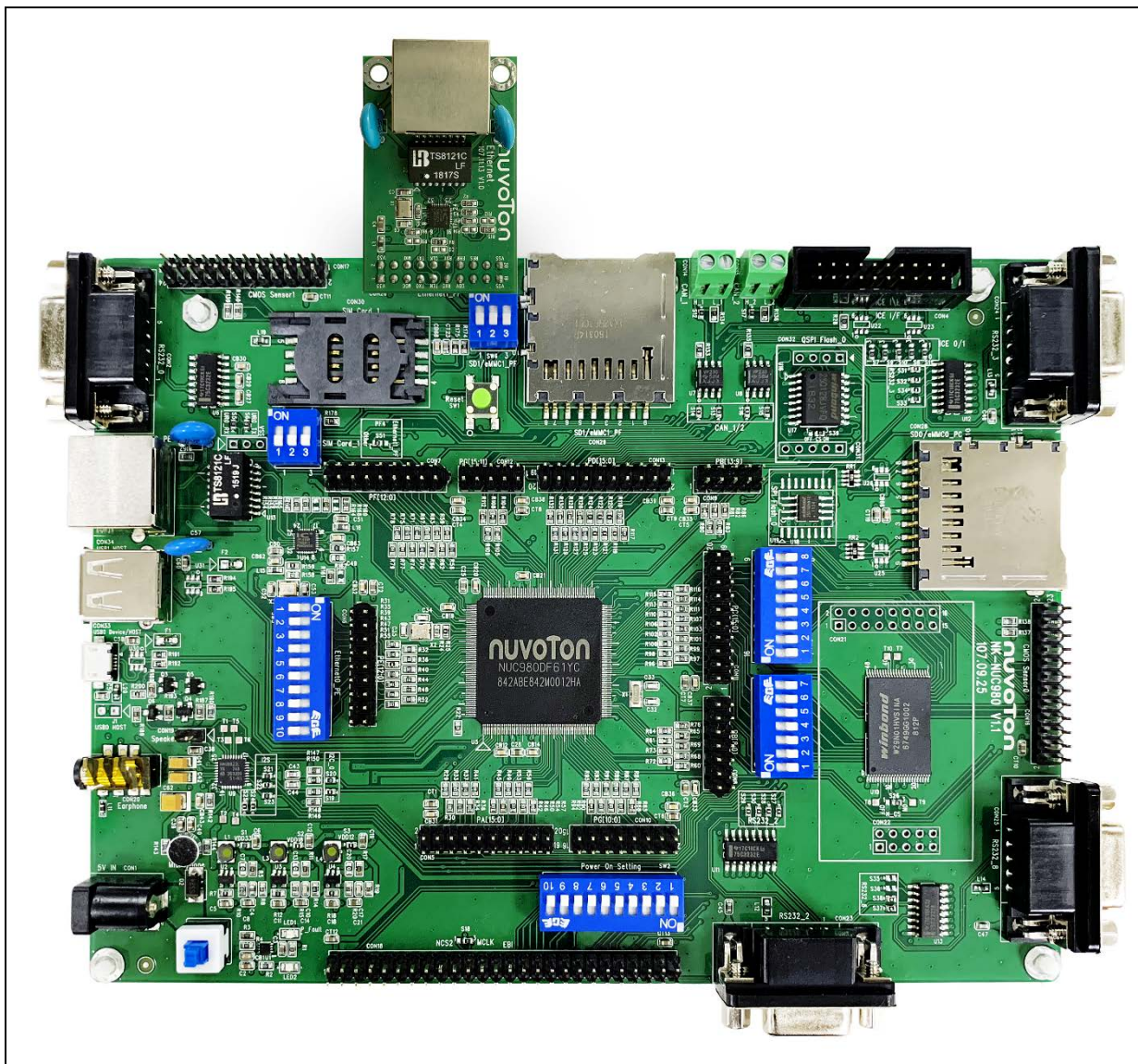


Figure 1-1 NK-NUC980 Board

## 2 INTRODUCTION TO NK-NUC980 BOARD

The NK-NUC980 is a development board based on an ARM® ARM926EJ-S microprocessor NUC980DF61YC which has very rich peripherals to help users easily to design-in their products or application systems.

The NK-NUC980 board uses NUC980DF61YC microprocessor run up to 300 MHz with built-in 64MB DDR2 memory, 16 KB I-cache, 16 KB D-cache and MMU, 16 KB embedded SRAM and 16.5 KB IBR (Internal Boot ROM) for system booting from USB, NAND flash, SD/eMMC and SPI Flash. All functions of the NUC980DF61YC are placed on the board, including peripheral interfaces such as memory (NAND, SPI, eMMC, SD), UART, IIS, Ethernet, USB (device, HOST), CMOS sensor, SIM card, CAN, JTAG and EBI. Users can use it to develop and verify applications to emulate the real behavior.

### 2.1 NUC980DF61YC MPU Features

- NUC980DF61YC: LQFP216 pin MCP package with DDR2 (64 MB), which can run up to 300MHz operating speed
- Can choose system booting mode from USB, NAND Flash, SD, eMMC and SPI Flash
- NAND Flash ECC 24bits
- External Bus Interface (EBI)
- SD/SDIO x2
- Ethernet 10/100 MAC x2
- USB2.0 HS HOST x2
- USB2.0 HS Device x1
- USB1.1 FS HOST x6
- Real Time Clock (RTC)
- Timer (32-bit) x6
- Watchdog Timer
- PWM x8
- 12bit ADC x8
- UART x10
- CAN BUS x4
- IIC x4
- SPI x3
- ISO-7816-3(SIM card) x2
- CMOS interface x2
- GPIO x104
- IIS
- Operating Temp. Range -40~85

## 2.2 NK-NUC980 Board Features

- SOC CPU: NUC980DF61YC
- Provides 2 sets of SPI Flash
  - SPI Flash (QSPI0): quad mode system booting or data storage, use W25Q128 (16 MB)
  - SPI Flash (SPI0): dual mode for data storage, use W25X80 (1 MB)
- NAND Flash: System booting or data storage, use W29N01HVS1NA (128 MB)
- Provides 2 sets of STD SD slot
  - SD0/eMMC0: Use SD/eMMC memory card for system booting, data storage or SDIO (Wi-Fi) device
  - SD1/eMMC1: Use SD/eMMC memory card for system booting, data storage or SDIO (Wi-Fi) device
- Provides 4 sets of COM ports
  - UART0: DB9 port with RS232 transceiver for system development, debug message output
  - UART2/UART3/UART8: DB9 port with RS232 transceiver
- JTAG interface provided for software development (JTAG0/JTAG1)
- 2 sets of terminal with CAN transceiver (CAN1/CAN2)
- 2 sets of pin headers with CMOS sensor (CMOS sensor0/CMOS sensor1)
- 1 set of RJ45 port with Ethernet 10/100 MAC (Ethernet0), 1 set of pin header with Ethernet 10/100 MAC (Ethernet1)
- EBI interface with pin header
- Mini SIM card (SIM1)
- Microphone input and Earphone/Speaker output with 24-bit stereo audio codec (NAU8822L) for I2S interfaces
- 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
- All GPIO use pin headers
- Provides over-voltage and over current protection
- 3.3V I/O power, 3.3V RTC power, 1.8V Memory power and 1.2V core power

## 2.3 NK-NUC980 Board — Front View

Figure 2-1 shows the main components and connectors from the front view of NK-NUC980 board

- +5V in (CON1): Power adaptor 5V input
- SOC CPU: nuvoTon NUC980DF61YC (U5)
- Power supply switch (SW\_POWER1): System will be power on if the SW\_POWER1 button is pressed
- GPIO interface (CON5~CON13)

### ■ GPA0~15 (CON5)

Connector	GPIO pin of NUC980
CON5.1	Power 3.3V
CON5.2	Power 3.3V
CON5.3	GPA0
CON5.4	GPA1
CON5.5	GPA2
CON5.6	GPA3
CON5.7	GPA4
CON5.8	GPA5
CON5.9	GPA6
CON5.10	GPA7
CON5.11	GPA8
CON5.12	GPA9
CON5.13	GPA10
CON5.14	GPA11
CON5.15	GPA12
CON5.16	GPA13
CON5.17	GPA14
CON5.18	GPA15
CON5.19	VSS
CON5.20	VSS



**■ GPB0~8 (CON8)**

Connector	GPIO pin of NUC980
CON8.1	Power 3.3V
CON8.2	Power 3.3V
CON8.3	GPB0
CON8.4	GPB1
CON8.5	GPB2
CON8.6	GPB3
CON8.7	GPB4
CON8.8	GPB5
CON8.9	GPA6
CON8.10	GPB7
CON8.11	GPB8
CON8.12	-
CON8.13	VSS
CON8.14	VSS

**■ GPB9~13 (CON9)**

Connector	GPIO pin of NUC980
CON9.1	Power 3.3V
CON9.2	Power 3.3V
CON9.3	GPB9
CON9.4	GPB10
CON9.5	GPB11
CON9.6	GPB12
CON9.7	GPB13
CON9.8	-
CON9.9	VSS
CON9.10	VSS



## ■ GPC0~15 (CON11)

Connector	GPIO pin of NUC980
CON11.1	Power 3.3V
CON11.2	Power 3.3V
CON11.3	GPC0
CON11.4	GPC1
CON11.5	GPC2
CON11.6	GPC3
CON11.7	GPC4
CON11.8	GPC5
CON11.9	GPC6
CON11.10	GPC7
CON11.11	GPC8
CON11.12	GPC9
CON11.13	GPC10
CON11.14	GPC11
CON11.15	GPC12
CON11.16	GPC13
CON11.17	GPC14
CON11.18	GPC15
CON11.19	VSS
CON11.20	VSS

## ■ GPD0~15 (CON13)

Connector	GPIO pin of NUC980
CON13.1	Power 3.3V
CON13.2	Power 3.3V
CON13.3	GPD0
CON13.4	GPD1
CON13.5	GPD2
CON13.6	GPD3
CON13.7	GPD4

CON13.8	GPD5
CON13.9	GPD6
CON13.10	GPD7
CON13.11	GPD8
CON13.12	GPD9
CON13.13	GPD10
CON13.14	GPD11
CON13.15	GPD12
CON13.16	GPD13
CON13.17	GPD14
CON13.18	GPD15
CON13.19	VSS
CON13.20	VSS

■ GPE0~12 (CON6)

Connector	GPIO pin of NUC980
CON6.1	Power 3.3V
CON6.2	Power 3.3V
CON6.3	GPE0
CON6.4	GPE1
CON6.5	GPE2
CON6.6	GPE3
CON6.7	GPE4
CON6.8	GPE5
CON6.9	GPE6
CON6.10	GPE7
CON6.11	GPE8
CON6.12	GPE9
CON6.13	GPE10
CON6.14	GPE11
CON6.15	GPE12
CON6.16	-

CON6.17	VSS
CON6.18	VSS

■ GPF0~12 (CON7)

Connector	GPIO pin of NUC980
CON7.1	Power 3.3V
CON7.2	Power 3.3V
CON7.3	GPF0
CON7.4	GPF1
CON7.5	GPF2
CON7.6	GPF3
CON7.7	GPF4
CON7.8	GPF5
CON7.9	GPF6
CON7.10	GPF7
CON7.11	GPF8
CON7.12	GPF9
CON7.13	GPF10
CON7.14	GPF11
CON7.15	GPF12
CON7.16	-
CON7.17	VSS
CON7.18	VSS

■ GPG0~10 (CON10)

Connector	GPIO pin of NUC980
CON10.1	Power 3.3V
CON10.2	Power 3.3V
CON10.3	GPG0
CON10.4	GPG1
CON10.5	GPG2
CON10.6	GPG3

CON10.7	GPG4
CON10.8	GPG5
CON10.9	GPG6
CON10.10	GPG7
CON10.11	GPG8
CON10.12	GPG9
CON10.13	GPG10
CON10.14	-
CON10.15	VSS
CON10.16	VSS

■ GPG11~15 (CON12)

Connector	GPIO pin of NUC980
CON12.1	Power 3.3V
CON12.2	Power 3.3V
CON12.3	GPG11
CON12.4	GPG12
CON12.5	GPG13
CON12.6	GPG14
CON12.7	GPG15
CON12.8	-
CON12.9	VSS
CON12.10	VSS

● EBI interface (CON18)

Connector	GPIO pin of NUC980	Function	Note
CON18.1	-	Power 3.3V	
CON18.2	-	Power 3.3V	
CON18.3	GPC0	EBI_D0	
CON18.4	GPD12	EBI_D1	S15 need open
CON18.5	GPD13	EBI_D2	S16 need open
CON18.6	GPD14	EBI_D3	S13 need open

CON18.7	GPD15	EBI_D4	S14 need open
CON18.8	GPF0	EBI_D5	CON26/CON29/CON30 cannot be used
CON18.9	GPF1	EBI_D6	CON26/CON29/CON30 cannot be used
CON18.10	GPF2	EBI_D7	CON26/CON29/CON30 cannot be used
CON18.11	GPF3	EBI_D8	CON26/CON29/CON30 cannot be used
CON18.12	GPF4	EBI_D9	CON26/CON29/CON30 cannot be used
CON18.13	GPF5	EBI_D10	CON26/CON29 cannot be used
CON18.14	GPF6	EBI_D11	CON26/CON29 cannot be used
CON18.15	GPF7	EBI_D12	CON26 cannot be used
CON18.16	GPF8	EBI_D13	CON26 cannot be used
CON18.17	GPF9	EBI_D14	CON26 cannot be used
CON18.18	GPF10	EBI_D15	CON17 cannot be used
CON18.19	-	VSS	
CON18.20	-	VSS	
CON18.21	GPA1	EBI_NCS2	1.S19 need open 2.S18(1-2) need short
CON18.22	GPA1	EBI_MCLK	1.S19 need open 2.S18(2-3) need short
CON18.23	GPA6	EBI_NCS1	S11(2-3) and S21 needs open
CON18.24	GPA7	EBI_NWE	S27 need open
CON18.25	GPA8	EBI_NRE	S28 need open
CON18.26	GPA9	EBI_NCS0	S29 need open
CON18.27	-	VSS	
CON18.28	-	VSS	
CON18.29	GPG0	EBI_A0	
CON18.30	GPG1	EBI_A1	
CON18.31	GPG2	EBI_A2	

CON18.32	GPG3	EBI_A3	
CON18.33	GPG6	EBI_A4	
CON18.34	GPG7	EBI_A5	
CON18.35	GPG8	EBI_A6	S36 need open
CON18.36	GPG9	EBI_A7	S35 need open
CON18.37	GPA12	EBI_A8	S38 need open
CON18.38	GPA11	EBI_A9	S37 need open
CON18.39	GPA10	EBI_A10	S30 need open
CON18.40	GPB8	EBI_A11	
CON18.41	GPB0	EBI_A12	
CON18.42	GPA13	EBI_A13	
CON18.43	GPA14	EBI_A14	
CON18.44	GPB7	EBI_A15	CON16 cannot be used
CON18.45	GPB5	EBI_A16	CON16 cannot be used
CON18.46	GPB1	EBI_A17	
CON18.47	GPB3	EBI_A18	
CON18.48	GPA15	EBI_A19	
CON18.49	-	VSS	
CON18.50	-	VSS	
CON18.51	-	Power 5V	
CON18.52	-	Power 5V	

- Power on setting (SW2)

SW	Status	Function	GPIO pin of NUC980
SW2.2/SW2.1	ON/ON	Boot from USB	GPG1/GPG0
SW2.2/SW2.1	ON/OFF	Boot from SD/eMMC	GPG1/GPG0
SW2.2/SW2.1	OFF/ON	Boot from NAND Flash	GPG1/GPG0
SW2.2/SW2.1	OFF/OFF	Boot from QSPI0 Flash	GPG1/GPG0

SW	Status	Function	GPIO pin of NUC980
SW2.3	ON	QSPI0_CLK is 30MHz	GPG2
SW2.3	OFF	QSPI0_CLK is 50MHz	GPG2

SW	Status	Function	GPIO pin of NUC980
SW2.4	ON	Watchdog Timer OFF	GPG3
SW2.4	OFF	Watchdog Timer ON	GPG3

SW	Status	Function	GPIO pin of NUC980
SW2.5	ON	GPA[6:2] used as JTAG1 ICE interface	GPG4
SW2.5	OFF	GPG[15:11] used as JTAG0 ICE interface	GPG4

SW	Status	Function	GPIO pin of NUC980
SW2.6	ON	UART0 debug message ON	GPG5
SW2.6	OFF	UART0 debug message OFF	GPG5

SW	Status	Function	GPIO pin of NUC980
SW2.8/SW2.7	ON/ON	NAND Flash page size 2KB	GPG7/GPG6
SW2.8/SW2.7	ON/OFF	NAND Flash page size 4KB	GPG7/GPG6
SW2.8/SW2.7	OFF/ON	NAND Flash page size 8KB	GPG7/GPG6
SW2.8/SW2.7	OFF/OFF	Ignore	GPG7/GPG6

If SW2.2/SW2.1 status is ON/OFF

SW	Status	Function	GPIO pin of NUC980
SW2.10/SW2.9	OFF/OFF	SD0/eMMC0 boot from GPC group	GPG9/GPG8
SW2.10/SW2.9	Others	SD1/eMMC1 boot from GPF group	GPG9/GPG8



If SW2.2/SW2.1 status is OFF/ON

SW	Status	Function	GPIO pin of NUC980
SW2.10/SW2.9	ON/ON	NAND Flash ECC type BCH T8	GPG9/GPG8
SW2.10/SW2.9	ON/OFF	NAND Flash ECC type BCH T12	GPG9/GPG8
SW2.10/SW2.9	OFF/ON	NAND Flash ECC type BCH T24	GPG9/GPG8
SW2.10/SW2.9	OFF/OFF	Ignore	GPG9/GPG8

