Schematic: reComputer Robotics J401

Revision History

VER	DATE	REVISION	DESCRIPTION
V1.0	04/21/2025	reComputer Robotics J401_V1.0_SCH_250421	Initial Version.

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Title: reComputer Robotics J401

Size:	Document Number:	Rev:
A3	01 Table of Contents	V1.0

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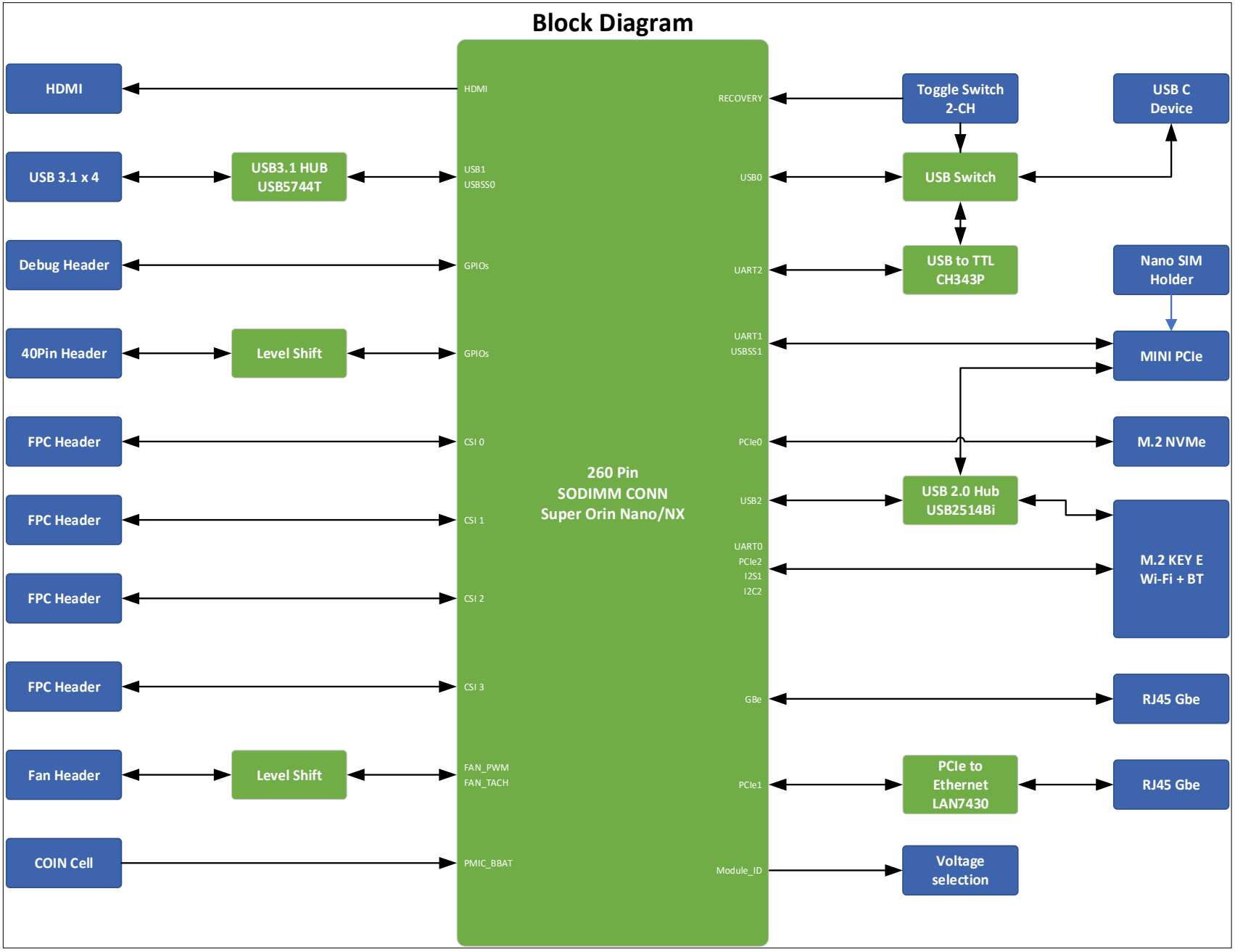
Junqing.Xin	Monday, April 21, 2025	1 of 25

