Schematic: reComputer industrial J501

Revision History

DATE	REVISION	DESCRIPTION
2025/07/04	v01	First release.
2025/10/30	v02	Fix SIM detect signal revertion issue.
2025/11/05	v1	First production release.
2025/12/16	v1	Fine-tuning the HDMI output eye diagram.

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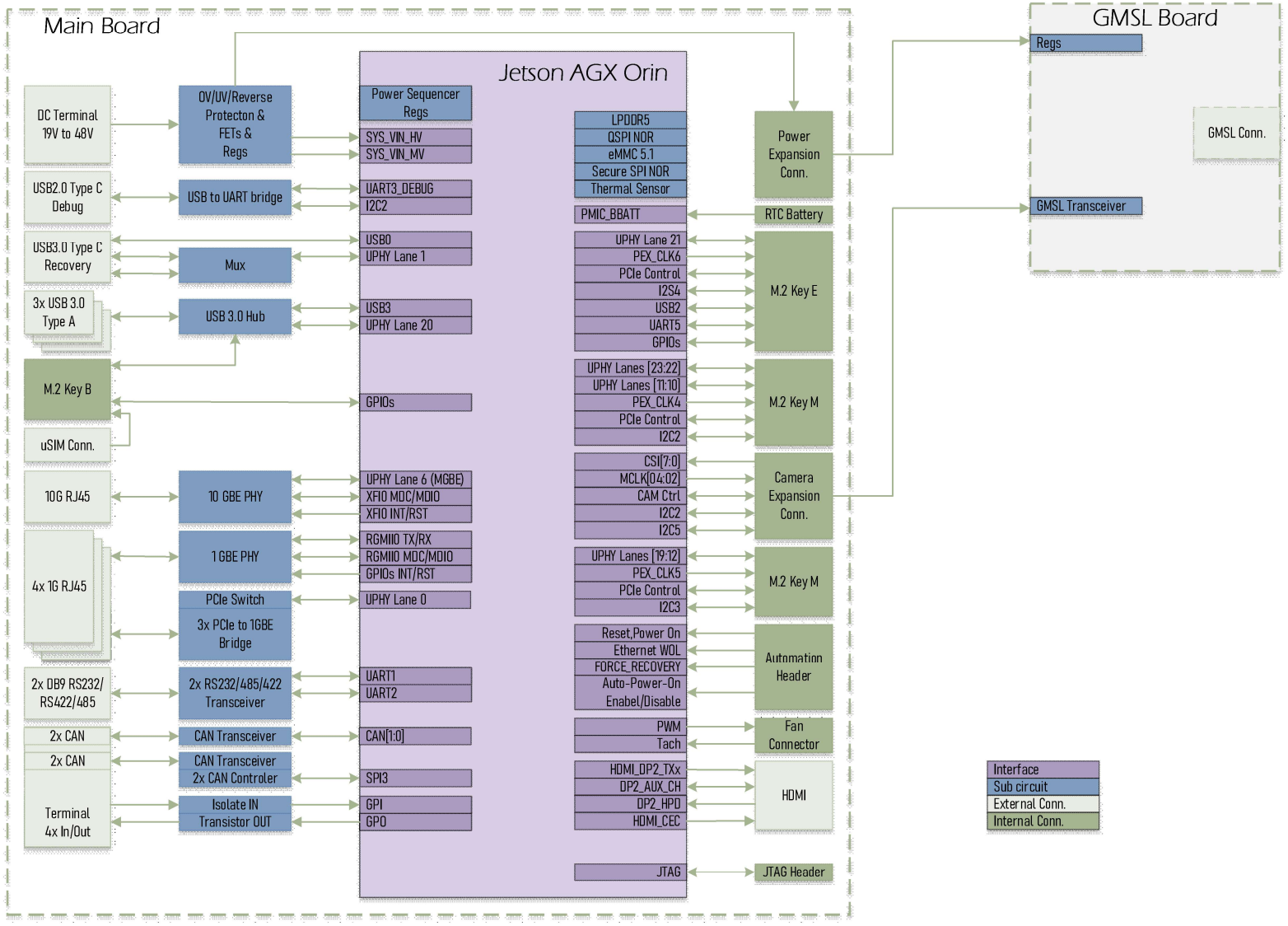
reComputer Robotics J501



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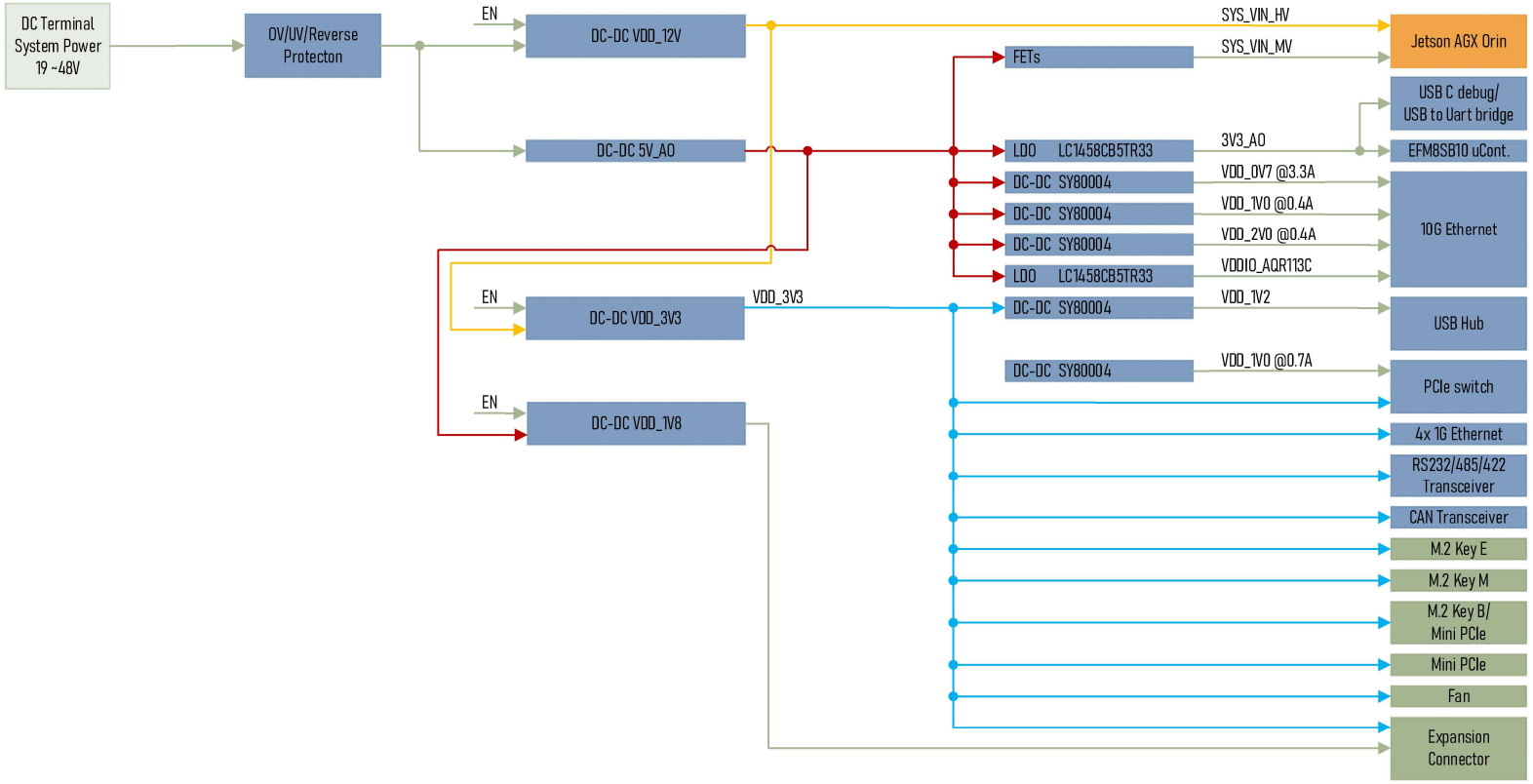

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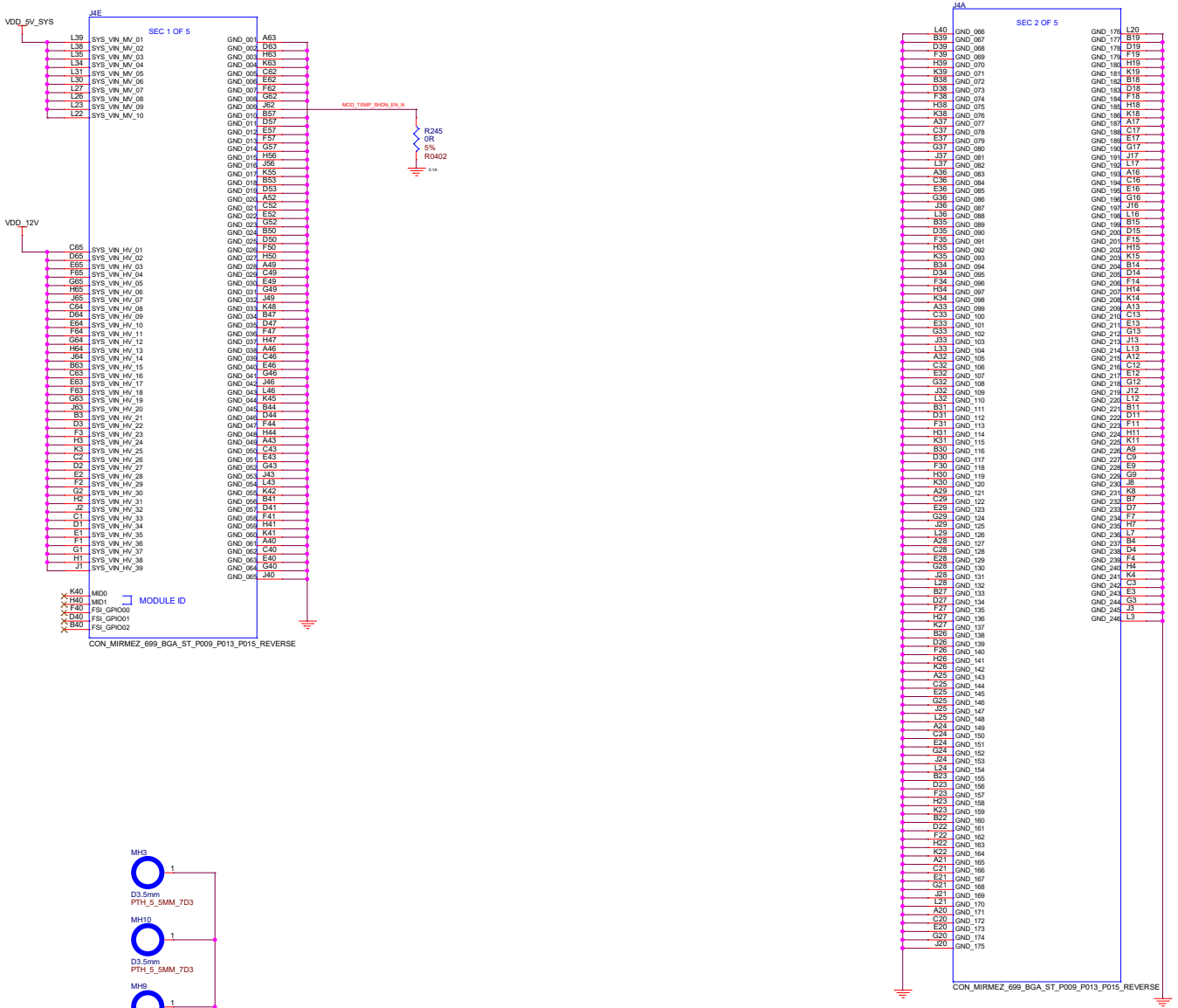

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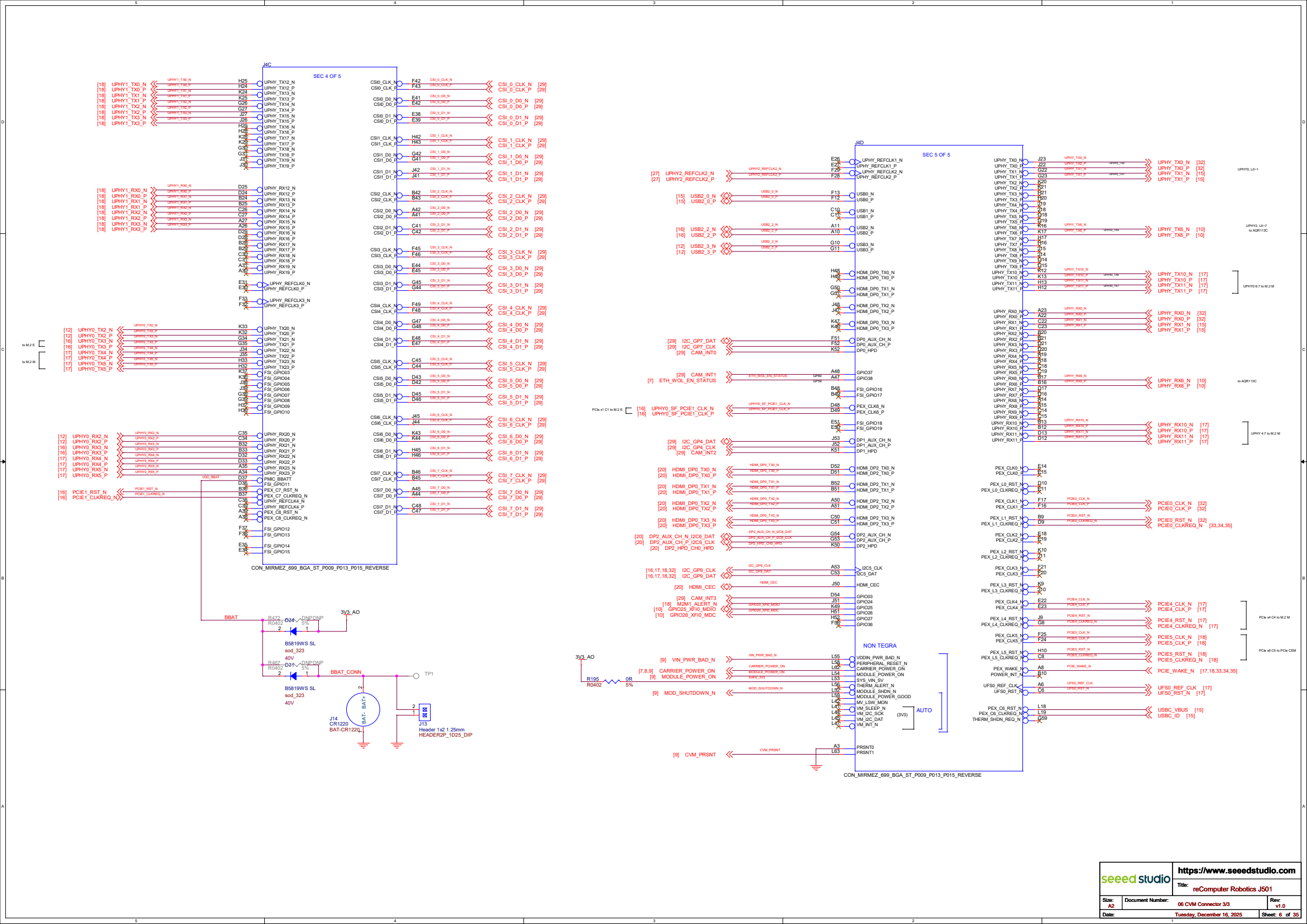

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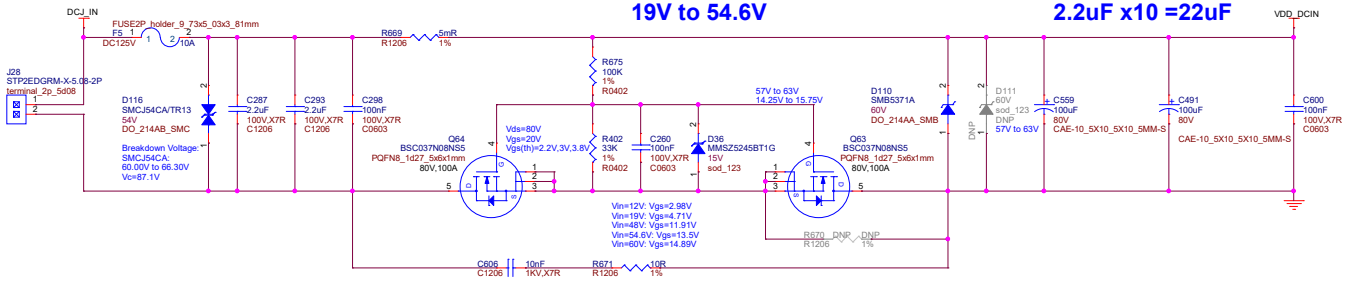
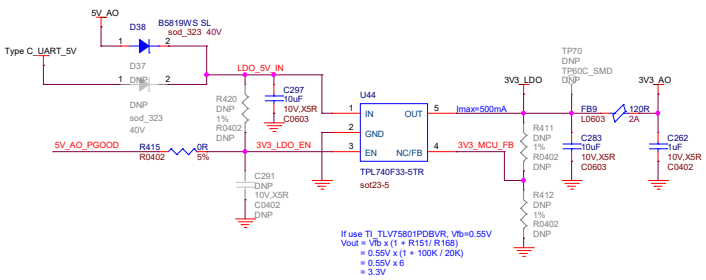
Vin protection



3V3_AO



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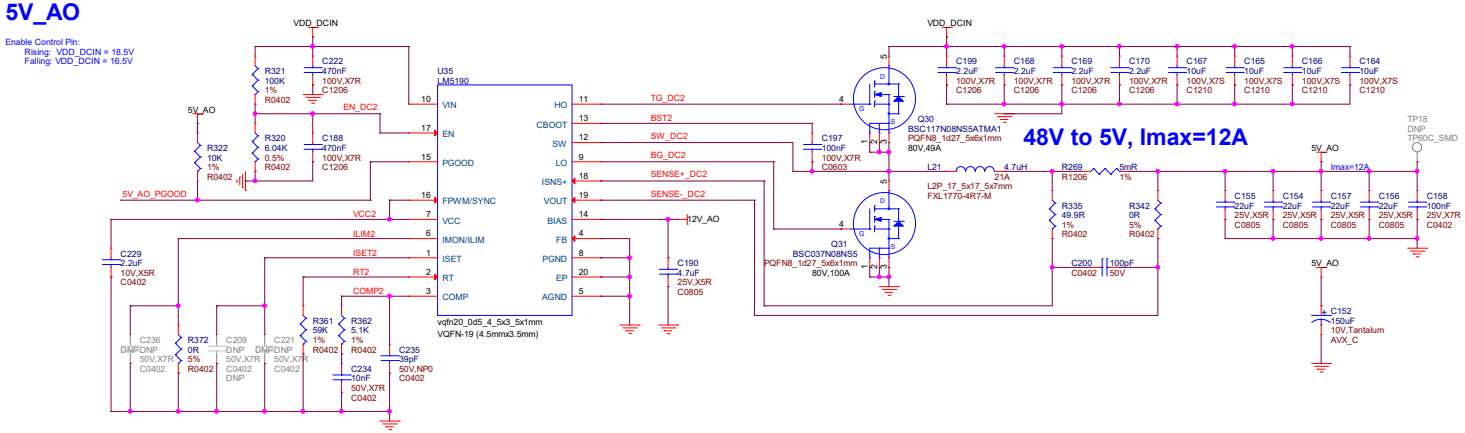
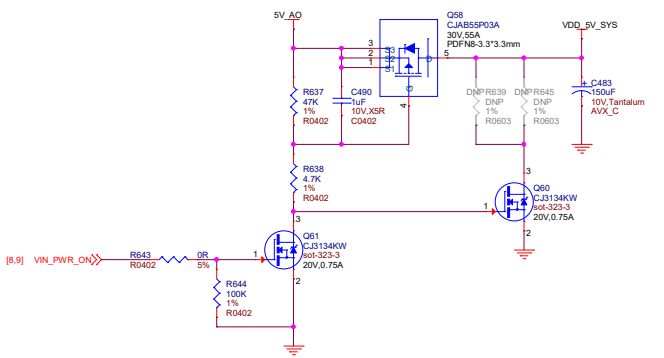
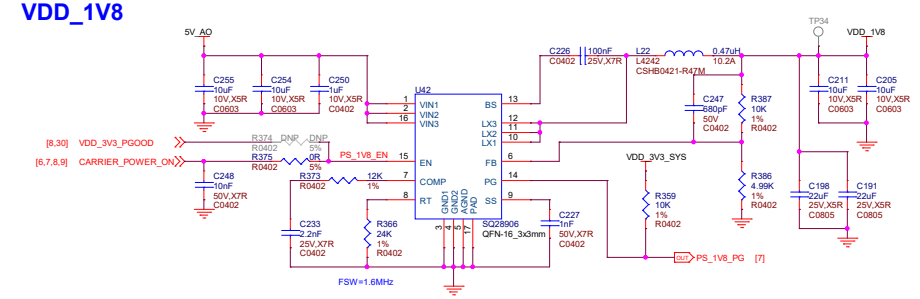


