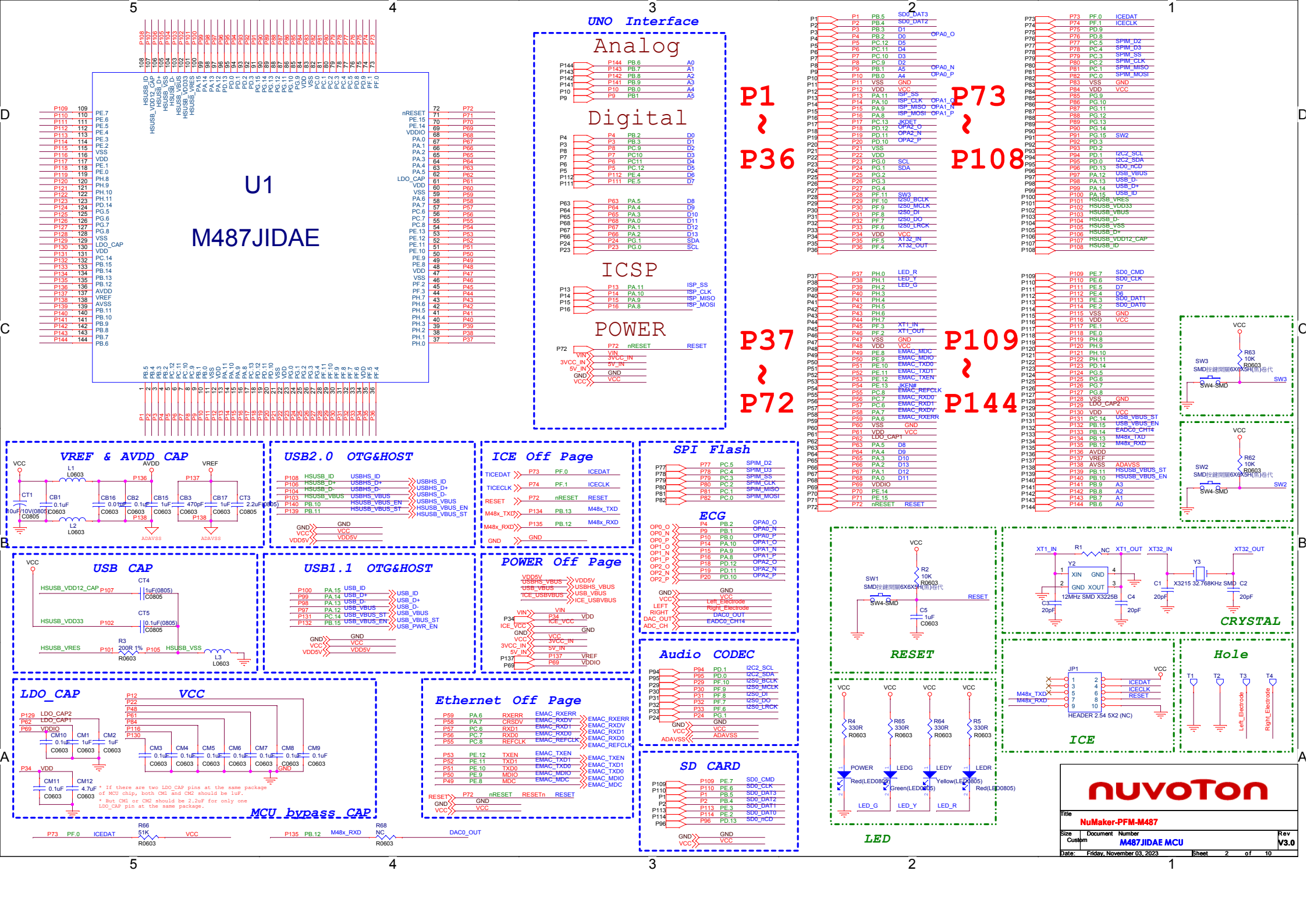
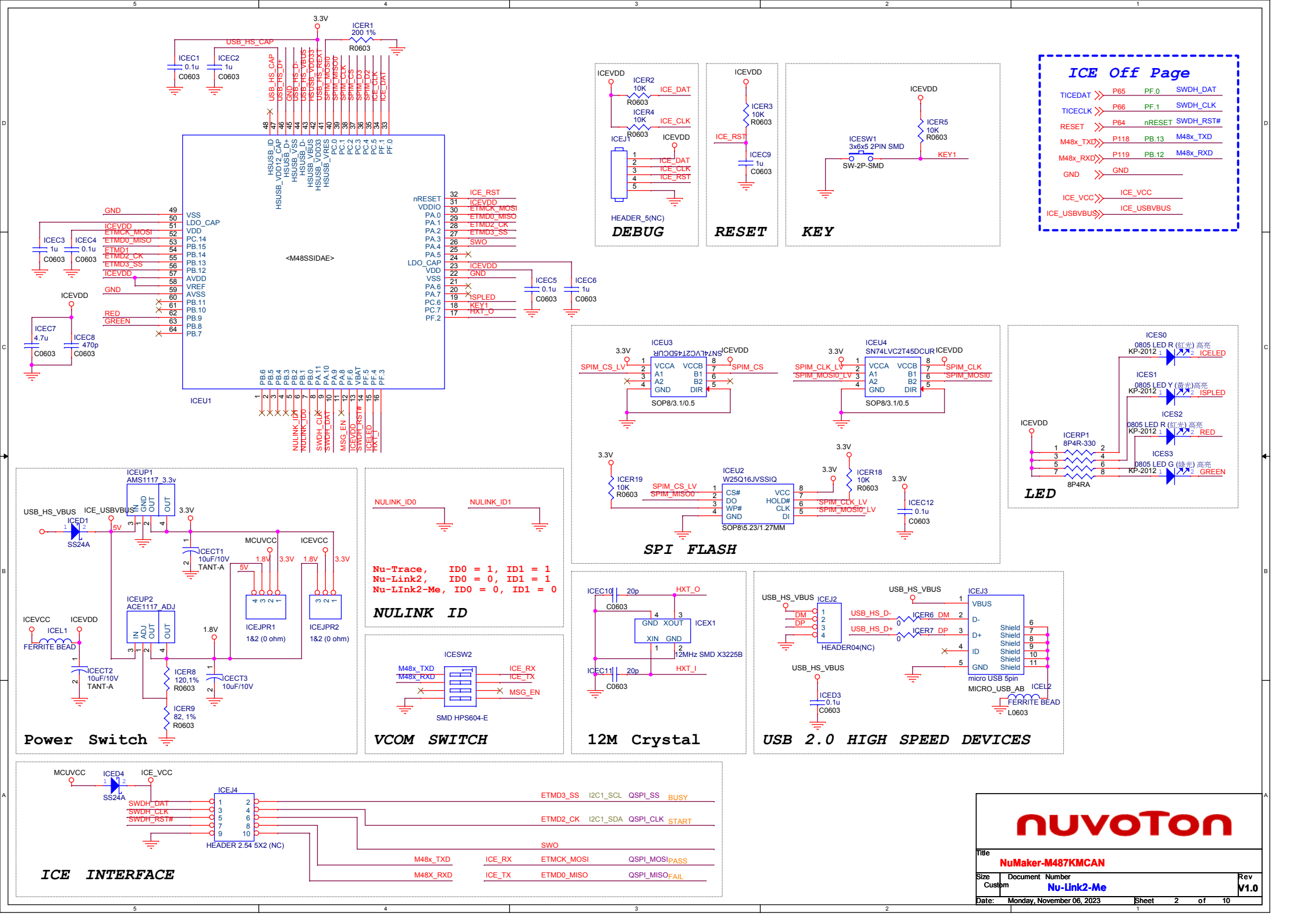
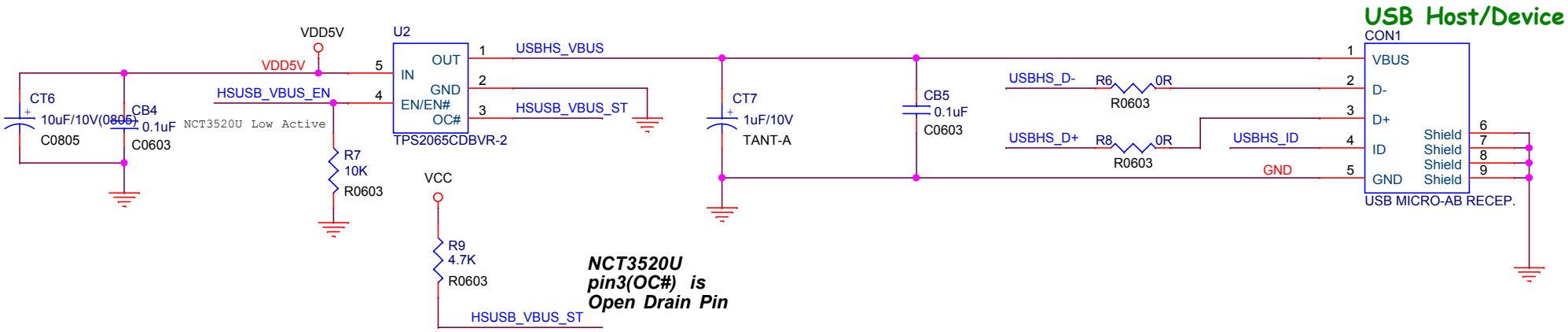
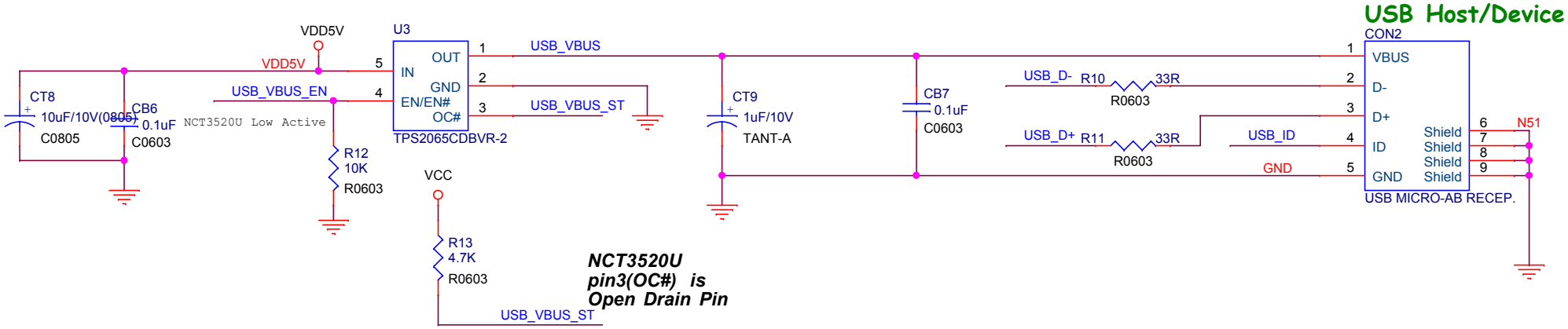

