

nuvoTon Technology Corp.			
Title			
NuMaker-IoT-MA35D16F90 (LQFP216)			
Size	Document Number		Rev
A	00. System Block		V2.4
Date:	Tuesday, August 27, 2024		Sheet 1 of 13

SYSPWR_EN SYSPWR_EN
 N123_USB5V N123_USB5V
 USB0_USB5V USB0_USB5V
 VDD5V VDD5V
 VDD3V3 VDD3V3
 VDD2V5 VDD2V5
 VDD1V8 VDD1V8
 DRAM_VDD DRAM_VDD
 VDD1V2 VDD1V2
 VSS VSS

Note: Please make sure the voltage of VDD_CORE power pins (fed from VDD1V2) of MA35D16F9(8/7)87C chip is above 1.25V, including the minimum value of ripple.

5V IN
 CON2 DC-PLUG(2.0)
1.28V
 VDD1V2

N123_USB5V
 USB0_USB5V

P_Fault

P_Good

RTC

32768Hz Crystal

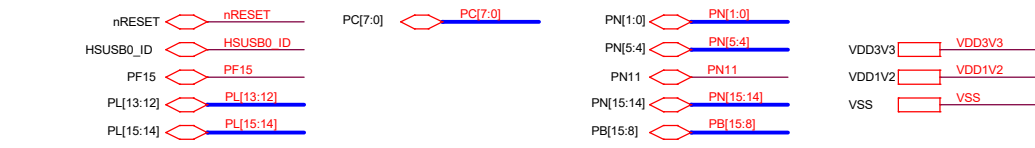
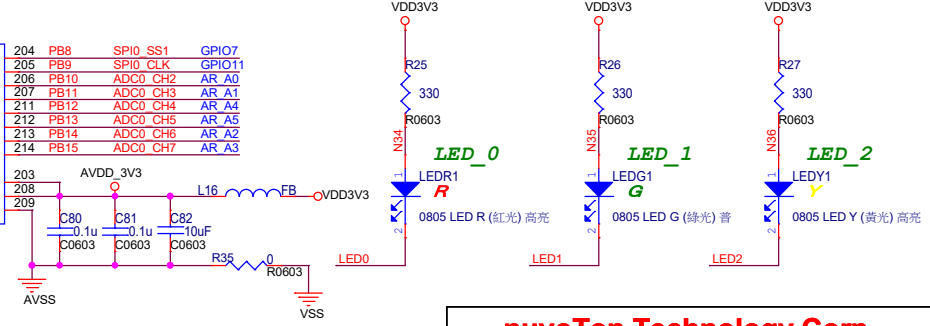
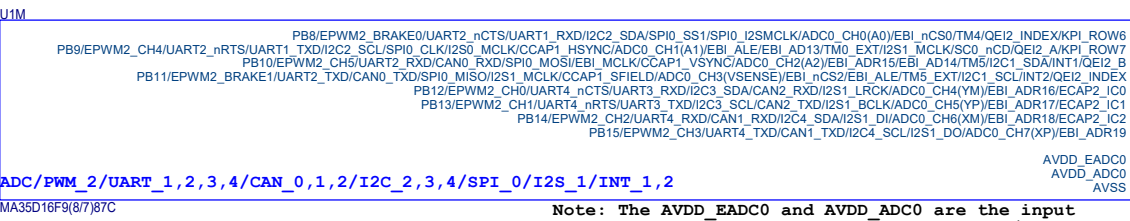
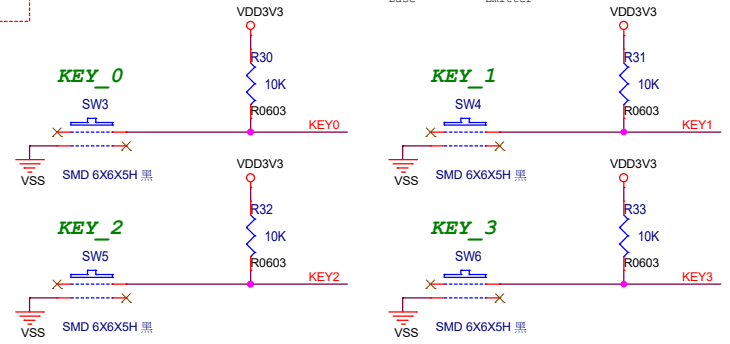
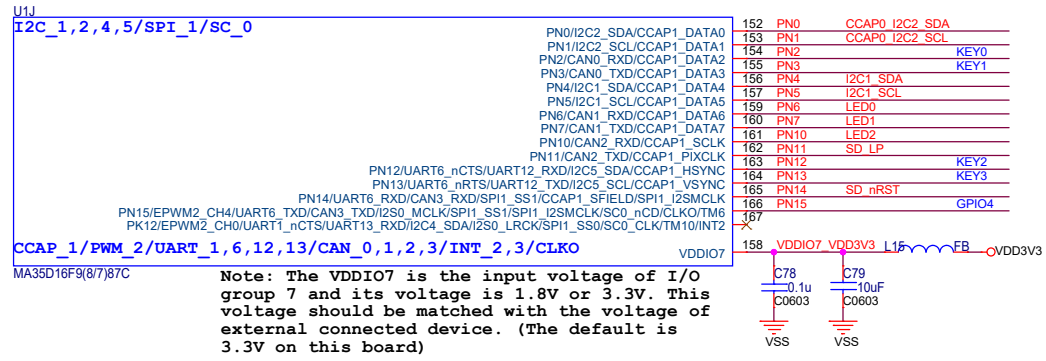
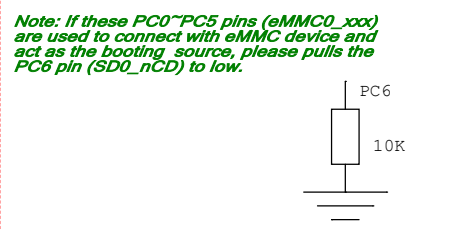
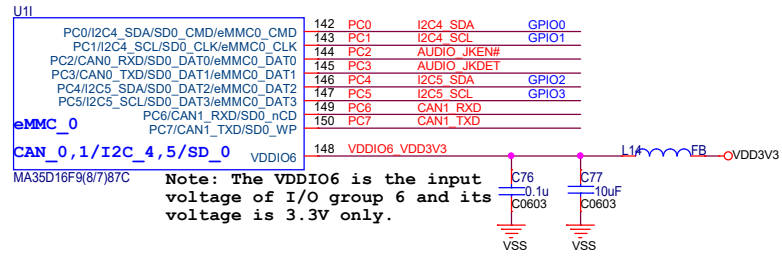
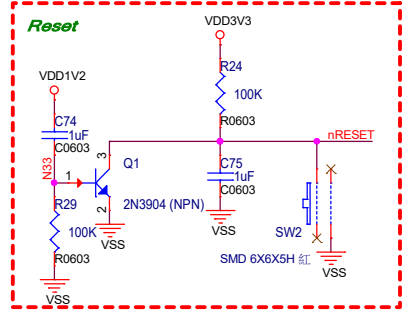
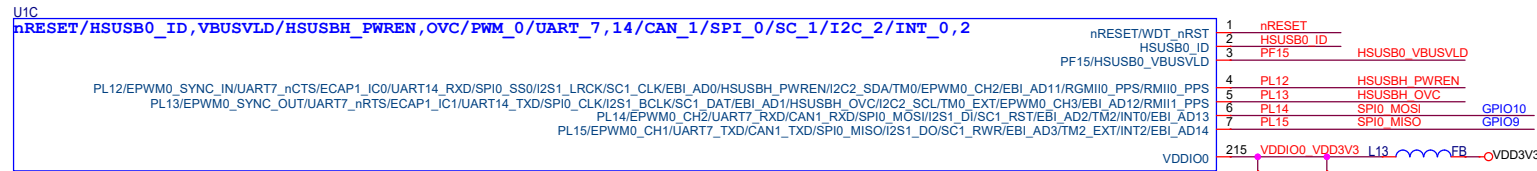
24MHz Crystal