will be updated later

Block Diagram



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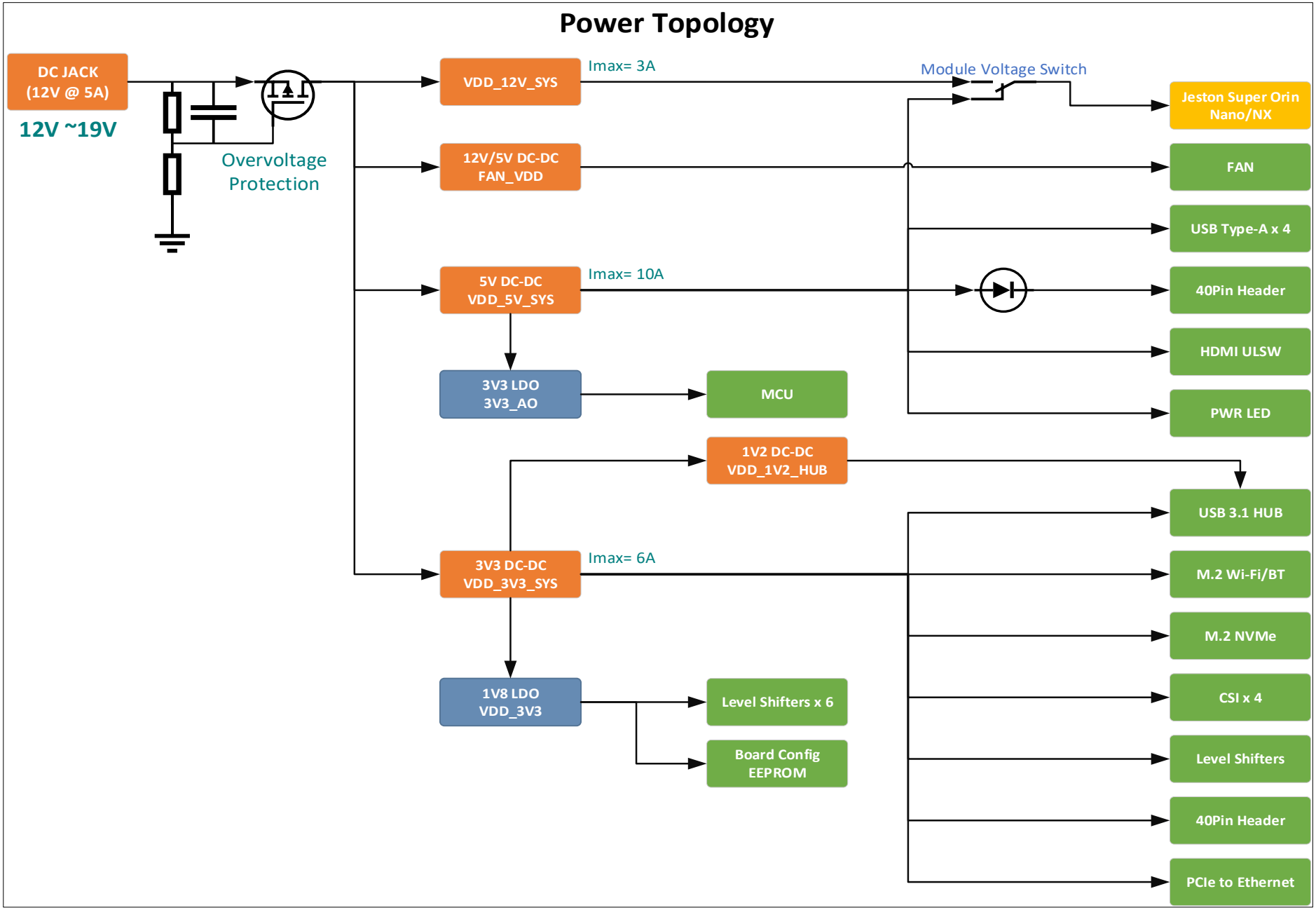
will be updated later