If SW2.2/SW2.1 status is OFF/OFF

SW	Status	Function	GPIO pin of NUC980
SW2.10/SW2.9	ON/ON	SPI-NAND Flash boot with 1-bit mode	GPG9/GPG8
SW2.10/SW2.9	ON/OFF	SPI-NAND Flash boot with 4-bit mode	GPG9/GPG8
SW2.10/SW2.9	OFF/ON	SPI-NOR Flash boot with 4-bit mode	GPG9/GPG8
SW2.10/SW2.9	OFF/OFF	SPI-NOR Flash boot with 1-bit mode	GPG9/GPG8

- When using the SW2.10/SW2.9 function, need to open the S35/S36

- UART2 (CON23, S27~30):

Function	GPIO pin of NUC980
UART2_TXD	GPA10
UART2_RXD	GPA9
UART2_RTS	GPA8
UART2_CTS	GPA7

- S27~30: need short for RS232 function and connected to DB9 female (CON23)

- UART8 (CON25, S35~38):

Function	GPIO pin of NUC980
UART8_TXD	GPA12
UART8_RXD	GPA11
UART8_RTS	GPG8
UART8_CTS	GPG9

- S35~38: need short for RS232 function and connected to DB9 female (CON25)

- NAND Flash (128 MB) with Winbond W29N01HVS1NA (U10)

- SW3/SW4 status is ON
- CON16/CON28 cannot be used
- S26(2-3) need short
- CMOS sensor0 interface (CON16)

Connector	GPIO pin of NUC980	Function
CON16.1	-	VSS
CON16.2	-	VSS
CON16.3	-	Power 3.3V
CON16.4	-	Power 3.3V
CON16.5	-	-
CON16.6	-	-
CON16.7	GPC4	VCAP0_PCLK
CON16.8	GPC3	VCAP0_CLKO
CON16.9	GPC8	VCAP0_DATA0
CON16.10	GPC9	VCAP0_DATA1
CON16.11	GPC10	VCAP0_DATA2
CON16.12	GPC11	VCAP0_DATA3
CON16.13	GPC12	VCAP0_DATA4
CON16.14	GPC13	VCAP0_DATA5
CON16.15	GPC14	VCAP0_DATA6
CON16.16	GPC15	VCAP0_DATA7
CON16.17	GPC6	VCAP0_VSYNC
CON16.18	GPC5	VCAP0_HSYNC
CON16.19	GPB1	VCAP0_PWDN
CON16.20	GPC7	VCAP0_NRST
CON16.21	GPB5	VCAP0_I2C_SCL
CON16.22	GPB7	VCAP0_I2C_SDA
CON16.23	-	VSS
CON16.24	-	VSS

- SW3/SW4 status is OFF
- CON28 cannot be used
- Standard SD connector for SD0/eMMC0 (CON28)
  - SW3/SW4 status is OFF
  - CON16 cannot be used
- SPI0\_ Flash (1 MB) with Winbond W25X80 (U19), only one (U18 or U19) SPI Flash can

be used, support dual mode

- UART3 (CON24, S31~34):

Function	GPIO pin of NUC980
UART3_TXD	GPB9
UART3_RXD	GPB10
UART3_RTS	GPB11
UART3_CTS	GPB12

- S31~34: need short for RS232 function and connected to DB9 female (CON24)

- ICE I/F interface (CON4, S7~11)

State	GPIO pin of NUC980	Function
S7: 1/2 short	GPG11	JTAG0_TDO
S7: 2/3 short	GPA2	JTAG1_TDO
S8: 1/2 short	GPG14	JTAG0_TDI
S8: 2/3 short	GPA5	JTAG1_TDI
S9: 1/2 short	GPG12	JTAG0_TCK
S9: 2/3 short	GPA3	JTAG1_TCK
S10: 1/2 short	GPG13	JTAG0_TMS
S10: 2/3 short	GPA4	JTAG1_TMS
S11: 1/2 short	GPG15	JTAG0_TRST
S11: 2/3 short	GPA6	JTAG1_TRST

Connector	GPIO pin of NUC980	Function
CON4.1	-	Power 3.3V
CON4.2	-	Power 3.3V
CON4.3	GPG15/GPA6	JTAG0/1_TRST
CON4.4	-	VSS
CON4.5	GPG14/GPA5	JTAG0/1_TDI
CON4.6	-	VSS
CON4.7	GPG13/GPA4	JTAG0/1_TMS
CON4.8	-	VSS
CON4.9	GPG12/GPA3	JTAG0/1_TCK

CON4.10	-	VSS
CON4.11	-	VSS
CON4.12	-	VSS
CON4.13	GPG11/GPA2	JTAG0/1_TDO
CON4.14	-	VSS
CON4.15	nRESET	System Reset
CON4.16	-	VSS
CON4.17	-	-
CON4.18	-	VSS
CON4.19	-	-
CON4.20	-	VSS

- QSPI0\_ Flash (16 MB) with Winbond W25Q128 (U16), only one (U16 or U17) SPI Flash can be used, support dual / quad mode

- S39(2-3) need short

- CAN\_2 (CON15, S15~16):

Function	GPIO pin of NUC980
S15: CAN2_RX	GPD12
S16: CAN2_TX	GPD13

- S15~16: need short for CAN bus function and connected to 2P terminal (CON15)

- CAN\_1 (CON14, S13~14):

Function	GPIO pin of NUC980
S13: CAN1_RX	GPD14
S14: CAN1_TX	GPD15

- S13~14: need short for CAN bus function and connected to 2P terminal (CON14)

- Standard SD connector for SD1/eMMC1 (CON29, SW6, S51)

- CON26/CON30 cannot be used
- SW6 status is ON, SW7 status is OFF
- S51(2-3) short

- System Reset (SW1): system will be reset if the SW1 button is pressed

- Ethernet1\_PF interface (CON26, SW5, SW7, S51):

Connector	GPIO pin of NUC980	Function
CON26.1	-	Power 3.3V
CON26.2	-	Power 3.3V
CON26.3	-	-

CON26.4	-	-
CON26.5	GPF9	RMII1_MDC
CON26.6	GPF8	RMII1_MDIO
CON26.7	GPF7	RMII1_TXD0
CON26.8	GPF6	RMII1_TXD1
CON26.9	GPF5	RMII1_TXEN
CON26.10	GPF4	RMII1_REFCLK
CON26.11	GPF3	RMII1_RXD0
CON26.12	GPF2	RMII1_RXD1
CON26.13	GPF1	RMII1_CRSDV
CON26.14	GPF0	RMII1_RXERR
CON26.15	-	-
CON26.16	nRESET	System Reset
CON26.17	-	-
CON26.18	-	-
CON26.19	-	VSS
CON26.20	-	VSS

- CON29/CON30 cannot be used
- SW6/SW7 status is OFF.
- S51(1-2) need short
- Mini SIM card slot for SIM1 (CON30, SW7, S51)
  - CON26/CON29 cannot be used
  - SW7 status is ON, SW6 status is OFF
  - S51(2-3) need short
- CMOS sensor1 interface (CON17, SW5):

Connector	GPIO pin of NUC980	Function
CON17.1	-	VSS
CON17.2	-	VSS
CON17.3	-	Power 3.3V
CON17.4	-	Power 3.3V
CON17.5	-	-
CON17.6	-	-
CON17.7	GPF10	VCAP1_PCLK
CON17.8	GPE12	VCAP1_CLKO

CON17.9	GPE2	VCAP1_DATA0
CON17.10	GPE3	VCAP1_DATA1
CON17.11	GPE4	VCAP1_DATA2
CON17.12	GPE5	VCAP1_DATA3
CON17.13	GPE6	VCAP1_DATA4
CON17.14	GPE7	VCAP1_DATA5
CON17.15	GPE8	VCAP1_DATA6
CON17.16	GPE9	VCAP1_DATA7
CON17.17	GPE1	VCAP1_VSYNC
CON17.18	GPE0	VCAP1_HSYNC
CON17.19	GPC0	VCAP1_PWDN
CON17.20	GPE10	VCAP1_NRST
CON17.21	GPB4	VCAP1_I2C_SCL
CON17.22	GPB6	VCAP1_I2C_SDA
CON17.23	-	VSS
CON17.24	-	VSS

- SW5 status is OFF
- UART0 (CON2, CON3, S5~6) :

Function	GPIO pin of NUC980
UART0_TXD	GPF12
UART0_RXD	GPF11

- S5~6 needs short. When using RS232 function and connected to DB9 female for debugging information output, connect serial cable directly to PC.
- GPF11/GPF12 connected to 3P terminal (CON3)
- Ethernet0\_PE (CON27, SW5): For Ethernet port, the NUC980 support RMII interface which add one Ethernet PHY (IP101GR) to RJ45 (CON27)
- SW5 status is ON
- CON17 cannot be used
- USB1 HOST (CON34): USB1 for USB HOST with type-A connector (CON34)
- USB0 Device/HOST (CON33, J1): USB0 Device/HOST Micro-B connector (CON33), By J1 status or inserted USB cable

Status	Function
J1: Open	Device
J1: Short	Host

- Audio CODEC (U9, M1, CON19, CON20, S19~25): nuvoTon NAU8822L (U9) connects to NUC980 using I2S interface
  - Microphone (M1): Through the NAU8822L chip sound input
  - Speaker output (CON19): Through the NAU8822L chip sound output
  - Earphone output (CON20): Through the NAU8822L chip sound output
  - S19~S25 need short



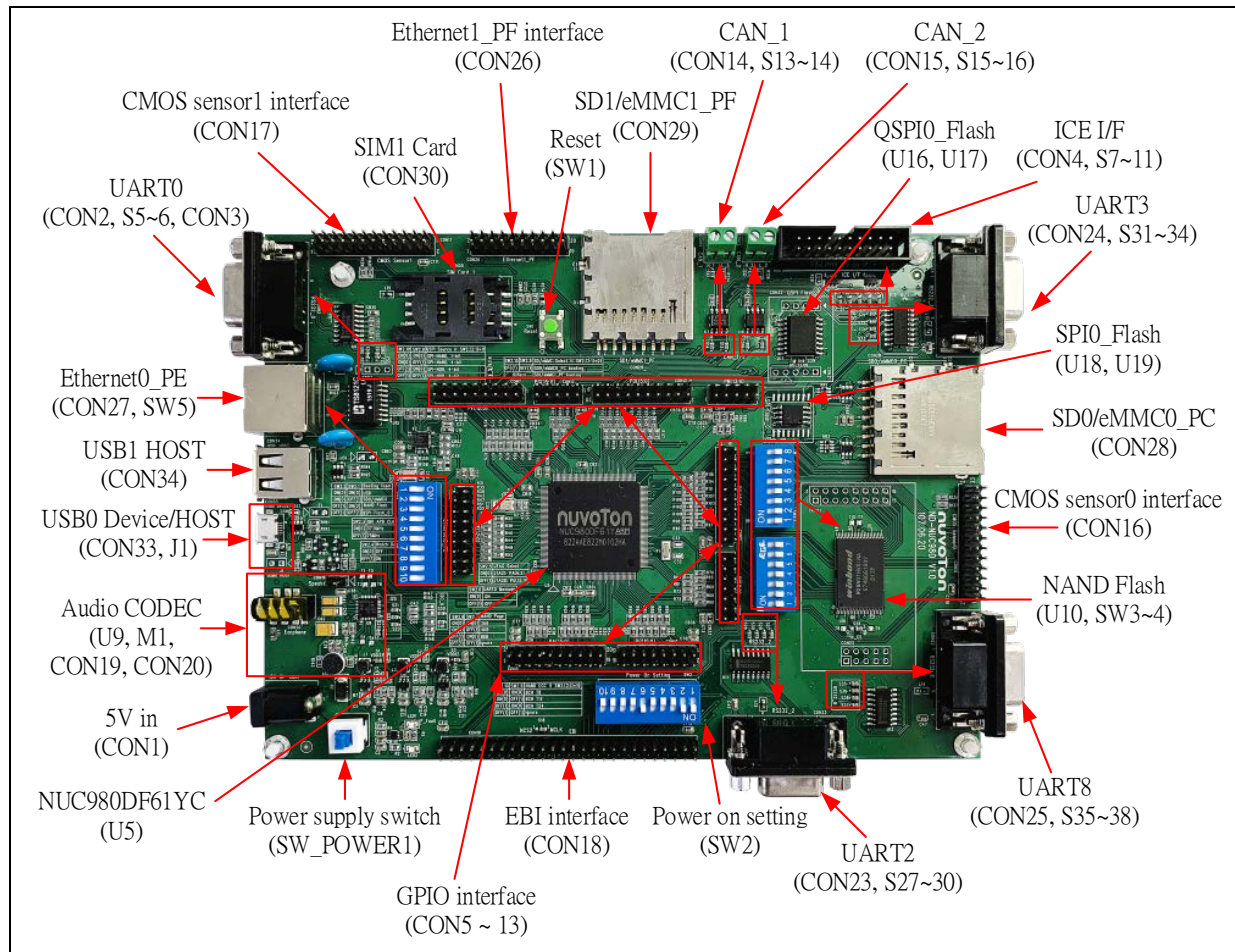


Figure 2-1 NK-NUC980 Board (Front View)

2.4 NK-NUC980 Board — Rear View

Figure 2-2 shows the main components and connectors from the rear view of NK-NUC980 board.

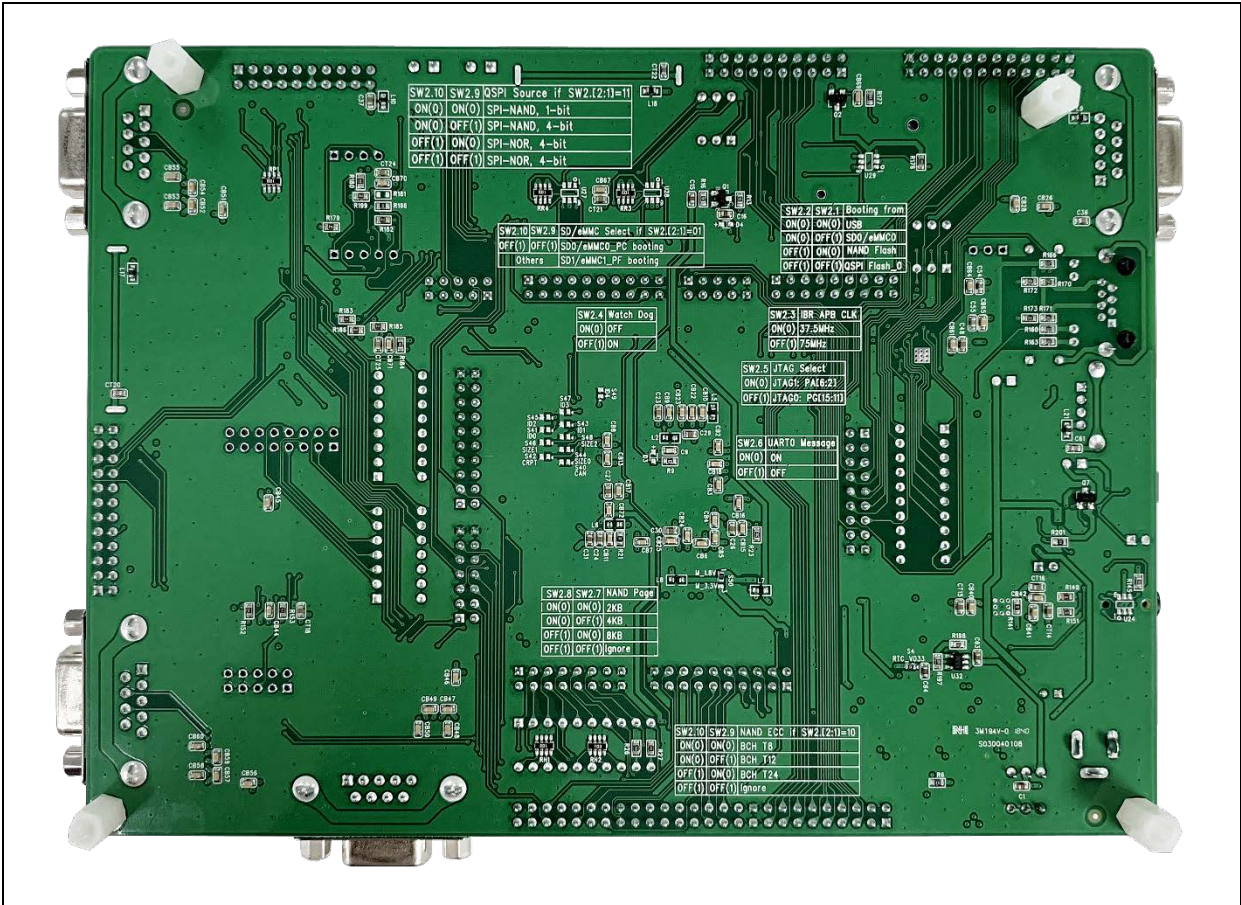


Figure 2-2 NK-NUC980 Board (Rear View)

## 2.5 NK-NUC980 Ethernet Daughter Board — Front View

Figure 2-3 shows the main components and connectors from the front view of Ethernet daughter board.