Option for the supply voltage of SDRAM power (DRAM_VDD)

1. Mount R252 only, DRAM_VDD = 1.35V (for MA35D16F987C/MA35D16F887C, DDR3L)
2. Mount R253 only, DRAM_VDD = 1.8V (for MA35D16F787C, DDR2)

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Title

NuMaker-IoT-MA35D16F90 (LQFP216)

Size B Document Number

02. VDDIO0/6/7/ADC

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Rev V2.4

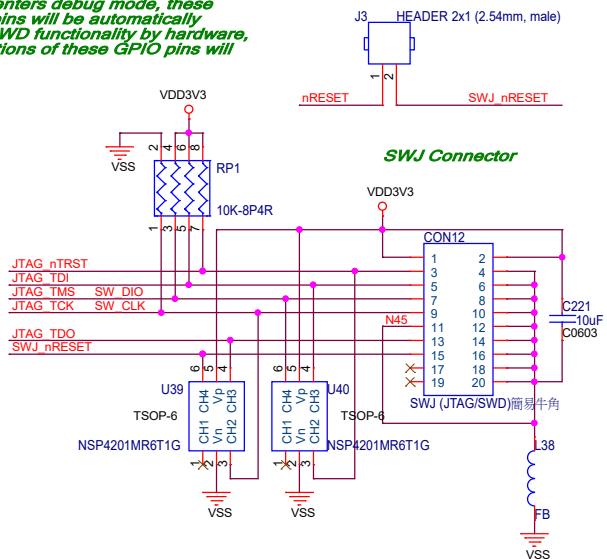
MA35D16F9(8/7)87C

PD6/EPW/MO_SYNC OUT/UART1_RXD/QSPI1_MOSI/I2C0_SDA/I2S0_MCLK/EPW/MO_CH0/EBI_ADS/SP13_SSP1
PD7/EPW/MO_SYNC OUT/UART1_TXD/QSPI1_MISO/I2C0_SCL/I2S1_MCLK/EPW/MO_CH1/EBI_ADS/C1_NCD
PD8/EPW/MO_BRAKE/UART16_nCTS/UART15_RXD/QSPI1_SS0/I2S1_LRCK/EPW/MO_CH2/EBI_ADS/C1_CLK/TMO
PD9/EPW/MO_BRAKE/UART16_nRTS/UART15_TXD/QSPI1_CLK/I2S1_BCLK/EPW/MO_CH3/EBI_ADS/C1_DAT/TMO_EXT
PD10/EPW/M1_BRAKE/UART16_RXD/QSPI1_MOSI/I2S1_DIF/EPW/MO_CH4/EBI_ADS/C1_RST/TMO_EXT
PD11/EPW/M1_BRAKE/UART16_TXD/QSPI1_MISO/I2S1_DOI/EPW/MO_CH5/EBI_ADS/C1_PWR/TMO_EXT










VDDIO1

Note: The VDDIO1 is the input voltage of I/O group 1 and its voltage is 3.3V only.

Note: When the chip enters debug mode, these GPIO PG11 ~ PG15 pins will be automatically forced to JTAG and SWD functionality by hardware, and other pinout functions of these GPIO pins will be disabled.



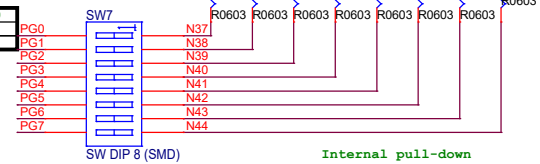
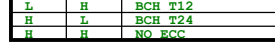
The diagram shows a 3.3V power plane (VDD3V3) with three decoupling capacitors (C85, C86, C87) connected to ground (VSS). The capacitors are labeled with their values: 0.1uF for C85 and C86, and 10uF for C87. The capacitors are connected to the power plane at pins 38, 64, and L17. The power plane is also connected to VDDIO1 and VDDIO1 at pins 38 and 64. The text 'input and its' is partially visible on the left.

PA[14:0]		PA[14:0]
PG0		PG0
PG[7:2]		PG[7:2]
PG[15:11]		PG[15:11]
PD[11:6]		PD[11:6]
PE[15:14]		PE[15:14]
nRESET		nRESET
VDD3V3		VDD3V3
VSS		VSS

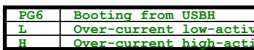
PG11~15 Connect to SWJ(I2S0)

PG11	R41	0 (NC) R0603	JTAG TDO	
PG12	R42	0 (NC) R0603	JTAG TCK	SW_CLK
PG13	R43	0 (NC) R0603	JTAG TMS	SW_DIO
PG14	R44	0 (NC) R0603	JTAG TDI	
PG15	R45	0 (NC) R0603	JTAG nTRST	

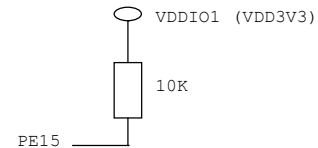
VDD3V3 ○



Internal pull-down



Note: The GPIO PE15 (UART0_RXD) pin must be pulled to high level through an external resistor or an internal pull-up resistor in the external device (such as a transceiver or MCU).