Power Topology



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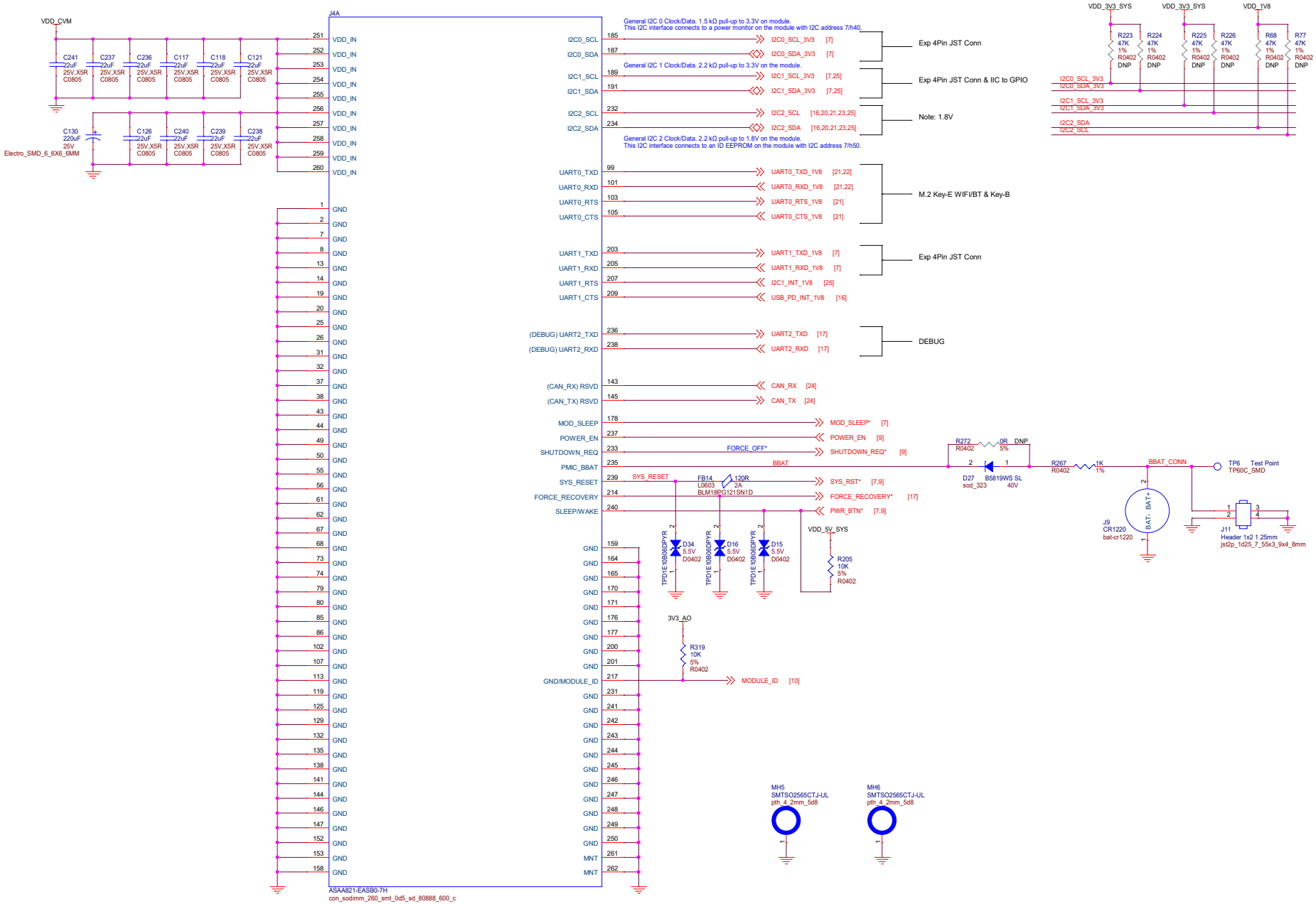
UART, I2C, CAN and GPIOs