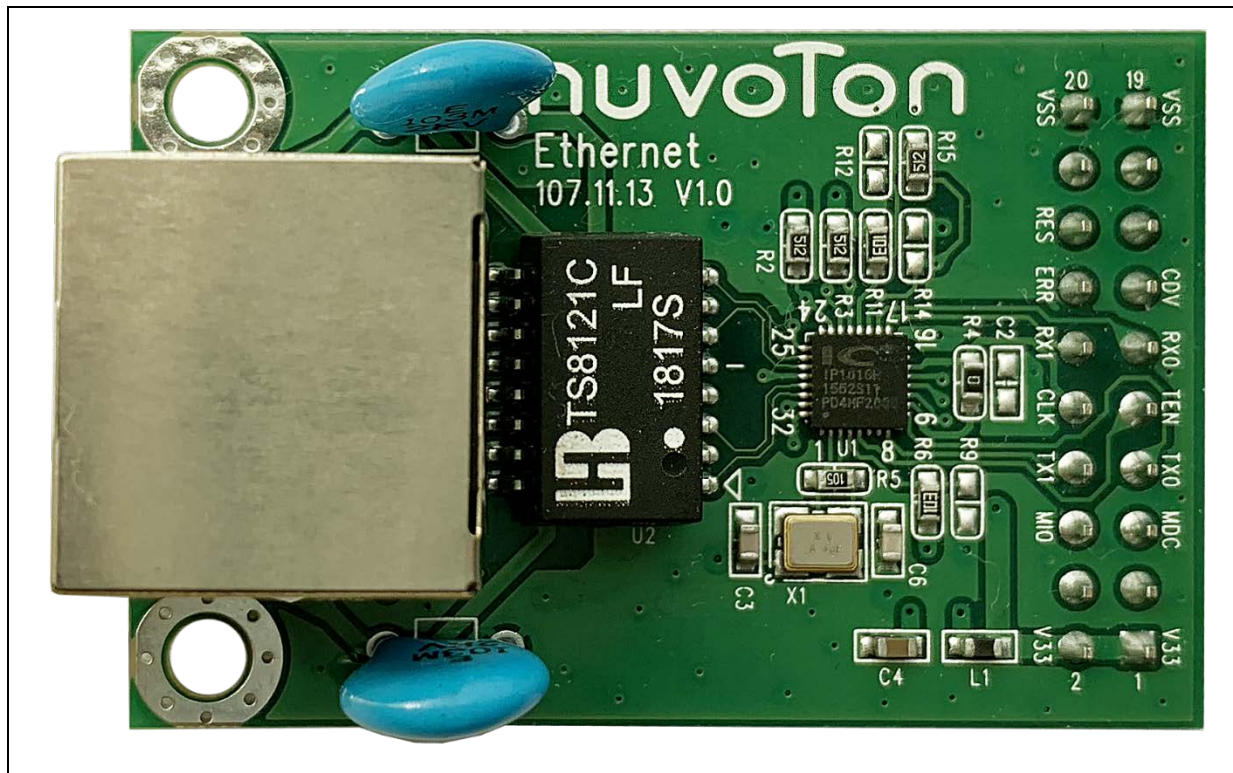


Figure 2-3 NK-NUC980 Ethernet Daughter Board (Front View)



## 2.6 NK-NUC980 Ethernet Daughter Board — Rear View

Figure 2-4 shows the main components and connectors from the rear view of Ethernet daughter board.

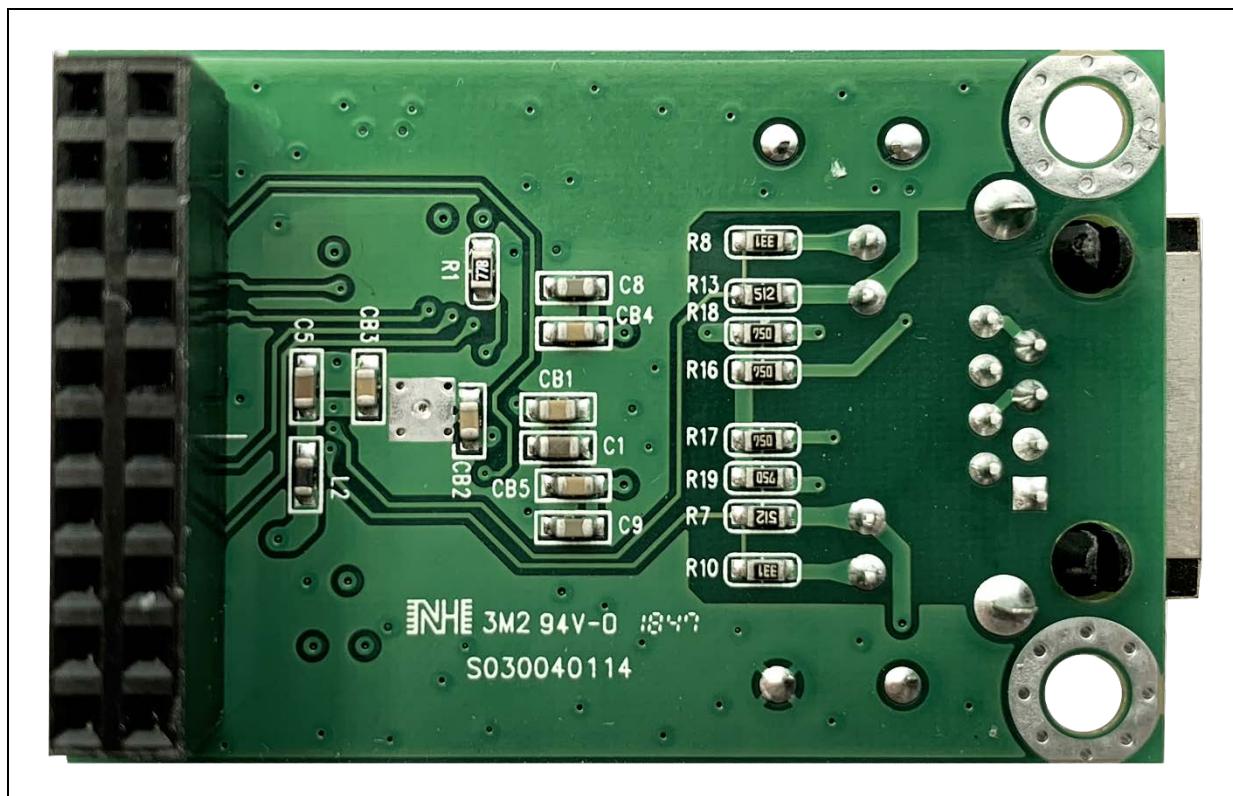


Figure 2-4 NK-NUC980 Ethernet Daughter Board (Rear View)