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NuMaker-IoT-MA35D16F90 (LQFP216)

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U1E

PK9/I2C3_SCL/CCAP0_SCLK/EBI_AD0/EBI_ADR0
 PK10/CAN1_RXD/CCAP0_PIXCLK/EBI_AD1/EBI_ADR1
 PK11/CAN1_TXD/CCAP0_HSYNC/EBI_AD2/EBI_ADR2
 PM0/I2C4_SDA/CCAP0_VSYNC/EBI_AD3/EBI_ADR3
 PM1/I2C4_SCL/SP13_I2SMCLK/CCAP0_SFIDE/EBI_AD4/EBI_ADR4
 PM2/CAN3_RXD/CCAP0_DATA0/EBI_AD5/EBI_ADR5
 PM3/CAN3_TXD/CCAP0_DATA1/EBI_AD6/EBI_ADR6
 PM4/I2C5_SDA/CCAP0_DATA2/EBI_AD7/EBI_ADR7
 PM5/I2C5_SCL/CCAP0_DATA3/EBI_AD8/EBI_ADR8
 PM6/CAN0_RXD/CCAP0_DATA4/EBI_AD9/EBI_ADR9
 PM7/CAN0_TXD/CCAP0_DATA5/EBI_AD10/EBI_ADR10
 PM8/I2C0_SDA/CCAP0_DATA6/EBI_AD11/EBI_ADR11
 PM9/I2C0_SCL/CCAP0_DATA7/EBI_AD12/EBI_ADR12
 PM10/EPWM1_CH3/CAN2_TXD/SP13_SS0/CCAP0_DATA8/SP12_I2SMCLK/EBI_AD13/EBI_ADR13
 PM11/EPWM1_CH3/CAN2_TXD/SP13_SS1/CCAP0_DATA9/SP12_SS1/EBI_AD14/EBI_ADR14

CCAP_0/PWM_1/CAN_0,1,2,3/I2C_0,3,4,5

VDDIO2

MA35D16F9(8/7)87C

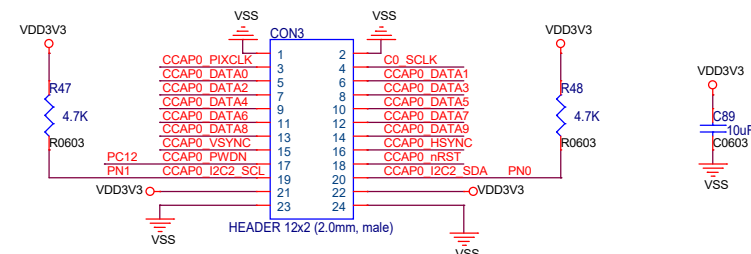
Note: The VDDIO2 is the input voltage of I/O group 2 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)

65 PK9 CCAP0_SCLK R48 33 C0_SCLK
 66 PK10 CCAP0_PIXCLK R0603 C88 NC
 67 PK11 CCAP0_HSYNC C0603
 68 PM0 CCAP0_VSYNC
 69 PM1 CCAP0_nRST
 70 PM2 CCAP0_DATA0
 71 PM3 CCAP0_DATA1
 72 PM4 CCAP0_DATA2
 73 PM5 CCAP0_DATA3
 74 PM6 CCAP0_DATA4
 75 PM7 CCAP0_DATA5
 76 PM8 CCAP0_DATA6
 77 PM9 CCAP0_DATA7
 78 PM10 CCAP0_DATA8
 79 PM11 CCAP0_DATA9

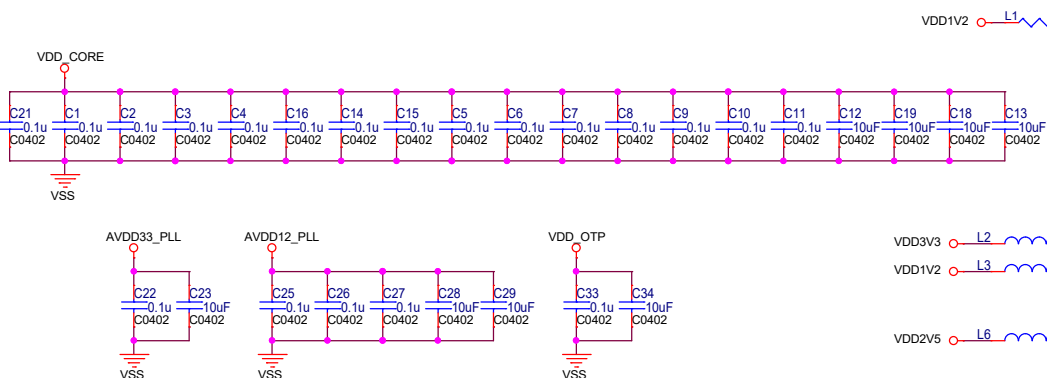
76 CCAP0_VDD3V3 L18 FB VDD3V3

C90 0.1uF C0603
 C91 10uF C0603

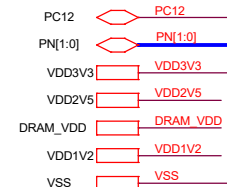
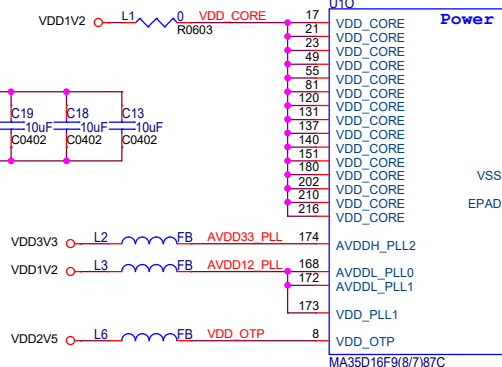
CCAP0 Connector



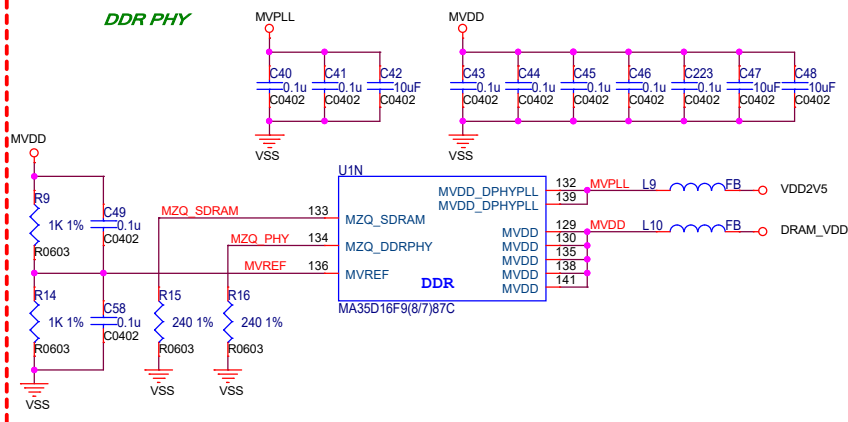
Power



Note: Please make sure the voltage of VDD_CORE power pins (fed from VDD1V2) of MA35D16F9(8/7)87C chip is above 1.25V, including the minimum value of ripple.