VDD_5V



VDD_1V8



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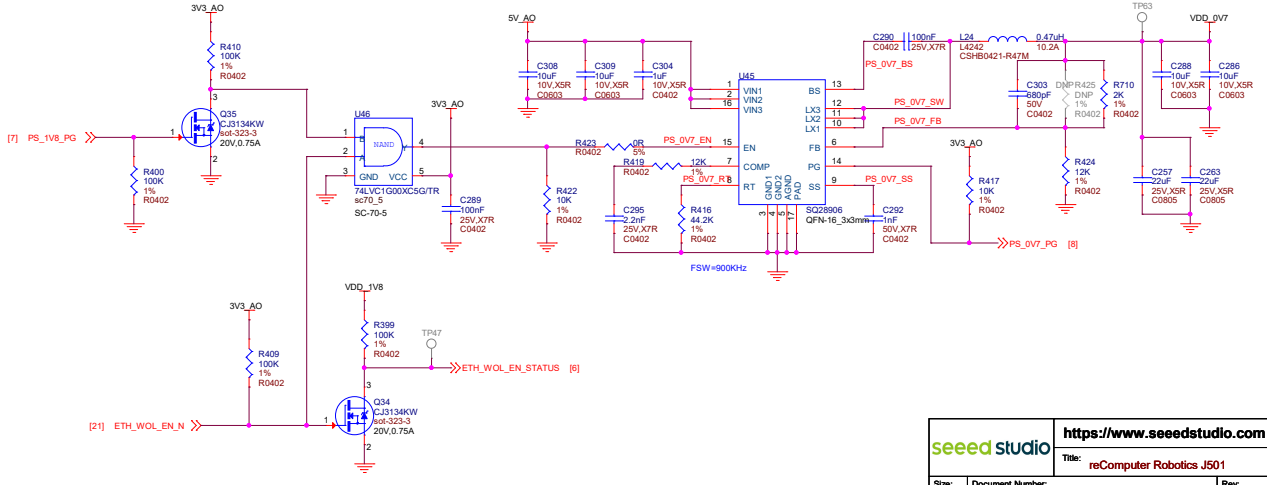
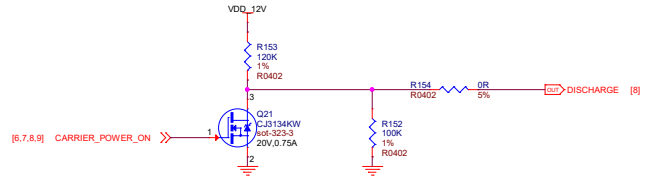


Discharge



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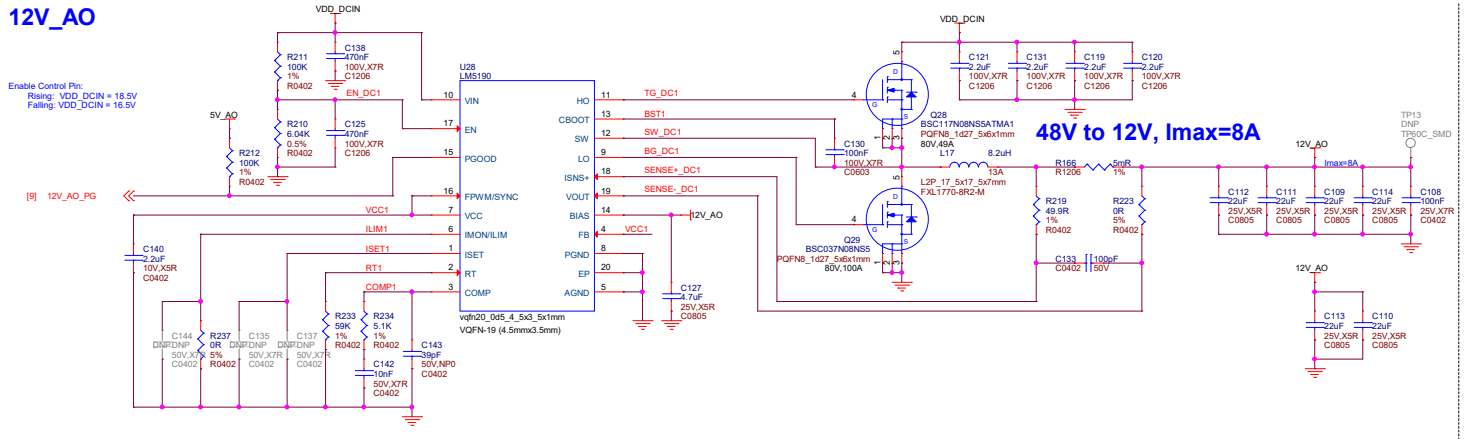
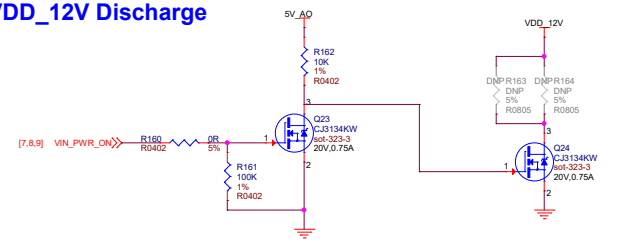
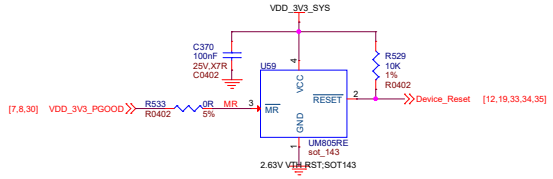
12V_AO



VDD_12V Discharge



VDD_3V3 Supervisor



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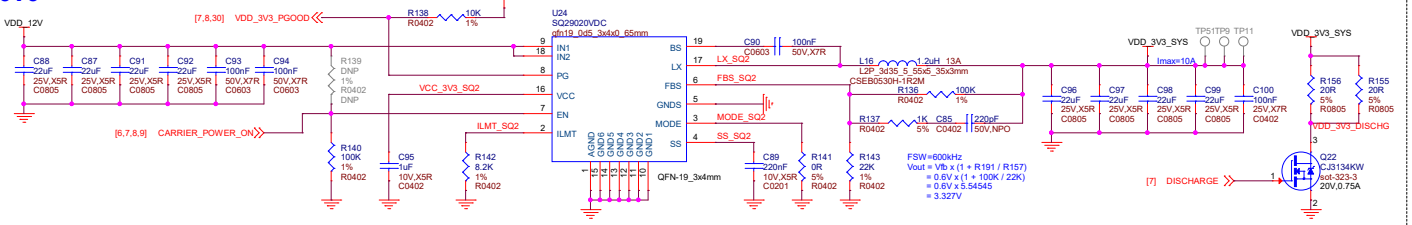

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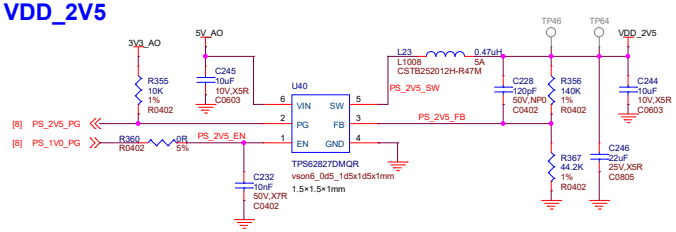
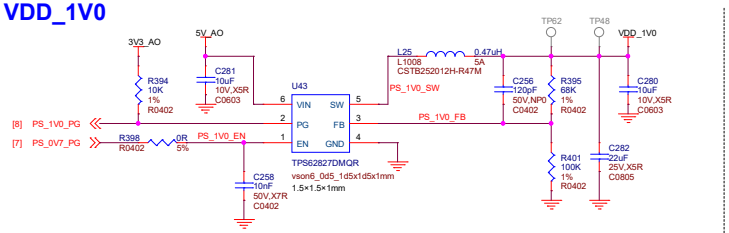


VDD_1V0



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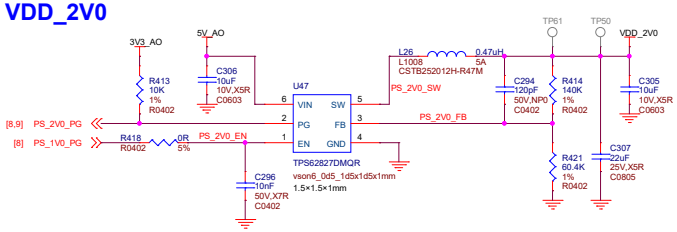

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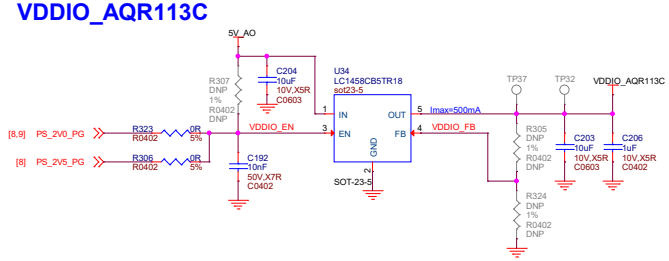

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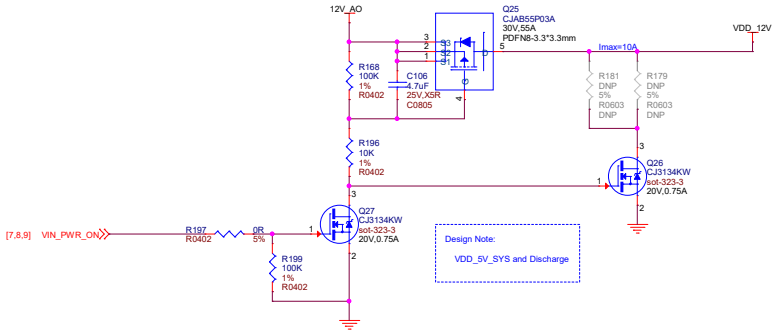

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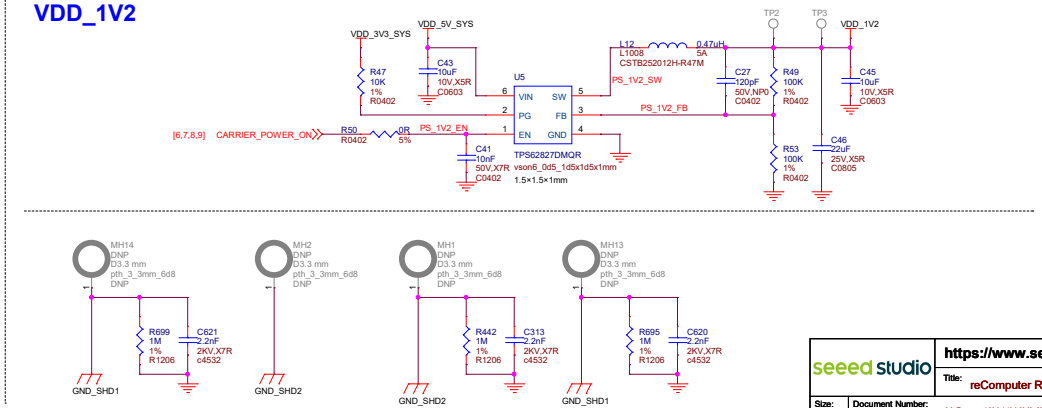

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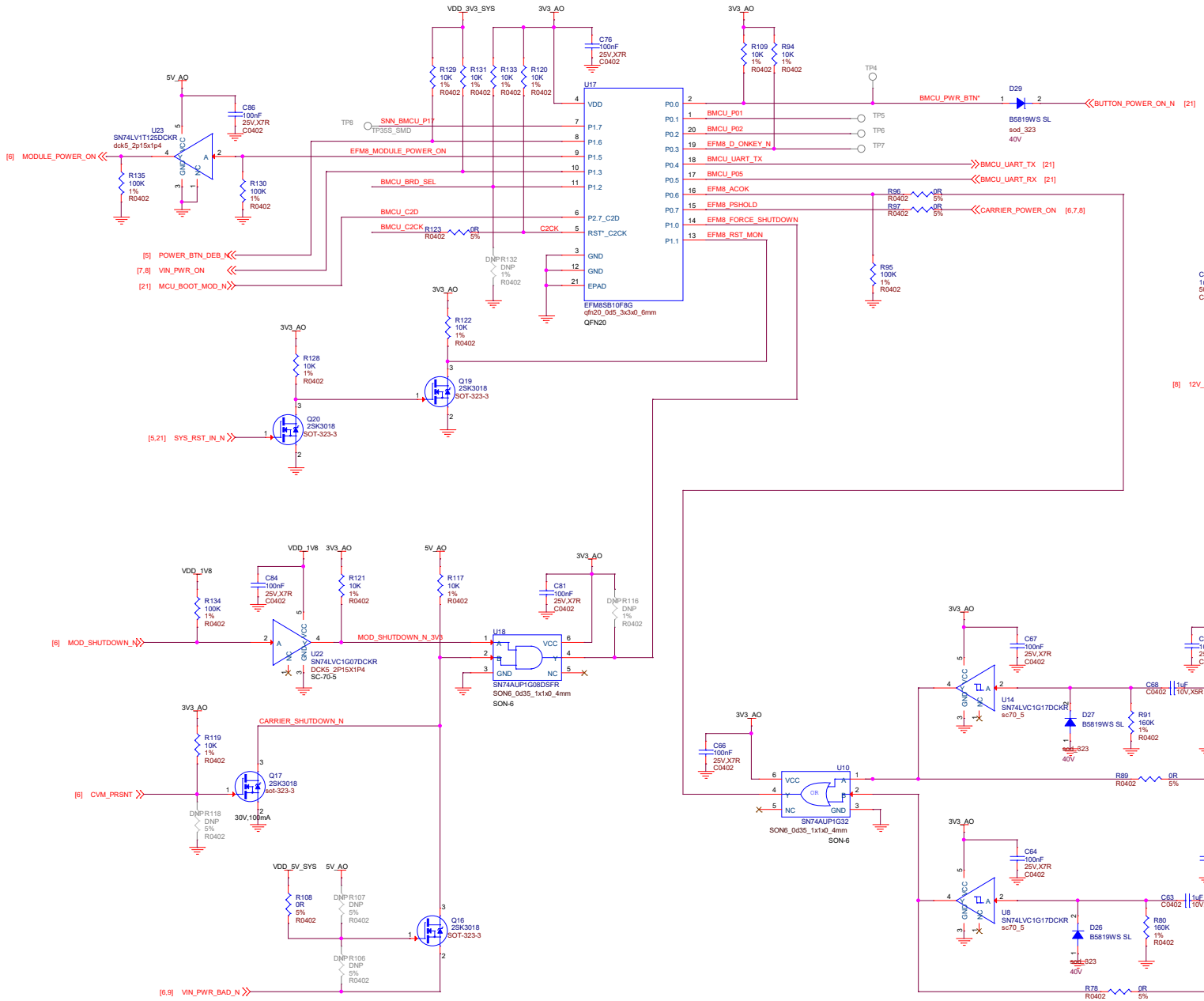
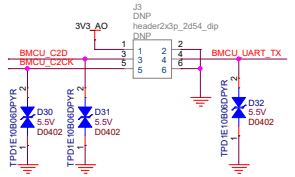
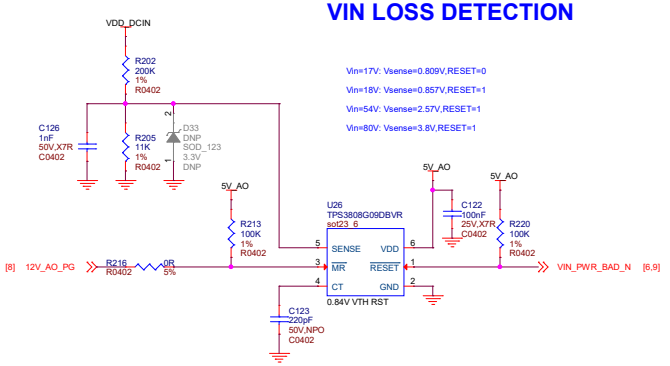
Button MCU For Power Up

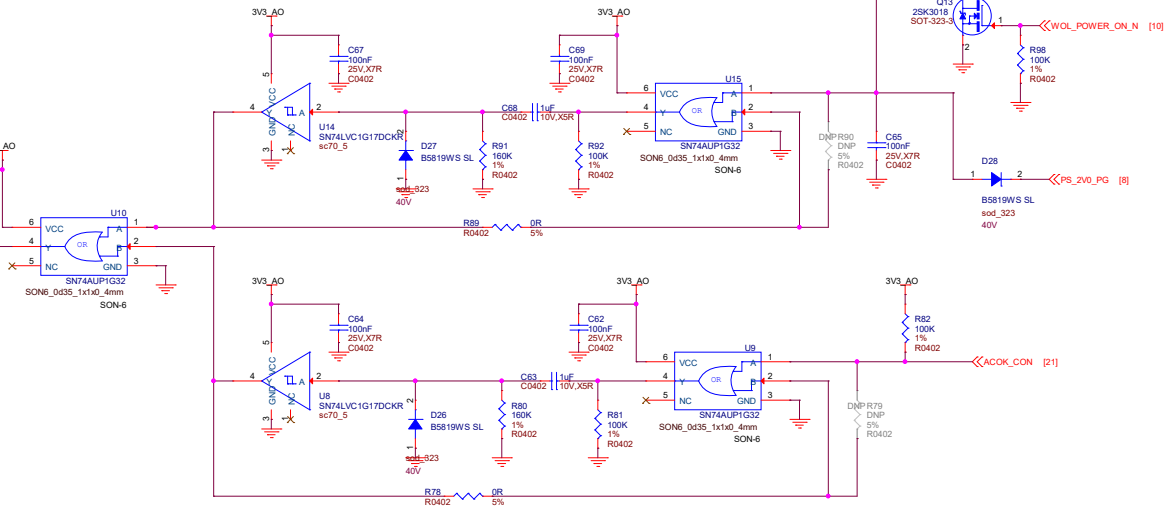


Debug - C2

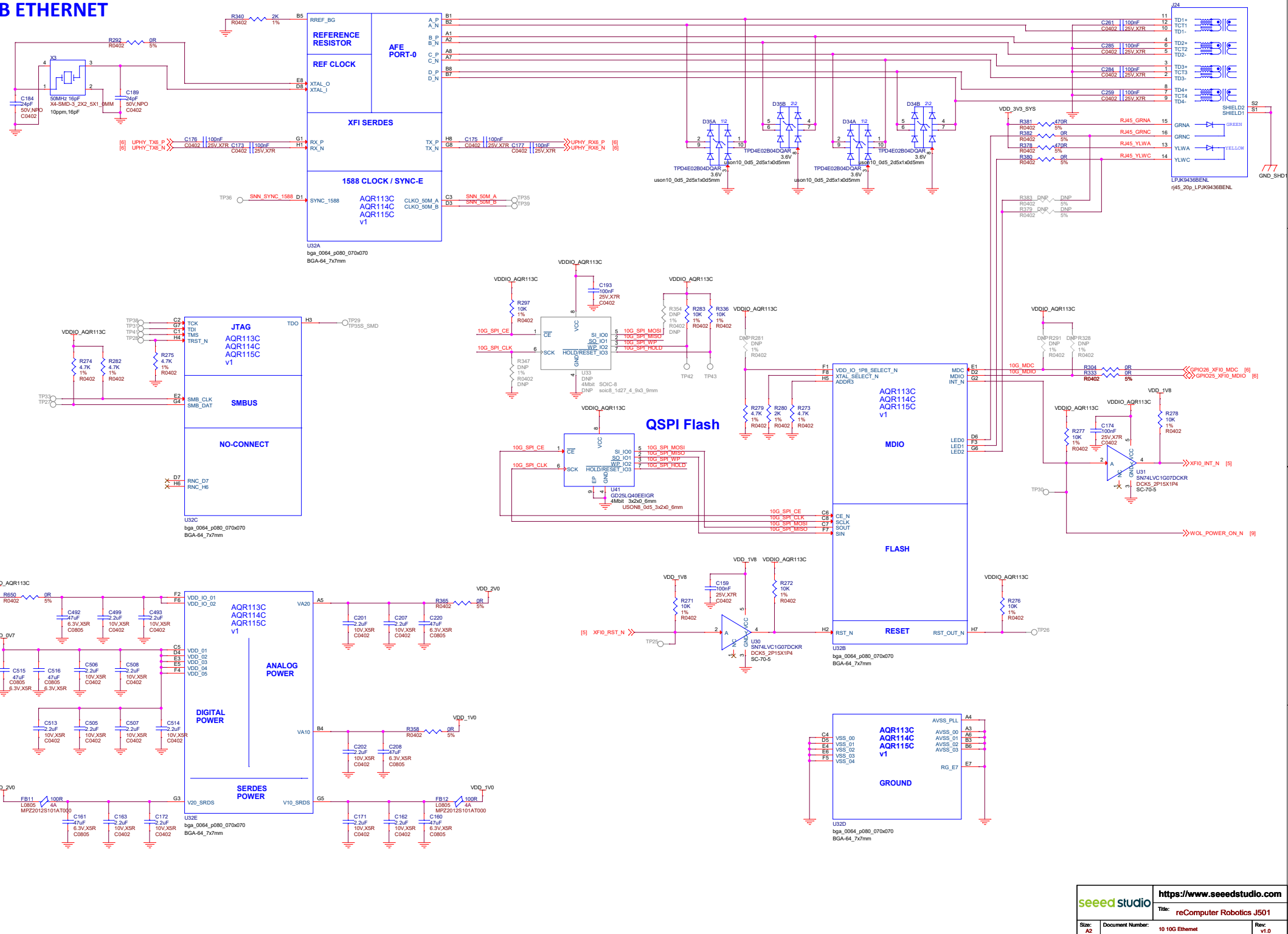


VIN LOSS DETECTION





10GB ETHERNET



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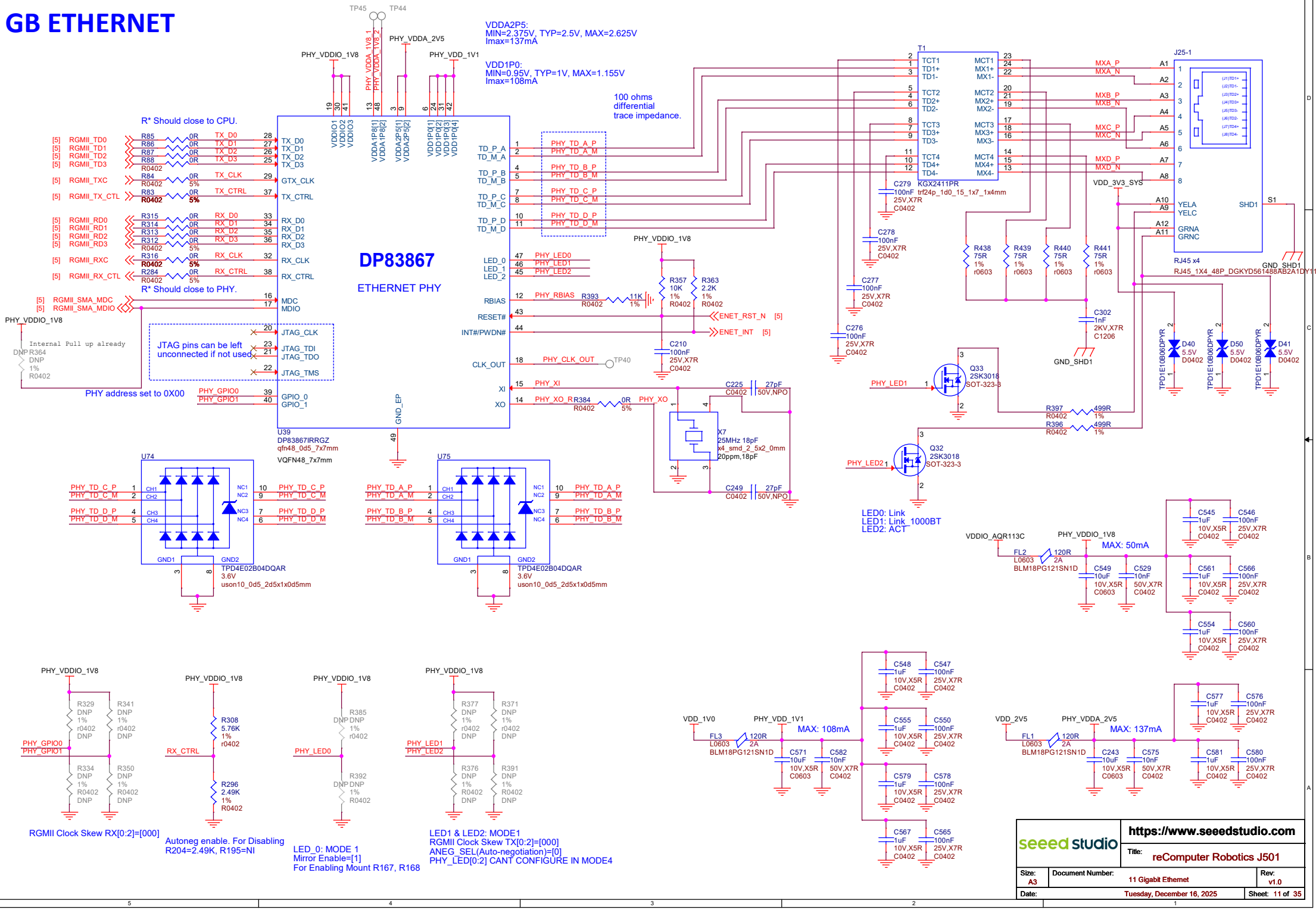
GB ETHERNET