UNO Interface
Analog
Digital
ICSP
POWER
P1 ~ P36
P37 ~ P72
P73 ~ P108
P109 ~ P144
U1
M487JIDAE
VREF & AVDD CAP
USB2.0 OTG&HOST
ICE Off Page
SPI Flash
ECG
USB CAP
USB1.1 OTG&HOST
POWER Off Page
Audio CODEC
LDO_CAP
VCC
Ethernet Off Page
SD CARD
MCU bypass CAP
RESET
CRYSTAL
Hole
ICE
LED
NuMaker-PFM-M487
M487JIDAE MCU
V3.0
Friday, November 03, 2023


ICE Off Page
TICEDAT P65 PF.0 SWDH_DAT
TICECLK P66 PF.1 SWDH_CLK
RESET P64 nRESET SWDH_RST#
M48x_TXD P118 PB.13 M48x_TXD
M48x_RXD P119 PB.12 M48x_RXD
GND GND
ICE_VCC ICE_VCC
ICE_USBVBUS ICE_USBVBUS
DEBUG
RESET
KEY
<M48SSIDAE>
ICEU1
ICEU3 SN74LVC2T45DCUR
ICEU4 SN74LVC2T45DCUR
SOP8/3.1/0.5
SPI FLASH
LED
ICEU2 W25Q16JVSSIQ
SOP8\5.23/1.27MM
NULINK_ID0
NULINK_ID1
Nu-Trace, ID0 = 1, ID1 = 1
Nu-Link2, ID0 = 0, ID1 = 1
Nu-LInk2-Me, ID0 = 0, ID1 = 0
NULINK ID
ICEUP1 AMS1117 3.3v
ICEUP2 ACE1117_ADJ
Power Switch
ICESW2
SMD HPS604-E
VCOM SWITCH
12M Crystal
USB 2.0 HIGH SPEED DEVICES
HEADER04(NC)
micro USB 5pin
ICE INTERFACE
HEADER 2.54 5X2 (NC)
NuMaker-M487KMCAN
Nu-Link2-Me
V1.0
Monday, November 06, 2023
Sheet 2 of 10

USB2.0 OTG HOST/DEVICE



USB1.1 OTG HOST/DEVICE



USB2.0 OTG&HOST

P108	HSUSB_ID	USBHS_ID	USBHS_ID
P106	HSUSB_D+	USBHS_D+	USBHS_D+
P104	HSUSB_D-	USBHS_D-	USBHS_D-
P103	HSUSB_VBUS	USBHS_VBUS	USBHS_VBUS
P140	PB.10	HSUSB_VBUS_EN	HSUSB_VBUS_EN
P139	PB.11	HSUSB_VBUS_ST	HSUSB_VBUS_ST

GND	GND	GND
VCC	VCC	VCC
VDD5V	VDD5V	VDD5V

USB1.1 OTG&HOST

P100	PA.15	USB_ID	USB_ID
P99	PA.14	USB_D+	USB_D+
P98	PA.13	USB_D-	USB_D-
P97	PA.12	USB_VBUS	USB_VBUS
P131	PC.14	USB_VBUS_ST	USB_VBUS_ST
P132	PB.15	USB_VBUS_EN	USB_PWR_EN