DDR PHY



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Size B Document Number 04. CCAP0 (VDDIO2)

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U1G

PG8/EPWM1_CH4/UART12_RXD/CAN3_RXD/SPI2_SS0/LCM_VSYNC/LCM_MPU_RD/ENI2C3_SDA/EBI_AD7/EBI_nCS0
PG9/EPWM1_CH5/UART12_TXD/SPI2_CLK/LCM_HSYNC/LCM_MPU_WRRW/I2C3_SCL/EBI_AD8/EBI_nCS1
PG10/UART12_nRTS/UART13_TXD/SPI2_MOSI/LCM_CLK/EBI_AD9/EBI_nWRL
PK4/UART12_nCTS/UART13_RXD/SPI2_MISO/LCM_DEN/LCM_MPU_RS/EBI_AD10/EBI_nWRL
PI8/UART4_nCTS/UART3_RXD/LCM_DATA0/LCM_MPU_D0/EBI_AD11
PI9/UART4_nRTS/UART3_TXD/LCM_DATA1/LCM_MPU_D1/EBI_AD12
PH0/UART4_RXD/LCM_DATA2/LCM_MPU_D2/EBI_AD13
PH11/UART4_TXD/LCM_DATA3/LCM_MPU_D3/EBI_AD14
PI12/UART6_nCTS/UART5_RXD/LCM_DATA4/LCM_MPU_D4
PI13/UART6_nRTS/UART5_TXD/LCM_DATA5/LCM_MPU_D5
PI14/UART6_RXD/LCM_DATA6/LCM_MPU_D6
PI15/UART6_TXD/LCM_DATA7/LCM_MPU_D7
PH0/UART8_nCTS/UART7_RXD/LCM_DATA8/LCM_MPU_D8
PH1/UART8_nRTS/UART7_TXD/LCM_DATA9/LCM_MPU_D9
PH2/UART8_RXD/LCM_DATA10/LCM_MPU_D10
PH3/UART8_TXD/LCM_DATA11/LCM_MPU_D11
PH4/UART10_nCTS/UART9_RXD/LCM_DATA12/LCM_MPU_D12
PH5/UART10_nRTS/UART9_TXD/LCM_DATA13/LCM_MPU_D13
PH6/UART10_RXD/LCM_DATA14/LCM_MPU_D14
PH7/UART10_TXD/LCM_DATA15/LCM_MPU_D15
PC12/UART12_nCTS/UART11_RXD/LCM_DATA16/LCM_MPU_D16
PC13/UART12_nRTS/UART11_TXD/LCM_DATA17/LCM_MPU_D17
PC14/UART12_RXD/LCM_DATA18/LCM_MPU_CS
PC15/UART12_TXD/LCM_DATA19/LCM_MPU_TELCM_MPU_VSYNC
PH12/UART14_nCTS/UART13_RXD/LCM_DATA20
PH13/UART14_nRTS/UART13_TXD/LCM_DATA21
PH14/UART14_RXD/LCM_DATA22
PH15/UART14_TXD/LCM_DATA23

LCM/UART_3,4,5,6,7,8,9,10,11,12,13,14

CAN_3/I2C_3/PWM_1/SPI_2/INT_1,2,3/CLKO

MA35D16F9(8/7)87C

Note: The VDDIO4 is the input voltage of I/O group 4 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)

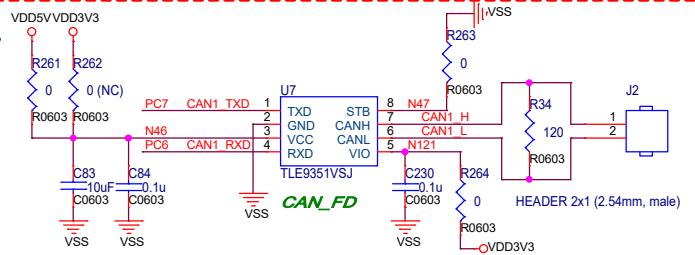
VDDIO4



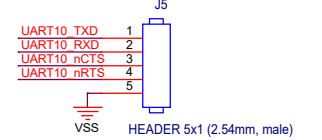
VDD3V3



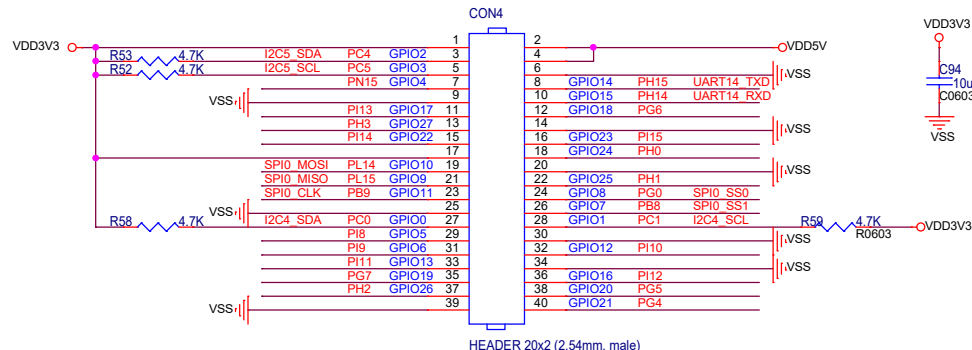
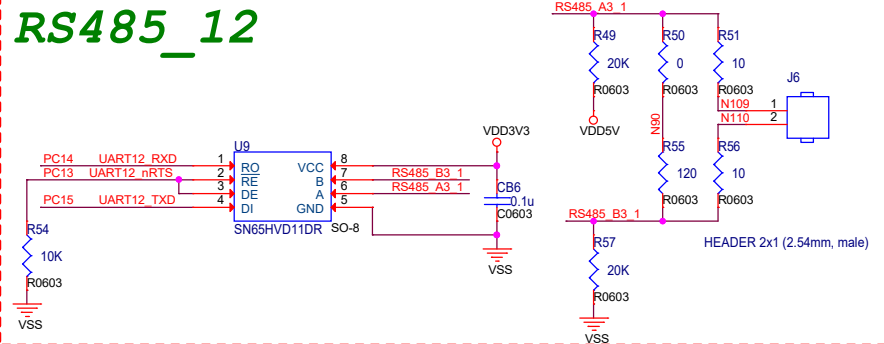
CAN_1



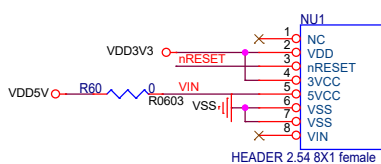
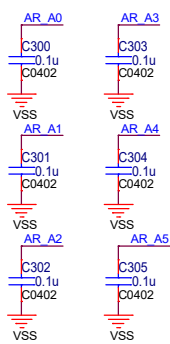
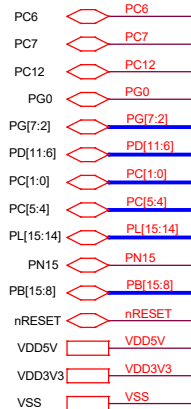
UART_10



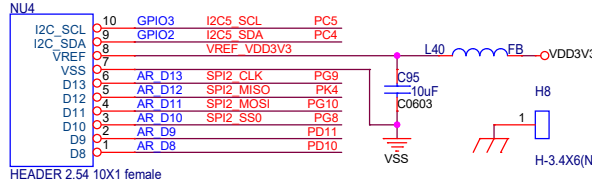
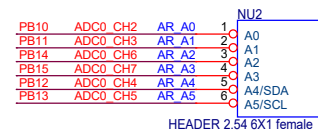
RS485_12