## 2.7 NK-NUC980 PCB Placement

The following figure shows NK-NUC980 PCB place

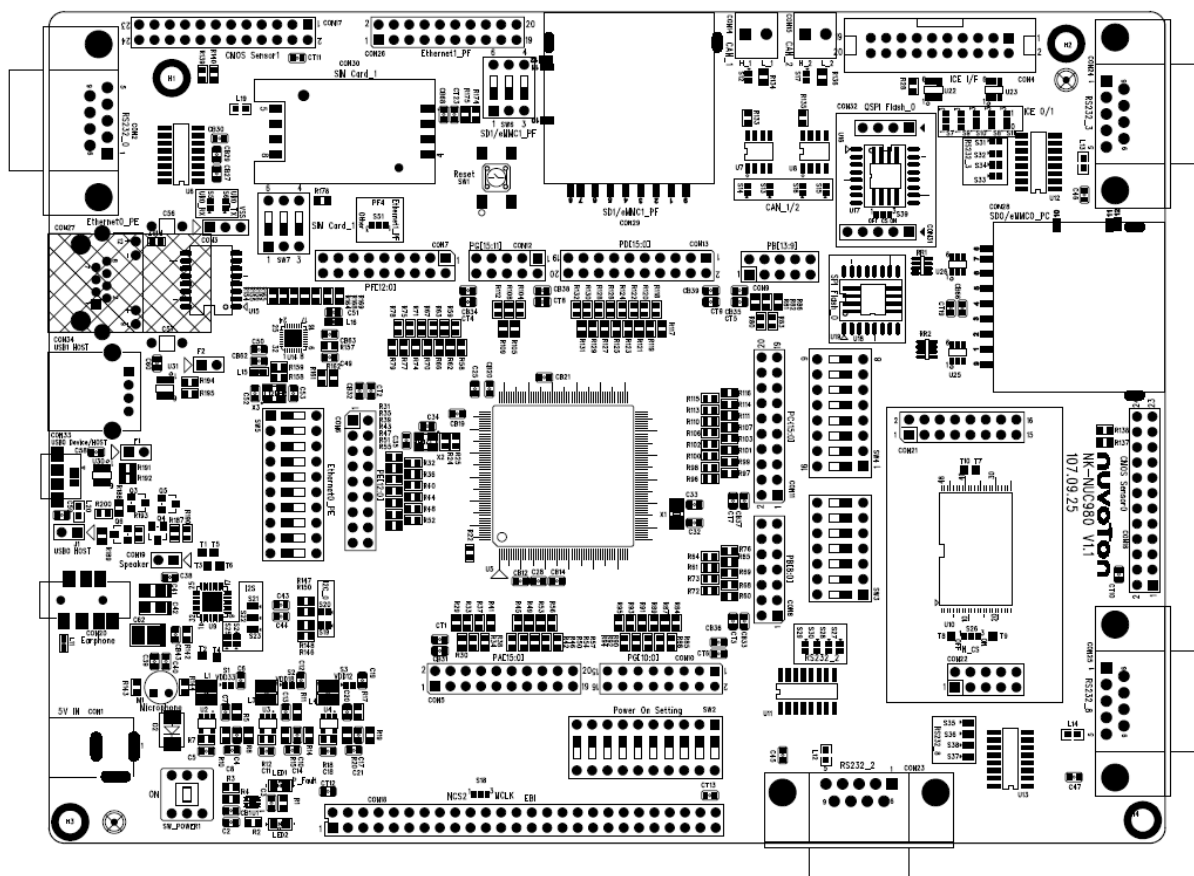


Figure 2-5 NK-NUC980 Front PCB Placement

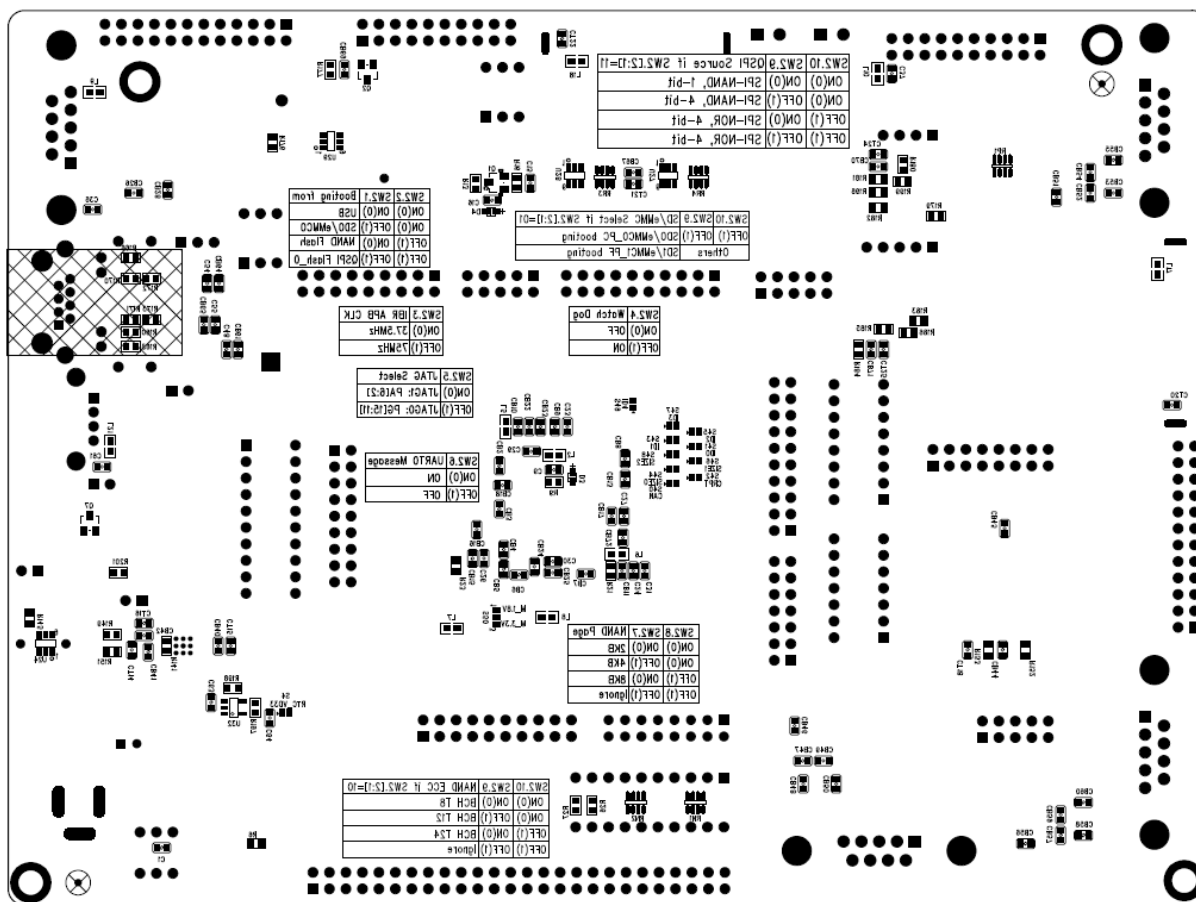


Figure 2-6 NK-NUC980 Rear PCB Placement

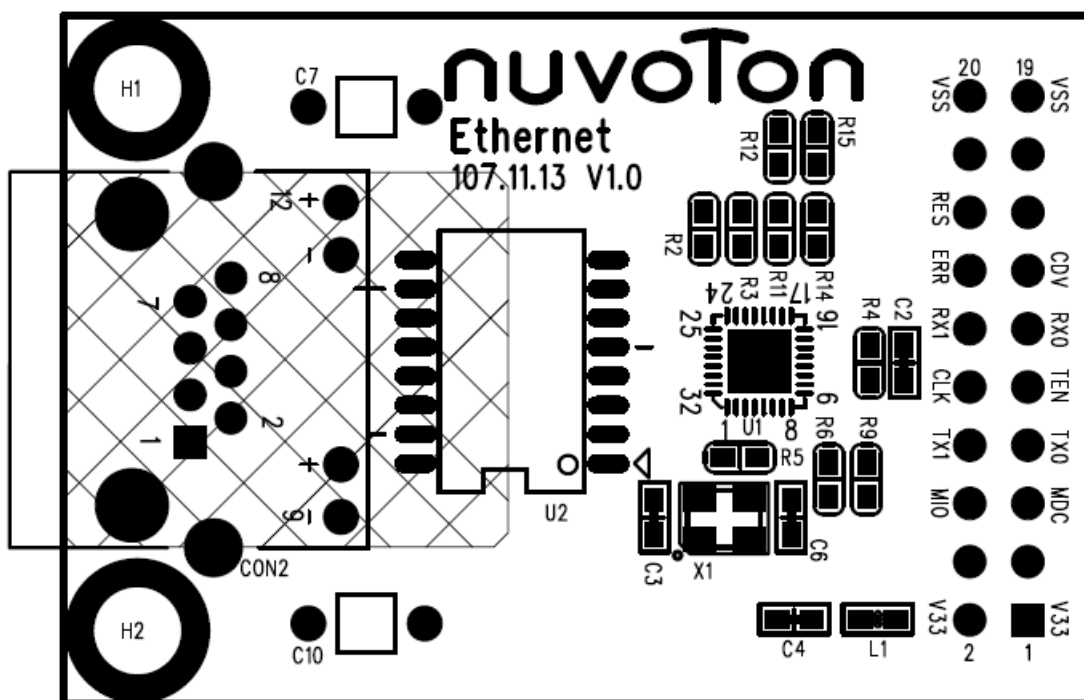


Figure 2-7 NK-NUC980 Ethernet Daughter Board Front PCB Placement

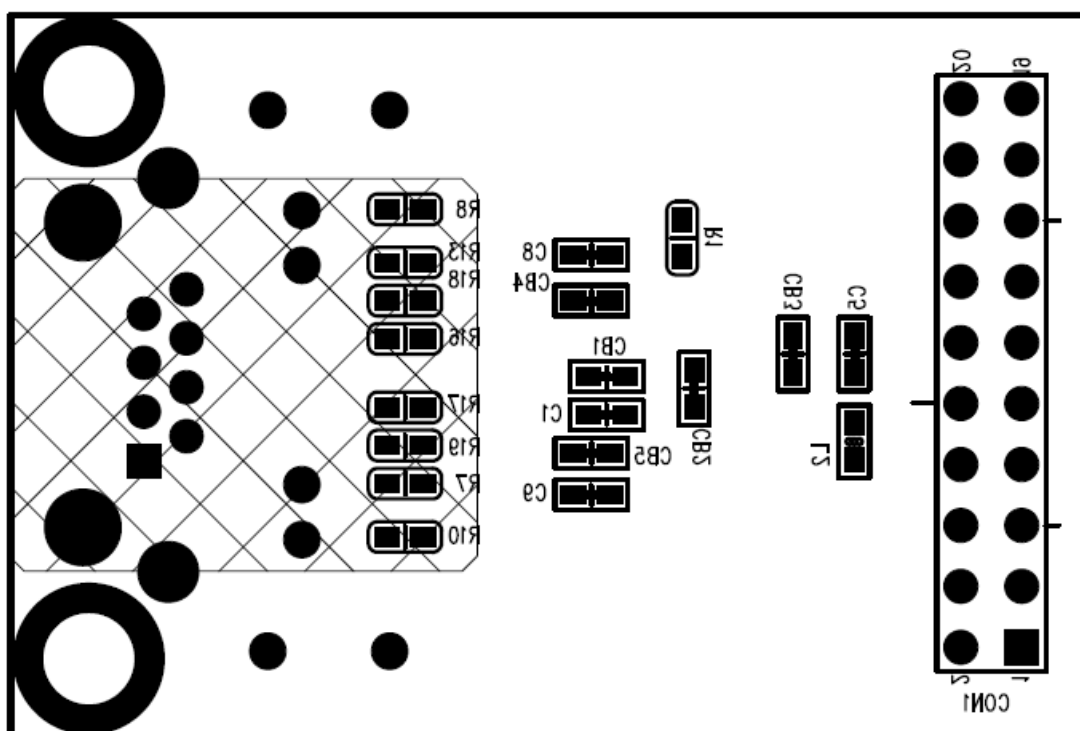
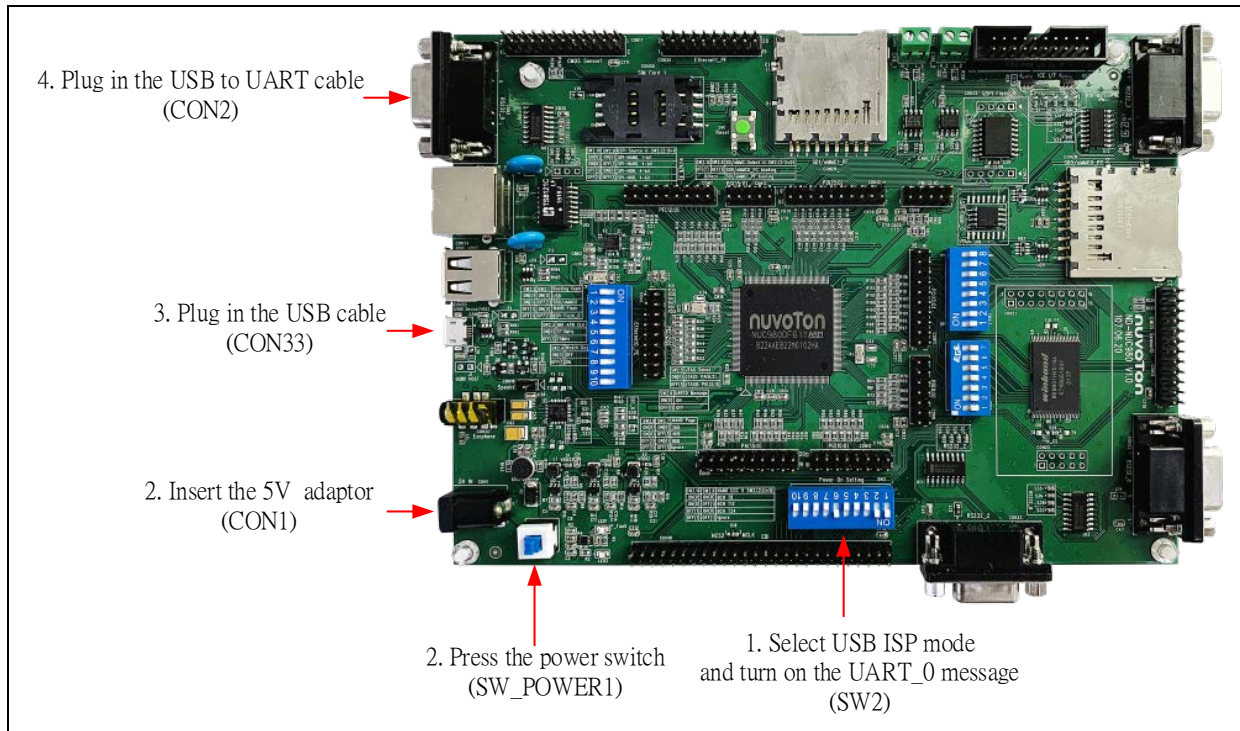


Figure 2-8 NK-NUC980 Ethernet Daughter Board Rear PCB Placement



### 3 QUICK STARTING TO USE NK-NUC980



#### 1. Select USB ISP mode and turn on the UART\_0 message

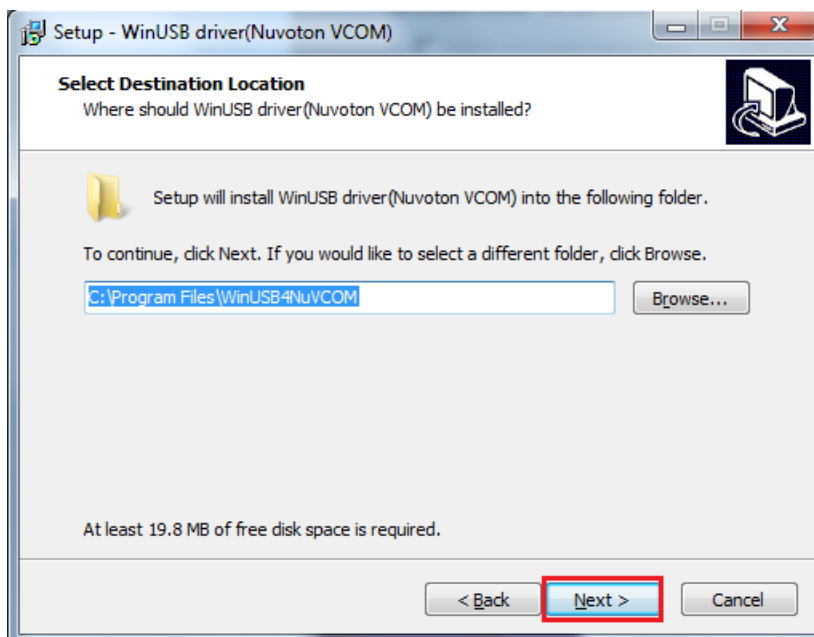
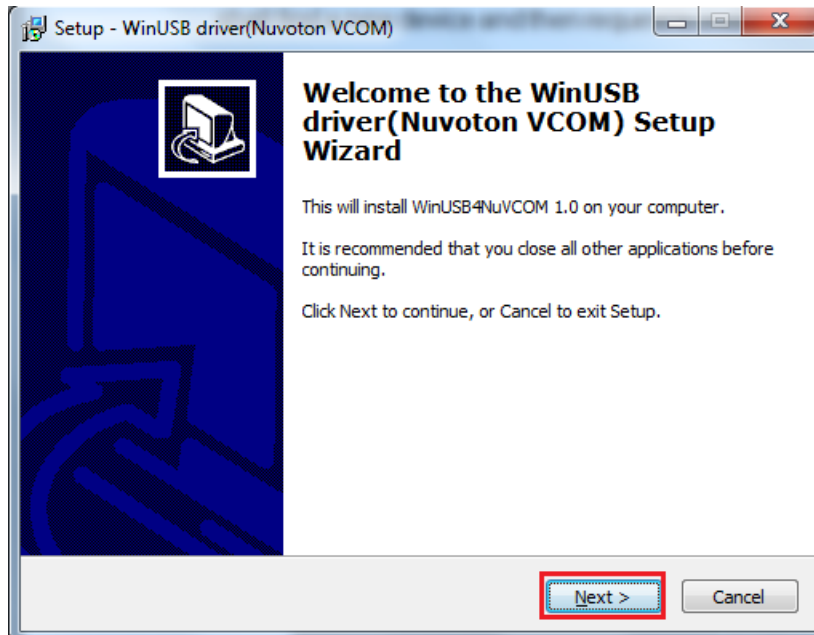
The NK-NUC980 provides jumpers (SW2) to select boot-up conditions. To select USB ISP mode and turn on the UART\_0 message, PA0、PA1 and PA5 must be set to low (SW2.1、SW2.2 and SW2.6 status is ON).

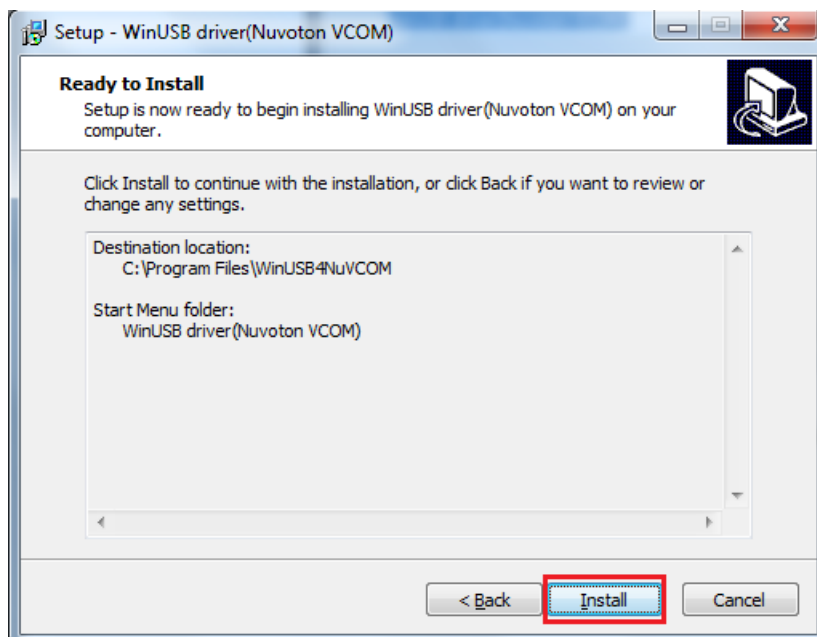
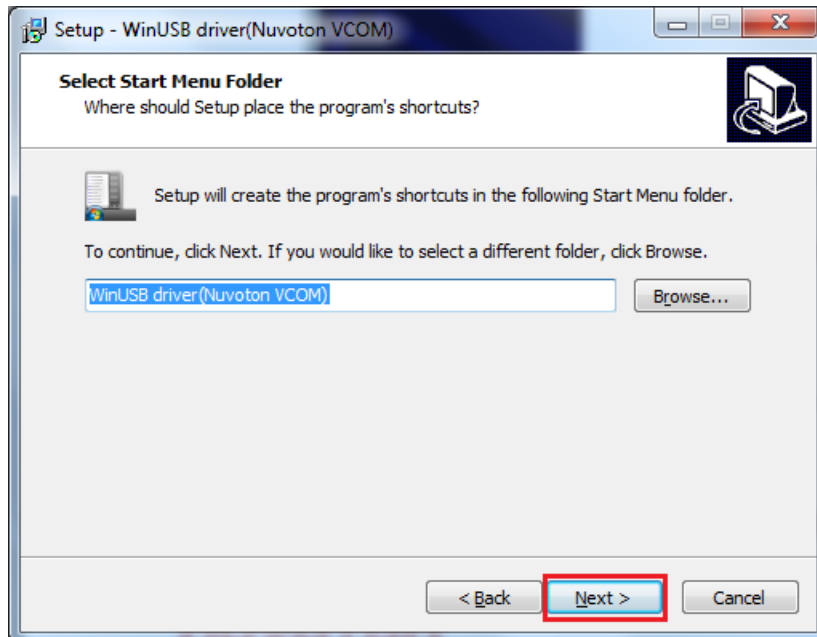
#### 2. Insert the 5V adaptor (CON1) and press the power switch (SW-POWER1)

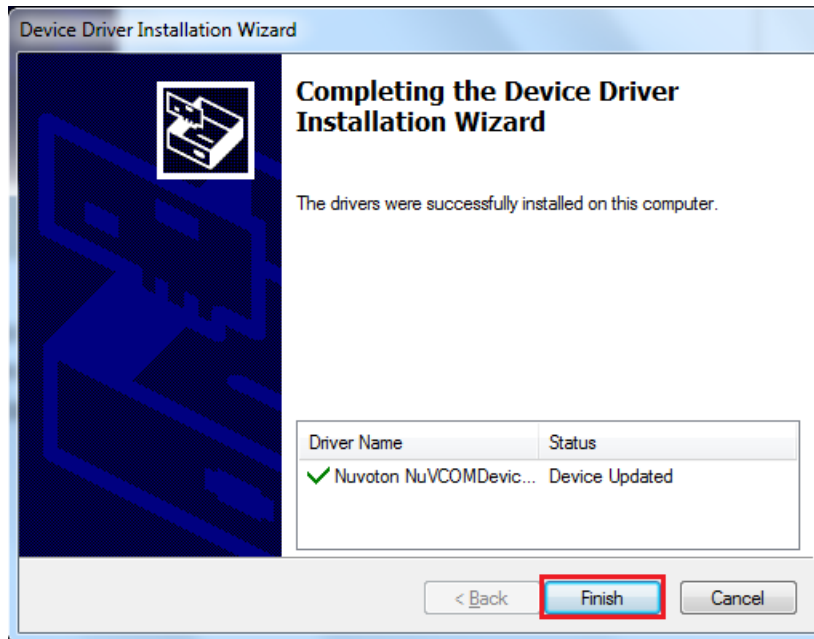
#### 3. Install the NuWriter driver

The burning tool requires a NuWriter driver to be installed on PC first. Please follow the steps below to install the driver.

Run the "WinUSB4NuVCOM.exe" before the USB cable is plugged in. The "WinUSB4NuVCOM.exe" can be found in the BSP "Tool" directory. Power on the NK-NUC980 board and plug the USB cable into PC, the Windows shall find a new device and then request to install its driver.







If the installation is successful, a virtual COM port named "WinUSB driver (Nuvoton VCOM)" can be found by using "Device Manager" to check the ports devices.



#### 4. Connect the RS232\_0 to PC

Connect the RS232\_0 DB9 female port (CON2) to the PC via USB to UART cable.

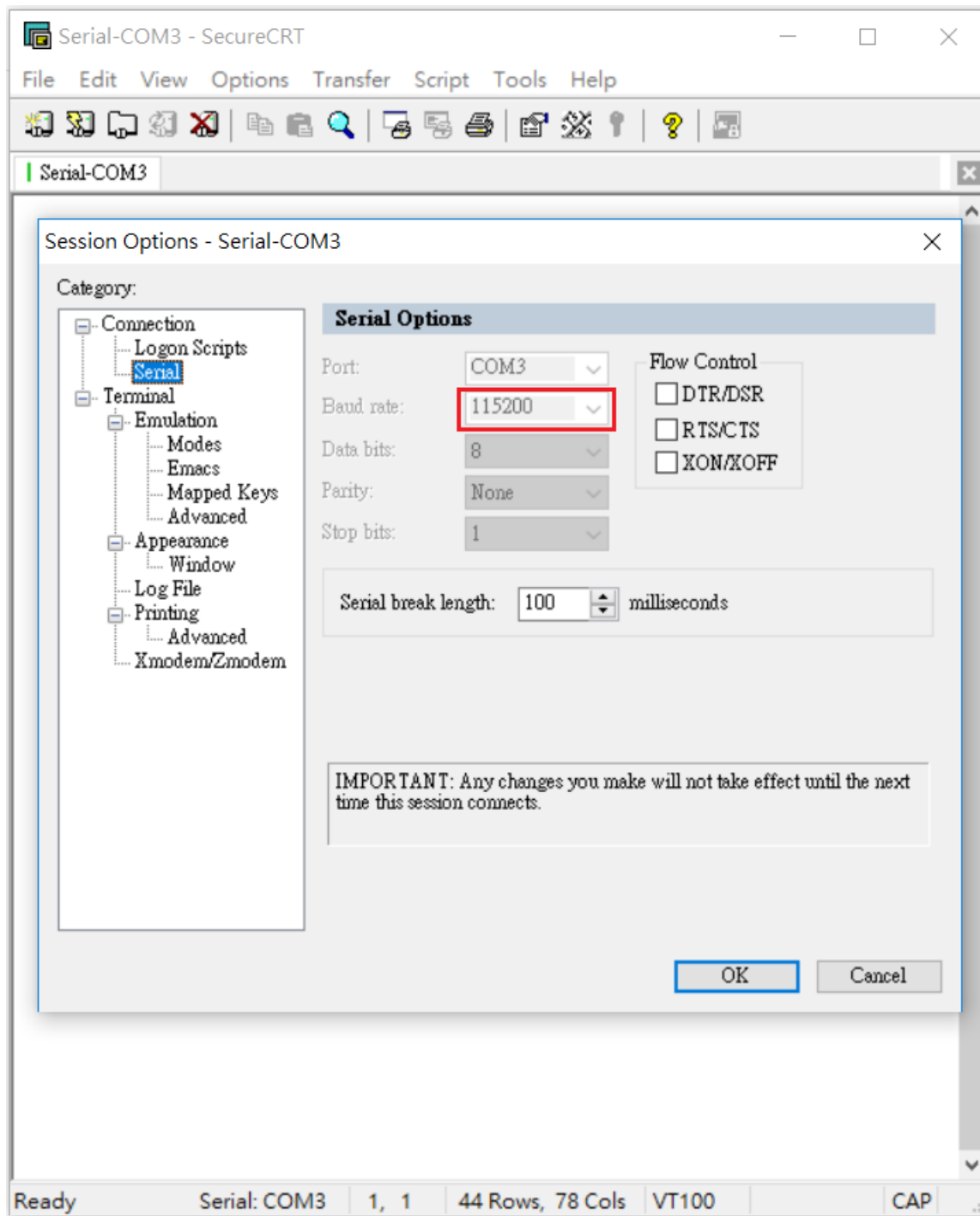
The PC will recognize the board as a USB composite device.

The USB serial port function is used to print some messages on PC API, such as SecureCRT, through the standard UART protocol to help user to debug program.

#### 5. Open the Serial Port Terminal

Use the serial port terminal, SecureCRT for example, to print out debug message.