GND	GND	GND
VCC	VCC	VCC
VDD5V	VDD5V	VDD5V

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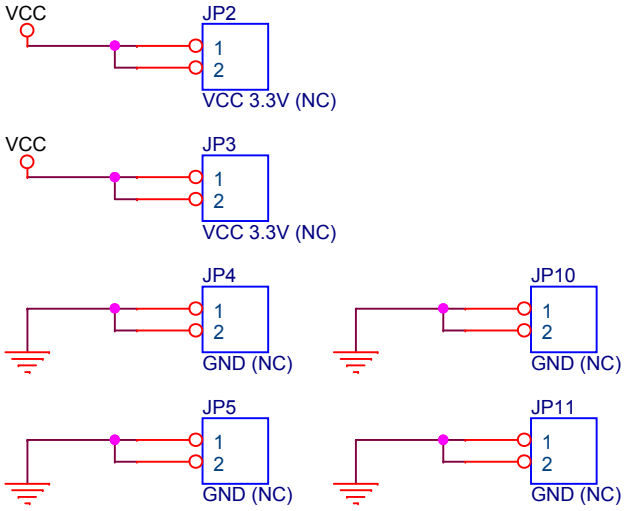
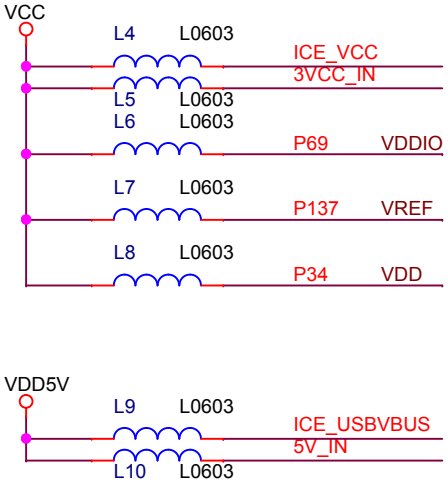
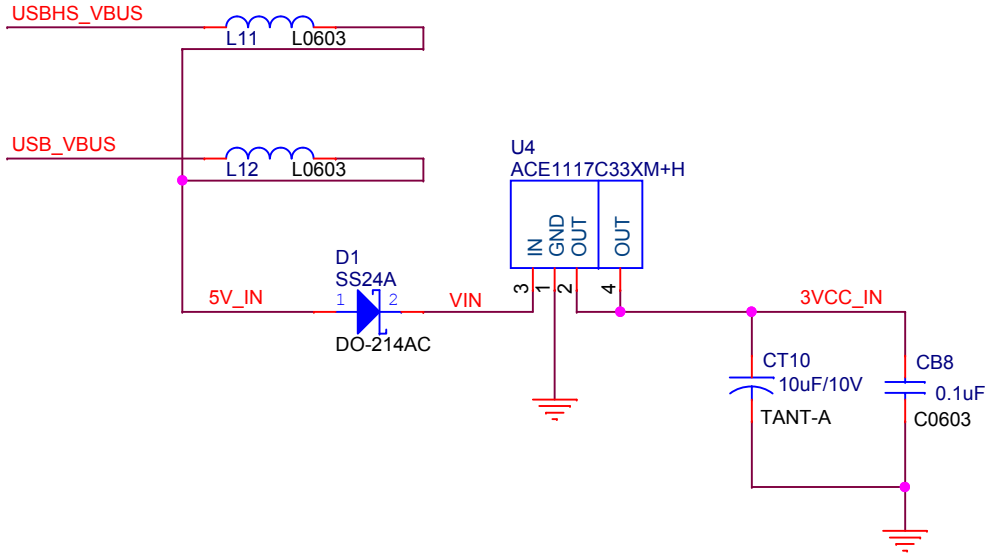
Title	NuMaker-PFM-M487	
Size A4	Document Number USB OTG	Rev V3.0
Date: Friday, November 03, 2023	Sheet 3 of 10	

Power (3.3V) Connector

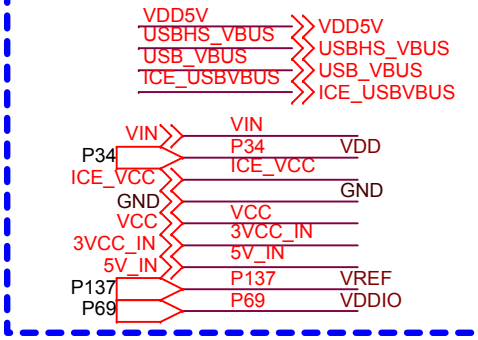


Power Selector





POWER Off Page



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Title: NuMaker-PFM-M487		
Size: A	Document Number: POWER	Rev: V3.0
Date: Friday, November 03, 2023	Sheet 4 of 10	

MCU CONNECTOR

JP6

P1	1	2	P2
P3	3	4	P4
P5	5	6	P6
P7	7	8	P8
P9	9	10	P10
P11	11	12	P12
P13	13	14	P14
P15	15	16	P16
P17	17	18	P18
P19	19	20	P20
P21	21	22	P22
P23	23	24	P24
P25	25	26	P26
P27	27	28	P28
P29	29	30	P30
P31	31	32	P32
P33	33	34	P34
P35	35	36	P36

HEADER 2.54 18X2 (NC)

JP7

P73	1	2	P74
P75	3	4	P76
P77	5	6	P78
P79	7	8	P80
P81	9	10	P82
P83	11	12	P84
P85	13	14	P86
P87	15	16	P88
P89	17	18	P90
P91	19	20	P92
P93	21	22	P94
P95	23	24	P96
P97	25	26	P98
P99	27	28	P100
	29	30	P102
P103	31	32	
P105	33	34	
	35	36	P108

HEADER 2.54 18X2 (NC)

JP8

P37	1	2	P38
P39	3	4	P40
P41	5	6	P42
P43	7	8	P44
P45	9	10	P46
P47	11	12	P48
P49	13	14	P50
P51	15	16	P52
P53	17	18	P54
P55	19	20	P56
P57	21	22	P58
P59	23	24	P60
P61	25	26	P62
P63	27	28	P64
P65	29	30	P66
P67	31	32	P68
P69	33	34	P70
P71	35	36	P72

HEADER 2.54 18X2 (NC)

JP9

P109	1	2	P110
P111	3	4	P112
P113	5	6	P114
P115	7	8	P116
P117	9	10	P118
P119	11	12	P120
P121	13	14	P122
P123	15	16	P124
P125	17	18	P126
P127	19	20	P128
P129	21	22	P130
P131	23	24	P132
P133	25	26	P134
P135	27	28	P136
P137	29	30	P138
P139	31	32	P140
P141	33	34	P142
P143	35	36	P144

HEADER 2.54 18X2 (NC)