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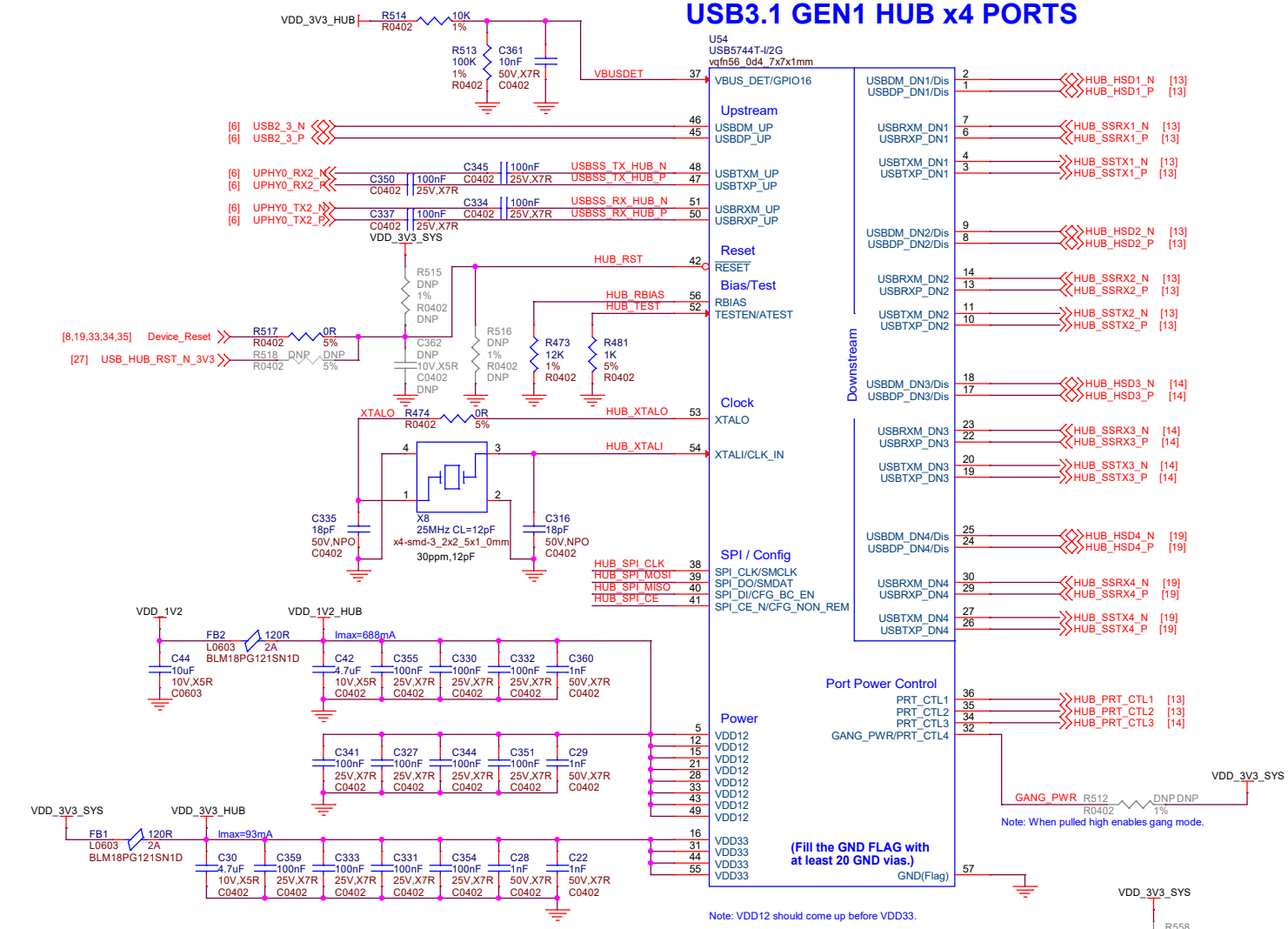
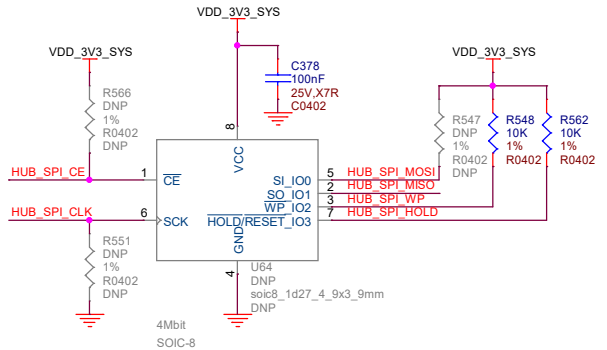
USB3.1 GEN1 HUB x4 PORTS





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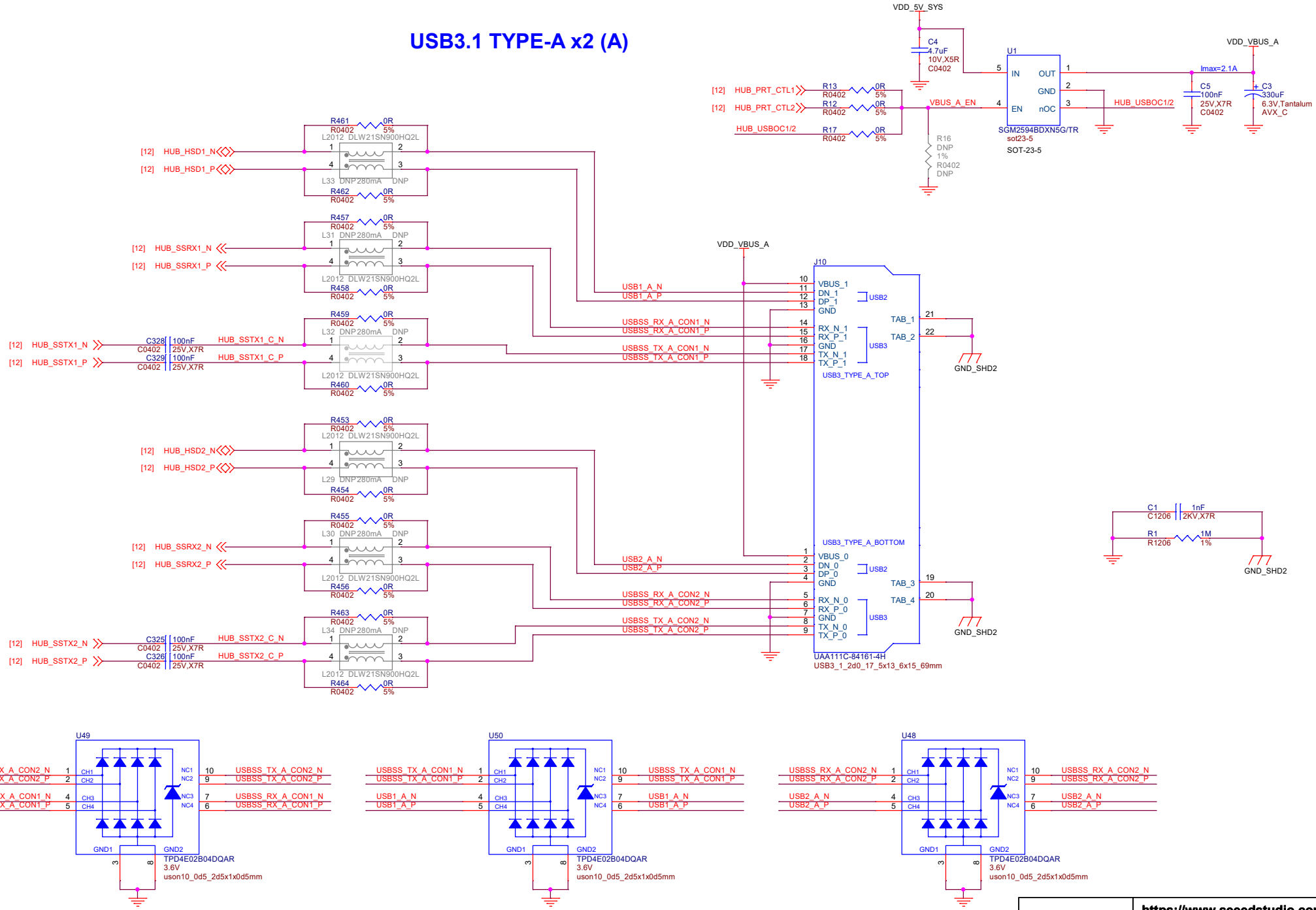
USB3.1 TYPE-A x2 (A)



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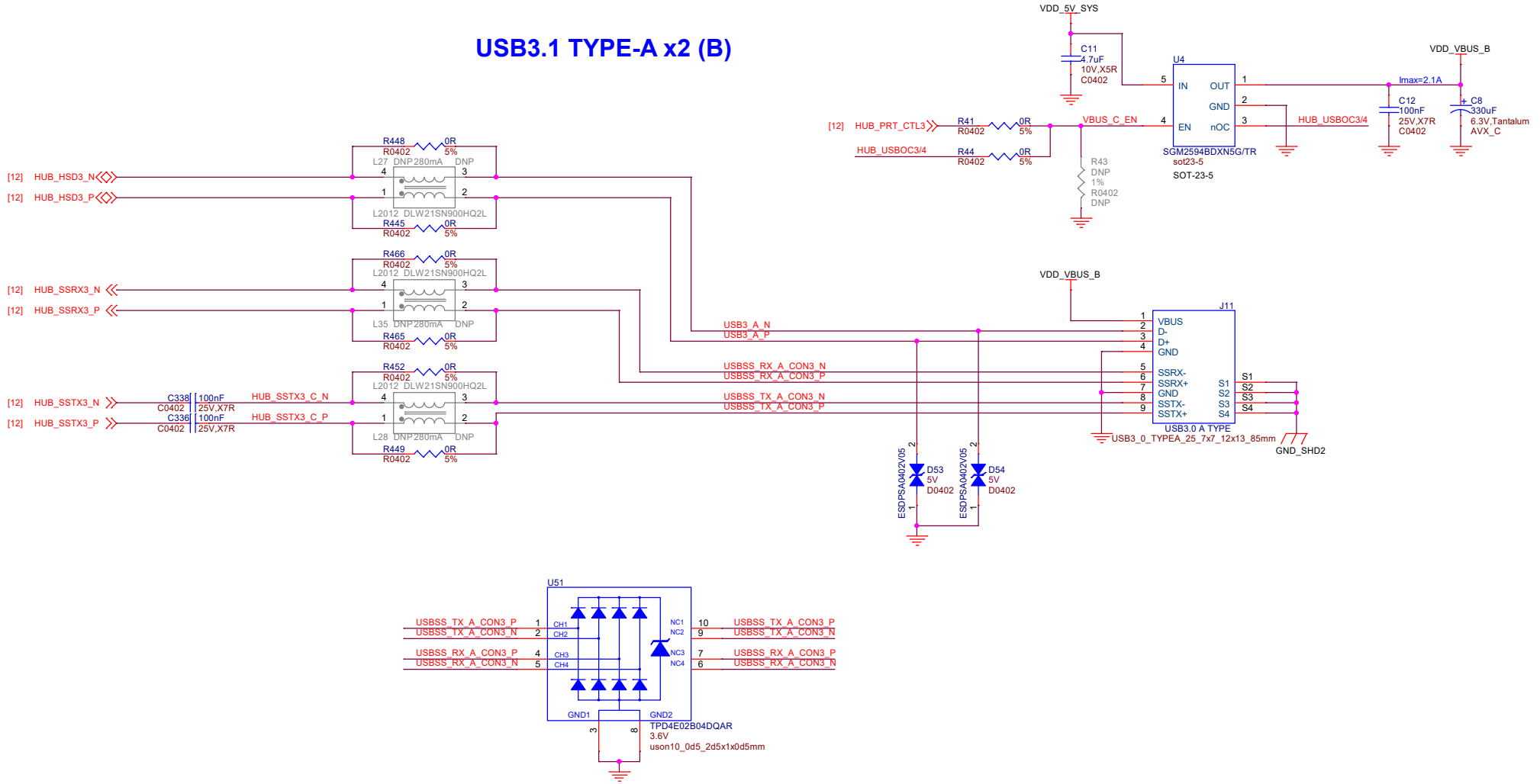
USB3.1 TYPE-A x2 (B)



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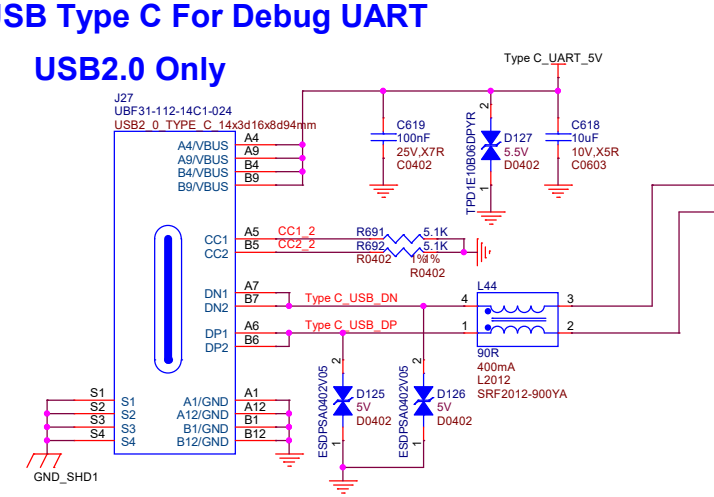
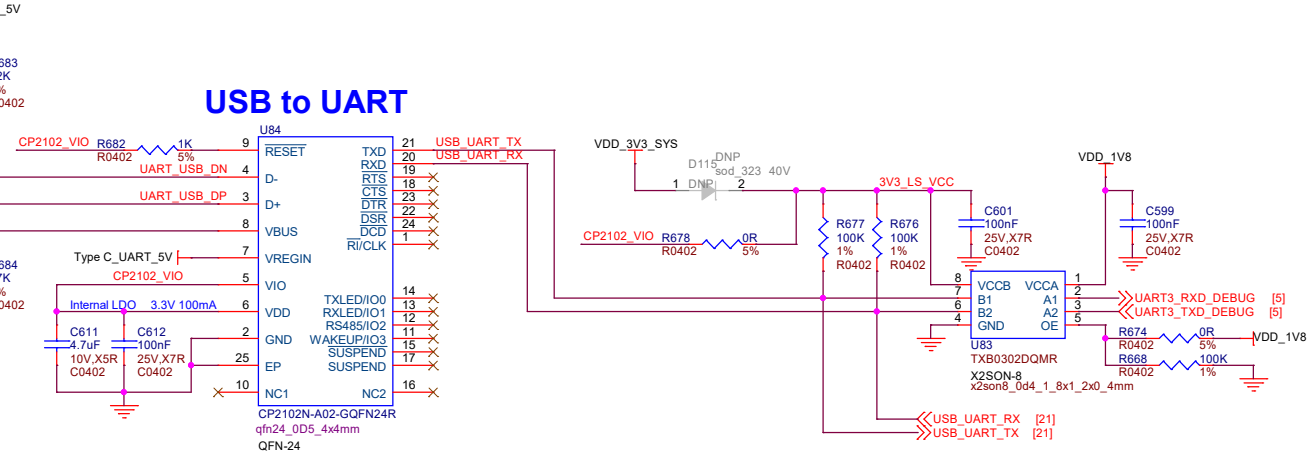
USB Type C For Debug UART