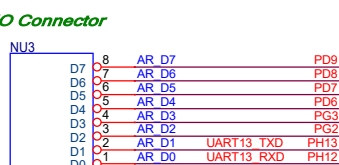
Raspberry Pi Connector



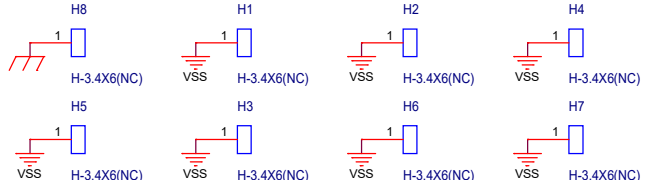
Arduino UNO Connector



HEADER 2.54 10X1 female



HEADER 2.54 8X1 female



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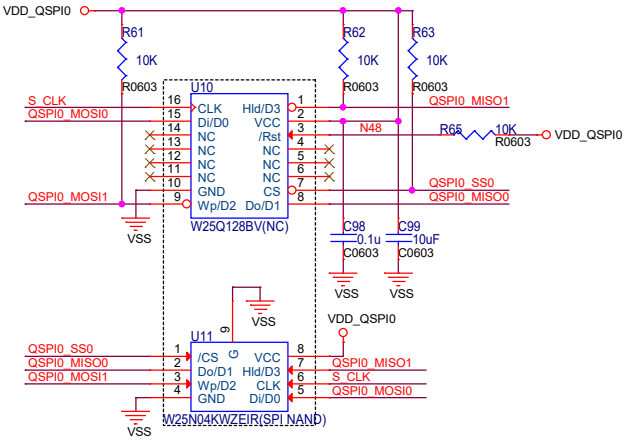
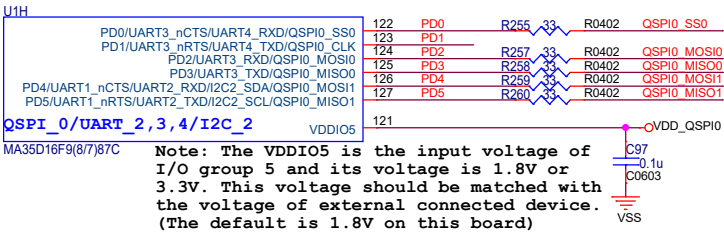
NuMaker-IoT-MA35D16F90 (LQFP216)

05. RP PI (VDDIO4)

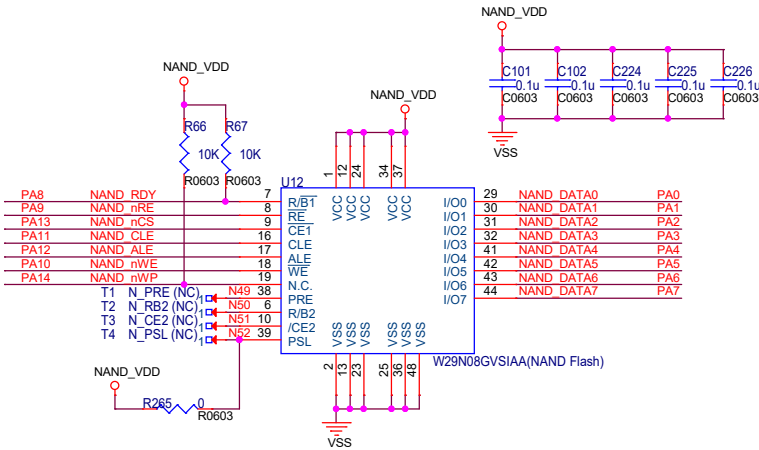
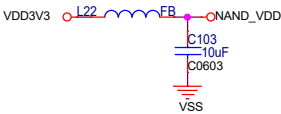
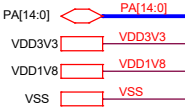
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Rev V2.4

QSPI0_Flash

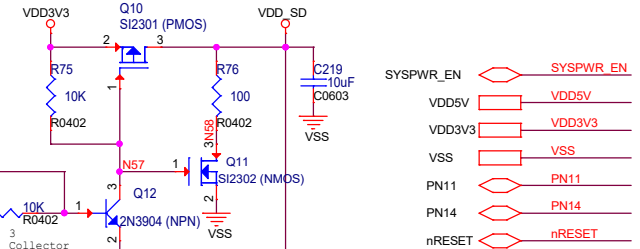
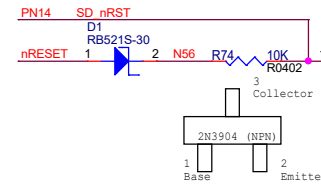
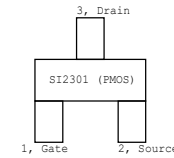


NAND_Flash



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Title			
NuMaker-IoT-MA35D16F90 (LQFP216)			
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B	06. NAND/QSPI0 (VDDIO5)	V2.4	
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A circuit diagram showing a 10K resistor connected between pin PJ5 and ground. The resistor is represented by a rectangle with '10K' written next to it. The ground is indicated by a horizontal line with three short vertical lines below it.



The diagram shows a circuit for a 1.8V/3.3V level shifter. It features an APL5325AB1 (U25) and an SI2302 (Q9) NMOS transistor. The input signal (VIN) is connected to the gate of the NMOS transistor. The source of the NMOS transistor is connected to ground (GND). The drain of the NMOS transistor is connected to the output signal (VOUT). The circuit also includes a pull-up resistor (R73) connected to VDDSDIO (3.3V & 1.8V) and a pull-down resistor (R71) connected to ground. The output signal (VOUT) is connected to the input of the next stage (N120). The circuit is powered by VDD5V and VSS.

Components and Values:

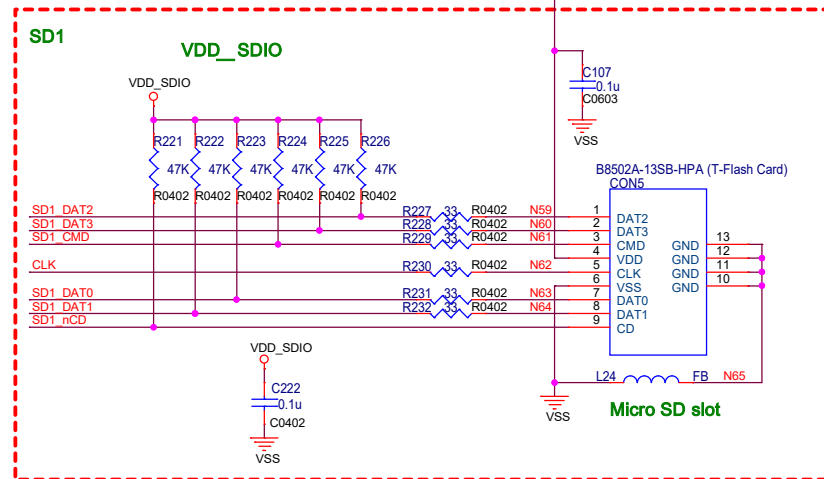
- U25: APL5325AB1
- Q9: SI2302 (NMOS)
- R69: 10K
- R70: 75K 1%
- R71: 24K 1%
- R72: 51K 1%
- R73: 100K
- R0402: 0Ω
- C110: NC
- C111: 1uF
- C112: 2.2uF
- C0402: 0.1μF