P1 ~ P36

P1	P1	PB.5	SD0_DAT3
P2	P2	PB.4	SD0_DAT2
P3	P3	PB.3	D1
P4	P4	PB.2	D0 OPA0_O
P5	P5	PC.12	D5
P6	P6	PC.11	D4
P7	P7	PC.10	D3
P8	P8	PC.9	D2
P9	P9	PB.1	A5 OPA0_N
P10	P10	PB.0	A4 OPA0_P
P11	P11	VSS	GND
P12	P12	VDD	VCC
P13	P13	PA.11	ISP_SS
P14	P14	PA.10	ISP_CLK OPA1_O
P15	P15	PA.9	ISP_MISO OPA1_N
P16	P16	PA.8	ISP_MOSI OPA1_P
P17	P17	PC.13	JKDET
P18	P18	PD.12	OPA2_O
P19	P19	PD.11	OPA2_N
P20	P20	PD.10	OPA2_P
P21	P21	VSS	
P22	P22	VDD	
P23	P23	PG.0	SCL
P24	P24	PG.1	SDA
P25	P25	PG.2	
P26	P26	PG.3	
P27	P27	PG.4	
P28	P28	PF.11	SW3
P29	P29	PF.10	I2S0_BCLK
P30	P30	PF.9	I2S0_MCLK
P31	P31	PF.8	I2S0_DI
P32	P32	PF.7	I2S0_DO
P33	P33	PF.6	I2S0_LRCK
P34	P34	VDD	VCC
P35	P35	PF.5	XT32_IN
P36	P36	PF.4	XT32_OUT

P73 ~ P108

P73	P73	PF.0	ICEDAT
P74	P74	PF.1	ICECLK
P75	P75	PD.9	
P76	P76	PD.8	
P77	P77	PC.5	SPIM_D2
P78	P78	PC.4	SPIM_D3
P79	P79	PC.3	SPIM_SS
P80	P80	PC.2	SPIM_CLK
P81	P81	PC.1	SPIM_MISO
P82	P82	PC.0	SPIM_MOSI
P83	P83	VSS	GND
P84	P84	VDD	VCC
P85	P85	PG.9	
P86	P86	PG.10	
P87	P87	PG.11	
P88	P88	PG.12	
P89	P89	PG.13	
P90	P90	PG.14	
P91	P91	PG.15	SW2
P92	P92	PD.3	
P93	P93	PD.2	
P94	P94	PD.1	I2C2_SCL
P95	P95	PD.0	I2C2_SDA
P96	P96	PD.13	SD0_nCD
P97	P97	PA.12	USB_VBUS
P98	P98	PA.13	USB_D-
P99	P99	PA.14	USB_D+
P100	P100	PA.15	USB_ID
P101	P101		HSUSB_VRES
P102	P102		HSUSB_VDD33
P103	P103		HSUSB_VBUS
P104	P104		HSUSB_D-
P105	P105		HSUSB_VSS
P106	P106		HSUSB_D+
P107	P107		HSUSB_VDD12_CAP
P108	P108		HSUSB_ID

P37 ~ P72

P37	P37	PH.0	LED_R
P38	P38	PH.1	LED_Y
P39	P39	PH.2	LED_G
P40	P40	PH.3	
P41	P41	PH.4	
P42	P42	PH.5	
P43	P43	PH.6	
P44	P44	PH.7	
P45	P45	PF.3	XT1_IN
P46	P46	PF.2	XT1_OUT
P47	P47	VSS	GND
P48	P48	VDD	VCC
P49	P49	PE.8	EMAC_MDC
P50	P50	PE.9	EMAC_MDIO
P51	P51	PE.10	EMAC_TXD0
P52	P52	PE.11	EMAC_TXD1
P53	P53	PE.12	EMAC_TXEN
P54	P54	PE.13	
P55	P55	PC.8	EMAC_REFCLK
P56	P56	PC.7	EMAC_RXD0
P57	P57	PC.6	EMAC_RXD1
P58	P58	PA.7	EMAC_RXDV
P59	P59	PA.6	EMAC_RXERR
P60	P60	VSS	GND
P61	P61	VDD	VCC
P62	P62	LDO_CAP1	
P63	P63	PA.5	D8
P64	P64	PA.4	D9
P65	P65	PA.3	D10
P66	P66	PA.2	D13
P67	P67	PA.1	D12
P68	P68	PA.0	D11
P69	P69	VDDIO	
P70	P70	PE.14	
P71	P71	PE.15	
P72	P72	nRESET	RESET

P109 ~ P144

P109	P109	PE.7	SD0_CMD
P110	P110	PE.6	SD0_CLK
P111	P111	PE.5	D7
P112	P112	PE.4	D6
P113	P113	PE.3	SD0_DAT1
P114	P114	PE.2	SD0_DAT0
P115	P115	VSS	GND
P116	P116	VDD	VCC
P117	P117	PE.1	
P118	P118	PE.0	
P119	P119	PH.8	
P120	P120	PH.9	
P121	P121	PH.10	
P122	P122	PH.11	
P123	P123	PD.14	
P124	P124	PG.5	
P125	P125	PG.6	
P126	P126	PG.7	
P127	P127	PG.8	
P128	P128	VSS	GND
P129	P129	LDO_CAP2	
P130	P130	VDD	VCC
P131	P131	PC.14	USB_VBUS_ST
P132	P132	PB.15	USB_VBUS_EN
P133	P133	PB.14	EADC0_CH14
P134	P134	PB.13	M48x_TXD
P135	P135	PB.12	M48x_RXD
P136	P136	AVDD	
P137	P137	VREF	
P138	P138	AVSS	ADAVSS
P139	P139	PB.11	HSUSB_VBUS_ST
P140	P140	PB.10	HSUSB_VBUS_EN
P141	P141	PB.9	A3
P142	P142	PB.8	A2
P143	P143	PB.7	A1
P144	P144	PB.6	A0