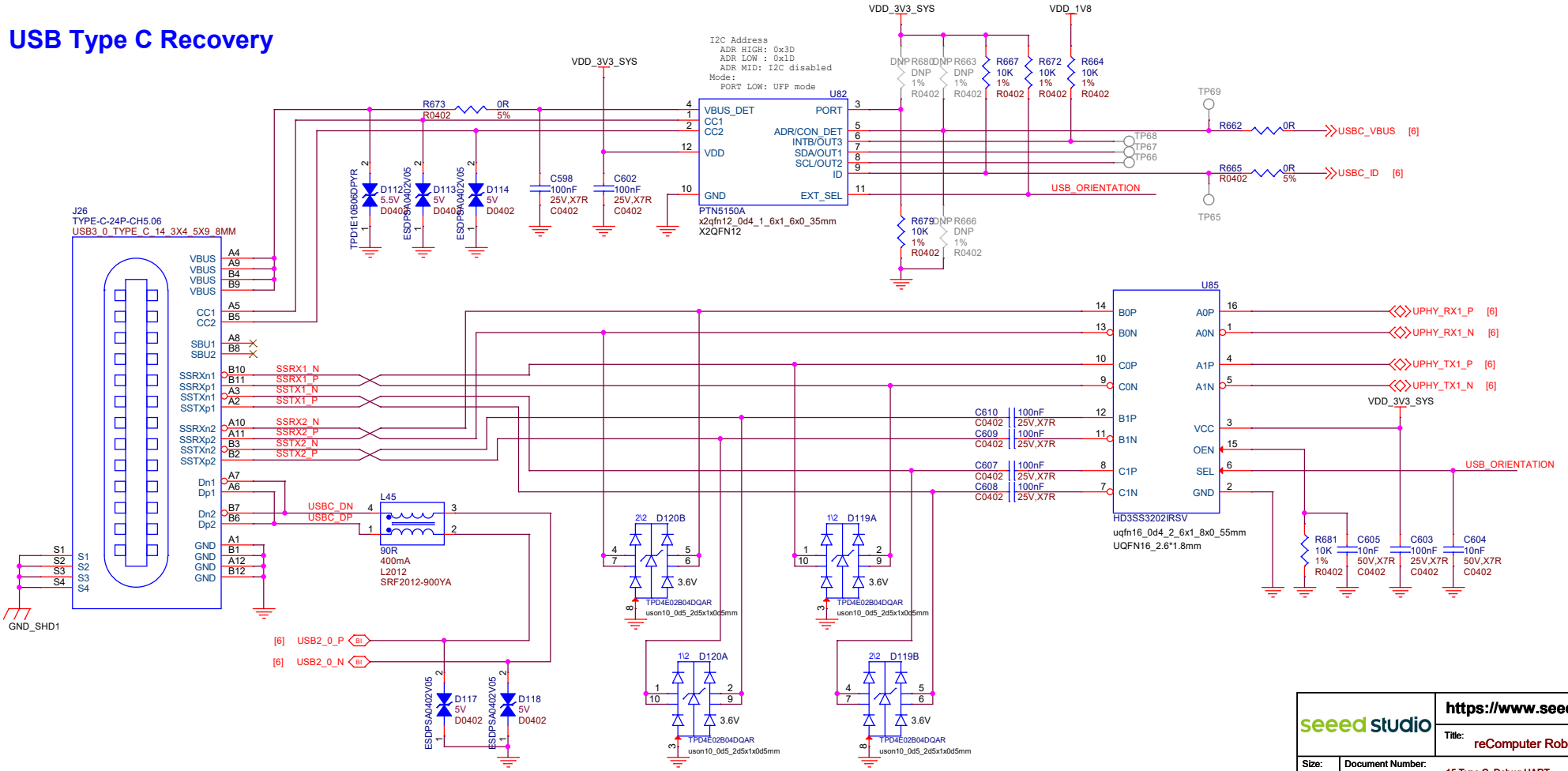
USB2.0 Only



USB to UART



USB Type C Recovery



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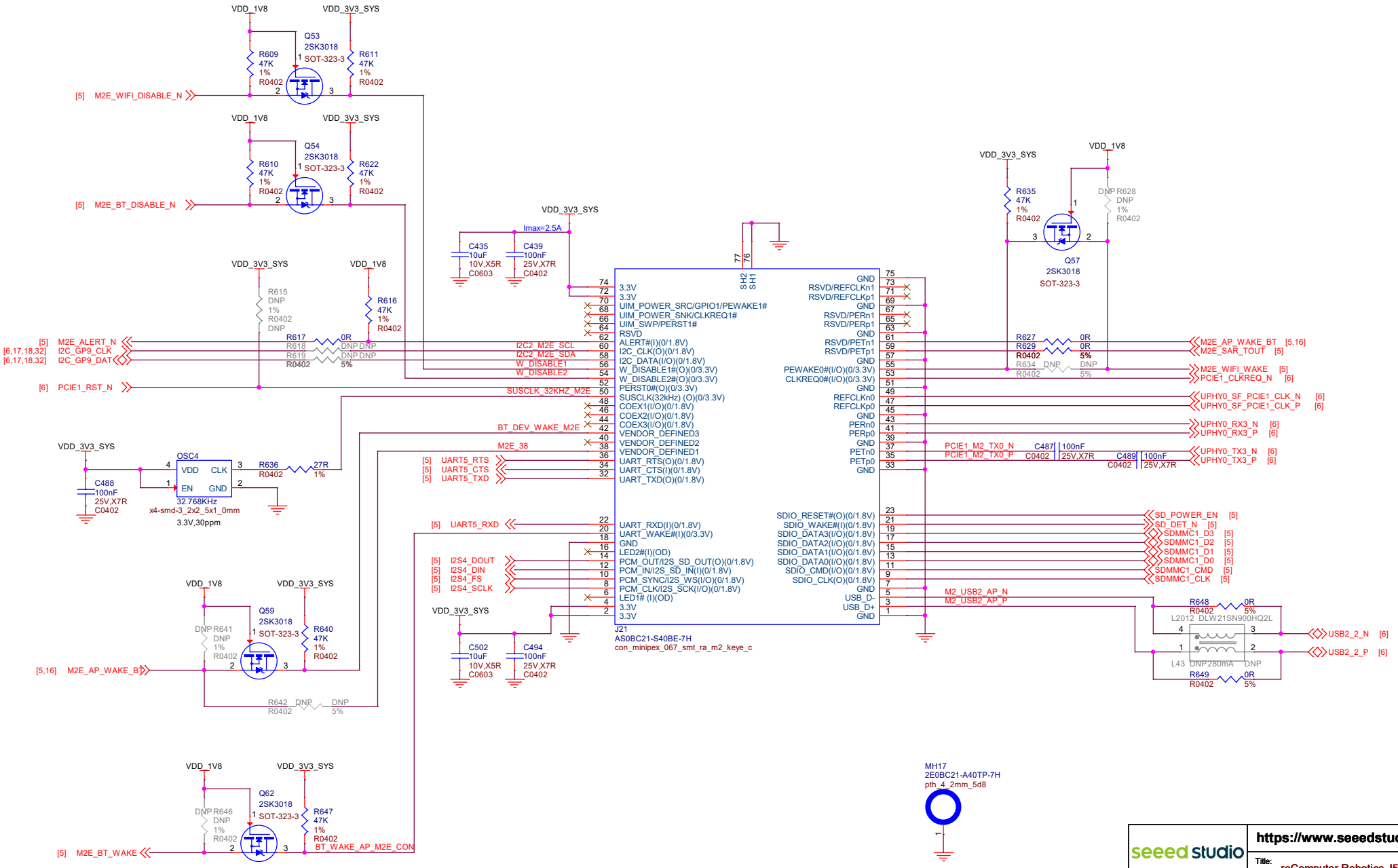
M.2 KEY-E (WIFI/BT)



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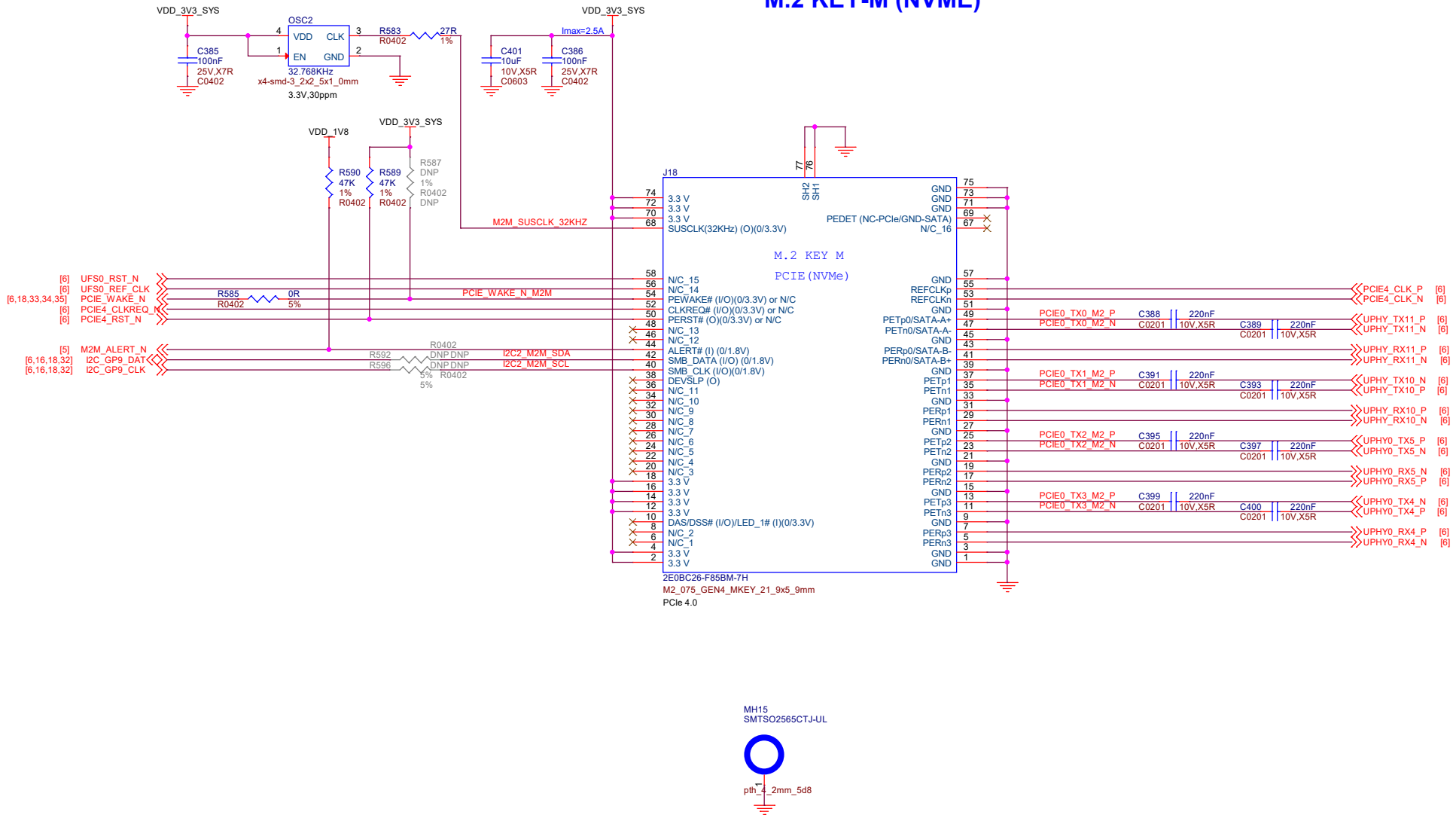
M.2 KEY-M (NVME)



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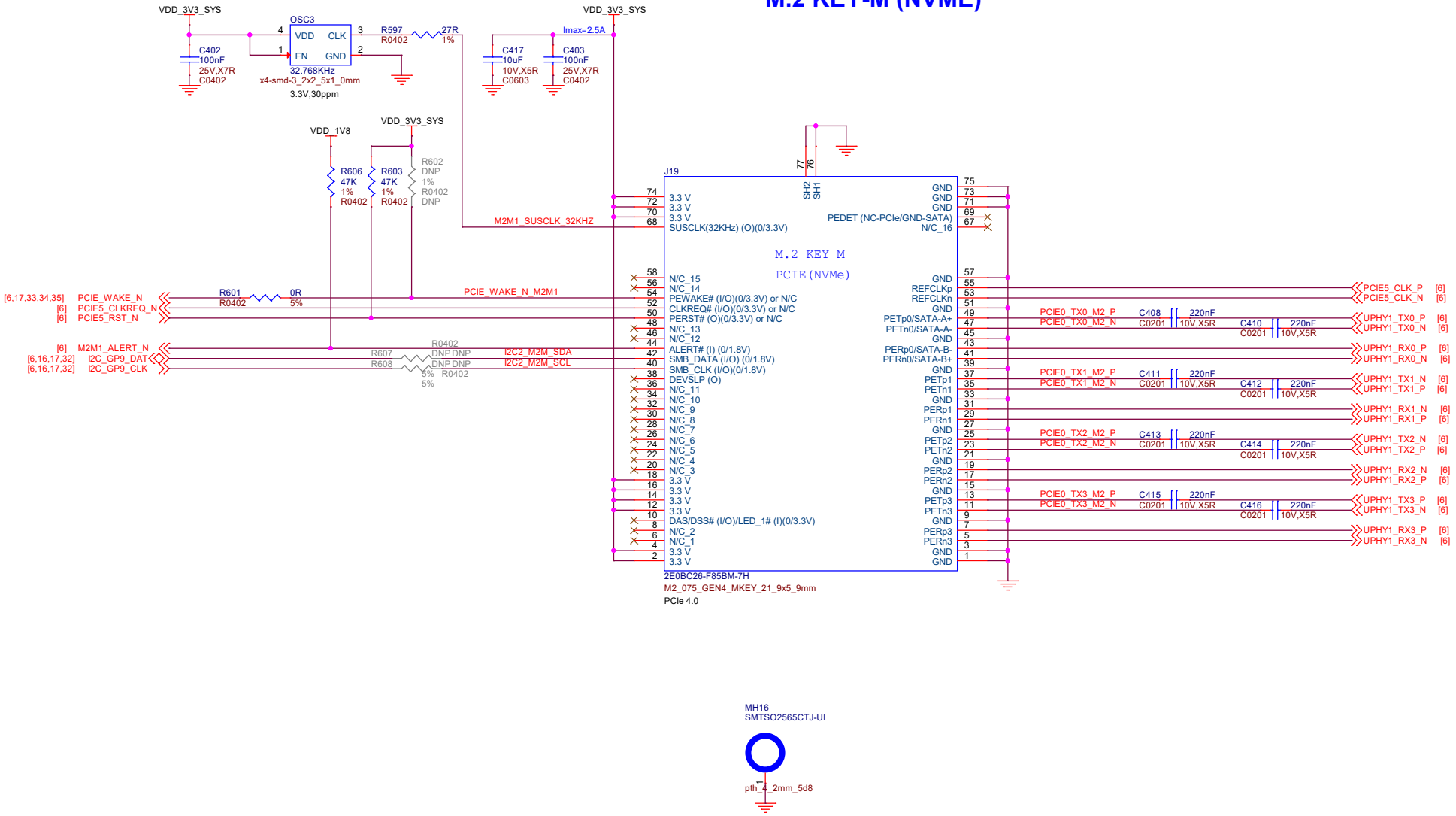
M.2 KEY-M (NVME)



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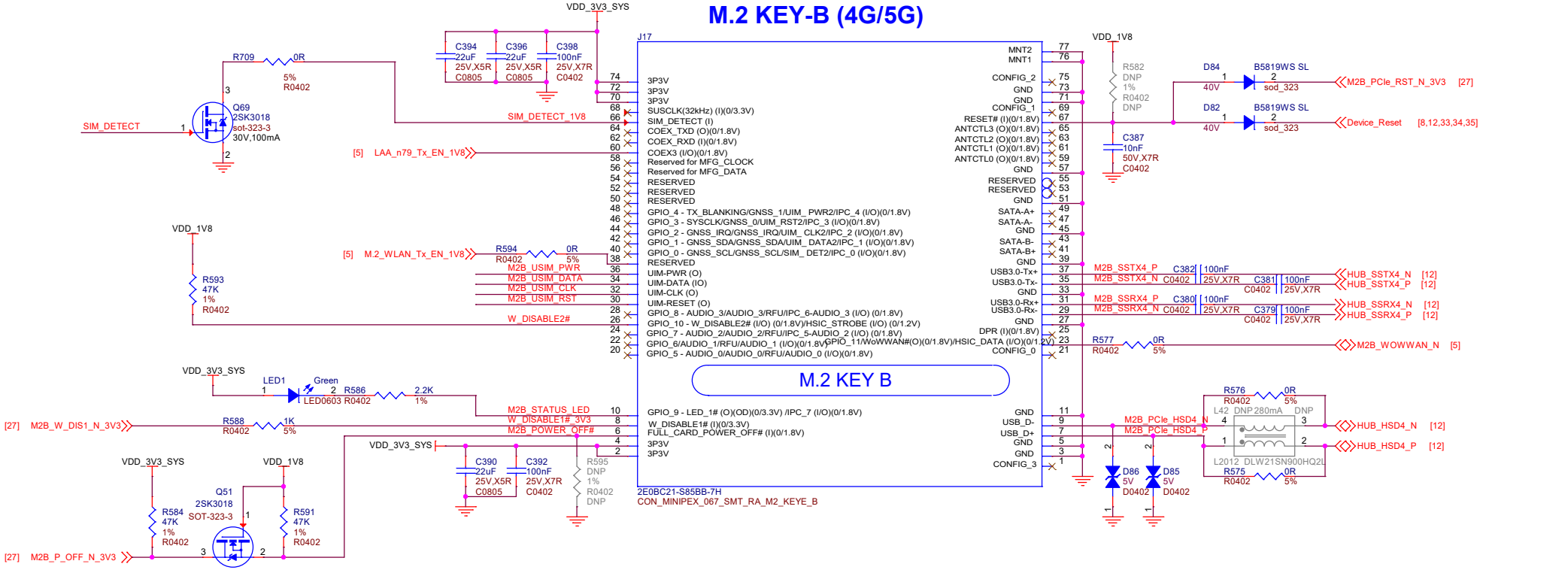
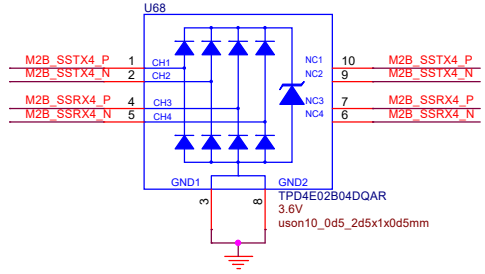
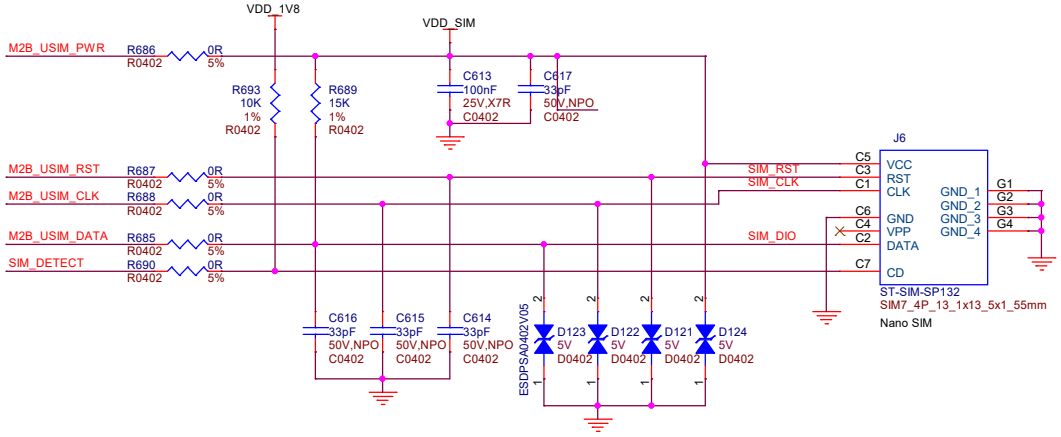
M.2 KEY-B (4G/5G)

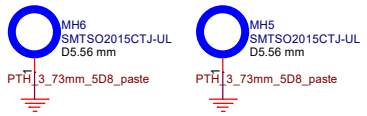


W_DISABLE1#_3V3
PCIe =3.3V
M.2 Key B=1.8V and 3.3V.

Must be 3.3 V tolerant for Adapters that support 1.8 V sideband signaling.
Platforms that expect 1.8 V sideband signaling must protect themselves from legacy 3.3 V adapters.







layout Note:

Place the MH9 MH10 to the other side of M.2 Key-B connector.

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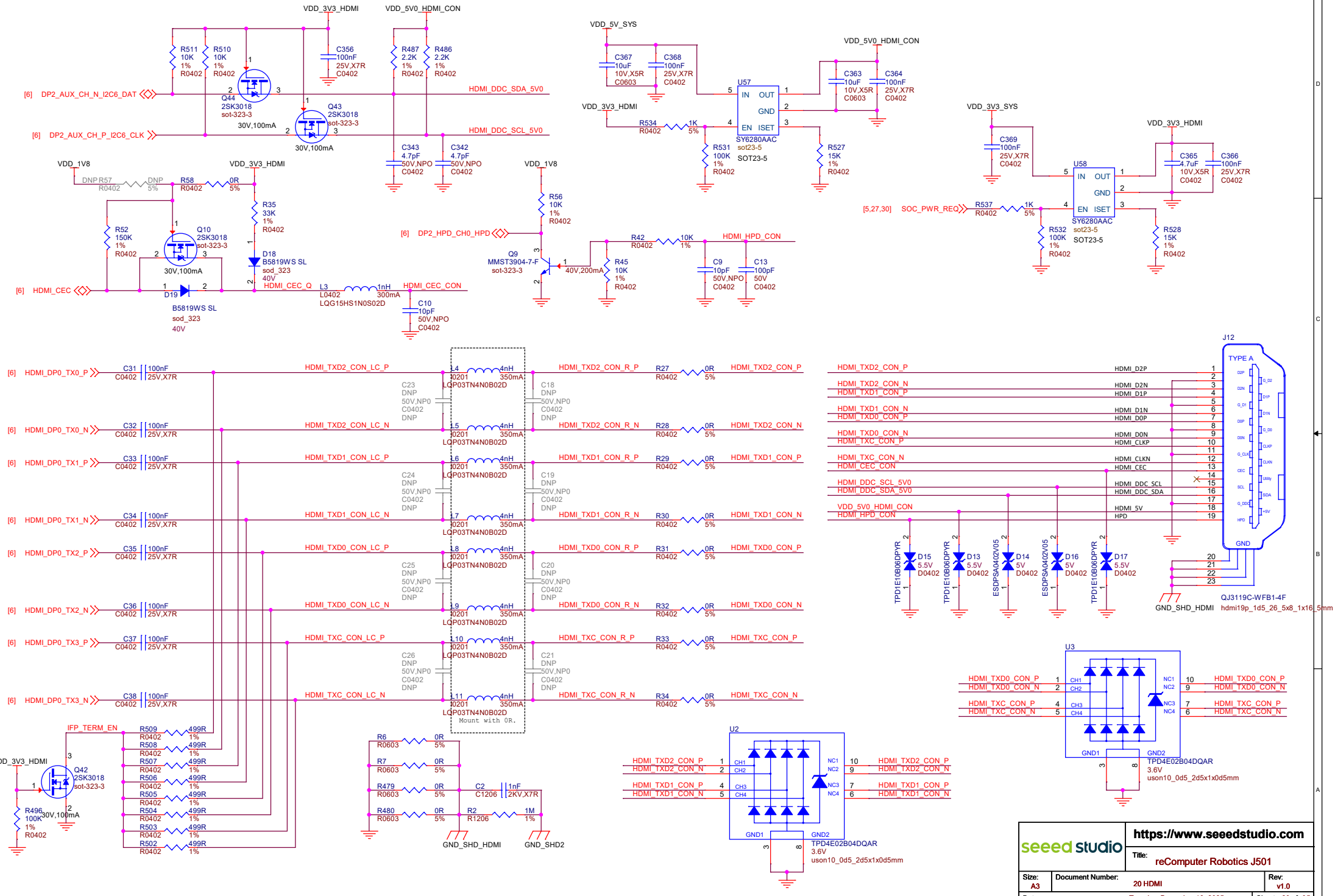
HDMI Connector