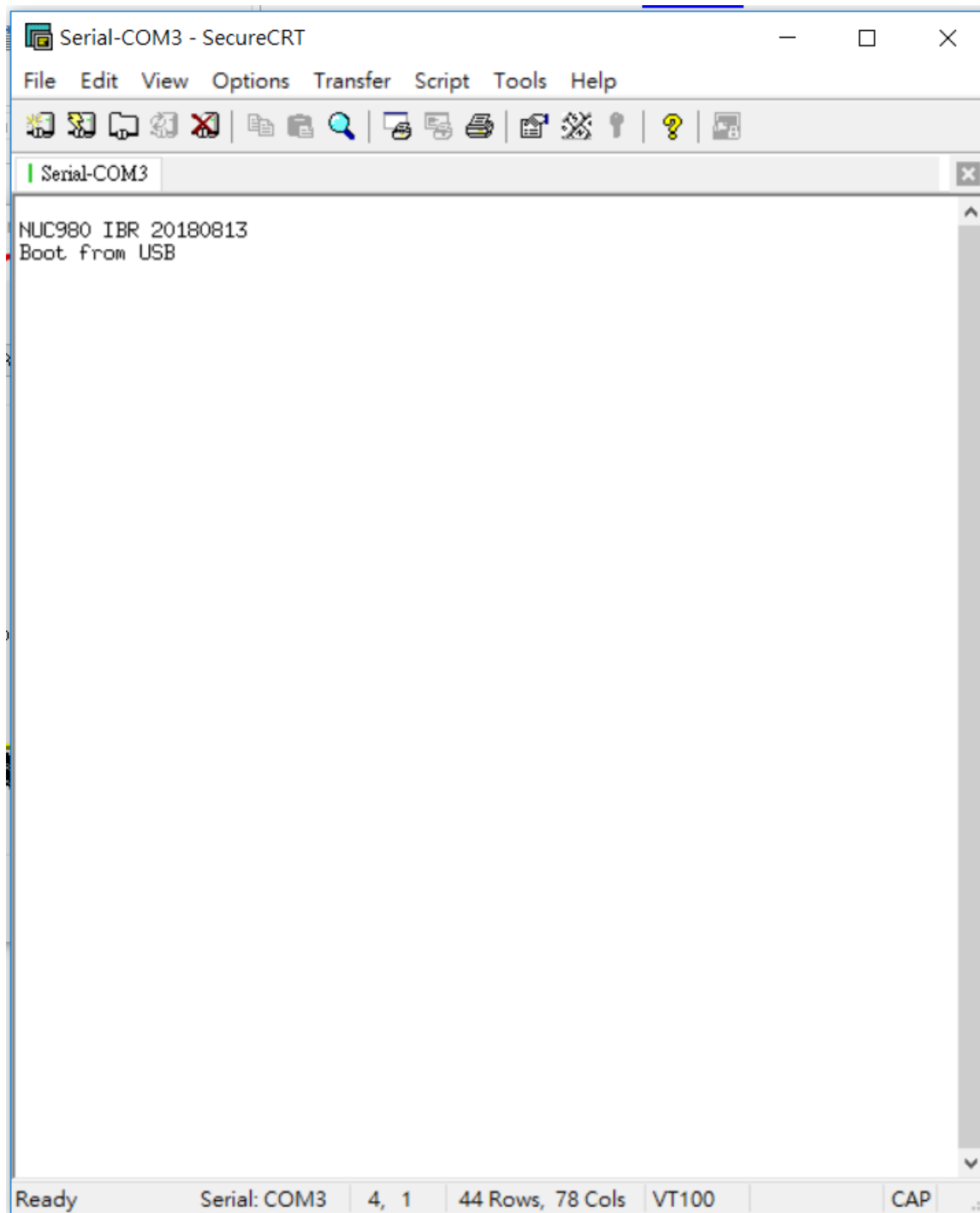




## 6. Reset chip

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

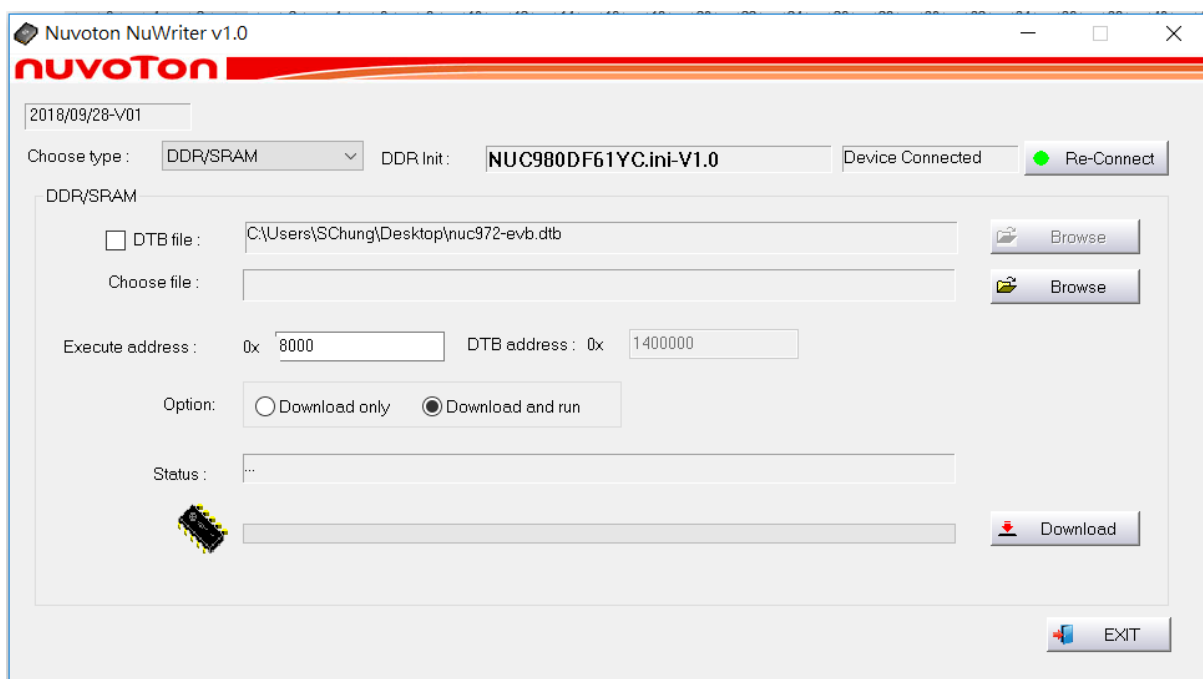
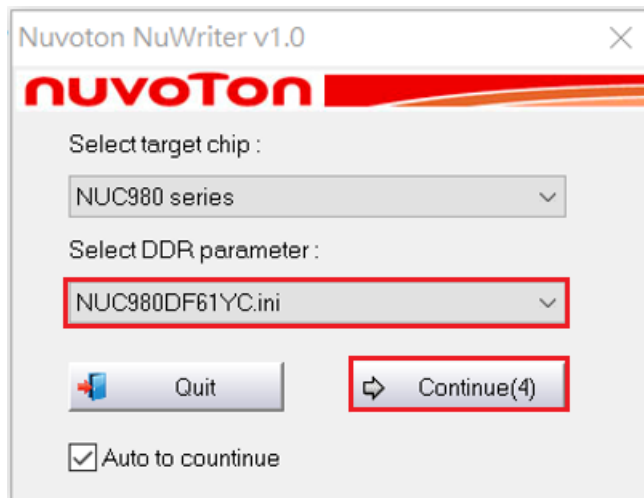




## 7. Run The NuWriter Tool

Double click "nuwriter.exe" on PC. NuWriter will start and a window appears. Select target chip to NUC980DF61YC and select DDR parameter to DDR initial files.

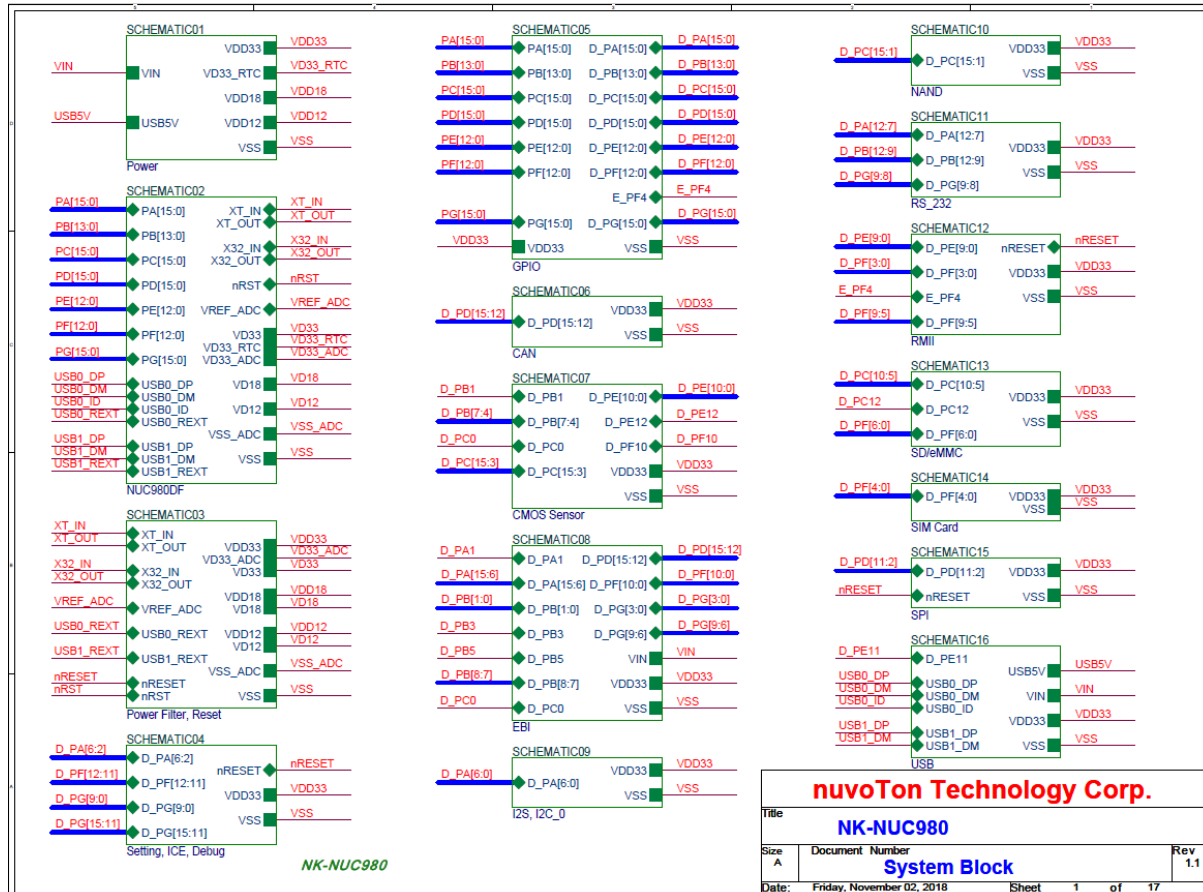
After select DDR parameter, click "Continue" to use NuWriter tool.



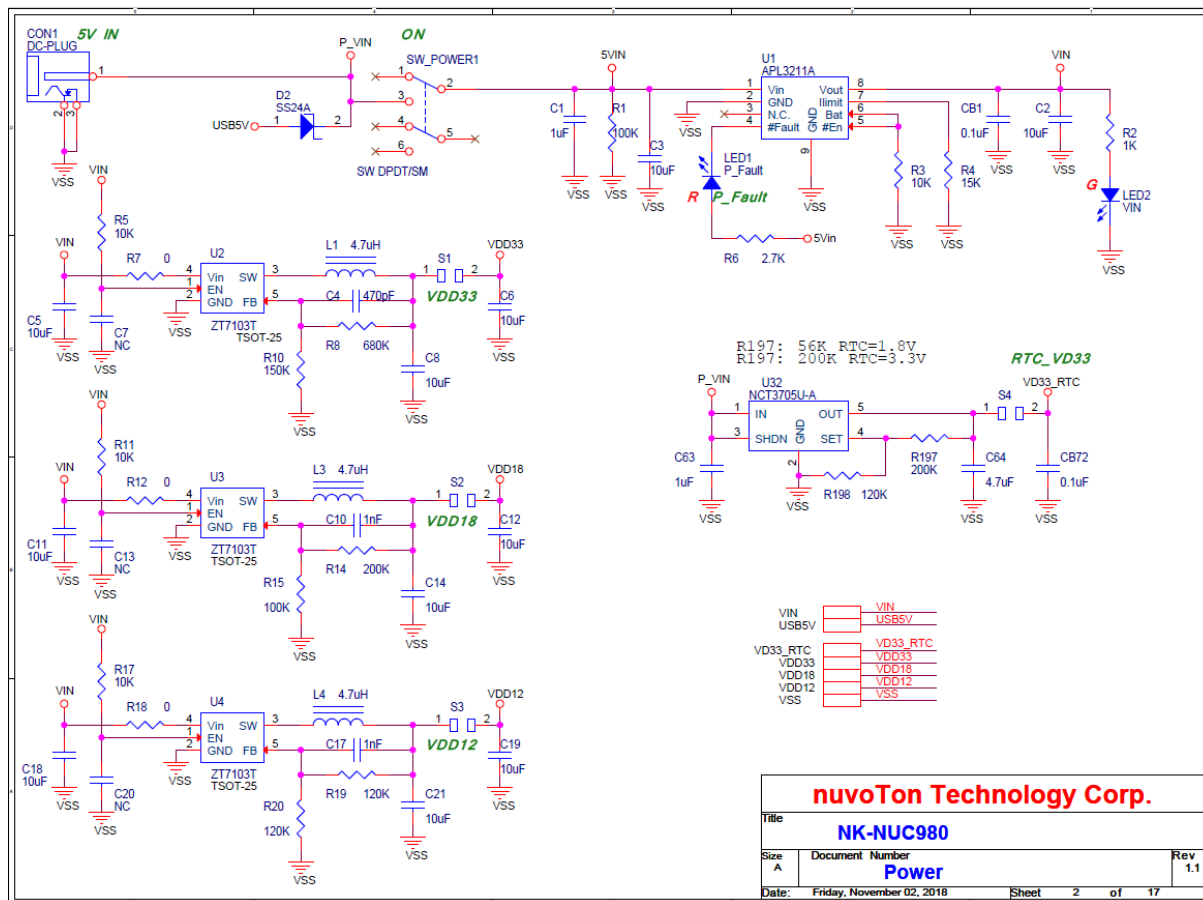
For detailed NuWriter operation, please refer to “NUC980 NuWriter User Manual”.

## 4 NK-NUC980 SCHEMATICS

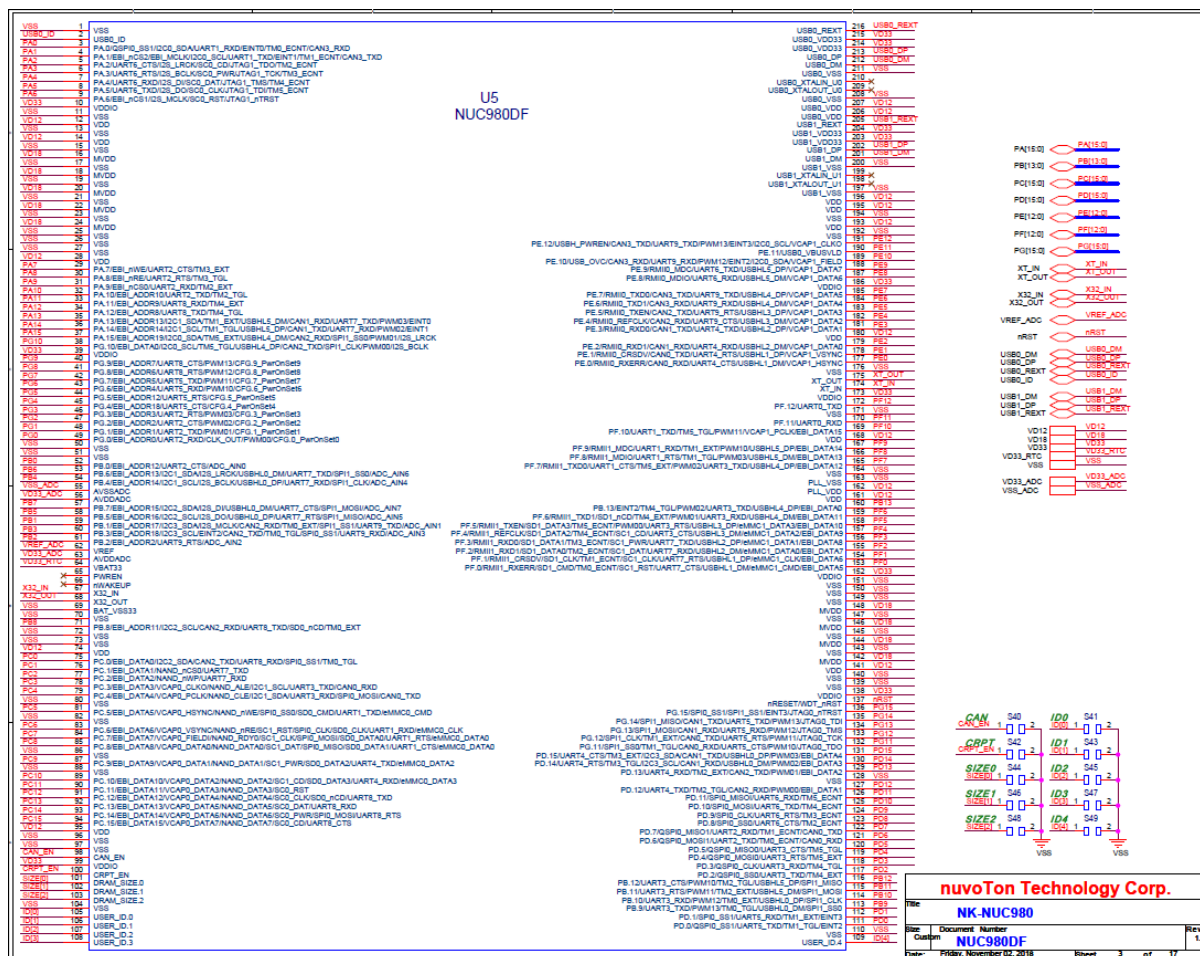
### 4.1 NK-NUC980 — System Block Schematic