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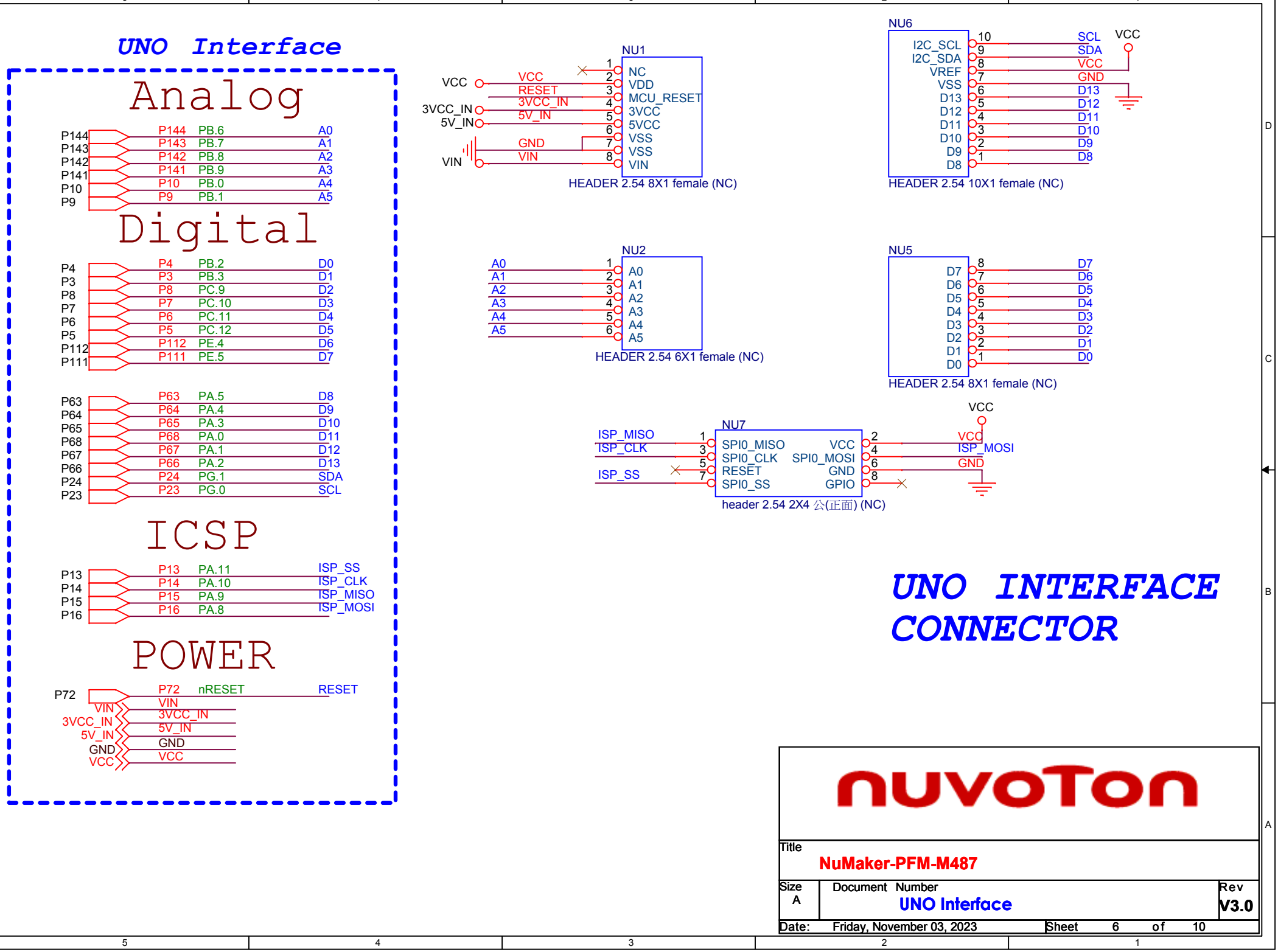
Size A4	Document Number MCU Connector	Rev V3.0
Date: Friday, November 03, 2023	Sheet 5 of 10	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P144 P143 P142 P141 P10 P9
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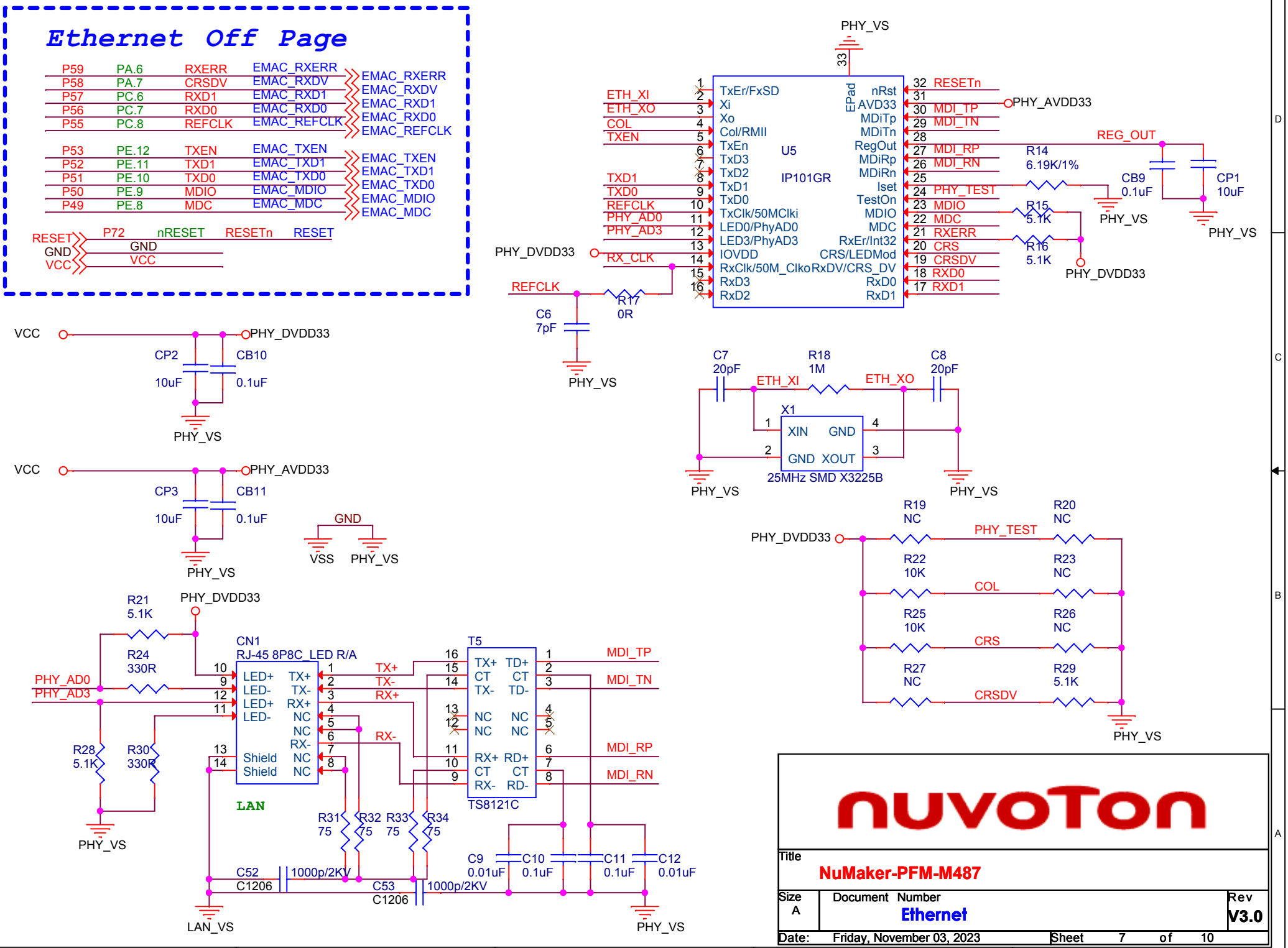
P143 PB.7 A1
P142 PB.8 A2
P141 PB.9 A3
P10 PB.0 A4
P9 PB.1 A5
Digital
P4 P3 P8 P7 P6 P5 P112 P111
P4 PB.2 D0
P3 PB.3 D1
P8 PC.9 D2
P7 PC.10 D3
P6 PC.11 D4
P5 PC.12 D5
P112 PE.4 D6
P111 PE.5 D7
P63 P64 P65 P68 P67 P66 P24 P23
P63 PA.5 D8
P64 PA.4 D9
P65 PA.3 D10
P68 PA.0 D11
P67 PA.1 D12
P66 PA.2 D13
P24 PG.1 SDA
P23 PG.0 SCL
ICSP
P13 P14 P15 P16
P13 PA.11 ISP_SS
P14 PA.10 ISP_CLK
P15 PA.9 ISP_MISO
P16 PA.8 ISP_MOSI
POWER
P72
P72 nRESET RESET
VIN VIN
3VCC_IN 3VCC_IN
5V_IN 5V_IN
GND GND
VCC VCC
NU1
VCC
3VCC_IN
5V_IN
VIN
VCC RESET 3VCC_IN 5V_IN GND VIN
1 2 3 4 5 6 7 8
NC VDD MCU_RESET 3VCC 5VCC VSS VSS VIN
HEADER 2.54 8X1 female (NC)
NU6
I2C_SCL I2C_SDA VREF VSS D13 D12 D11 D10 D9 D8
10 9 8 7 6 5 4 3 2 1
SCL SDA VCC GND D13 D12 D11 D10 D9 D8
VCC
HEADER 2.54 10X1 female (NC)
NU2
A0 A1 A2 A3 A4 A5
1 2 3 4 5 6
A0 A1 A2 A3 A4 A5
HEADER 2.54 6X1 female (NC)
NU5
D7 D6 D5 D4 D3 D2 D1 D0
8 7 6 5 4 3 2 1
D7 D6 D5 D4 D3 D2 D1 D0
HEADER 2.54 8X1 female (NC)
VCC
NU7
ISP_MISO
ISP_CLK
ISP_SS
1 3 5 7
SPI0_MISO SPI0_CLK RESET SPI0_SS
VCC SPI0_MOSI GND GPIO
2 4 6 8
VCC ISP_MOSI GND
header 2.54 2X4 公(正面) (NC)
UNO INTERFACE CONNECTOR
nuvoTon
Title
NuMaker-PFM-M487
Size A
Document Number
UNO Interface
Rev
V3.0
Date: Friday, November 03, 2023
Sheet 6 of 10