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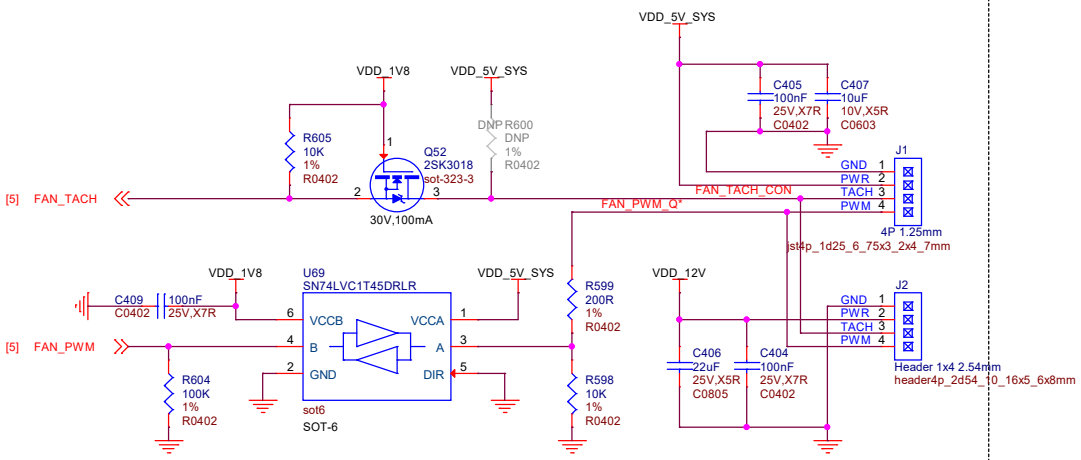
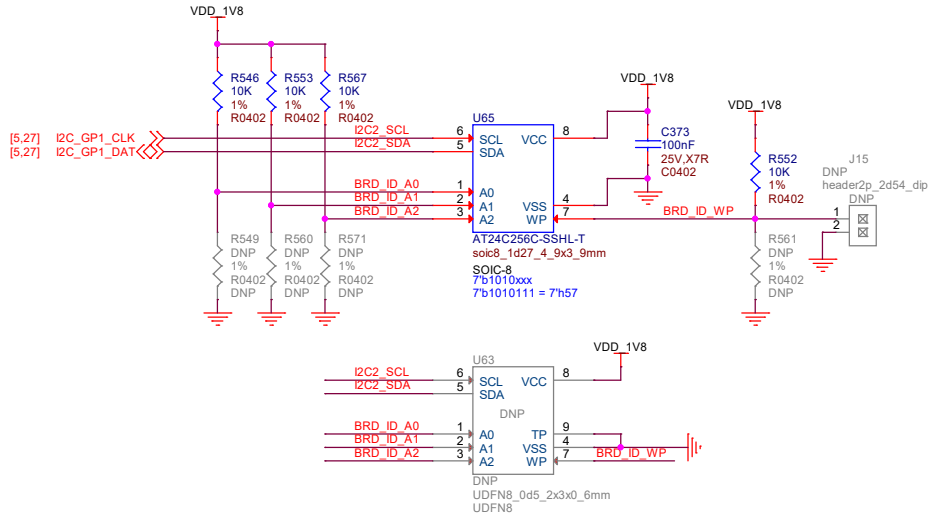
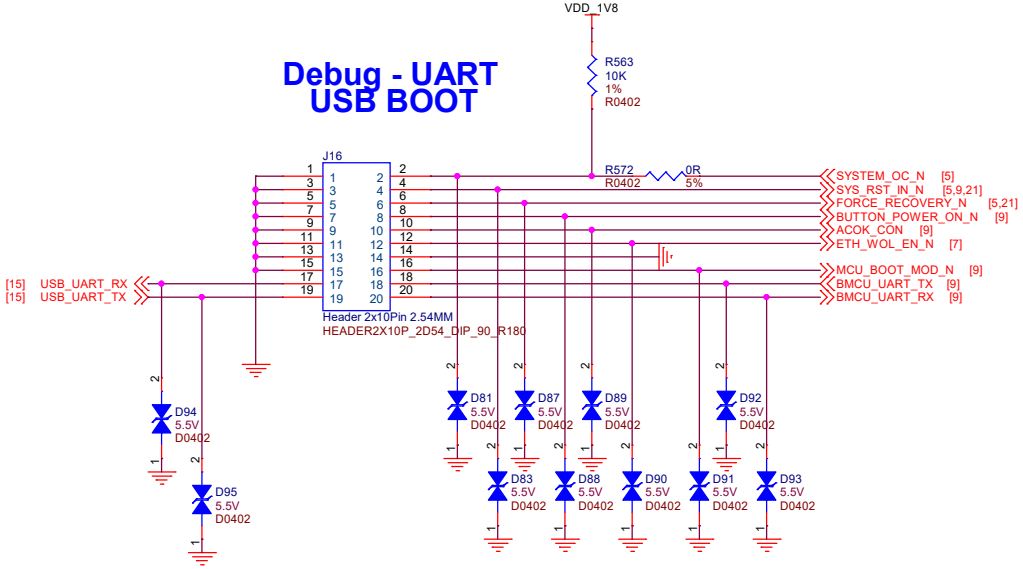
SoC Fan Header 4pin



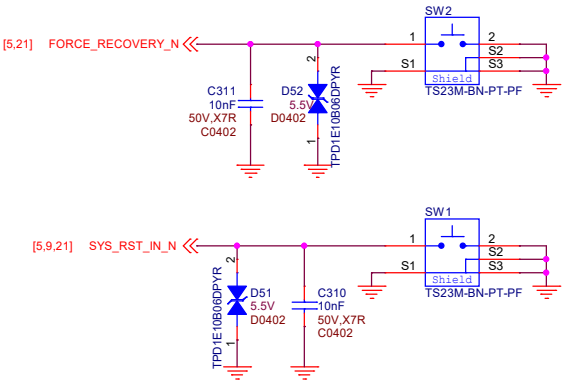
Carrier Board Config



Debug - UART USB BOOT



Button



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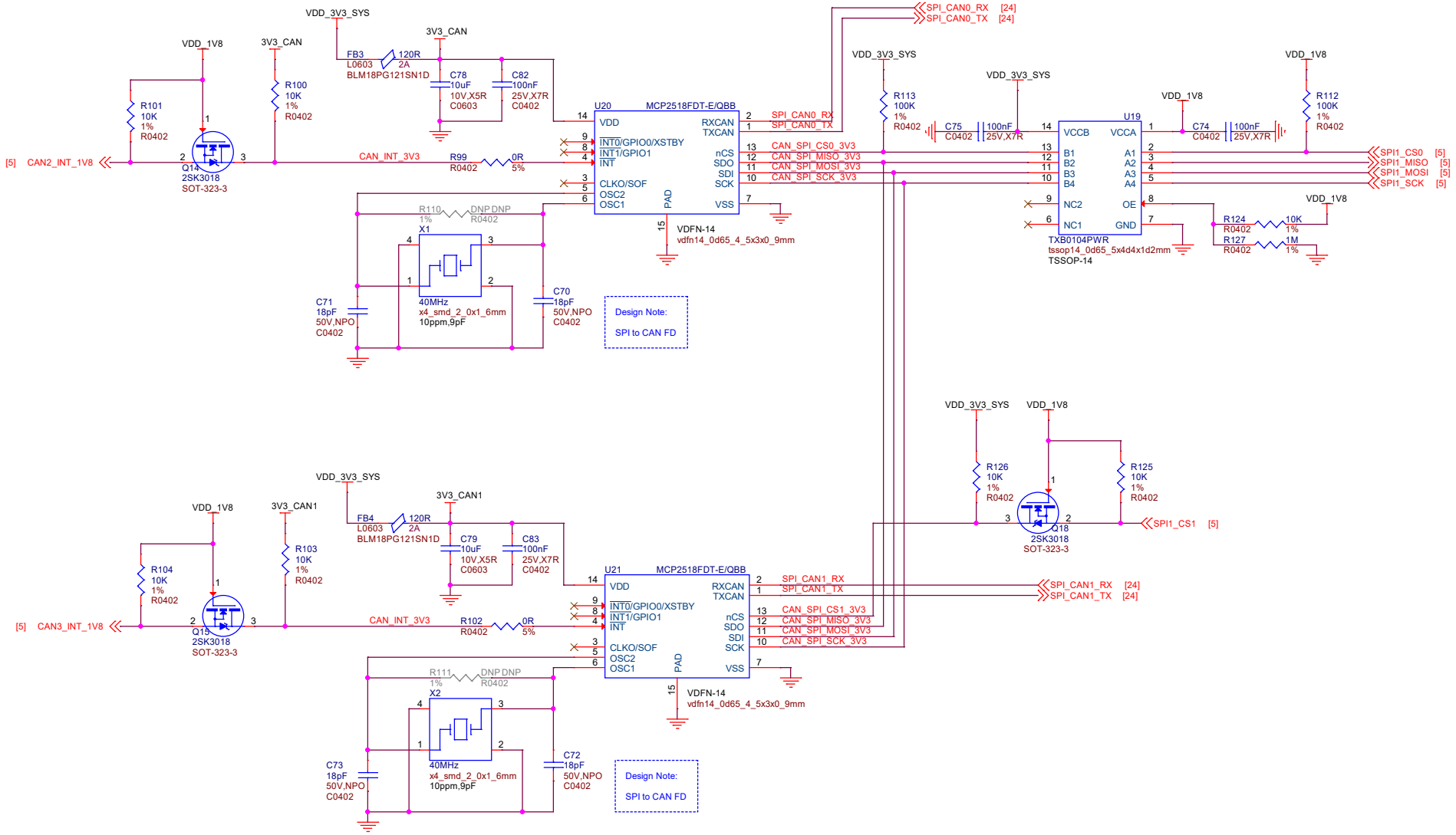

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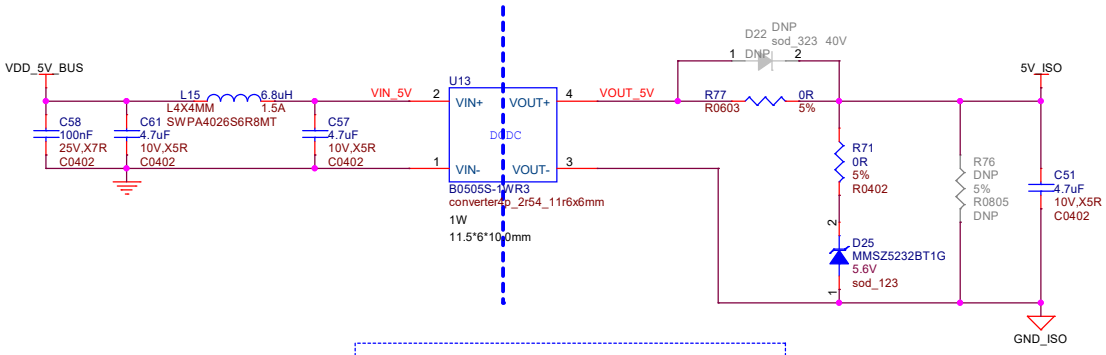
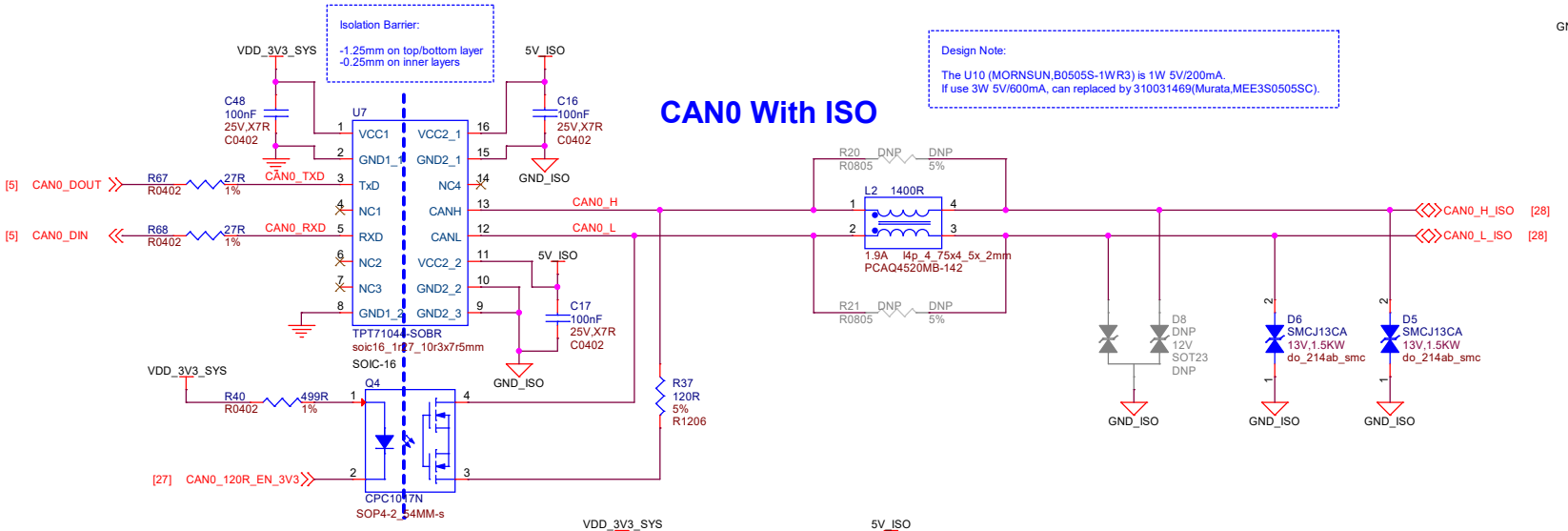
Isolated DCDC 5V to 5V



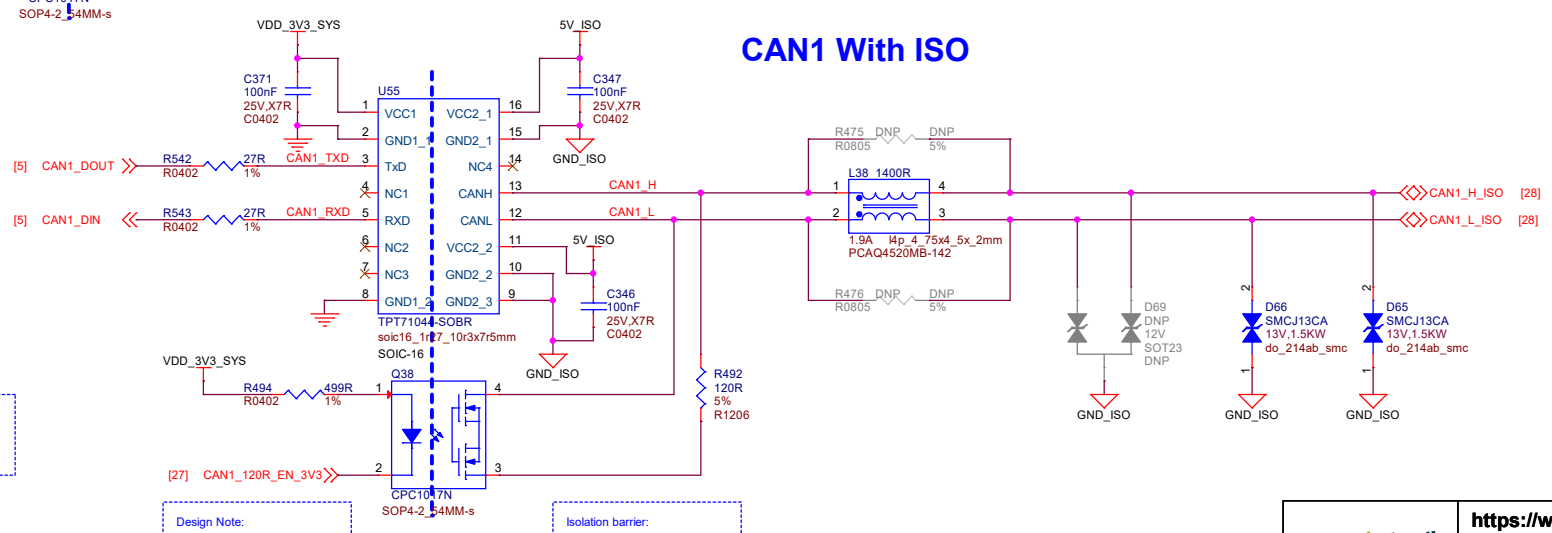
Design Note:

The U10 (MORNSUN,B0505S-1WR3) is 1W 5V/200mA.
If use 3W 5V/600mA, can replaced by 310031469(Murata,MEE3S0505SC).

CAN0 With ISO



CAN1 With ISO



Design Note:

Terminating Resistor Switch.
CAN_120R_EN=L to enable terminating resistor.

Design Note:

CAN FD : 5Mbps
Pin to Pin：TI,ISO1042BDWR

Isolation barrier:

-1.25mm on top/bottom layer
-0.25mm on inner layers

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Size: A3	Document Number: 23 CAN0/1, Isolated 5V	Rev: v1.0
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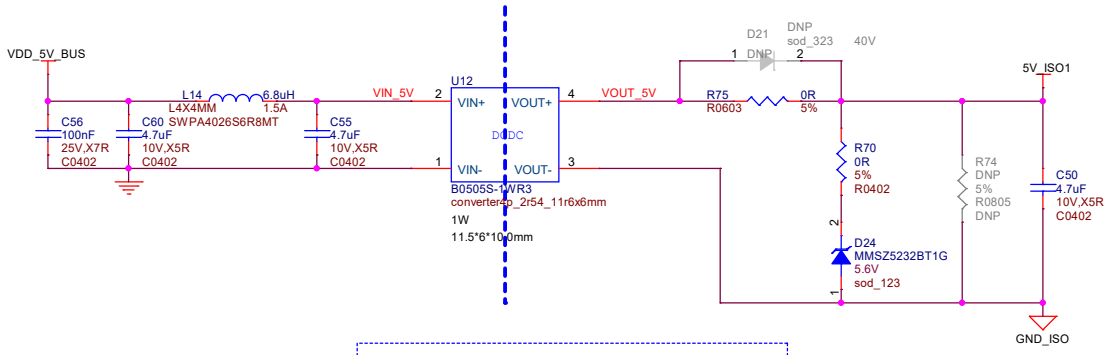
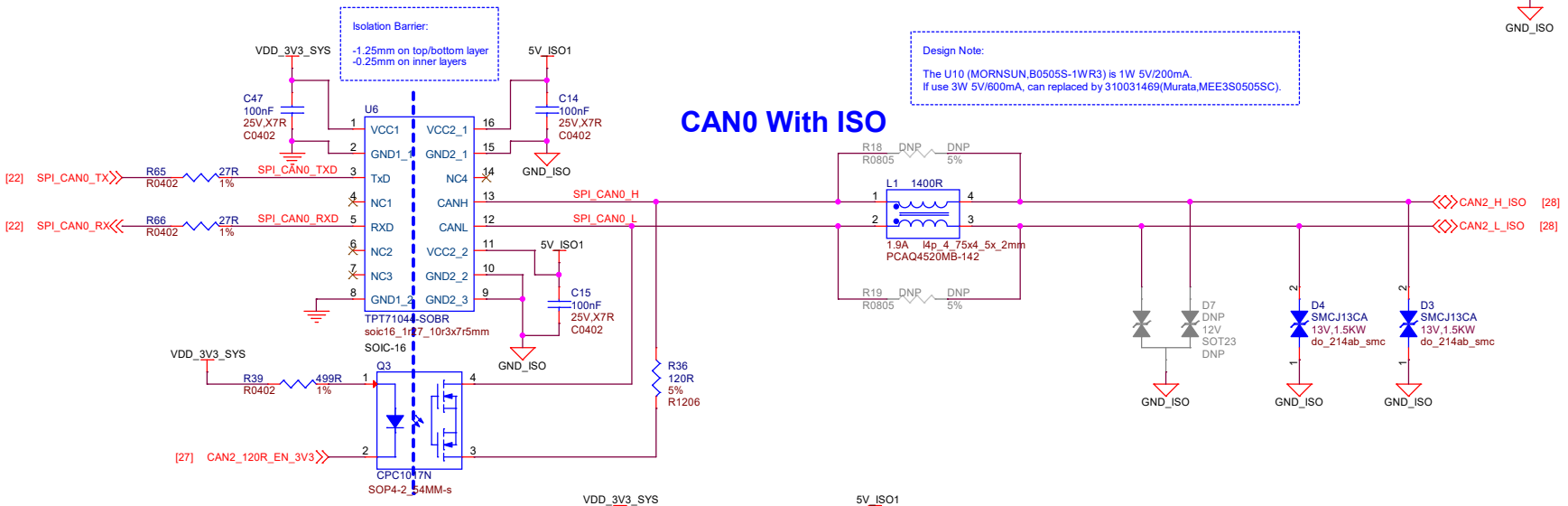
Isolated DCDC 5V to 5V



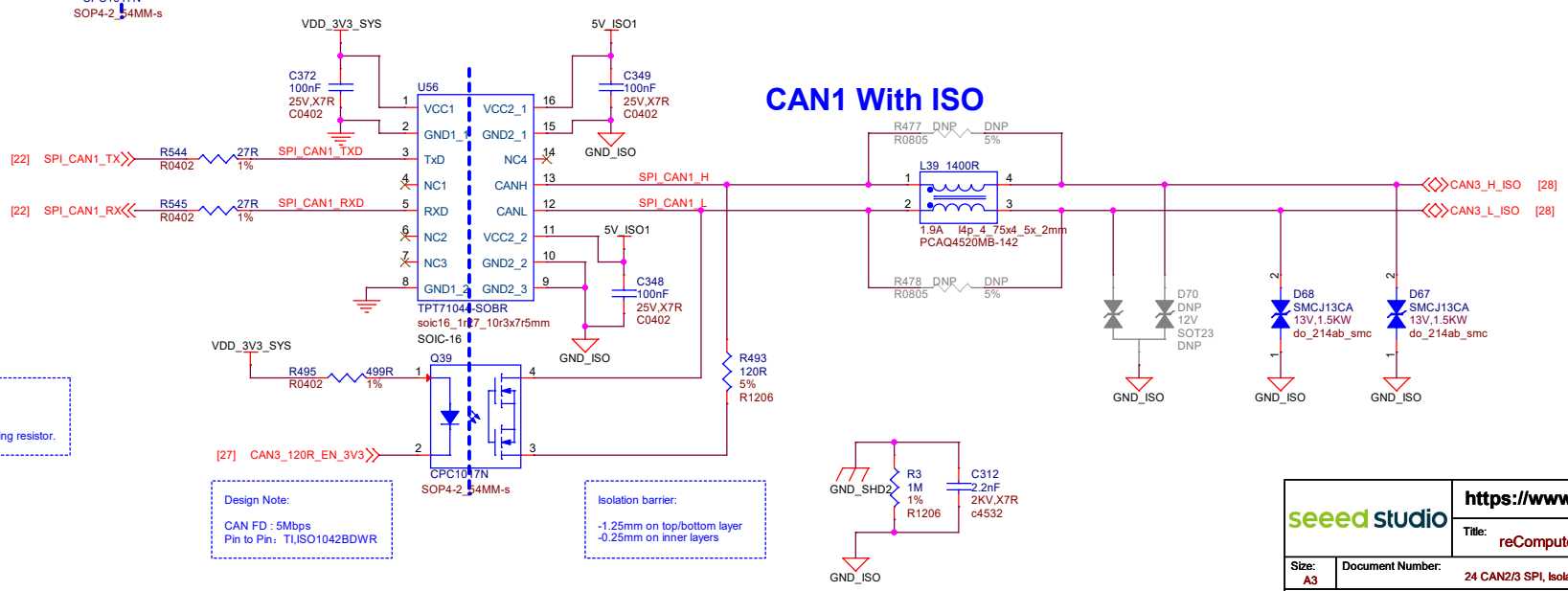
Design Note:

The U10 (MORNSUN,B0505S-1WR3) is 1W 5V/200mA.
If use 3W 5V/600mA, can replaced by 310031469(Murata,MEE3S0505SC).