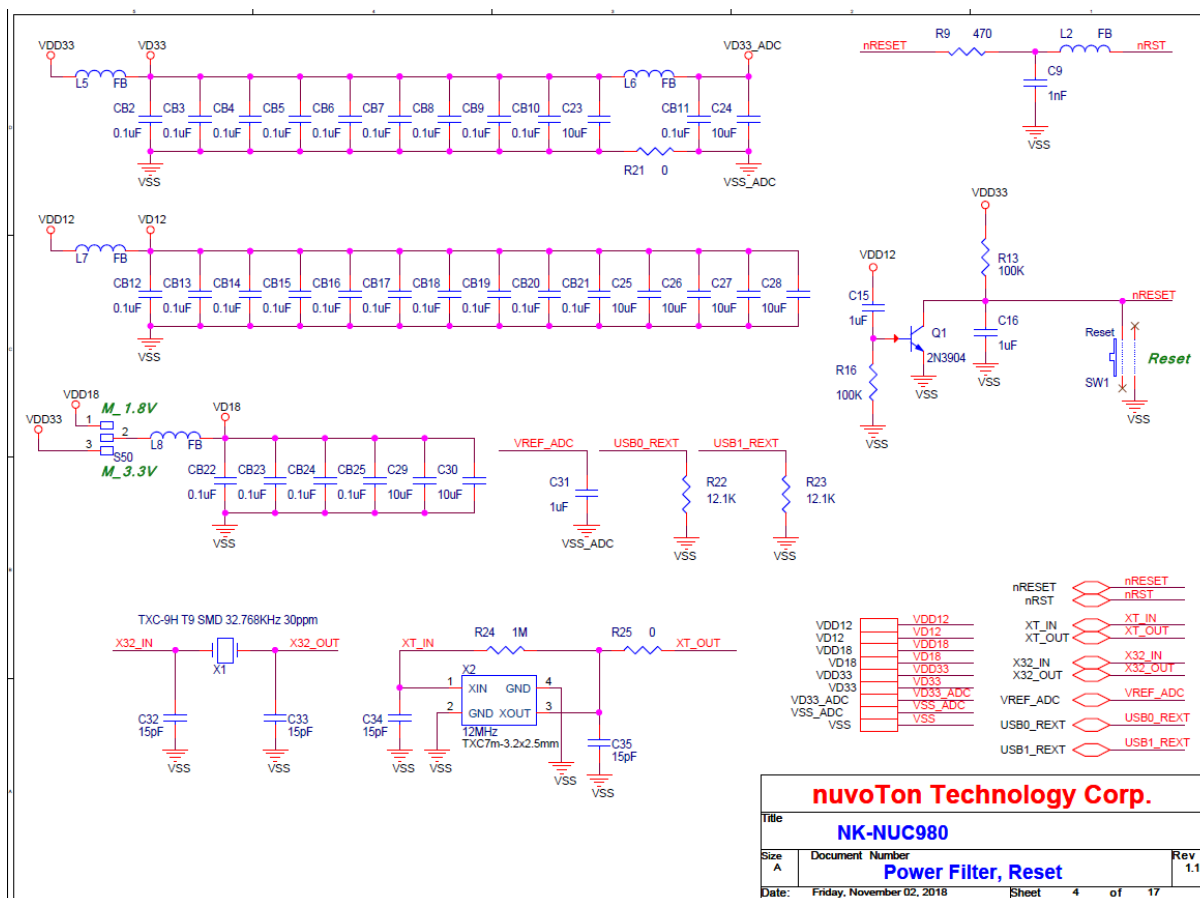
## 4.2 NK-NUC980 — Power Schematic



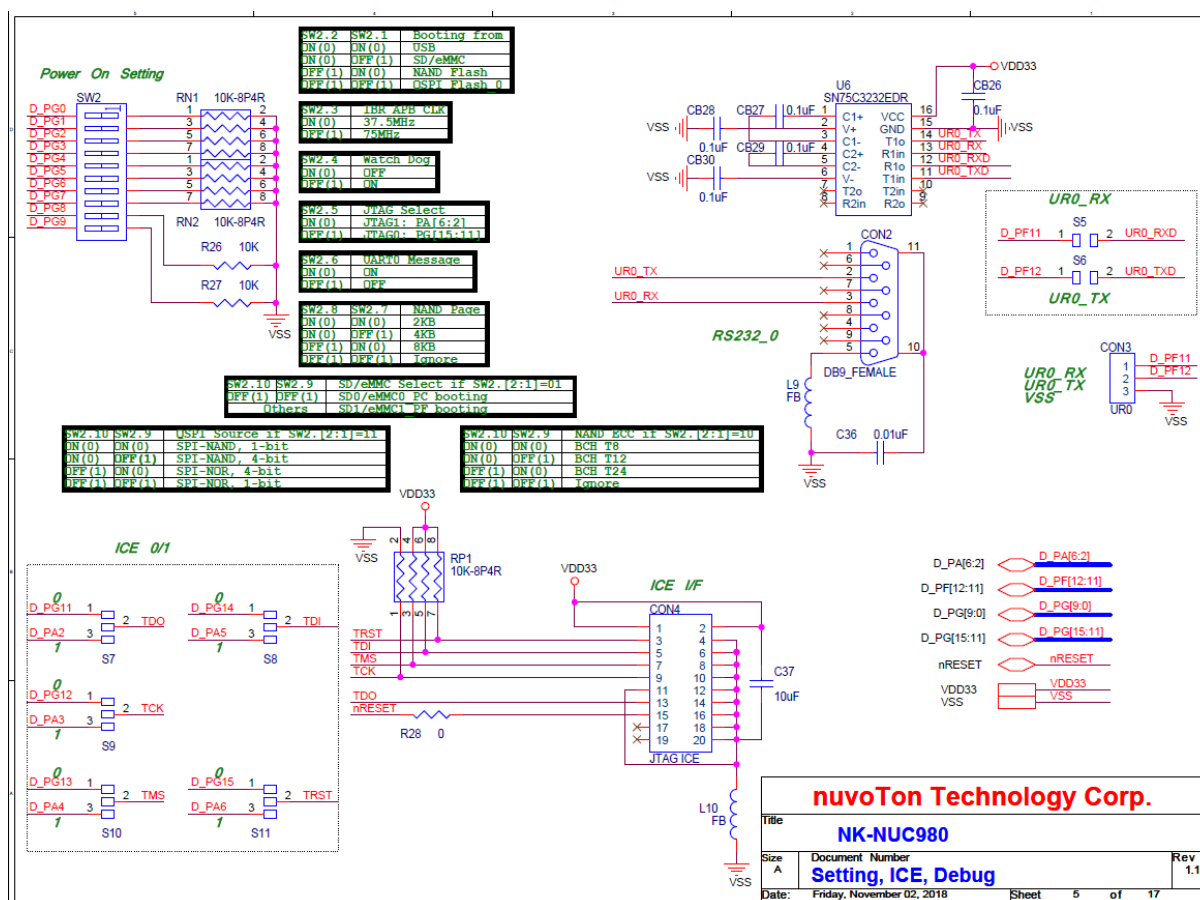
### 4.3 NK-NUC980 – NUC980DF Schematic



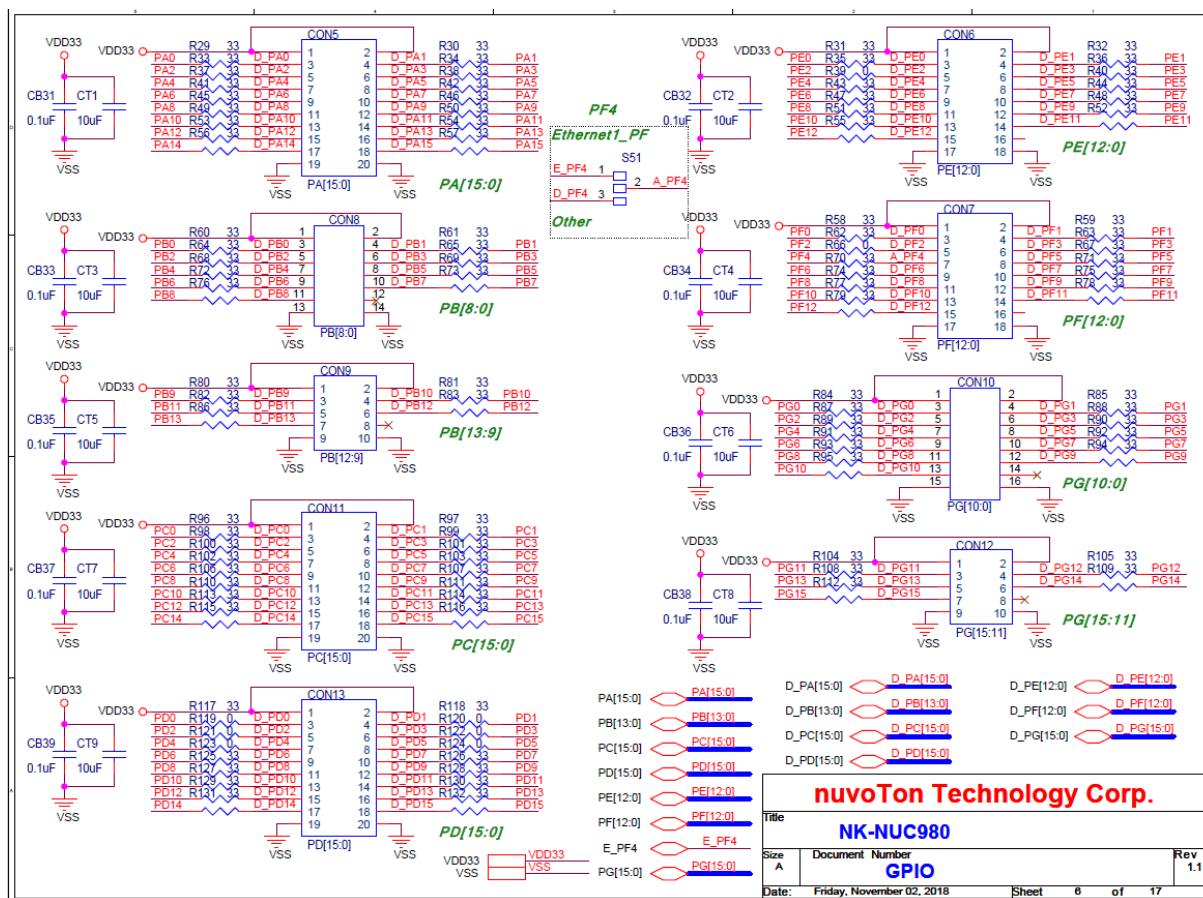
#### 4.4 NK-NUC980 — Power Filter, Reset Schematic