Ethernet Off Page
P59 PA.6 RXERR EMAC_RXERR
P58 PA.7 CRSDV EMAC_RXDV
P57 PC.6 RXD1 EMAC_RXD1
P56 PC.7 RXD0 EMAC_RXD0
P55 PC.8 REFCLK EMAC_REFCLK
P53 PE.12 TXEN EMAC_TXEN
P52 PE.11 TXD1 EMAC_TXD1
P51 PE.10 TXD0 EMAC_TXD0
P50 PE.9 MDIO EMAC_MDIO
P49 PE.8 MDC EMAC_MDC
RESET P72 nRESET RESETn RESET
GND GND
VCC VCC
PHY_VS
33
U5
IP101GR
TxEr/FxSD
Xi
Xo
Col/RMII
TxEn
TxD3
TxD2
TxD1
TxD0
TxClk/50MClki
LED0/PhyAD0
LED3/PhyAD3
IOVDD
RxClk/50M_Clko
RxD3
RxD2
EPad
nRst
AVD33
MDiTp
MDiTn
RegOut
MDiRp
MDiRn
Iset
TestOn
MDIO
MDC
RxEr/Int32
CRS/LEDMod
RxDV/CRS_DV
RxD0
RxD1
ETH_XI
ETH_XO
COL
TXEN
TXD1
TXD0
REFCLK
PHY_AD0
PHY_AD3
RX_CLK
PHY_DVDD33
PHY_AVDD33
RESETn
MDI_TP
MDI_TN
MDI_RP
MDI_RN
PHY_TEST
MDIO
MDC
RXERR
CRS
CRSDV
RXD0
RXD1
R14 6.19K/1%
R15 5.1K
R16 5.1K
R17 0R
C6 7pF
REG_OUT
CB9 0.1uF
CP1 10uF
VCC
CP2 10uF
CB10 0.1uF
CP3 10uF
CB11 0.1uF
GND
VSS
C7 20pF
R18 1M
C8 20pF
X1
XIN GND
GND XOUT
25MHz SMD X3225B
R19 NC
R20 NC
R22 10K
R23 NC
R25 10K
R26 NC
R27 NC
R29 5.1K
R21 5.1K
R24 330R
R28 5.1K
R30 330R
CN1
RJ-45 8P8C_LED R/A
LED+ TX+
LED- TX-
LED+ RX+
LED- NC
NC
RX-
Shield NC
Shield NC
LAN
T5
TS8121C
TX+ TD+
CT CT
TX- TD-
NC NC
NC NC
RX+ RD+
CT CT
RX- RD-
TX+
TX-
RX+
RX-
R31 75
R32 75
R33 75
R34 75
C52 1000p/2KV C1206
C53 1000p/2KV C1206
C9 0.01uF
C10 0.1uF
C11 0.1uF
C12 0.01uF
LAN_VS
nuvoTon
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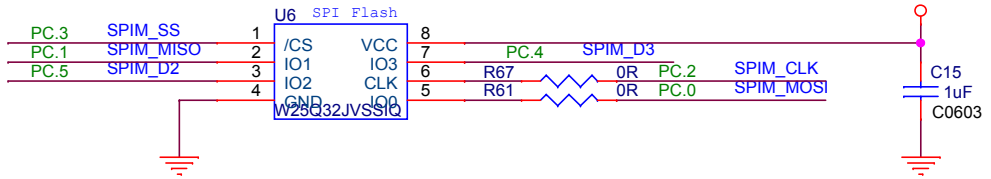
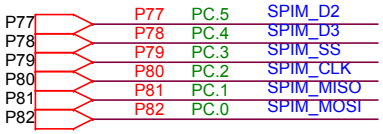
NuMaker-PFM-M487
Size A
Document Number
Ethernet
Rev V3.0
Date: Friday, November 03, 2023
Sheet 7 of 10