CAN0 With ISO



CAN1 With ISO



Design Note:

Terminating Resistor Switch.
CAN_120R_EN=L to enable terminating resistor.

Design Note:

CAN FD : 5Mbps
Pin to Pin：TI,ISO1042BDWR

Isolation barrier:

-1.25mm on top/bottom layer
-0.25mm on inner layers

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Size: A3	Document Number: 24 CAN2/3 SPI, Isolated 5V	Rev: v1.0
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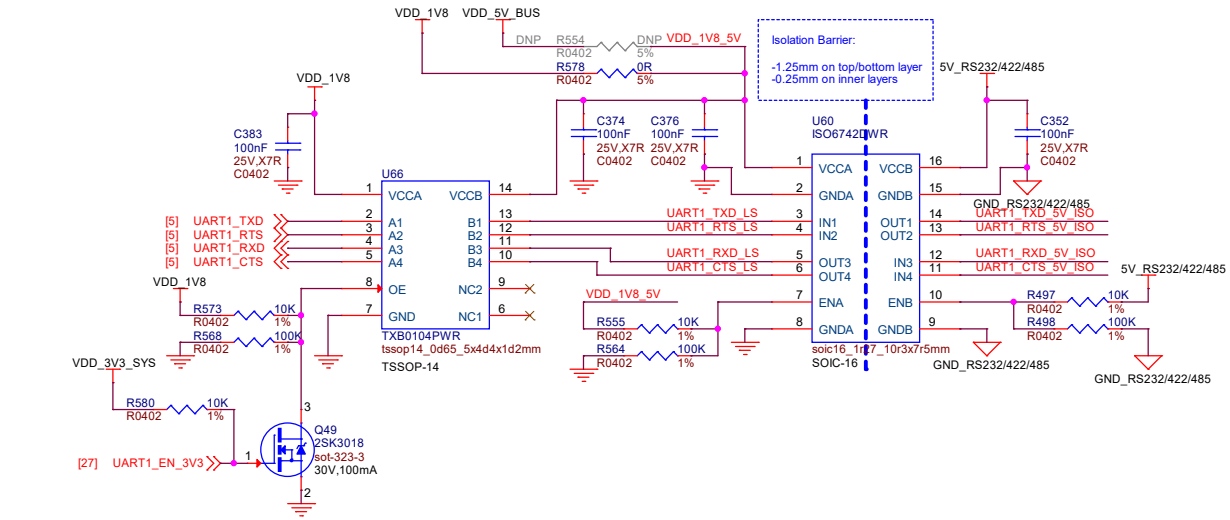
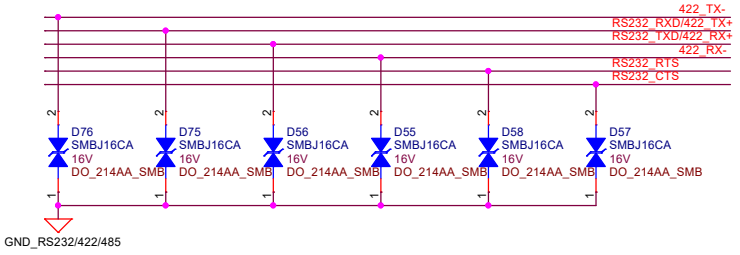
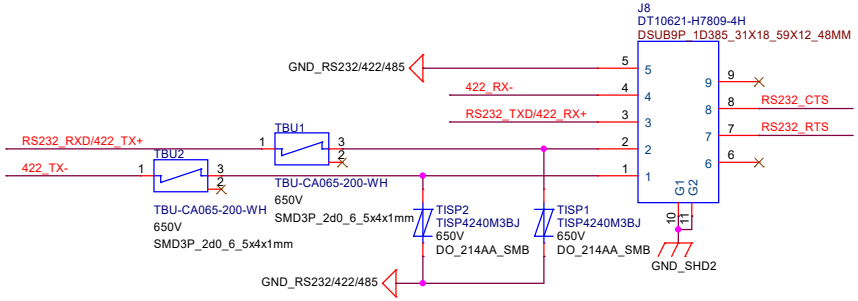
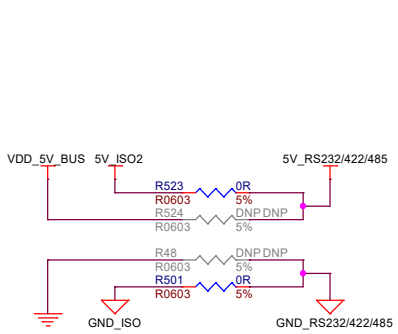
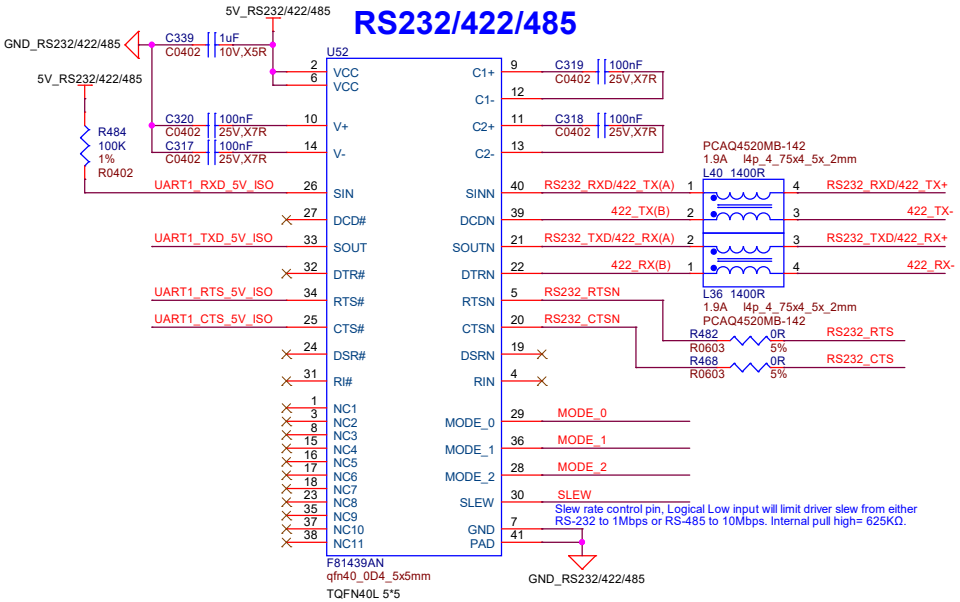
RS232/422/485



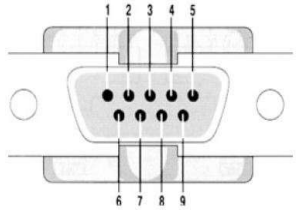








MODE	001	000/100	010/110
PIN	RS232	RS422	RS485
1		TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	
4		RXD-	
5	GND	GND	GND
6			
7	RTS		
8	CTS		
9			



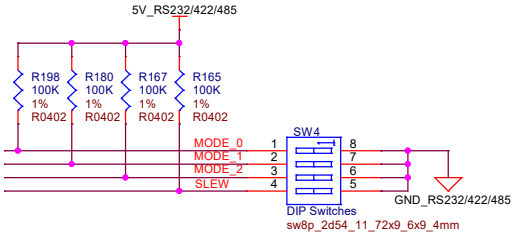


TABLE 1: Mode Select Configuration for F81439A

Pin 29 MODE_0	Pin 36 MODE_1	Pin28 MODE_2	Mode	Status
0	0	0	RS-422 Full Duplex	1T/1R RS-422
0	0	1	Pure RS-232	3T/5R RS-232.
0	1	0	RS-485 Half Duplex	1T/1R RS-485, TX ENABLE Low Active
0	1	1	RS-485 Half Duplex	1T/1R RS-485, TX ENABLE High Active
1	0	0	RS-422 Full Duplex	1T/1R RS-422 with termination resistor and bias resistor.
1	0	1	Reserved	Reserved
1	1	0	RS-485 Half Duplex	1T/1R RS-485 with termination resistor and bias resistor. TX ENABLE Low Active
1	1	1	Low Power Shutdown	All I/O pins are High Impedance

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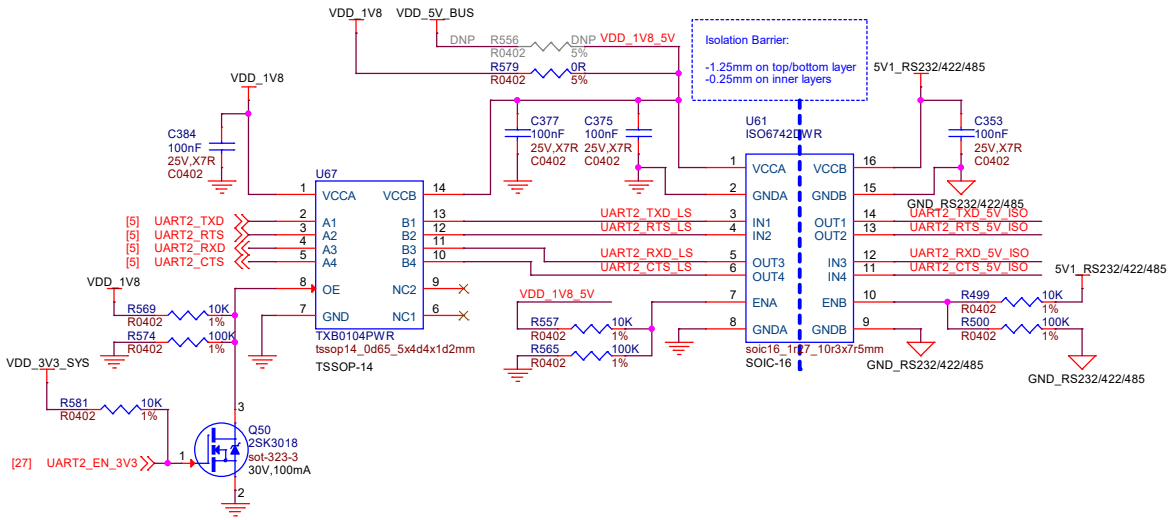
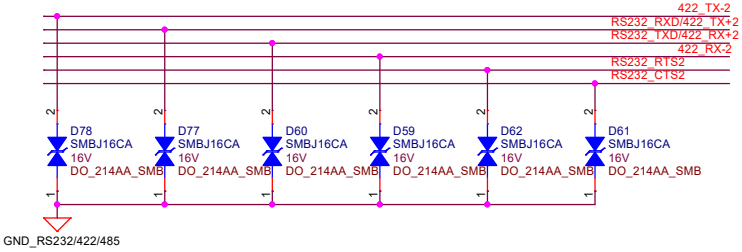
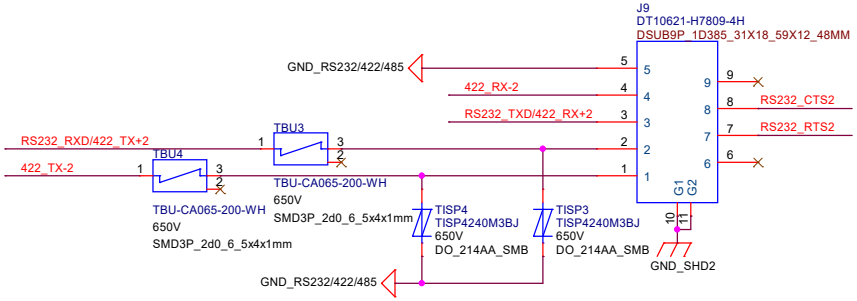
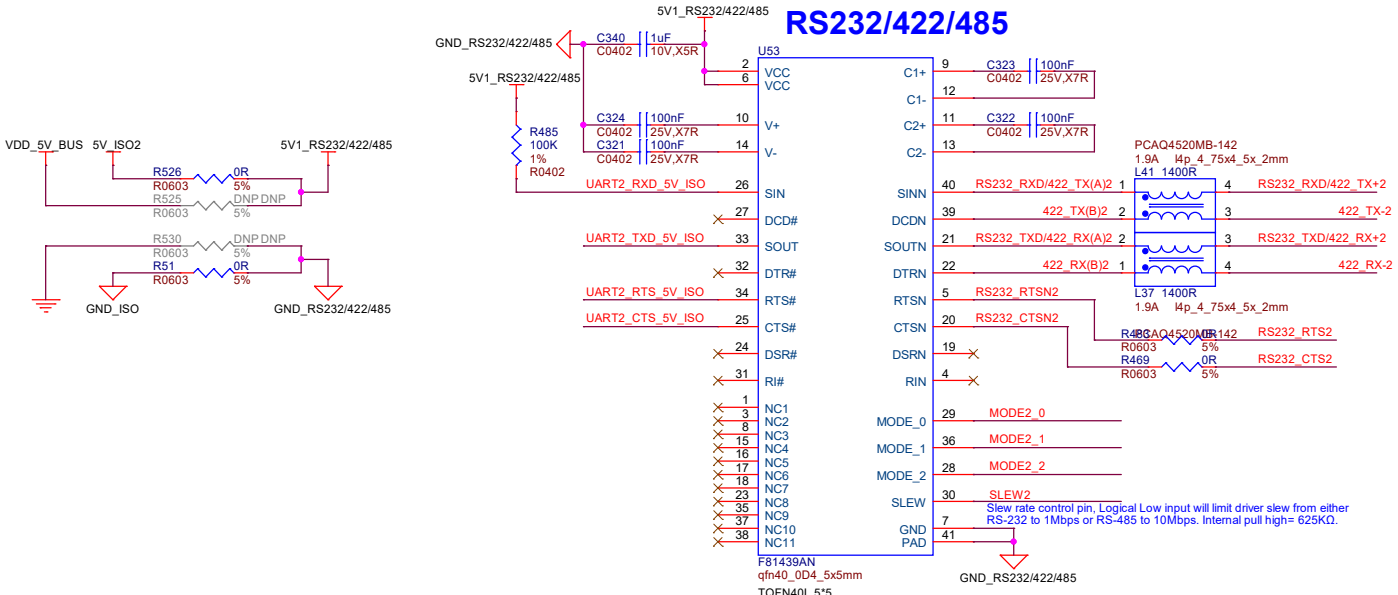
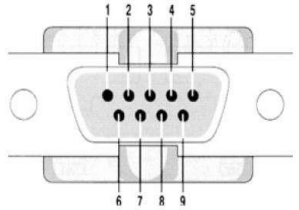








MODE	001	000/100	010/110
PIN	RS232	RS422	RS485
1		TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	
4		RXD-	
5	GND	GND	GND
6			
7	RTS		
8	CTS		
9			



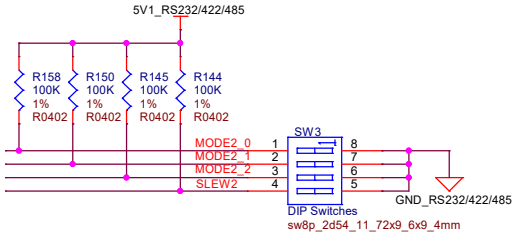


TABLE 1: Mode Select Configuration for F81439A

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0	0	0	RS-422 Full Duplex	1T/1R RS-422
0	0	1	Pure RS-232	3T/5R RS-232.
0	1	0	RS-485 Half Duplex	1T/1R RS-485, TX ENABLE Low Active
0	1	1	RS-485 Half Duplex	1T/1R RS-485, TX ENABLE High Active
1	0	0	RS-422 Full Duplex	1T/1R RS-422 with termination resistor and bias resistor.
1	0	1	Reserved	Reserved
1	1	0	RS-485 Half Duplex	1T/1R RS-485 with termination resistor and bias resistor. TX ENABLE Low Active
1	1	1	Low Power Shutdown	All I/O pins are High Impedance

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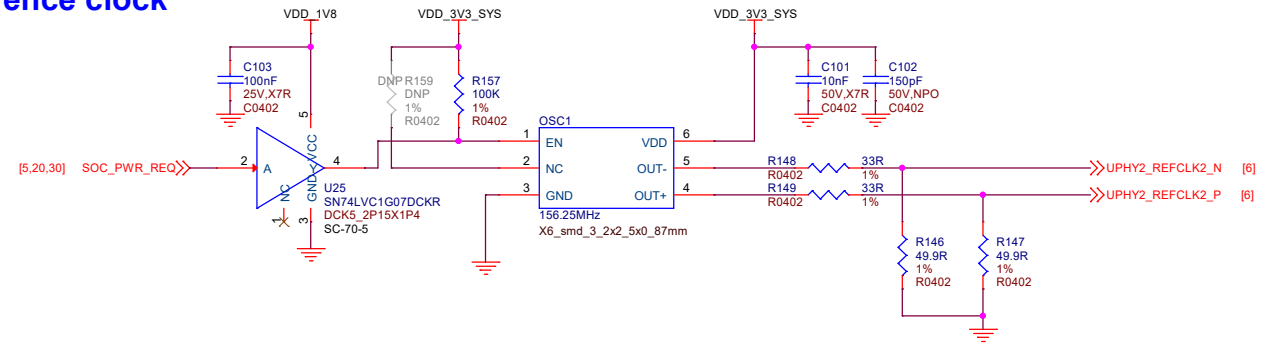
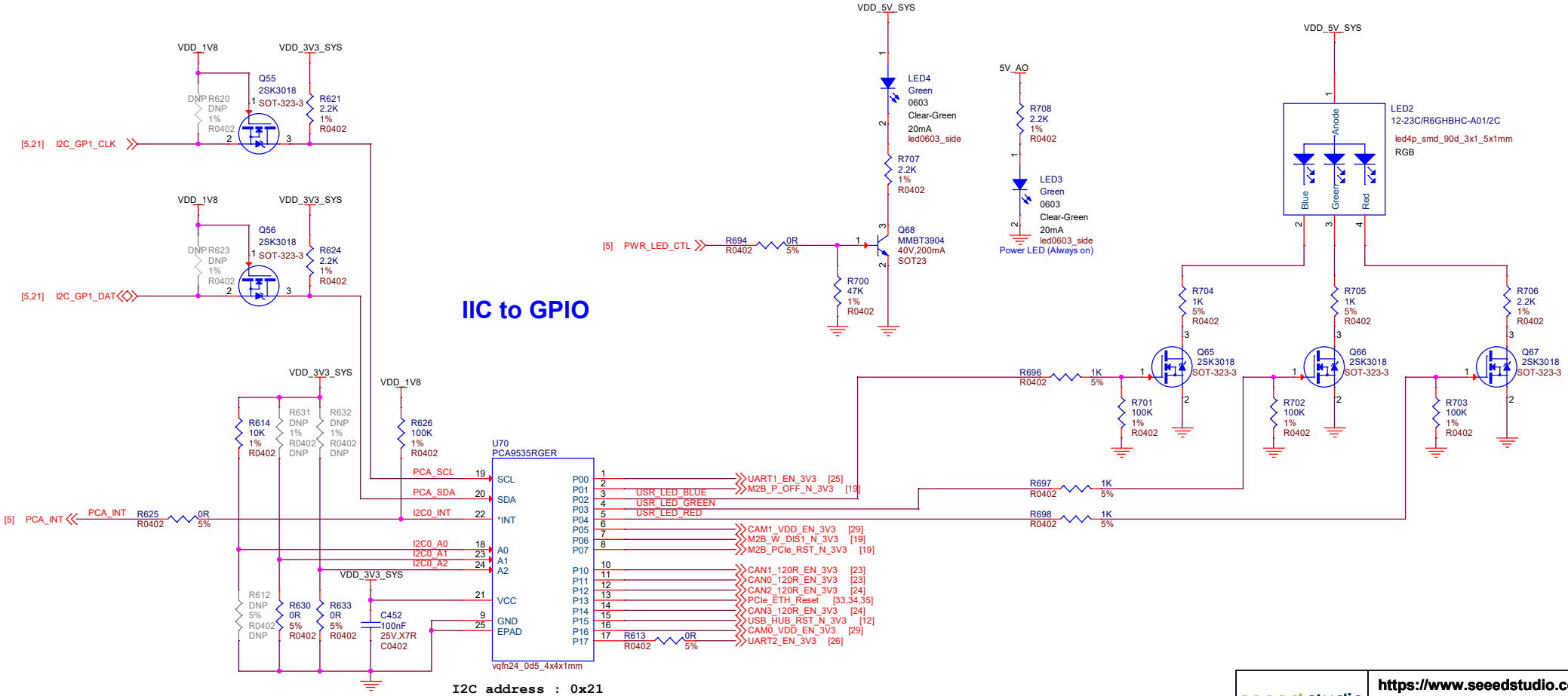
MGBE reference clock