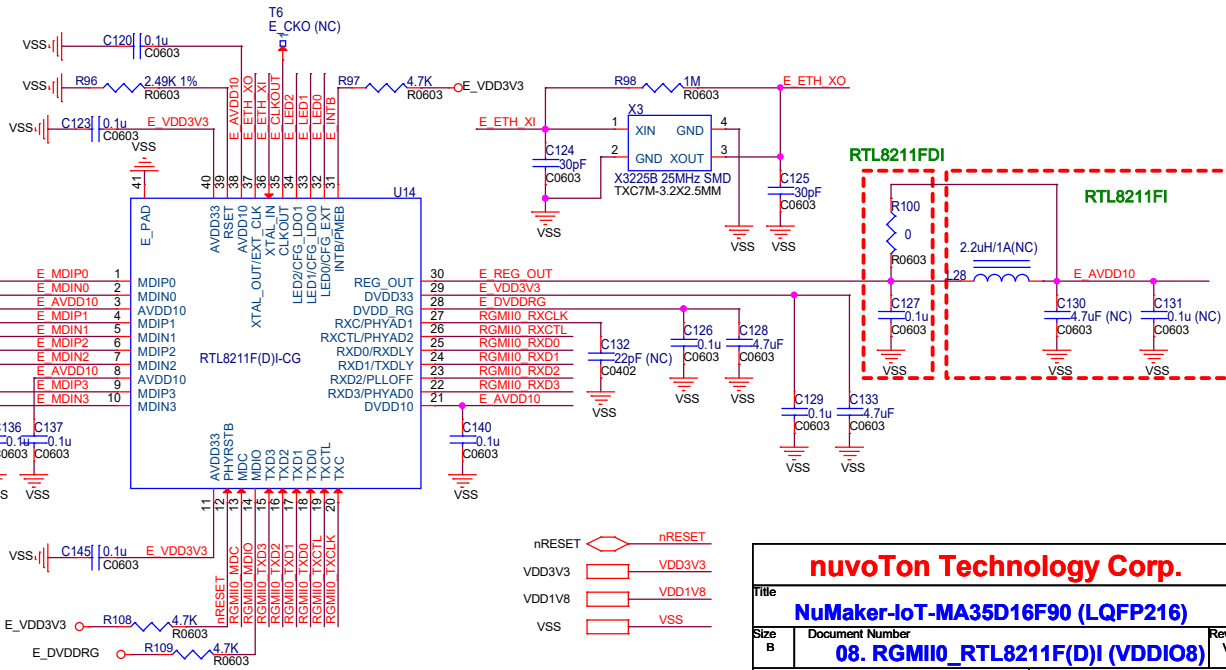
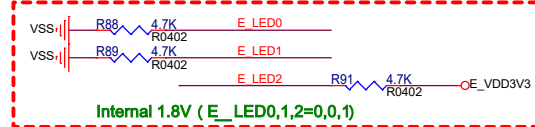
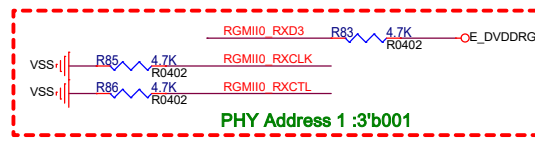
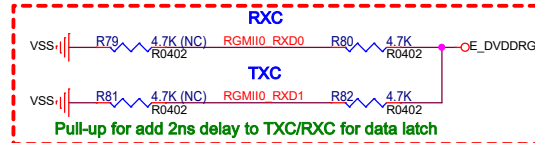
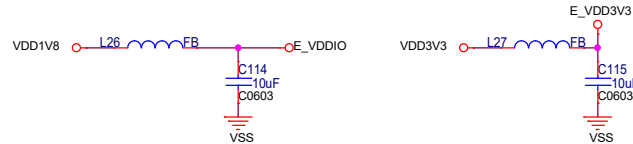
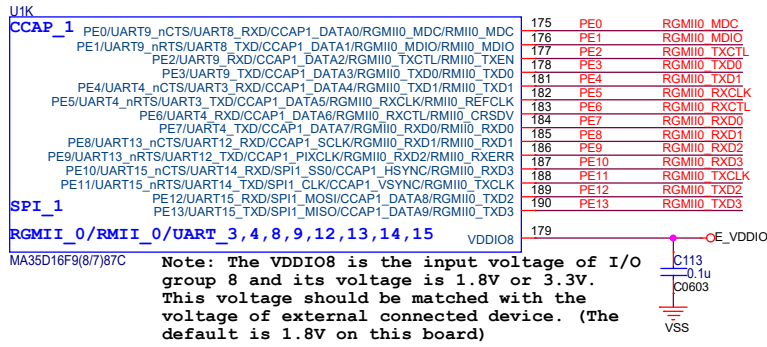
Connections:

- VIN (3) → U25 VIN
- VOUT (4) → U25 VOUT
- GND (2) → U25 GND
- SET (5) → U25 SET
- /SHDN (1) → U25 /SHDN
- VDD5V (0) → VDD5V
- VSS (0) → VSS
- VDDSDIO (0) → VDDSDIO
- SD LP (1) → SD LP

Notes:

- PN11 = L, VDDSDIO = 3.3V
- PN11 = H, VDDSDIO = 1.8V



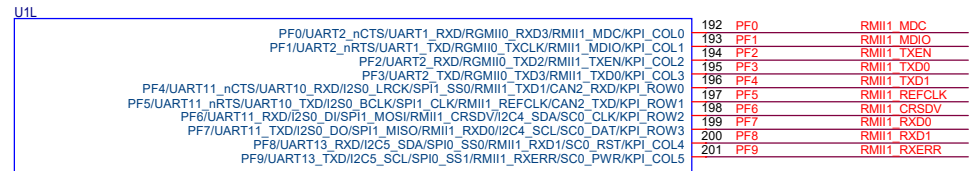


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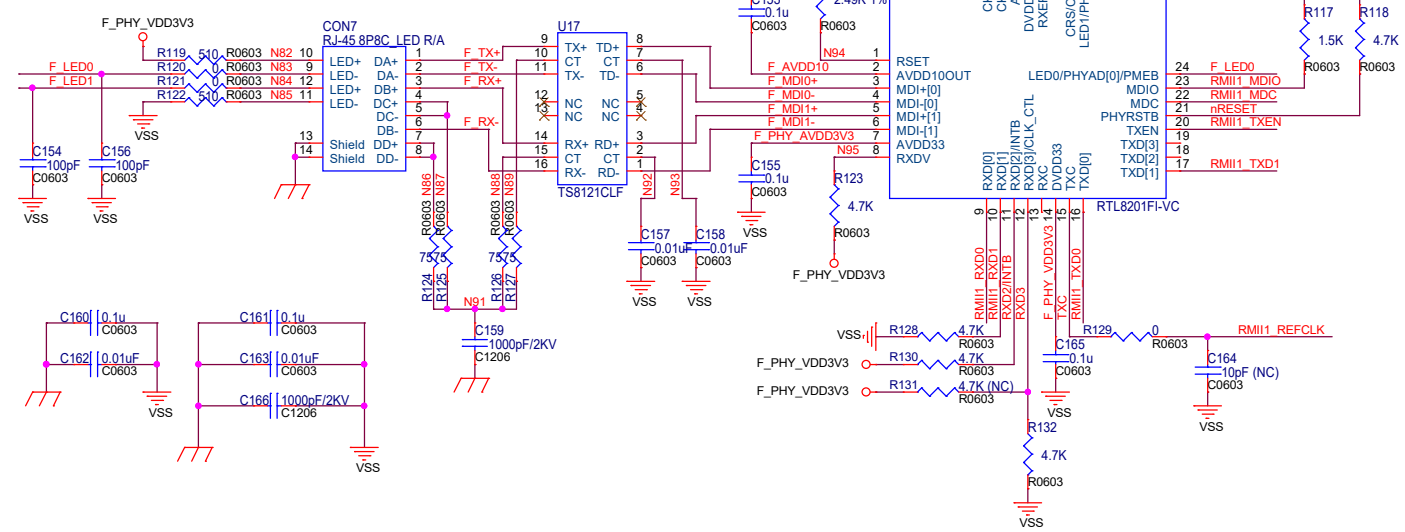
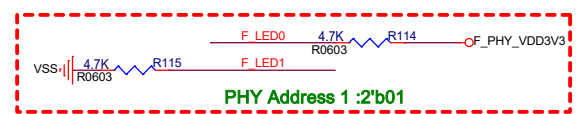
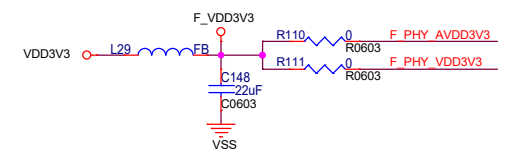
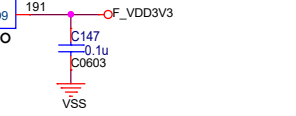
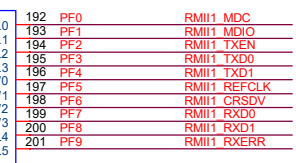
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NuMaker-IoT-MA35D16F90 (LQFP216)

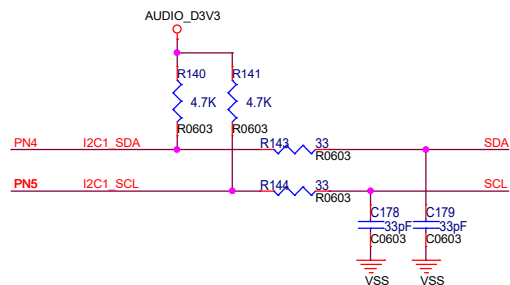
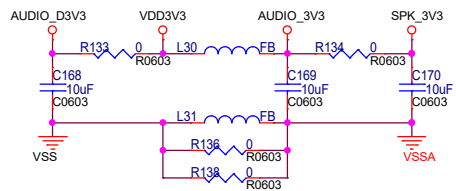
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08. RGMII0_RTL8211F(DI) (VDDIO8) Rev V2.4

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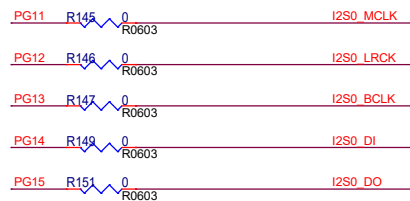


Note: The VDDIO9 is the input voltage of I/O group 9 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)

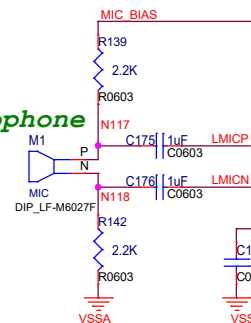




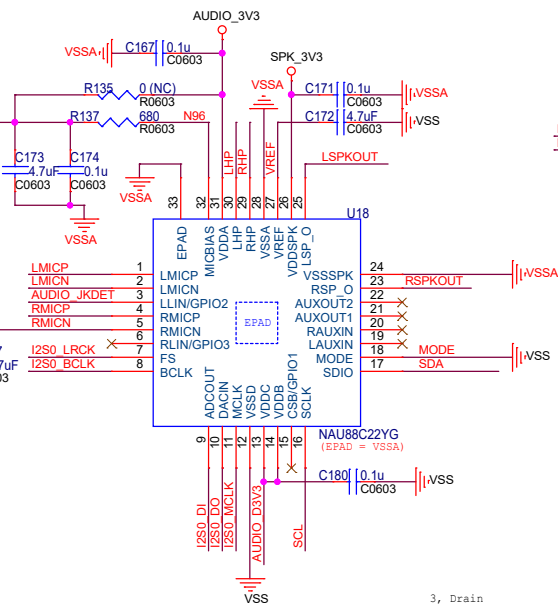
PG11~15 Connect to I2S0 (SWJ)



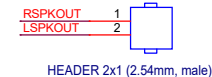
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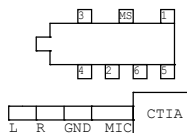
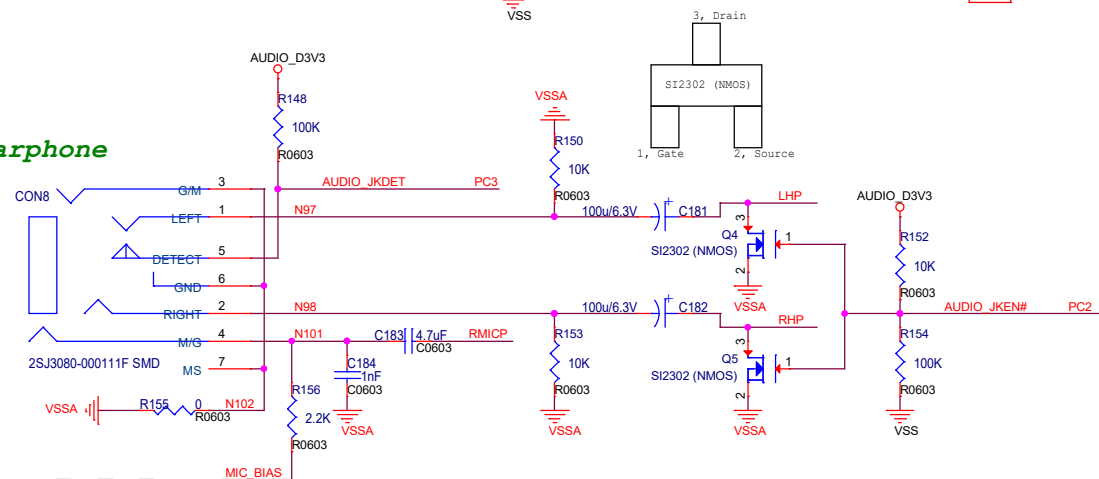
Codec