SPI Flash

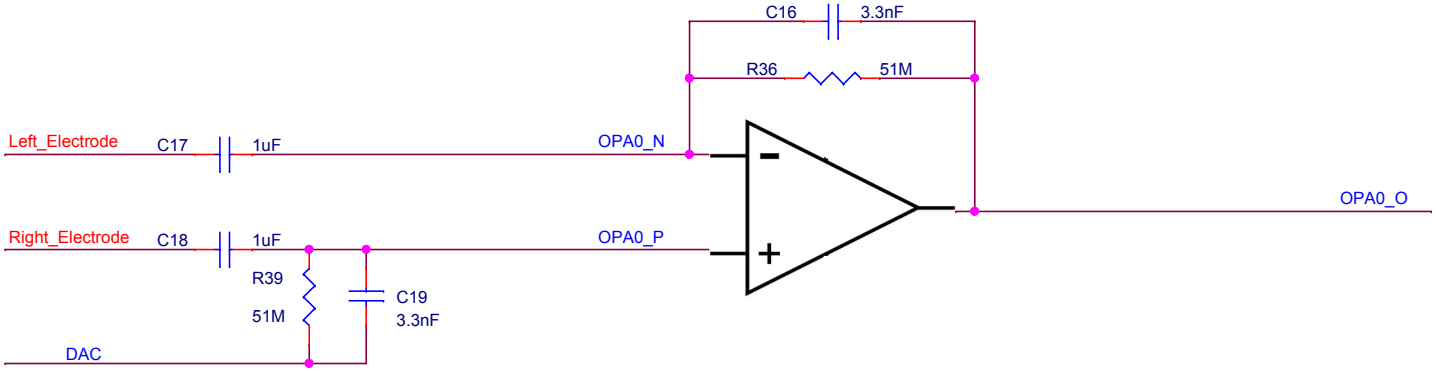


SPI Flash

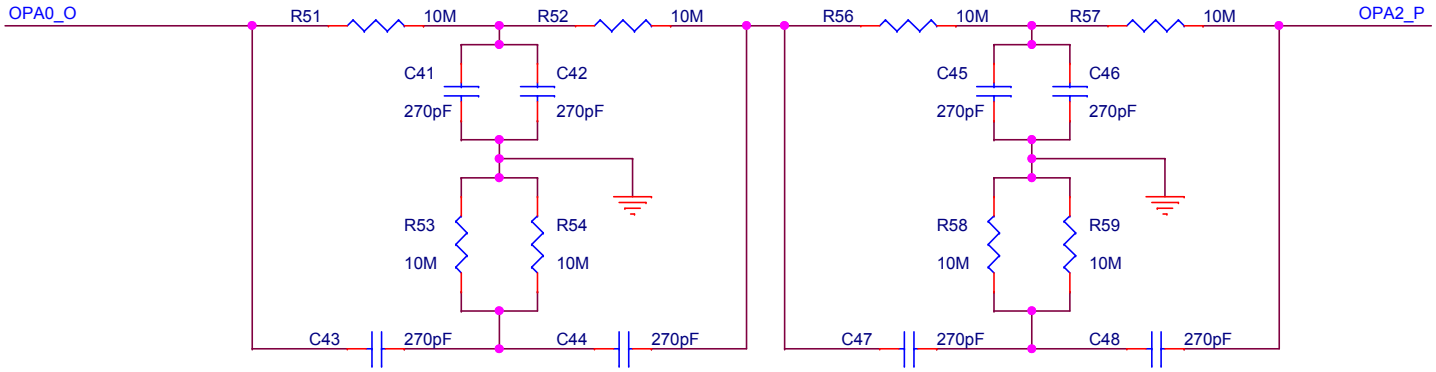


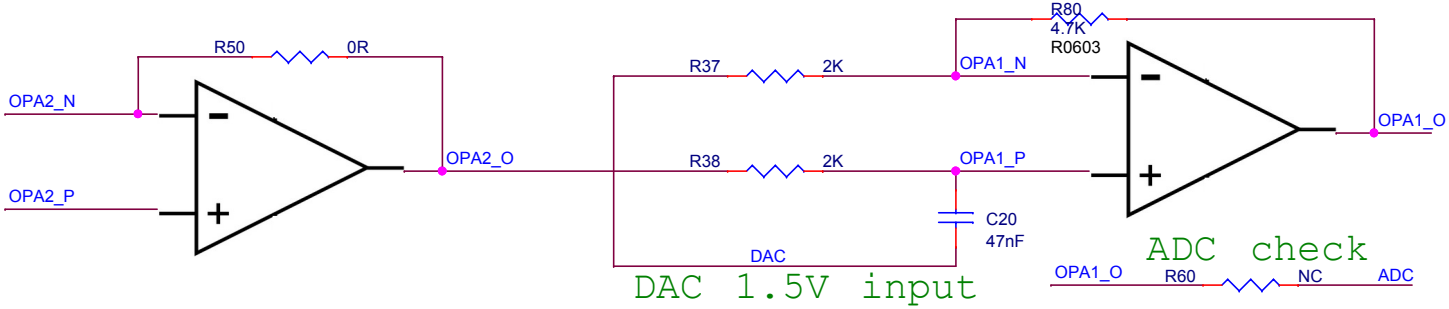
Heartbeat

Two-Stage Differential Pair Amplifier

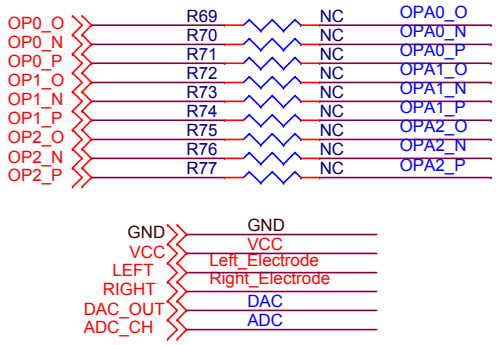


DAC 1.5V input

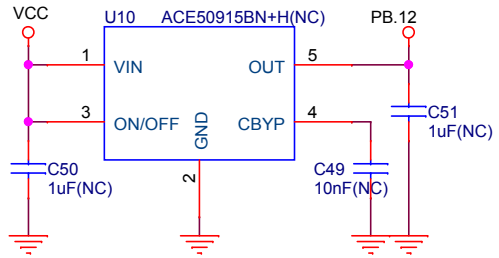




ECG



Power 3.3V to 1.5V



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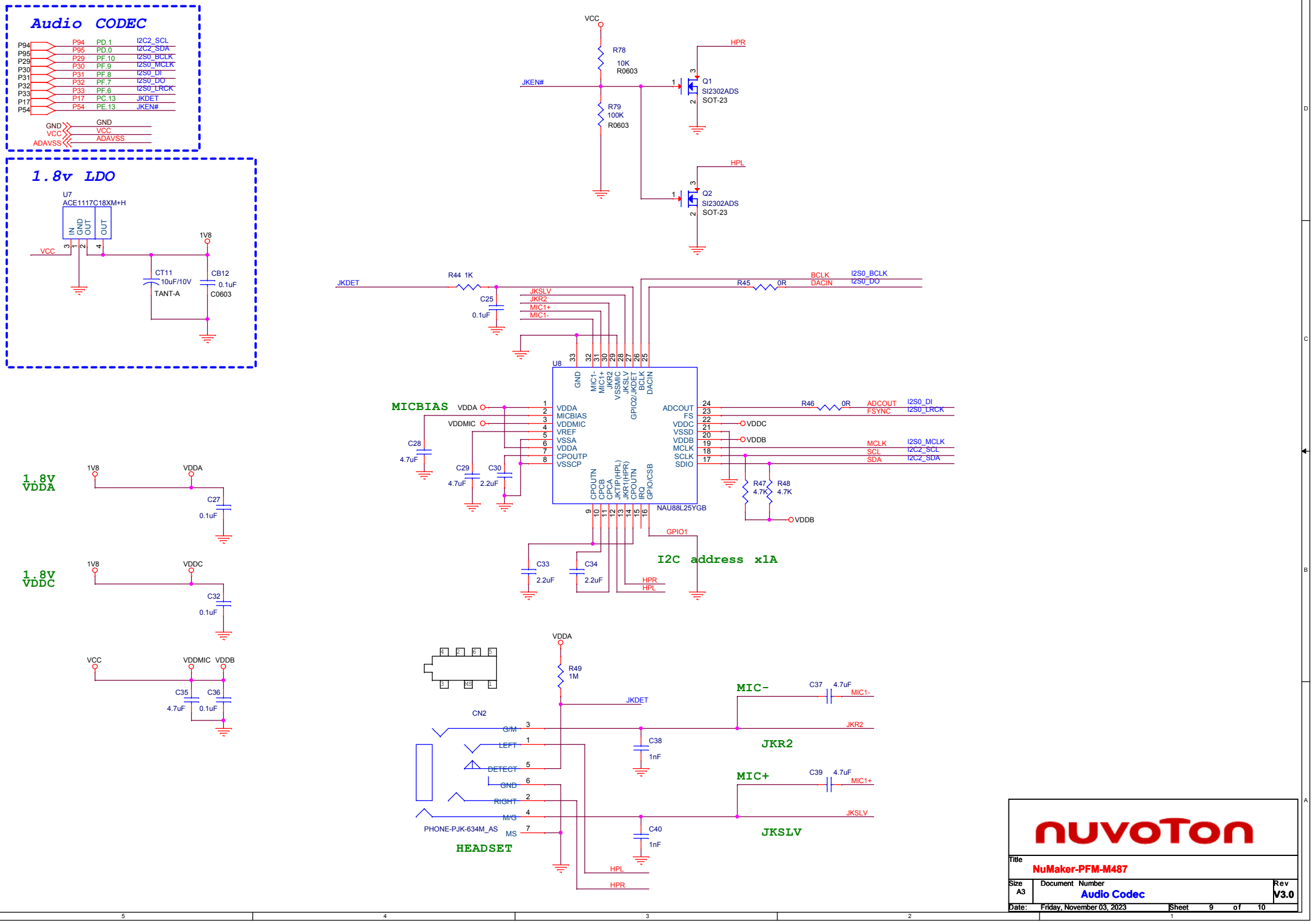
Audio CODEC
P94 PD.1 I2C2_SCL
P95 PD.0 I2C2_SDA
P29 PF.10 I2S0_BCLK
P30 PF.9 I2S0_MCLK
P31 PF.8 I2S0_DI
P32 PF.7 I2S0_DO
P33 PF.6 I2S0_LRCK
P17 PC.13 JKDET
P54 PE.13 JKEN#
GND
VCC
ADAVSS
1.8v LDO
U7
ACE1117C18XM+H
IN GND OUT OUT
VCC
1V8
CT11 10uF/10V TANT-A
CB12 0.1uF C0603
1.8V VDDA
1V8
VDDA
C27 0.1uF
1.8V VDDC
VDDC
C32 0.1uF
VCC
VDDMIC
VDDB
C35 4.7uF
C36 0.1uF
VCC
R78 10K R0603
JKEN#
R79 100K R0603
Q1 SI2302ADS SOT-23
HPR
Q2 SI2302ADS SOT-23
HPL
JKDET
R44 1K