IIC to GPIO



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Title: reComputer Robotics J501		
Size: A3	Document Number: 27 Ref CLK, IIC to IO, LED	Rev: v1.0
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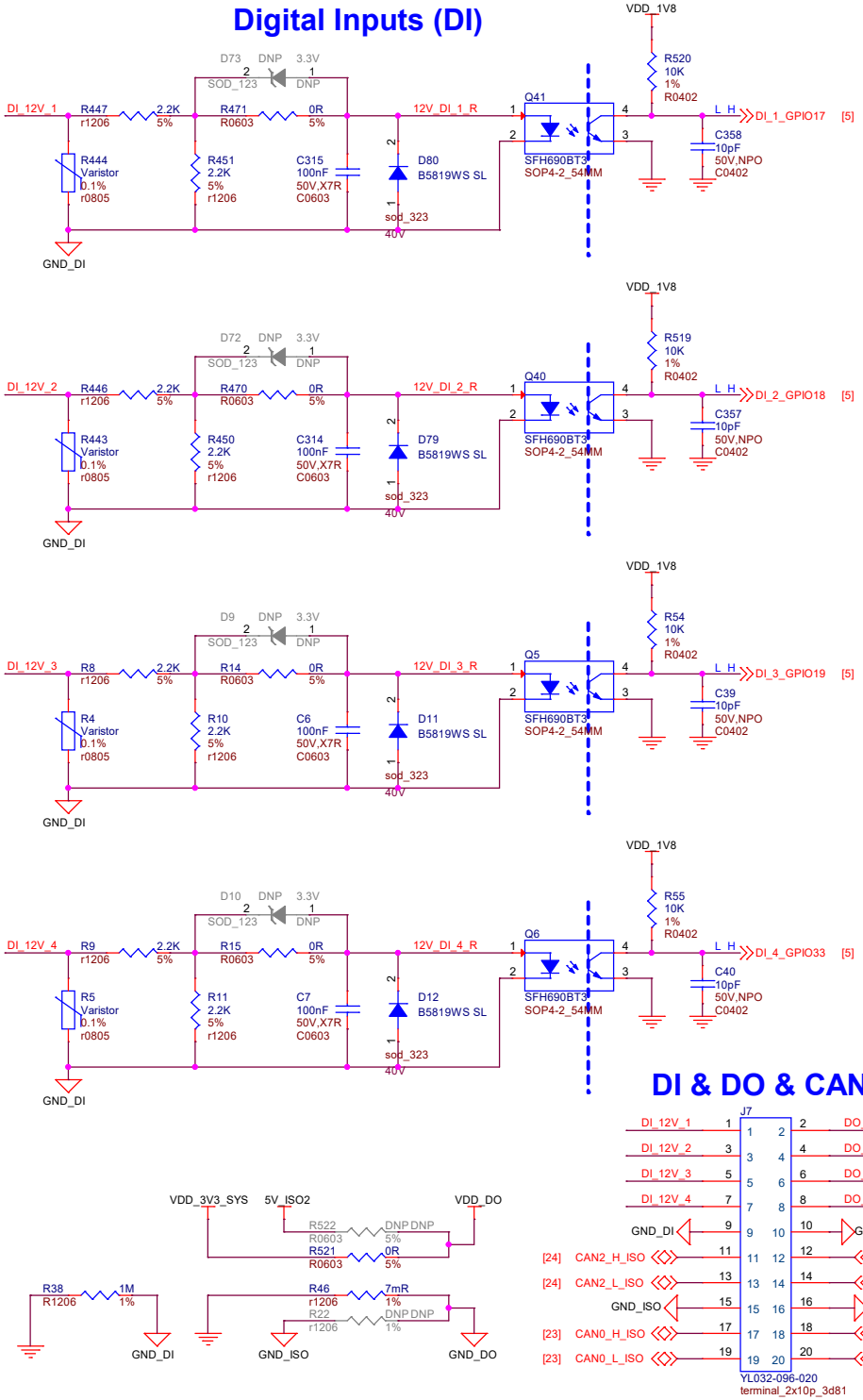
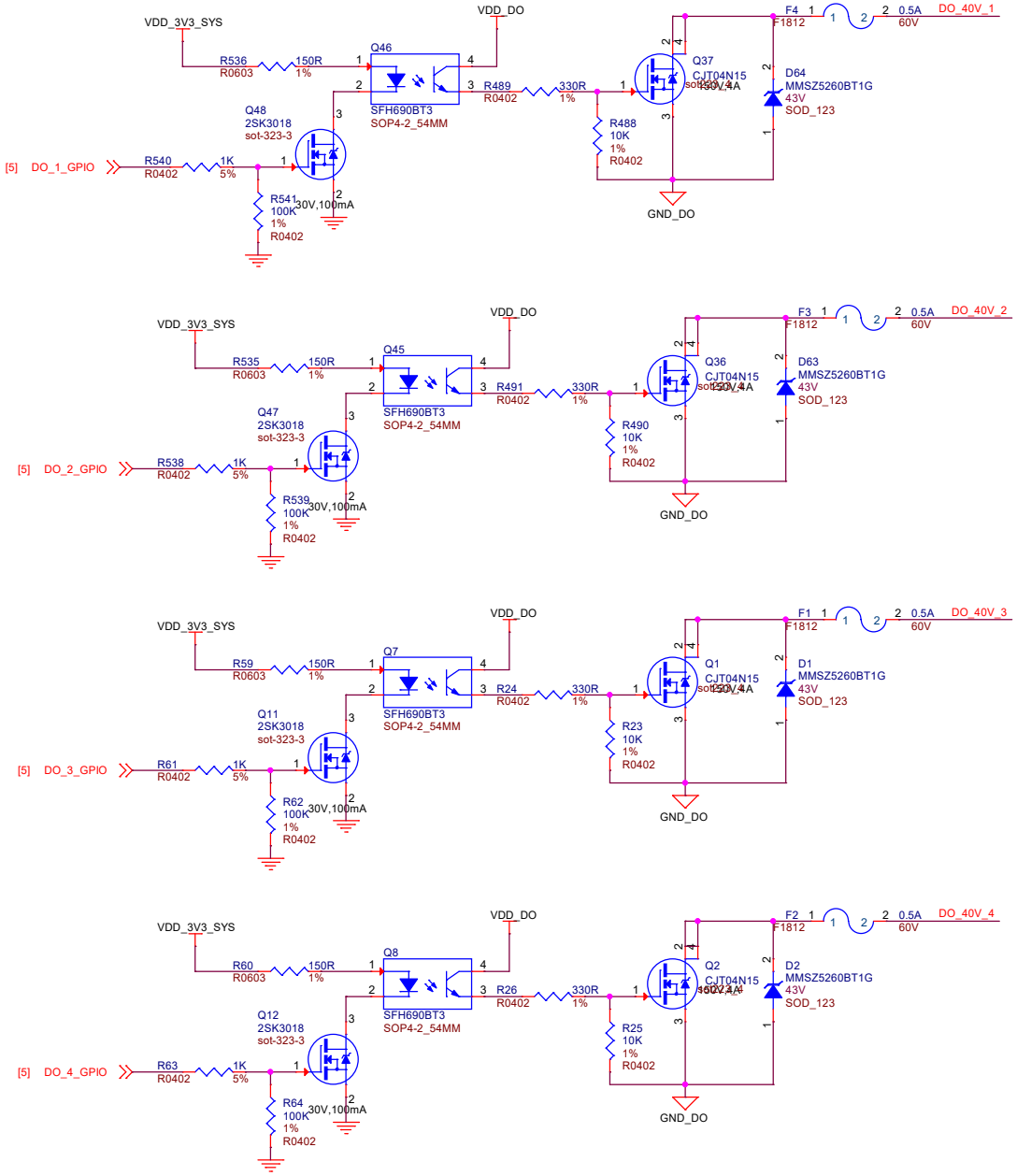
Digital Inputs (DI)



Digital Outputs (DO) rated 40V/0.2A



DI & DO & CAN

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	Title: reComputer Robotics J501	
Size: A3	Document Number: 28 DI, DO	Rev: v1.0
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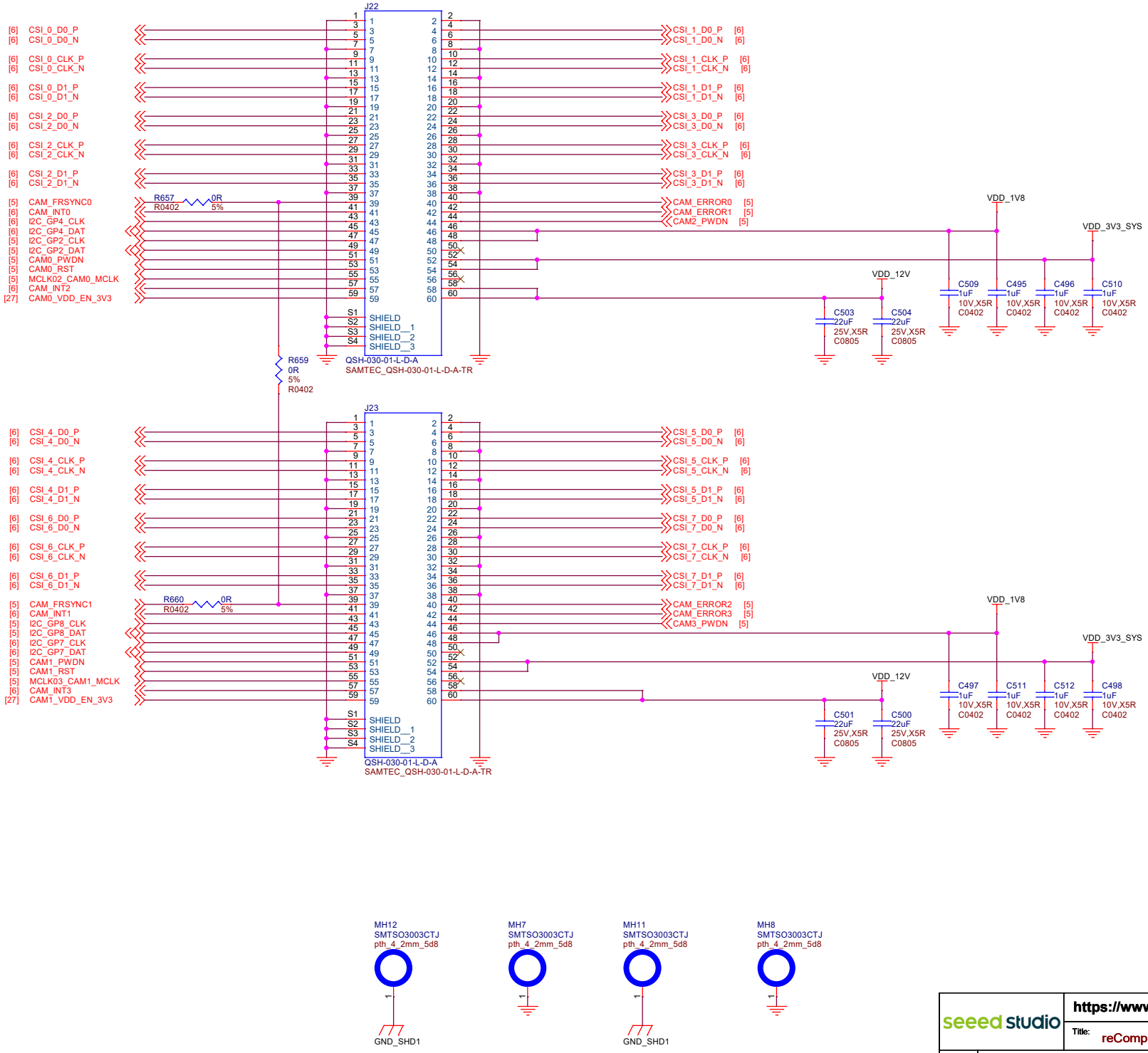
J22
[6] CSI_0_D0_P
[6] CSI_0_D0_N
[6] CSI_0_CLK_P
[6] CSI_0_CLK_N
[6] CSI_0_D1_P
[6] CSI_0_D1_N
[6] CSI_2_D0_P
[6] CSI_2_D0_N
[6] CSI_2_CLK_P
[6] CSI_2_CLK_N
[6] CSI_2_D1_P
[6] CSI_2_D1_N
[5] CAM_FRSYNC0
[6] CAM_INT0
[6] I2C_GP4_CLK
[6] I2C_GP4_DAT
[5] I2C_GP2_CLK
[5] I2C_GP2_DAT
[5] CAM0_PWDN
[5] CAM0_RST
[5] MCLK02_CAM0_MCLK
[6] CAM_INT2
[27] CAM0_VDD_EN_3V3
R657
0R
R0402
5%
R659
0R
5%
R0402
S1 SHIELD
S2 SHIELD__1
S3 SHIELD__2
S4 SHIELD__3
QSH-030-01-L-D-A
SAMTEC_QSH-030-01-L-D-A-TR
CSI_1_D0_P [6]
CSI_1_D0_N [6]
CSI_1_CLK_P [6]
CSI_1_CLK_N [6]
CSI_1_D1_P [6]
CSI_1_D1_N [6]
CSI_3_D0_P [6]
CSI_3_D0_N [6]
CSI_3_CLK_P [6]
CSI_3_CLK_N [6]
CSI_3_D1_P [6]
CSI_3_D1_N [6]
CAM_ERROR0 [5]
CAM_ERROR1 [5]
CAM2_PWDN [5]
VDD_1V8
VDD_3V3_SYS
VDD_12V
C503 22uF 25V,X5R C0805
C504 22uF 25V,X5R C0805
C509 1uF 10V,X5R C0402
C495 1uF 10V,X5R C0402
C496 1uF 10V,X5R C0402
C510 1uF 10V,X5R C0402
J23
[6] CSI_4_D0_P
[6] CSI_4_D0_N
[6] CSI_4_CLK_P
[6] CSI_4_CLK_N
[6] CSI_4_D1_P
[6] CSI_4_D1_N
[6] CSI_6_D0_P
[6] CSI_6_D0_N
[6] CSI_6_CLK_P
[6] CSI_6_CLK_N
[6] CSI_6_D1_P
[6] CSI_6_D1_N
[5] CAM_FRSYNC1
[6] CAM_INT1
[5] I2C_GP8_CLK
[5] I2C_GP8_DAT
[6] I2C_GP7_CLK
[6] I2C_GP7_DAT
[5] CAM1_PWDN
[5] CAM1_RST
[5] MCLK03_CAM1_MCLK
[6] CAM_INT3
[27] CAM1_VDD_EN_3V3
R660
0R
R0402
5%
S1 SHIELD
S2 SHIELD__1
S3 SHIELD__2
S4 SHIELD__3
QSH-030-01-L-D-A
SAMTEC_QSH-030-01-L-D-A-TR
CSI_5_D0_P [6]
CSI_5_D0_N [6]
CSI_5_CLK_P [6]
CSI_5_CLK_N [6]
CSI_5_D1_P [6]
CSI_5_D1_N [6]
CSI_7_D0_P [6]
CSI_7_D0_N [6]
CSI_7_CLK_P [6]
CSI_7_CLK_N [6]
CSI_7_D1_P [6]
CSI_7_D1_N [6]
CAM_ERROR2 [5]
CAM_ERROR3 [5]
CAM3_PWDN [5]
VDD_1V8
VDD_3V3_SYS
VDD_12V
C501 22uF 25V,X5R C0805
C500 22uF 25V,X5R C0805
C497 1uF 10V,X5R C0402
C511 1uF 10V,X5R C0402
C512 1uF 10V,X5R C0402
C498 1uF 10V,X5R C0402
MH12 SMTSO3003CTJ pth_4_2mm_5d8
MH7 SMTSO3003CTJ pth_4_2mm_5d8
MH11 SMTSO3003CTJ pth_4_2mm_5d8
MH8 SMTSO3003CTJ pth_4_2mm_5d8
GND_SHD1
GND_SHD1
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Size: A3
Document Number: 29 Camera Expansion
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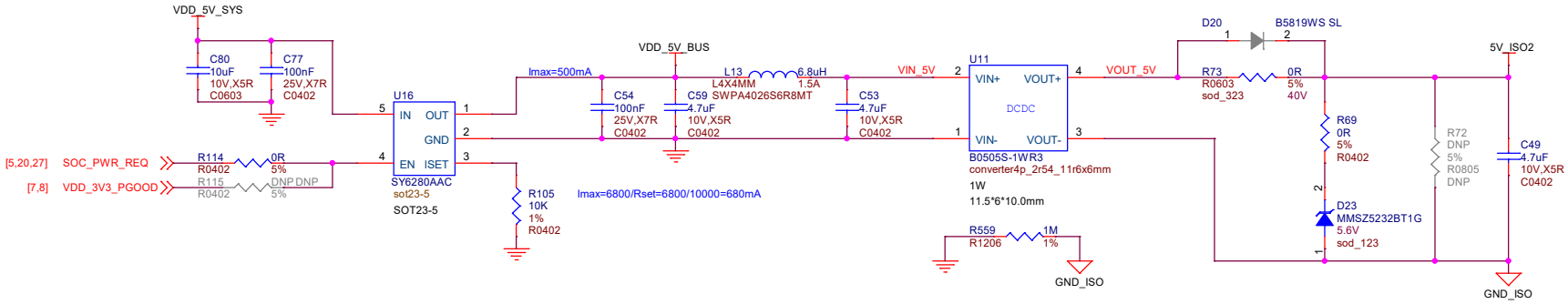
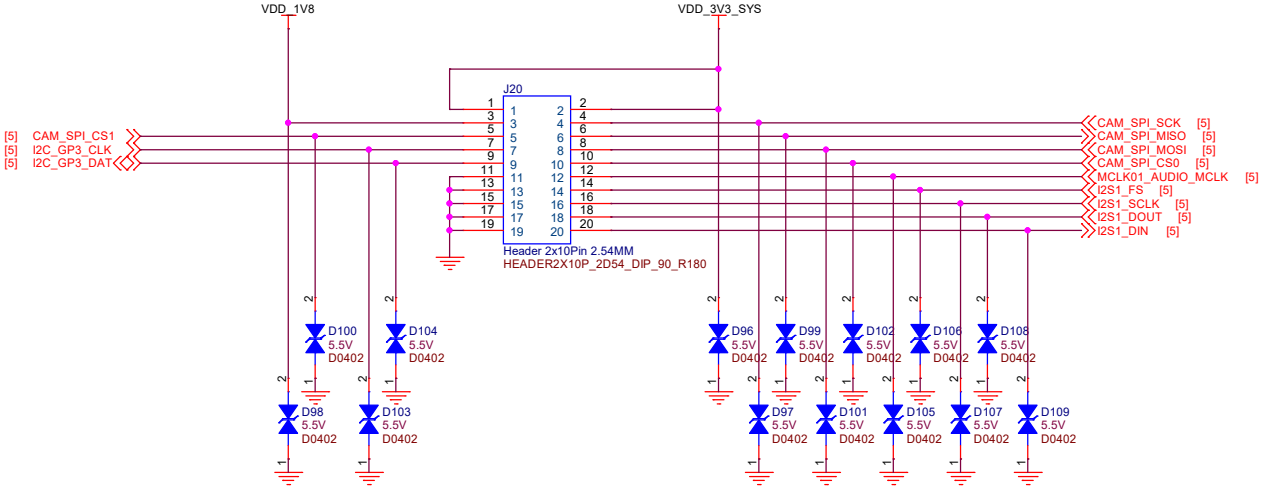
Isolated DCDC 5V to 5V





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	Title: reComputer Robotics J501	
Size: A3	Document Number: 30 IO Expansion	Rev: v1.0
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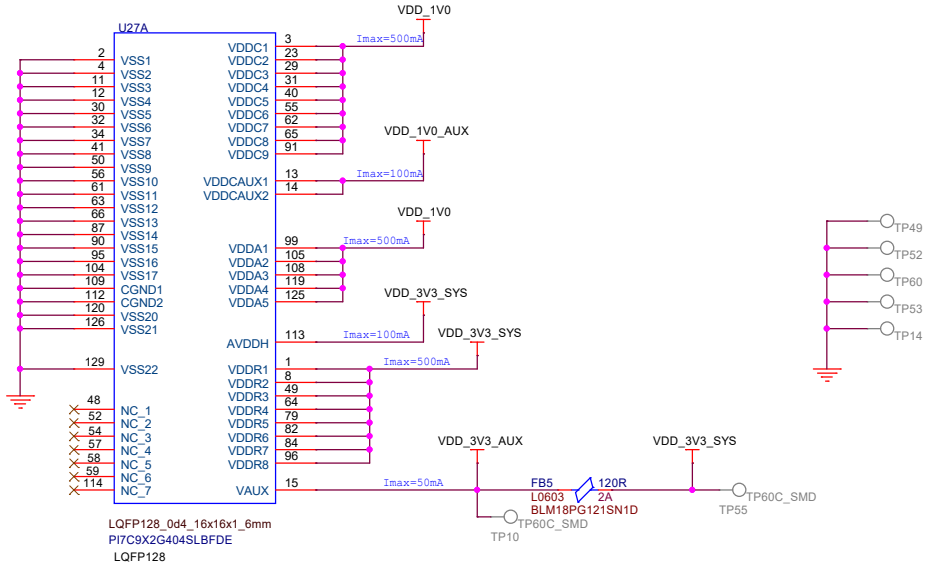
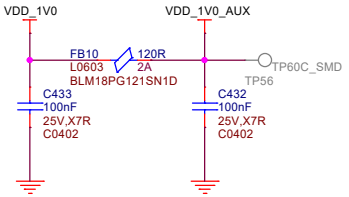
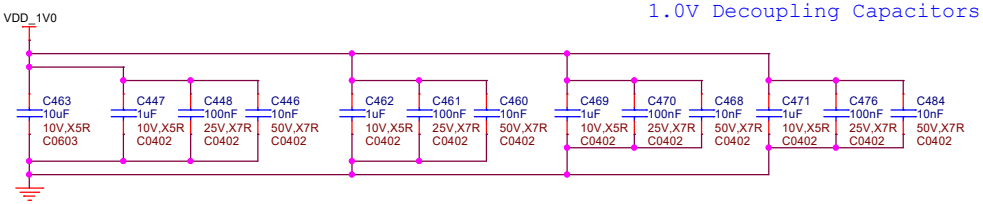
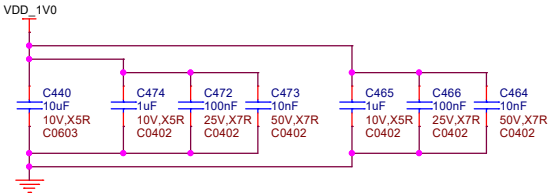
PCIe switch power