Speaker

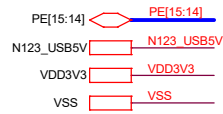


Earphone



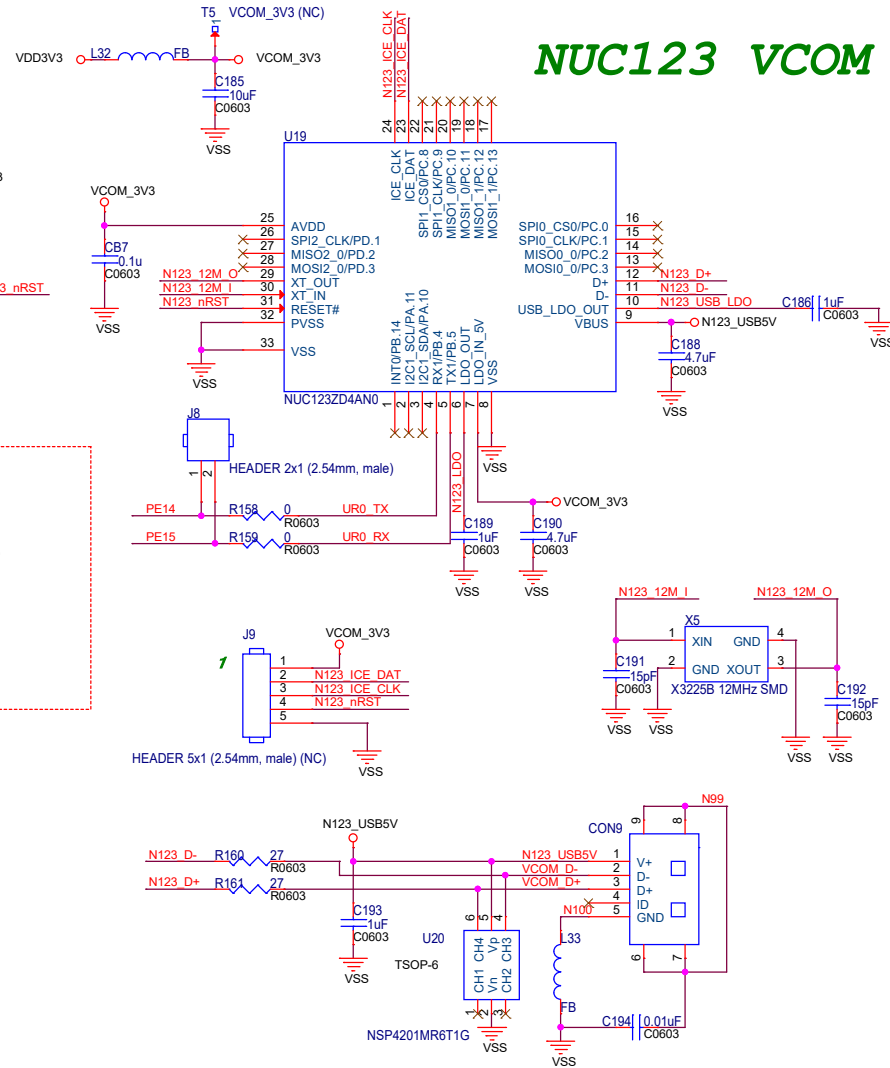
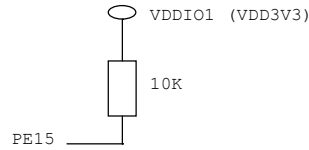
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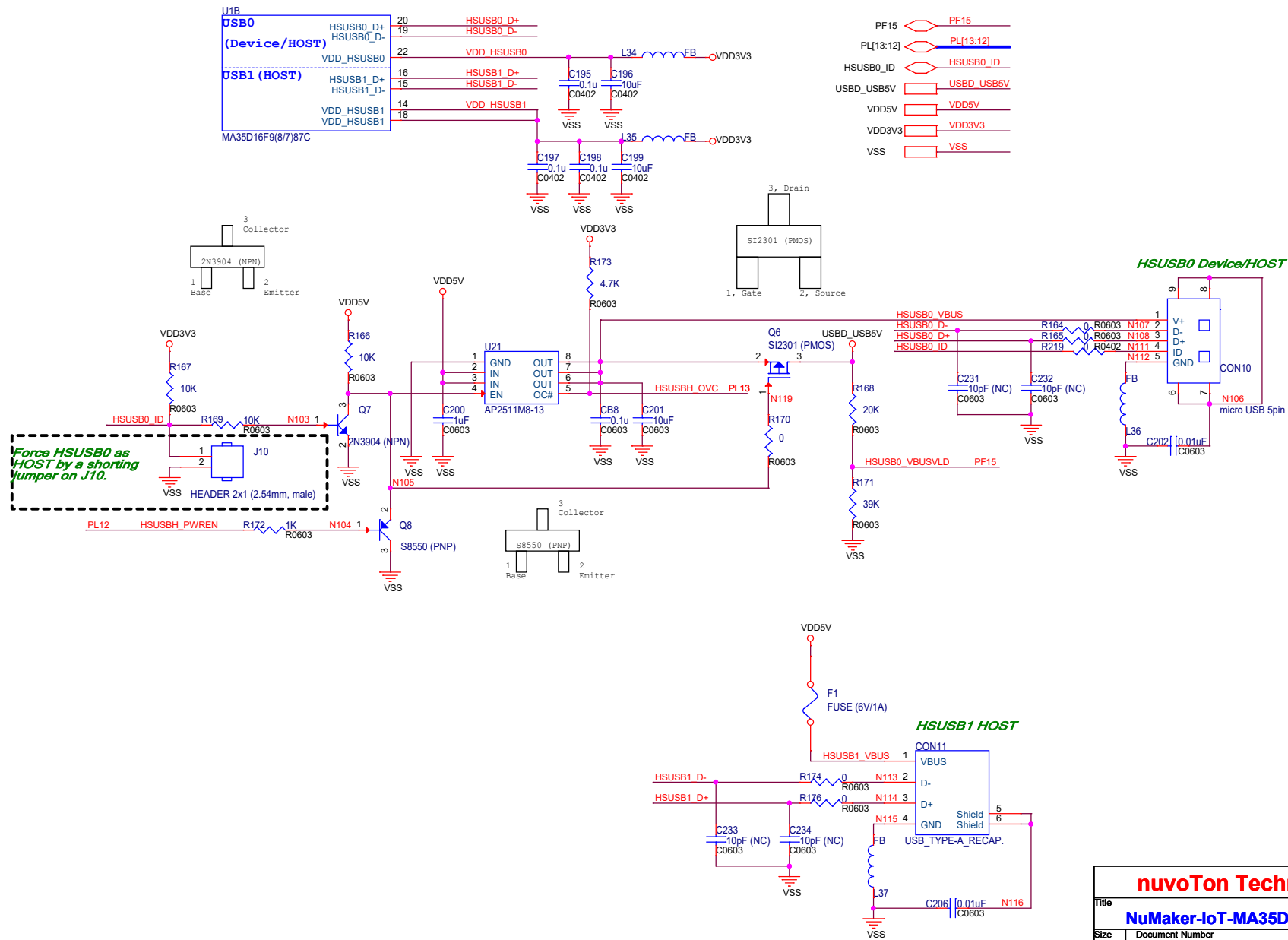
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NuMaker-IoT-MA35D16F90 (LQFP216)		
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NUC123 VCOM

Note: The GPIO PE15 (UART0_RXD) pin must be pulled to high level through an external resistor or an internal pull-up resistor in the external device (such as a transceiver or MCU).





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