C25 0.1uF
JKSLV
JKR2
MIC1+
MIC1-
R45 0R
BCLK
DACIN
I2S0_BCLK
I2S0_DO
U8
GND MIC1- MIC1+ JKR2 VSSMIC JKSLV GPIO2/JKDET BCLK DACIN
MICBIAS
VDDA
VDDMIC
C28 4.7uF
C29 4.7uF
C30 2.2uF
VDDA MICBIAS VDDMIC VREF VSSA VDDA CPOUTP VSSCP
ADCOUT FS VDDC VSSD VDDB MCLK SCLK SDIO
R46 0R
ADCOUT
FSYNC
I2S0_DI
I2S0_LRCK
VDDC
VDDB
MCLK
SCL
SDA
I2S0_MCLK
I2C2_SCL
I2C2_SDA
R47 4.7K
R48 4.7K
VDDB
CPOUTN CPCB CPCA JKTIP(HPL) JKR1(HPR) CPOUTN IRQ GPIO/CSB
NAU88L25YGB
GPIO1
I2C address x1A
C33 2.2uF
C34 2.2uF
HPR
HPL
VDDA
R49 1M
JKDET
CN2
G/M
LEFT
DETECT
GND
RIGHT
M/G
MS
PHONE-PJK-634M_AS
HEADSET
MIC-
C37 4.7uF
MIC1-
JKR2
C38 1nF
JKR2
MIC+
C39 4.7uF
MIC1+
JKSLV
C40 1nF
JKSLV
HPL
HPR
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NuMaker-PFM-M487
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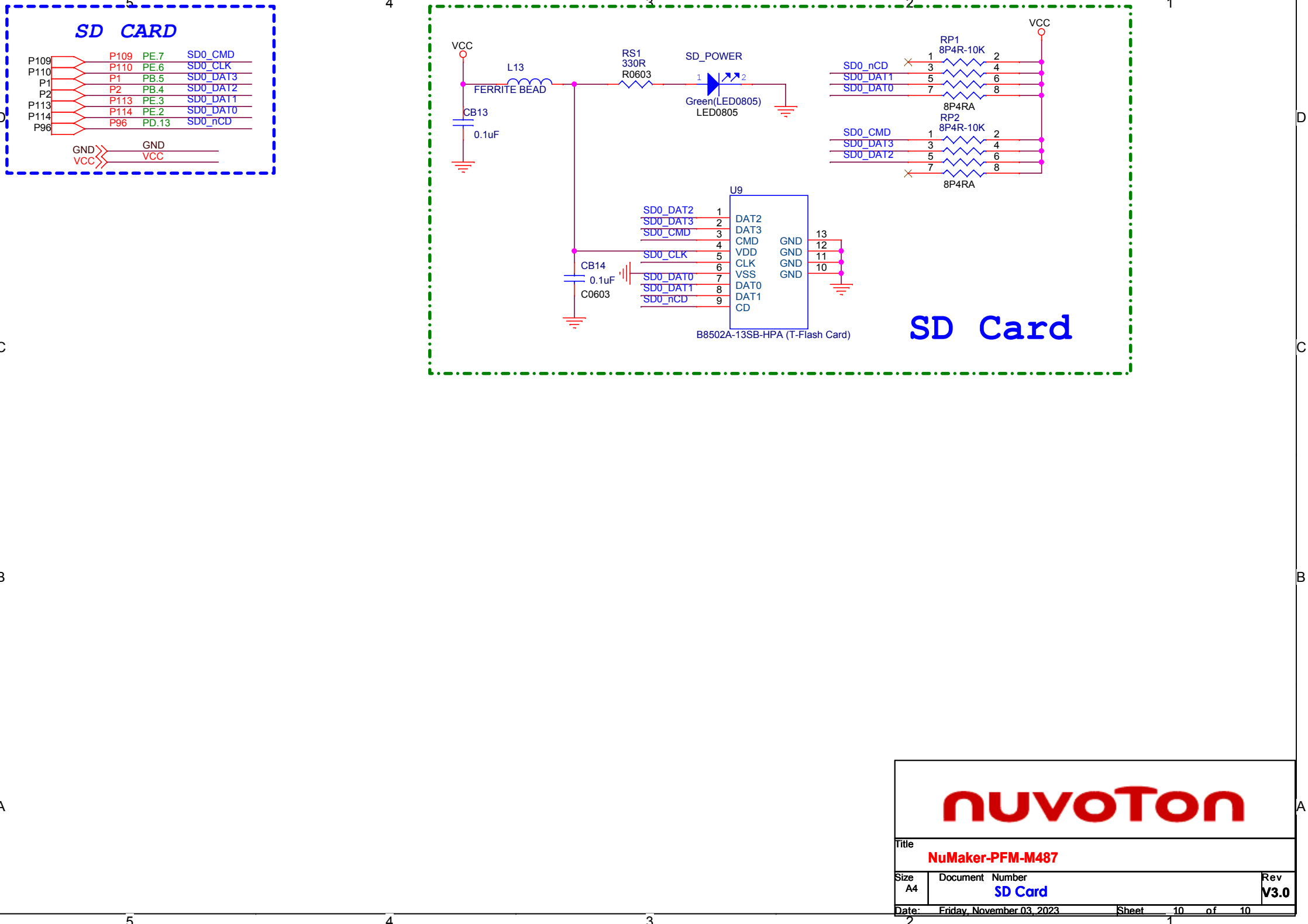

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