## 4.5 NK-NUC980 — Setting, ICE, Debug Schematic

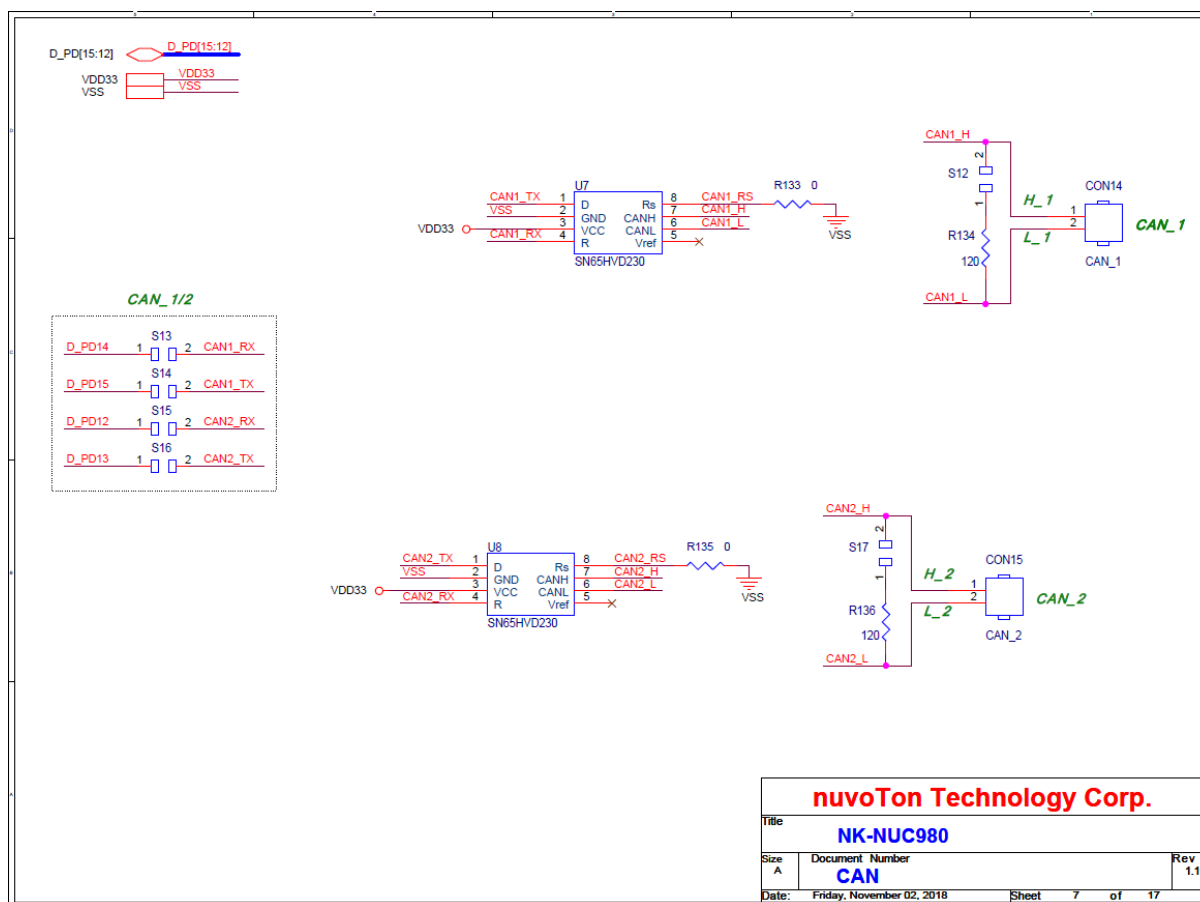


## 4.6 NK-NUC980 – GPIO Schematic





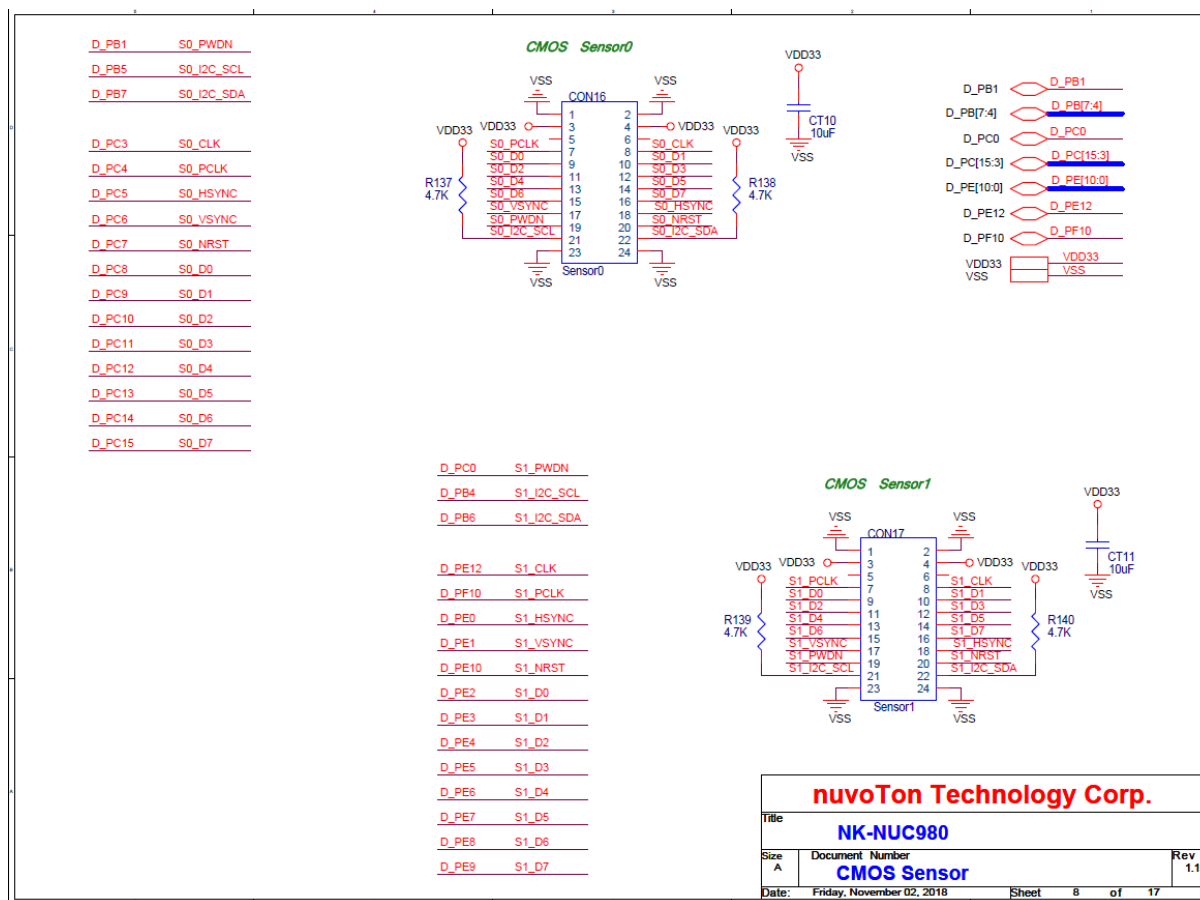
## 4.7 NK-NUC980 – CAN Schematic



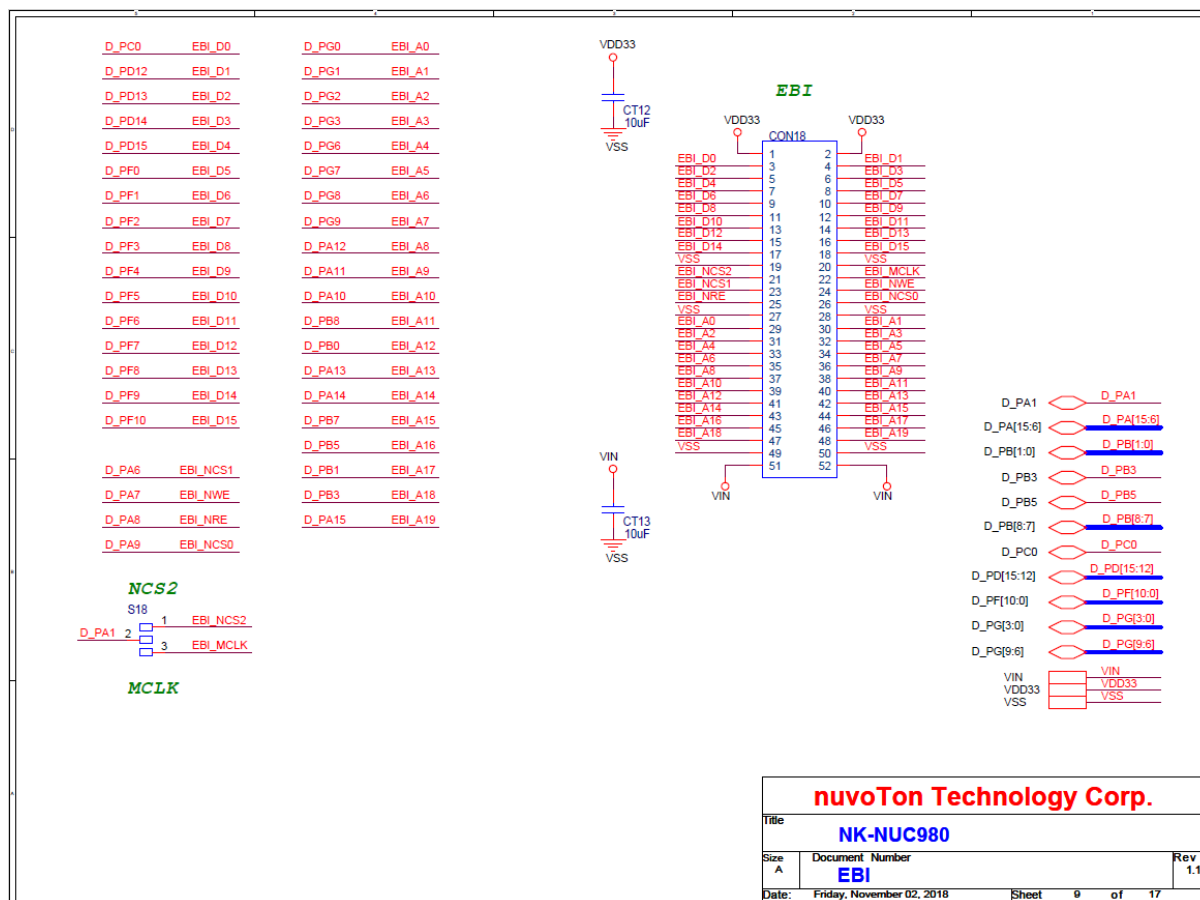
nuvoTon Technology Corp.

Title		
NK-NUC980		
Size	Document Number	Rev
A	CAN	1.1
Date:	Friday, November 02, 2018	Sheet 7 of 17

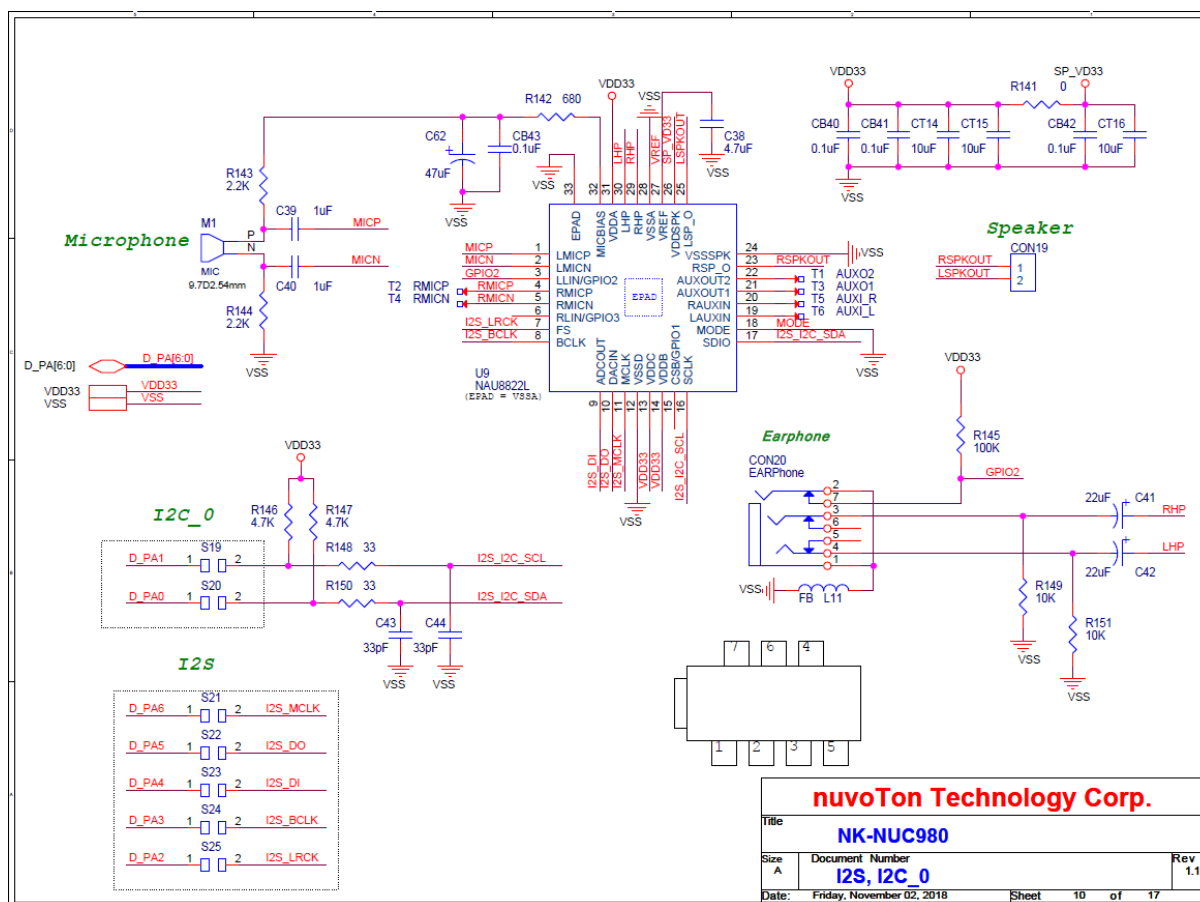
## 4.8 NK-NUC980 — CMOS Sensor Schematic



## 4.9 NK-NUC980 – EBI Schematic



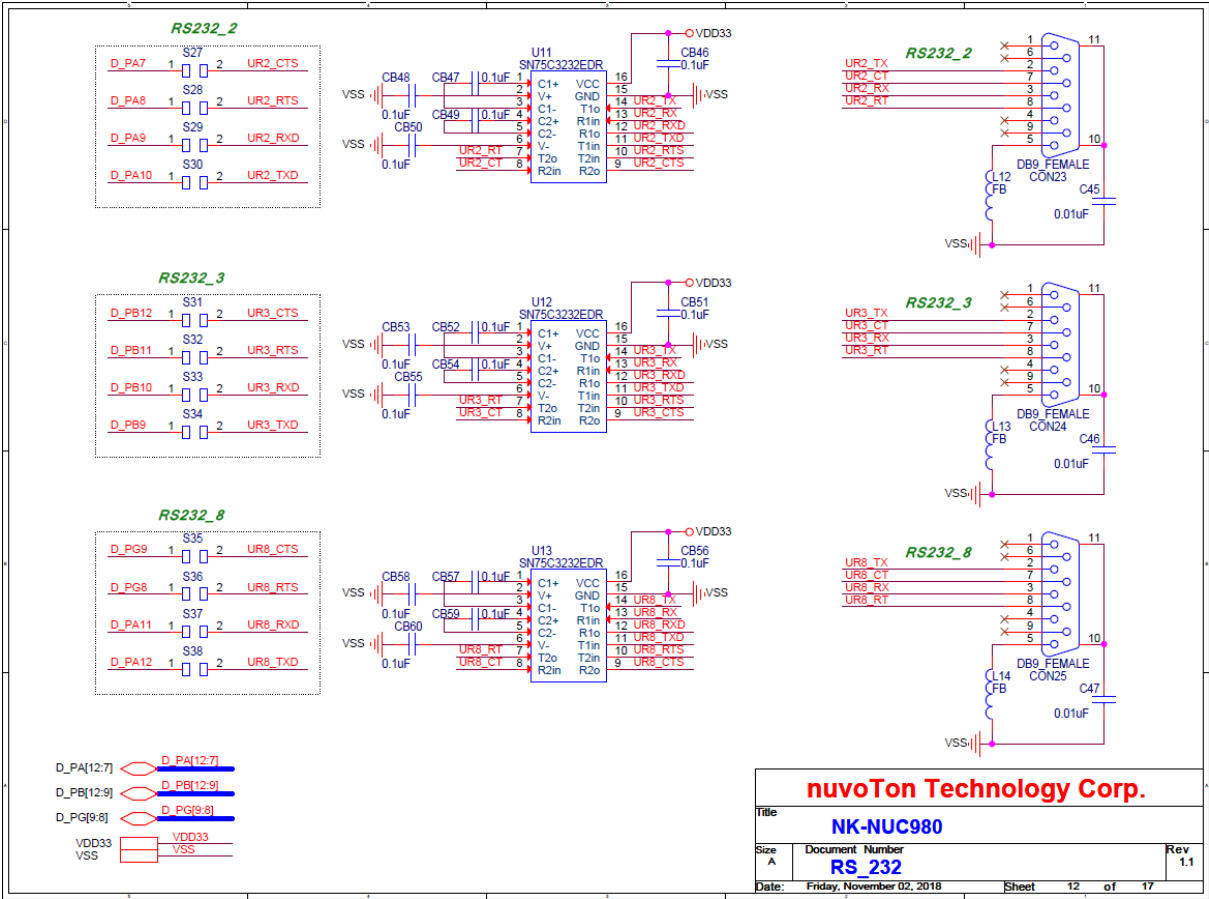
# 4.10 NK-NUC980 — I2S, I2C\_0 Schematic

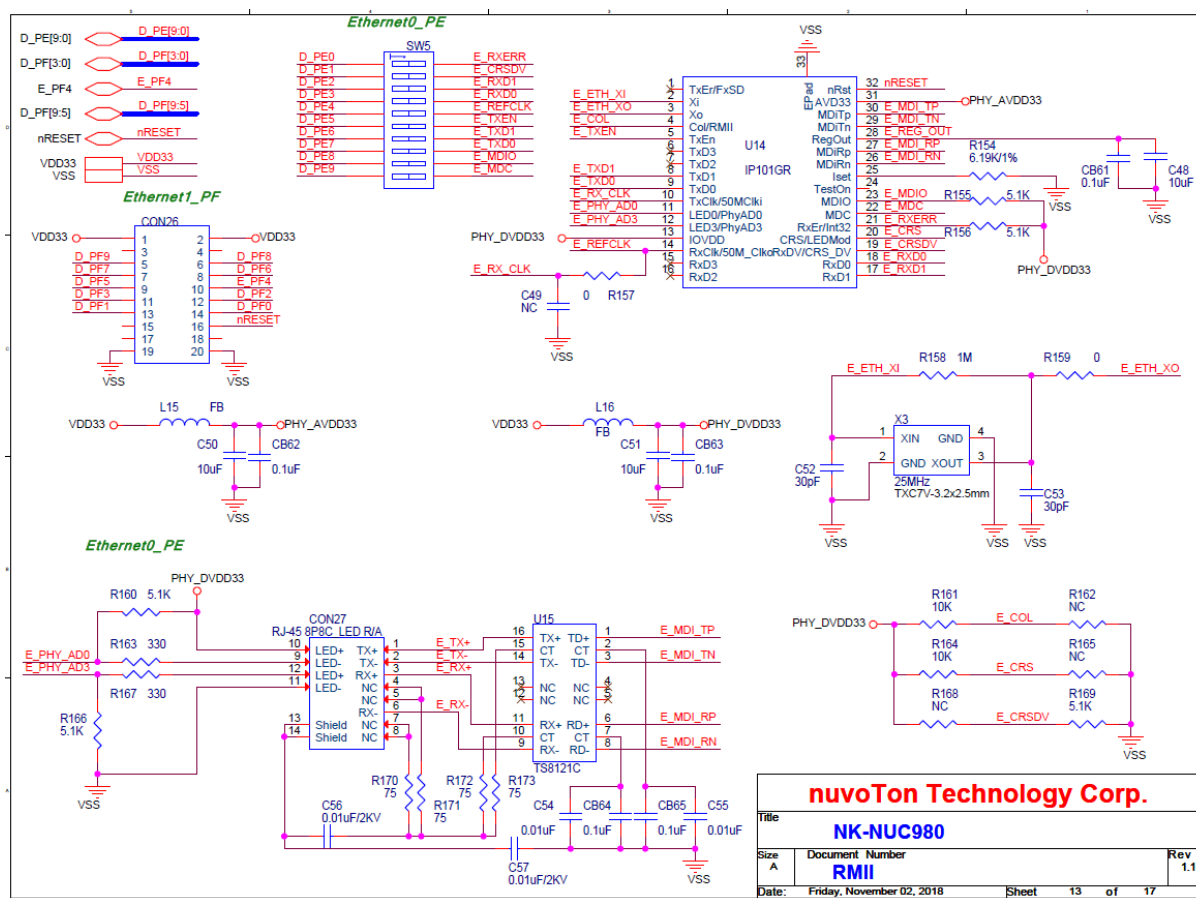


The schematic diagram illustrates the internal structure of the NAND\_F component, which is a NAND Flash. It shows the following components and connections:

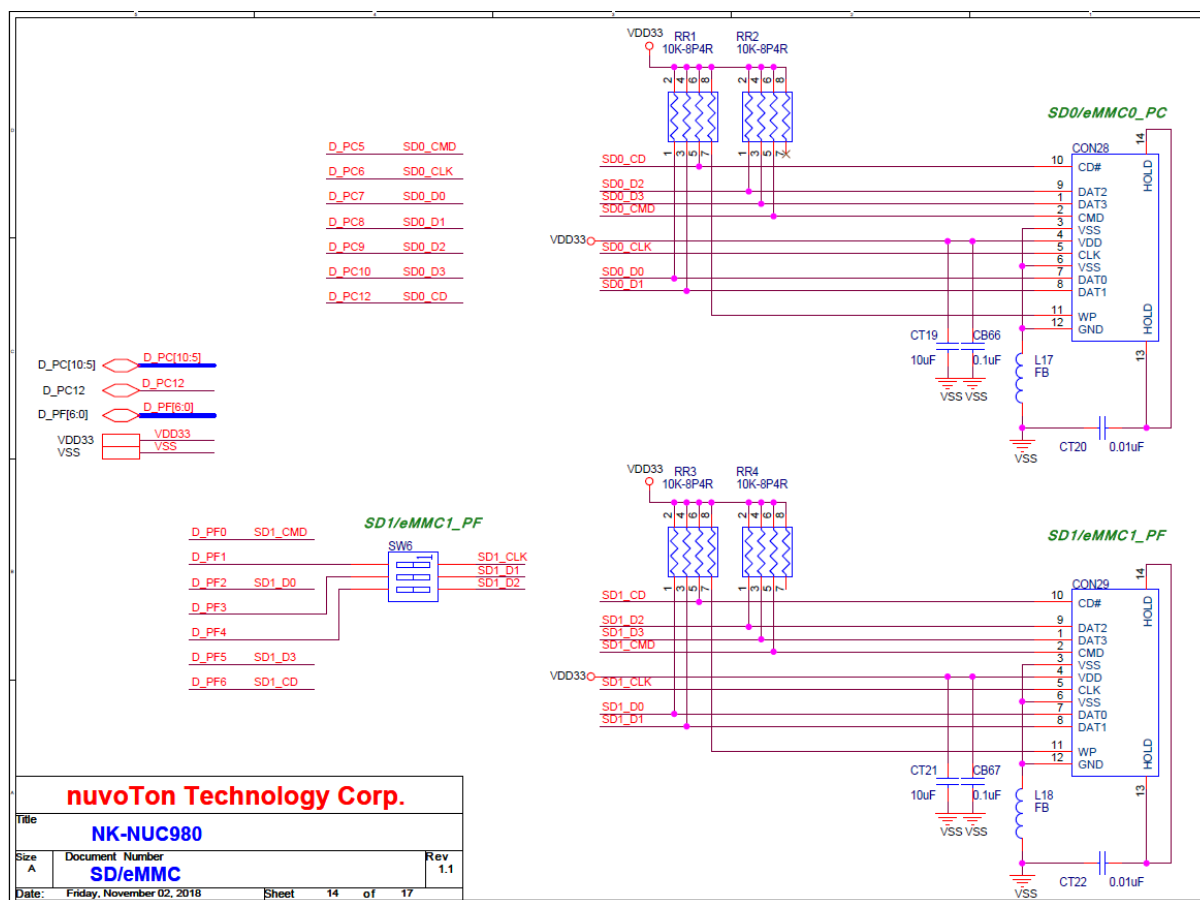
- SW3 (Switch 3):** A 3-pin switch connected to VDD33 and VSS. Its pins are labeled 1, 2, and 3. Pin 1 is connected to VDD33, pin 2 is connected to VSS, and pin 3 is connected to the NAND\_F component.
- SW4 (Switch 4):** A 4-pin switch connected to VDD33 and VSS. Its pins are labeled 1, 2, 3, and 4. Pin 1 is connected to VDD33, pin 2 is connected to VSS, pin 3 is connected to the NAND\_F component, and pin 4 is connected to VSS.
- U10 (NAND Flash):** A NAND Flash component with pins labeled 1 through 44. It is connected to VDD33 and VSS. The connections are as follows:
  - Pin 1: VDD33
  - Pin 2: VSS
  - Pin 3: VDD33
  - Pin 4: VSS
  - Pin 5: VDD33
  - Pin 6: VSS
  - Pin 7: VDD33
  - Pin 8: VSS
  - Pin 9: VDD33
  - Pin 10: VSS
  - Pin 11: VDD33
  - Pin 12: VSS
  - Pin 13: VDD33
  - Pin 14: VSS
  - Pin 15: VDD33
  - Pin 16: VSS
  - Pin 17: VDD33
  - Pin 18: VSS
  - Pin 19: VDD33
  - Pin 20: VSS
  - Pin 21: VDD33
  - Pin 22: VSS
  - Pin 23: VDD33
  - Pin 24: VSS
  - Pin 25: VDD33
  - Pin 26: VSS
  - Pin 27: VDD33
  - Pin 28: VSS
  - Pin 29: VDD33
  - Pin 30: VSS
  - Pin 31: VDD33
  - Pin 32: VSS
  - Pin 33: VDD33
  - Pin 34: VSS
  - Pin 35: VDD33
  - Pin 36: VSS
  - Pin 37: VDD33
  - Pin 38: VSS
  - Pin 39: VDD33
  - Pin 40: VSS
  - Pin 41: VDD33
  - Pin 42: VSS
  - Pin 43: VDD33
  - Pin 44: VSS

4.12 NK-NUC980 – RS\_232 Schematic



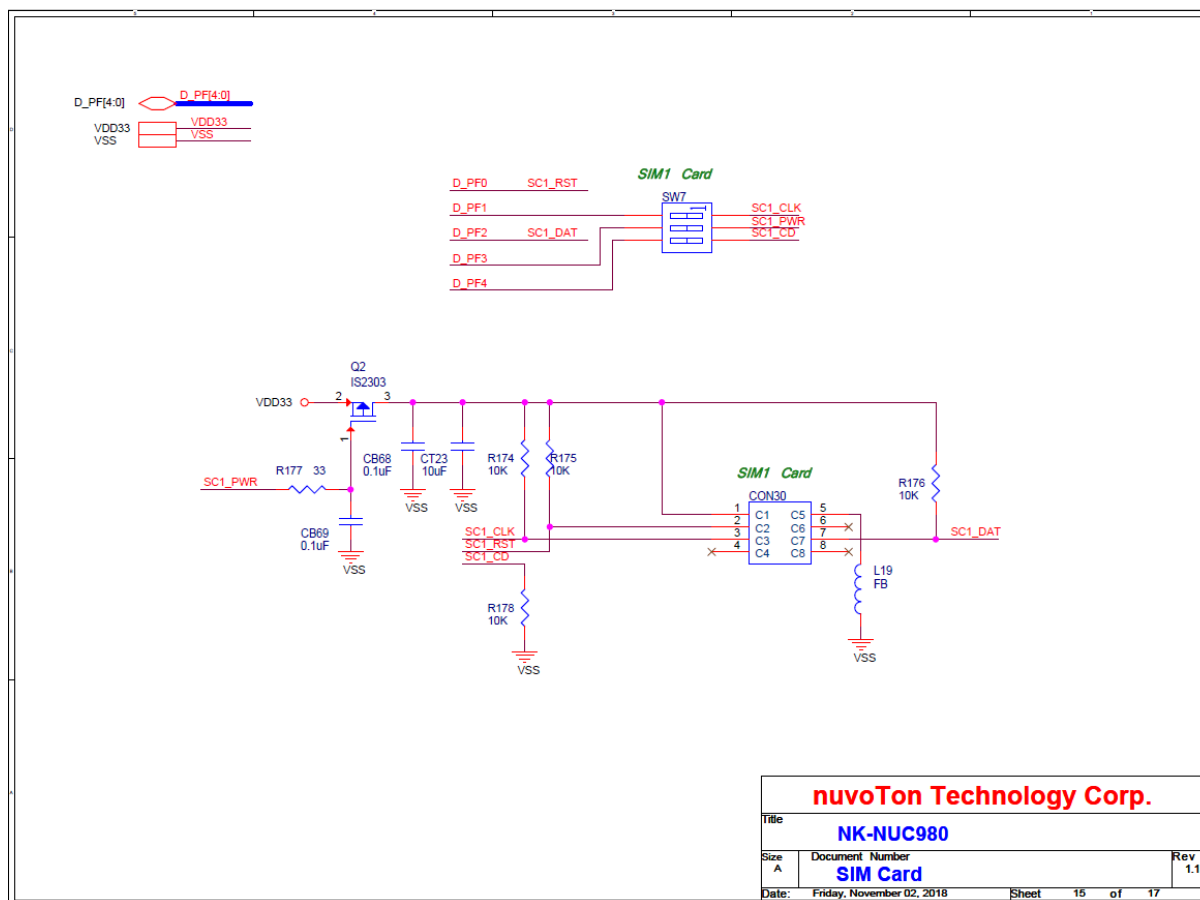


# 4.14 NK-NUC980 — SD/eMMC Schematic

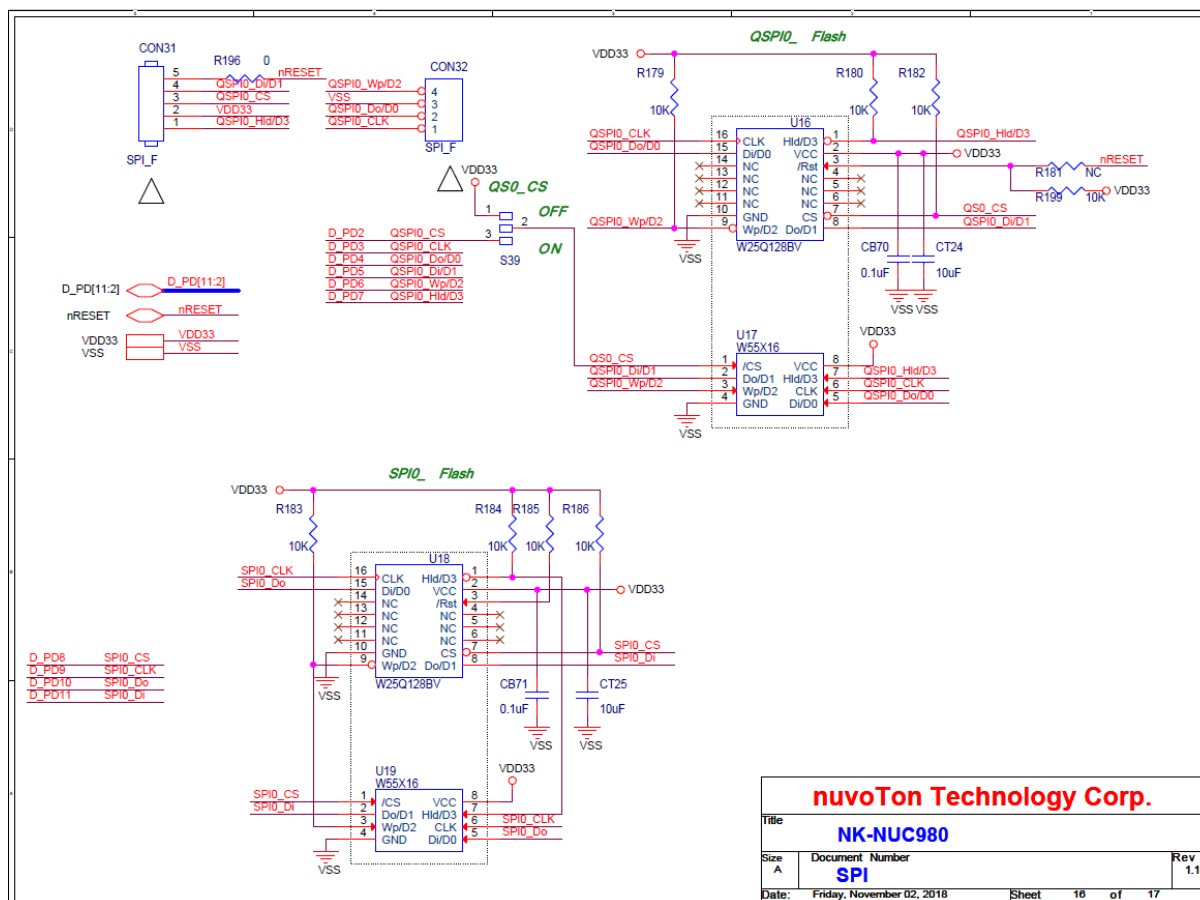




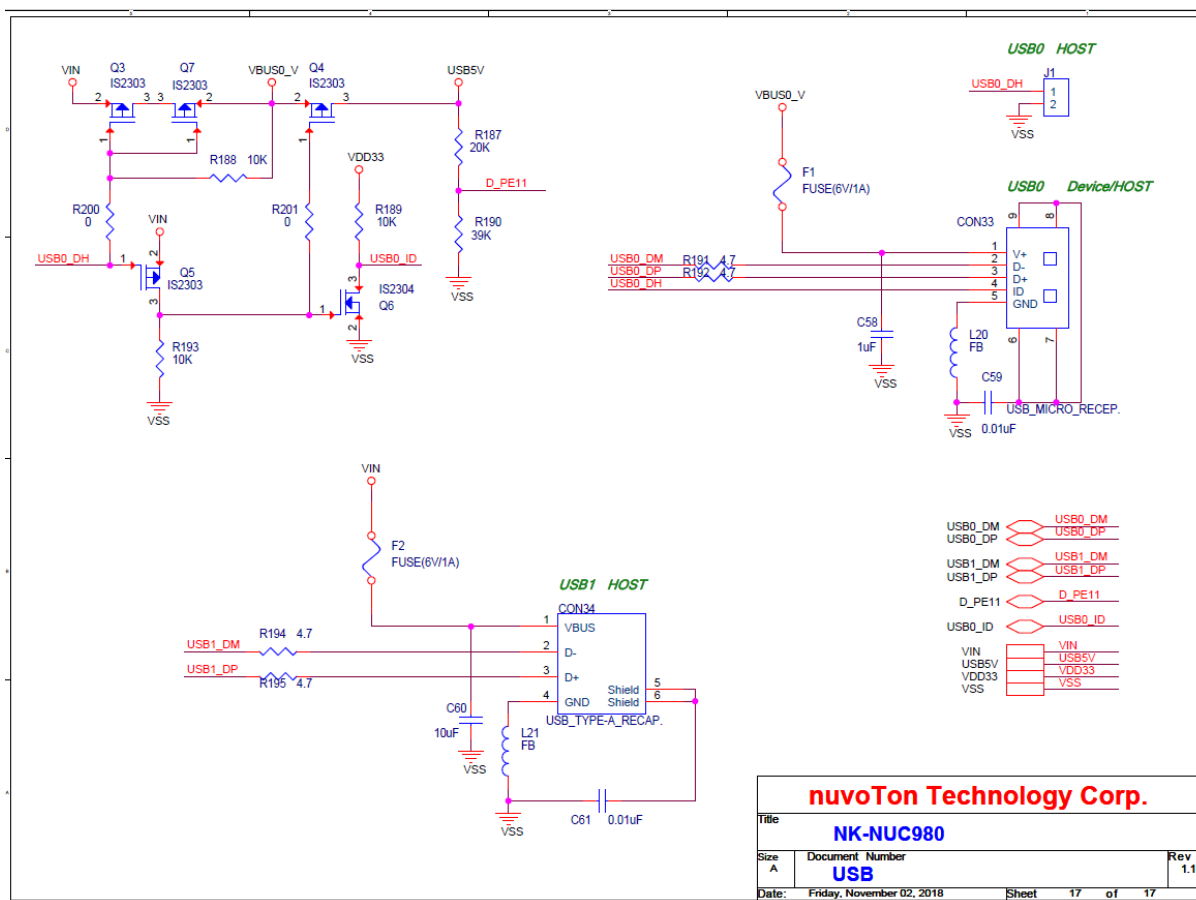
# 4.15 NK-NUC980 — SIM Card Schematic



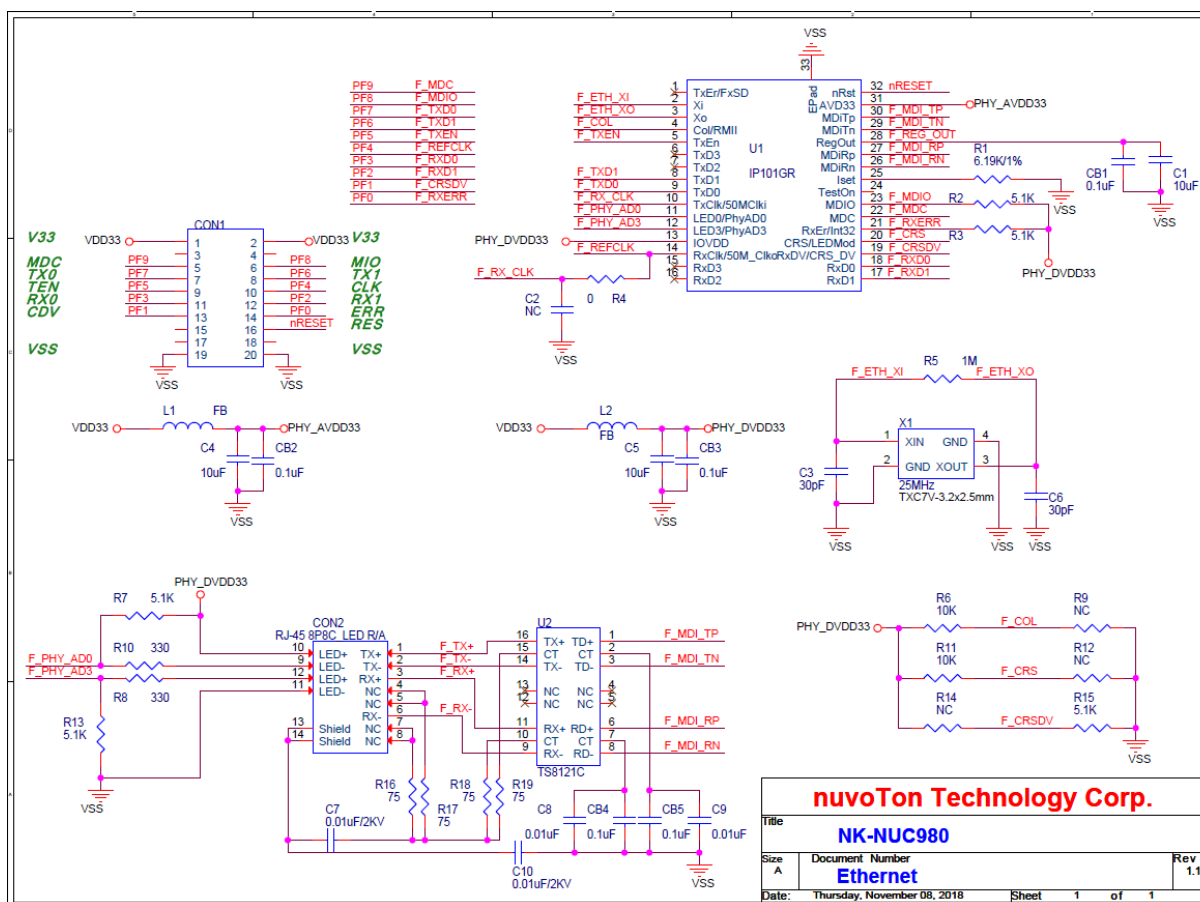
## 4.16 NK-NUC980 – SPI Schematic



## 4.17 NK-NUC980 — USB Schematic



# 4.18 NK-NUC980 — Ethernet Daughter Board Schematic



## 5 REVISION HISTORY

Date	Revision	Description
2018.10.30	1.00	1. Initially issued.
2018.11.02	1.10	1. Isolation SD1/eMMC1 and SIM1 card 2. Separate Ethernet RMII1_Refclk (PF4)

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