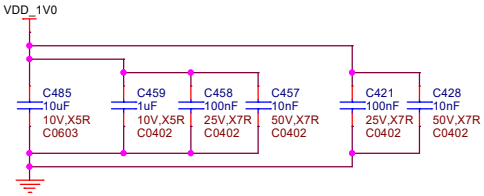


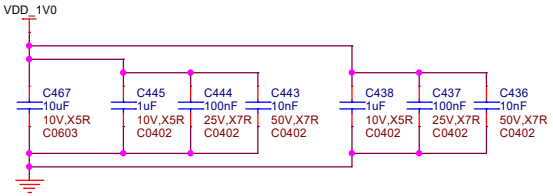


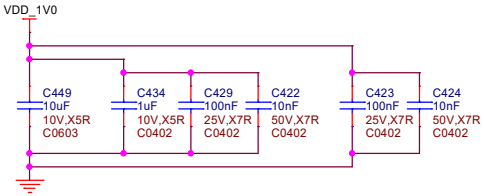
1.0V Decoupling Capacitors

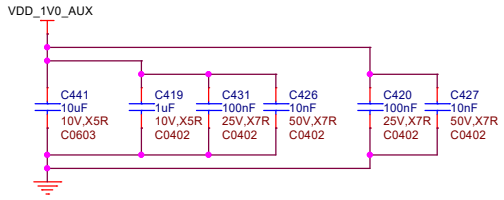




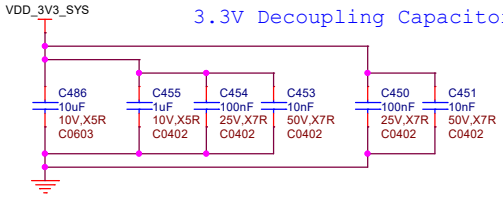


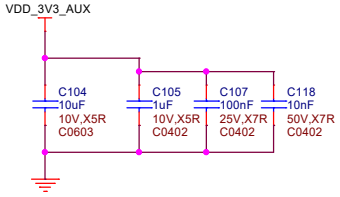


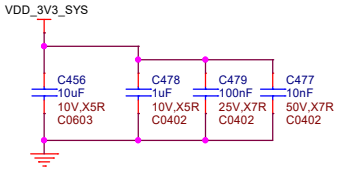


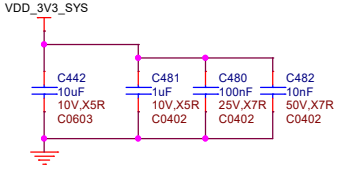


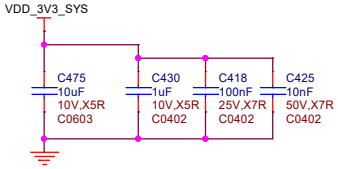
3.3V Decoupling Capacitors











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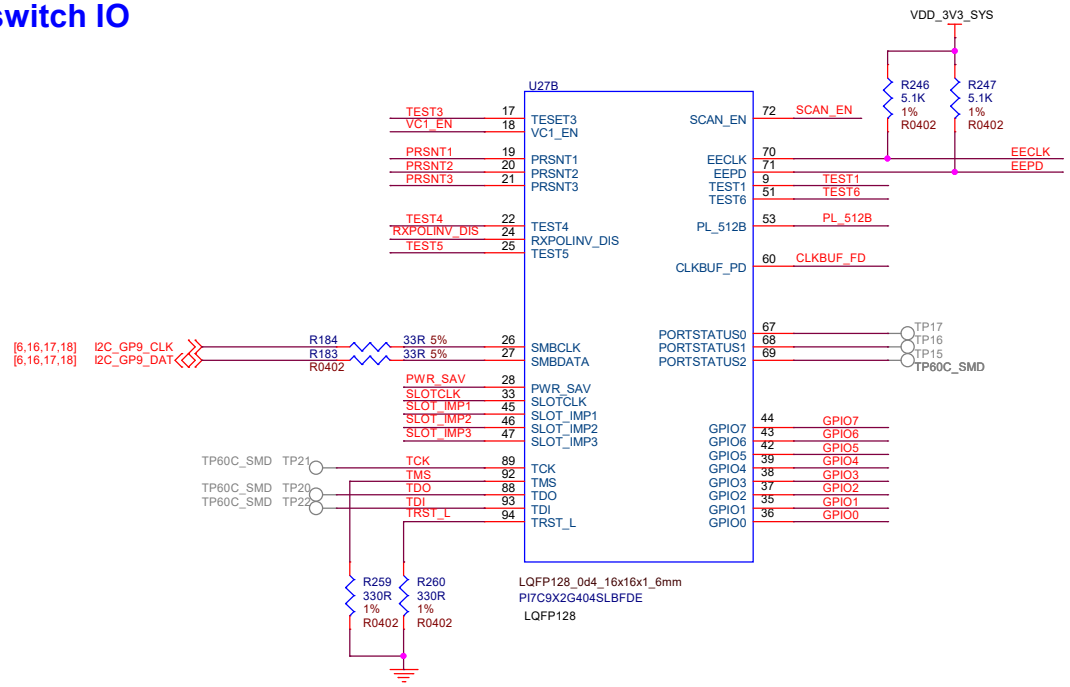
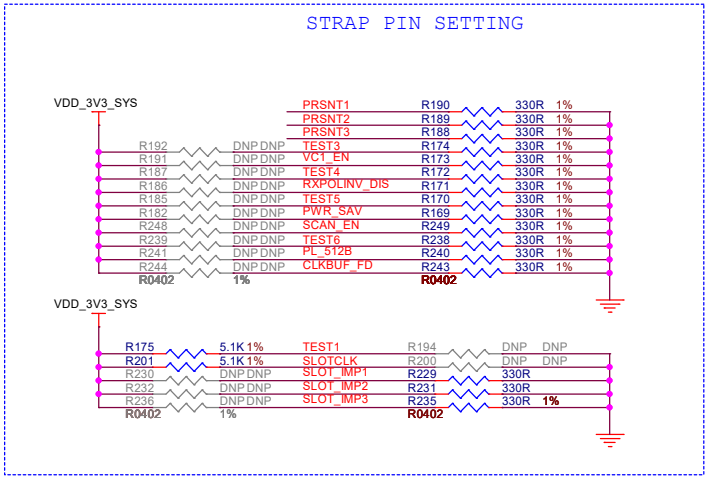
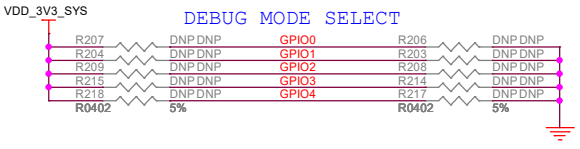
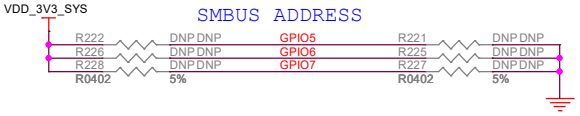
PCIe switch IO

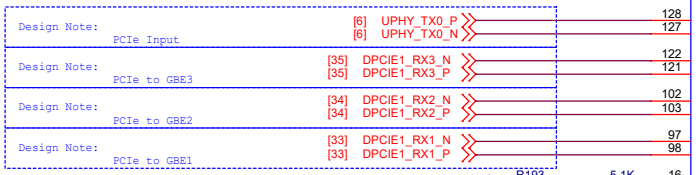


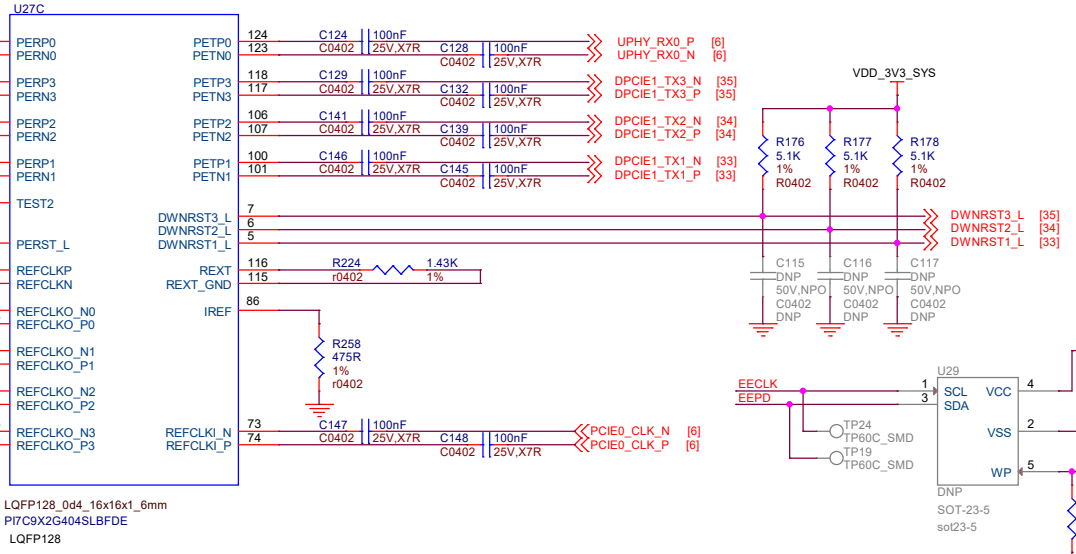






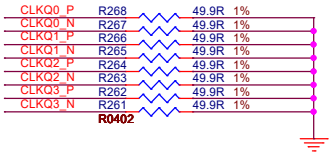
Design Note: CM4 has AC coupling capacitors for CLK and PCIe_TX signals





BIT	SMBus Address
0	GPIO[5]
1	GPIO[6]
2	GPIO[7]
3	1
4	0
5	1
6	1

Clock Output Termination Resistors



Layout Note: Put these resistors near to the end point

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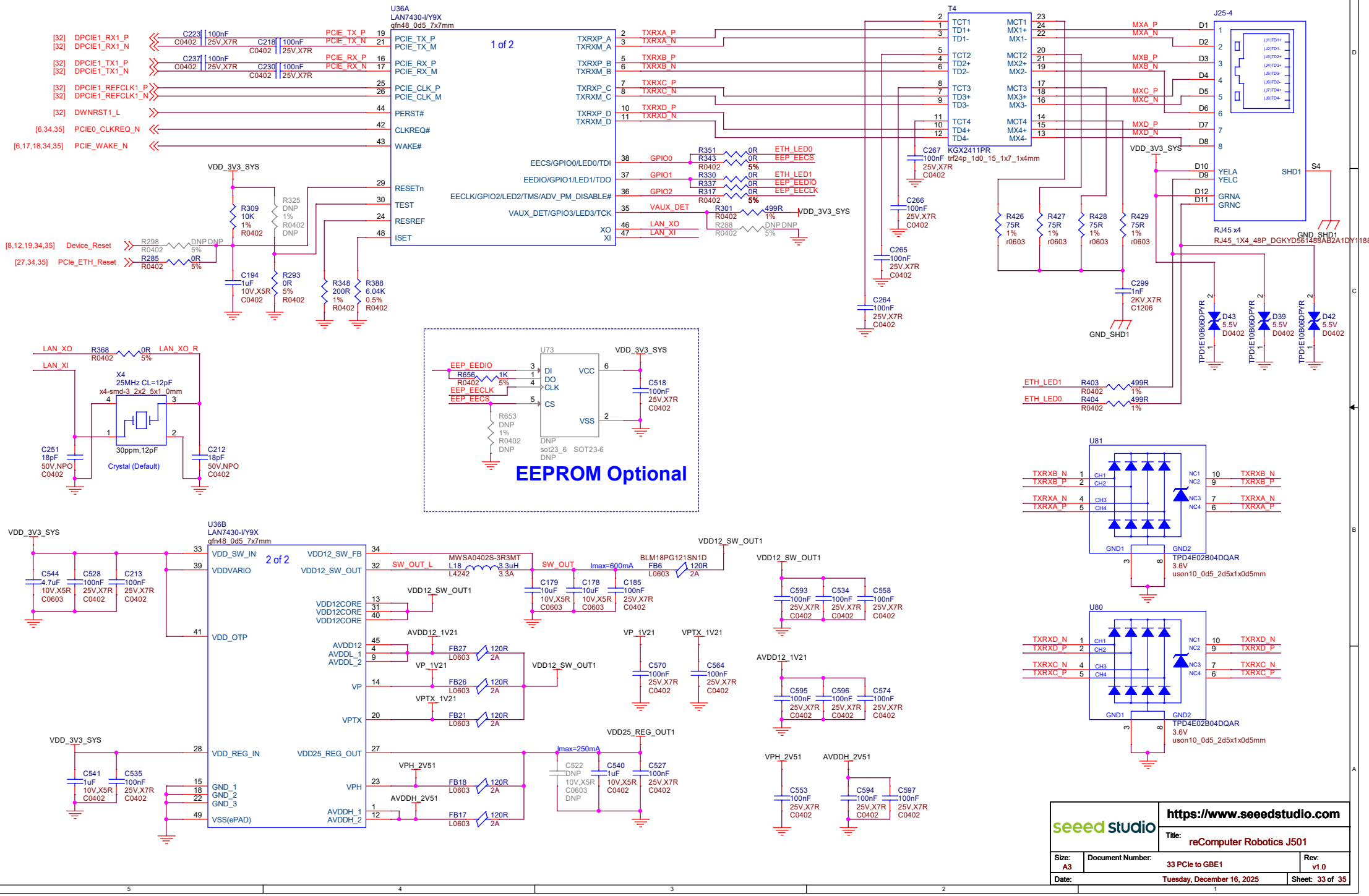
PCIe to Ethernet



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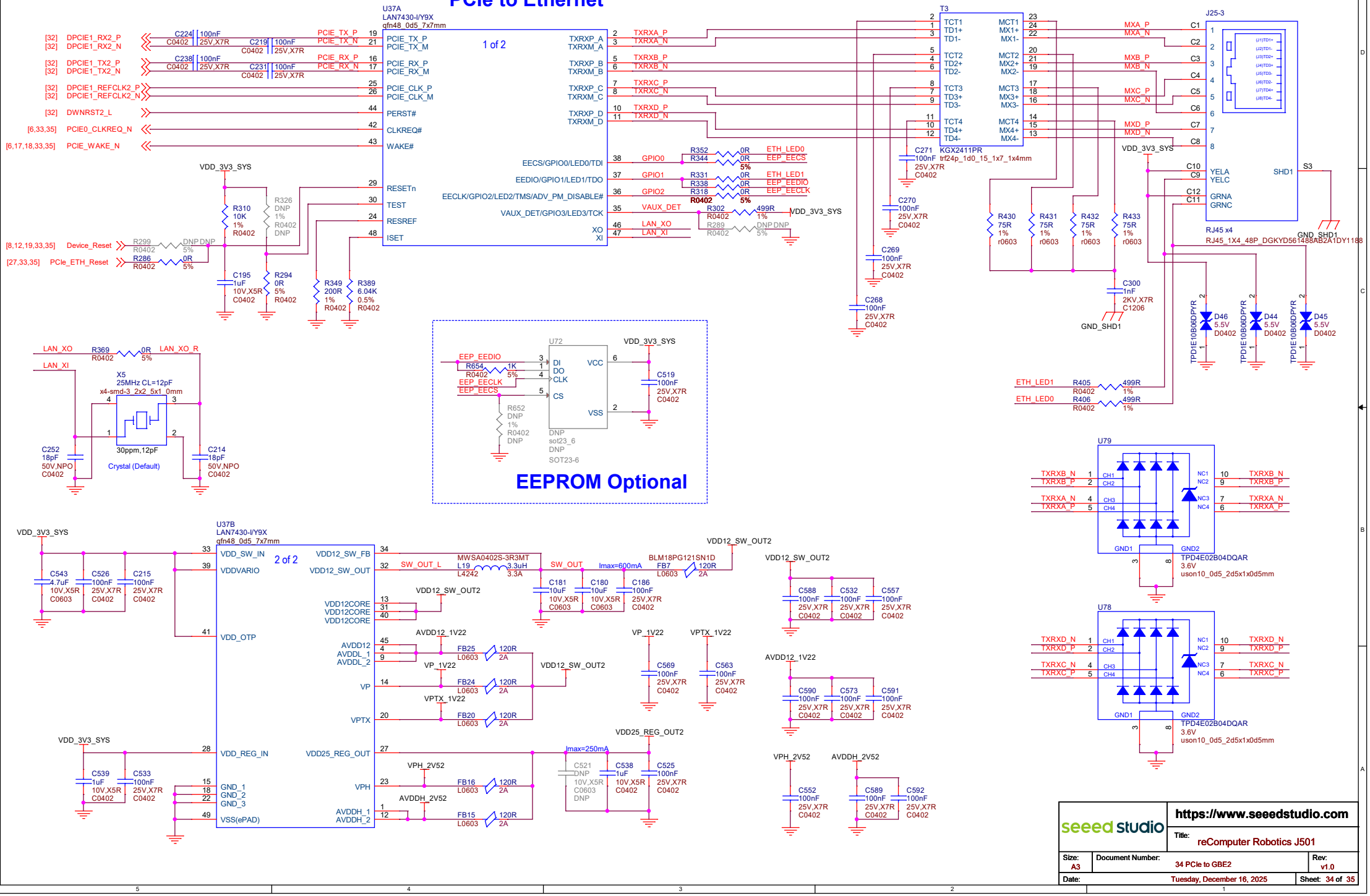
PCIe to Ethernet



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	Title: reComputer Robotics J501		
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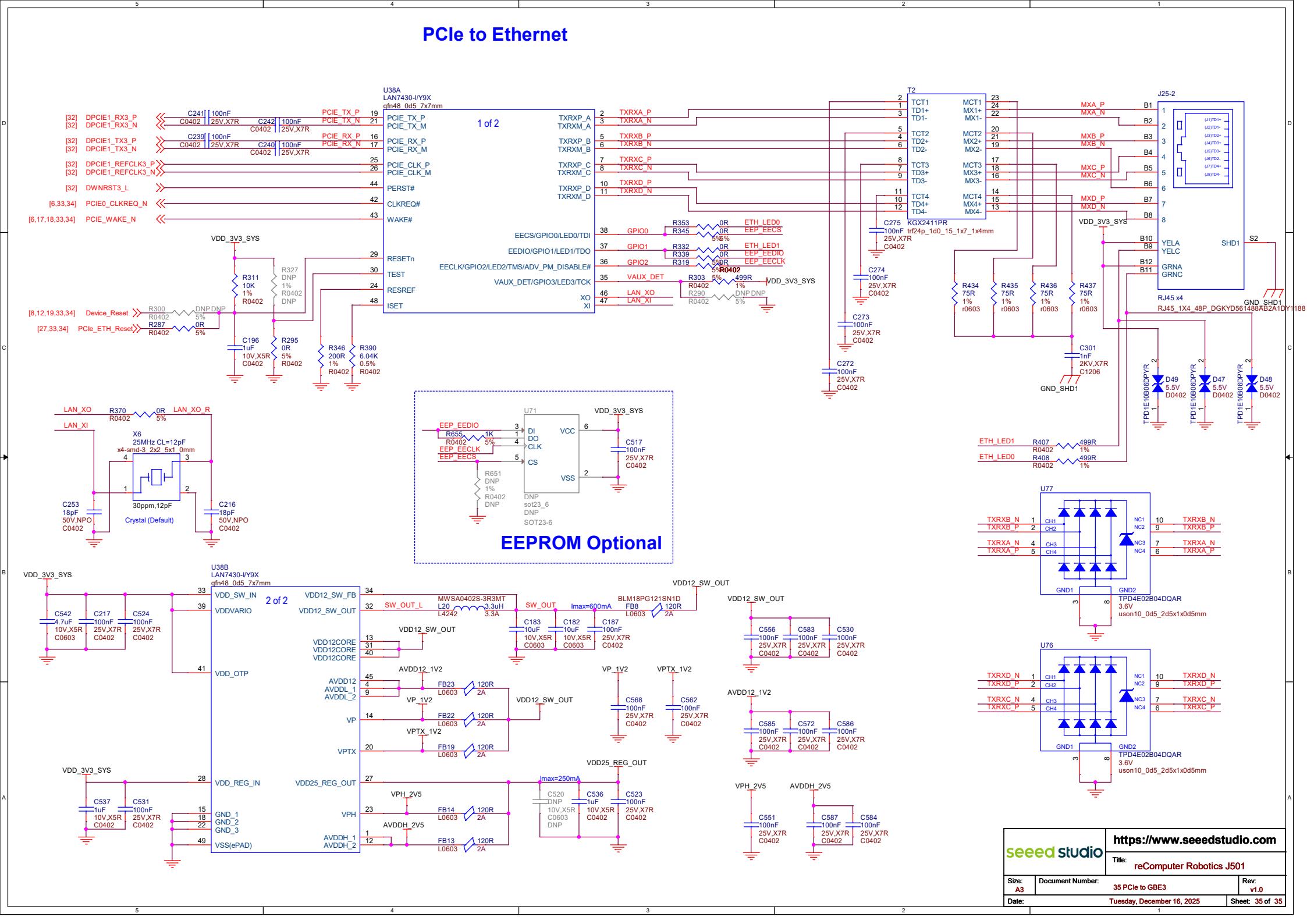
PCIe to Ethernet



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