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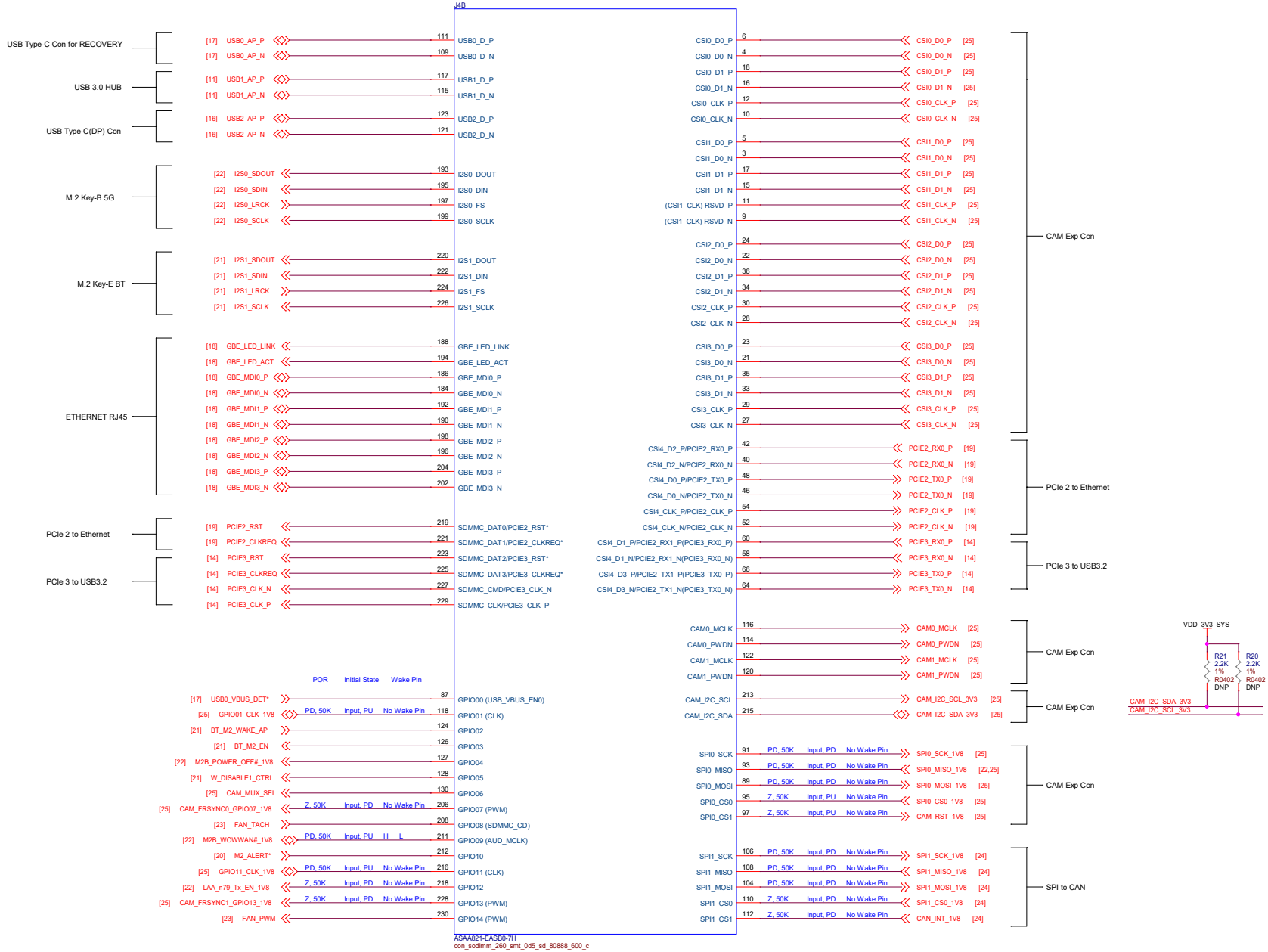
GPIOs, USB2.0, I2S, SPI, GBe and CSI



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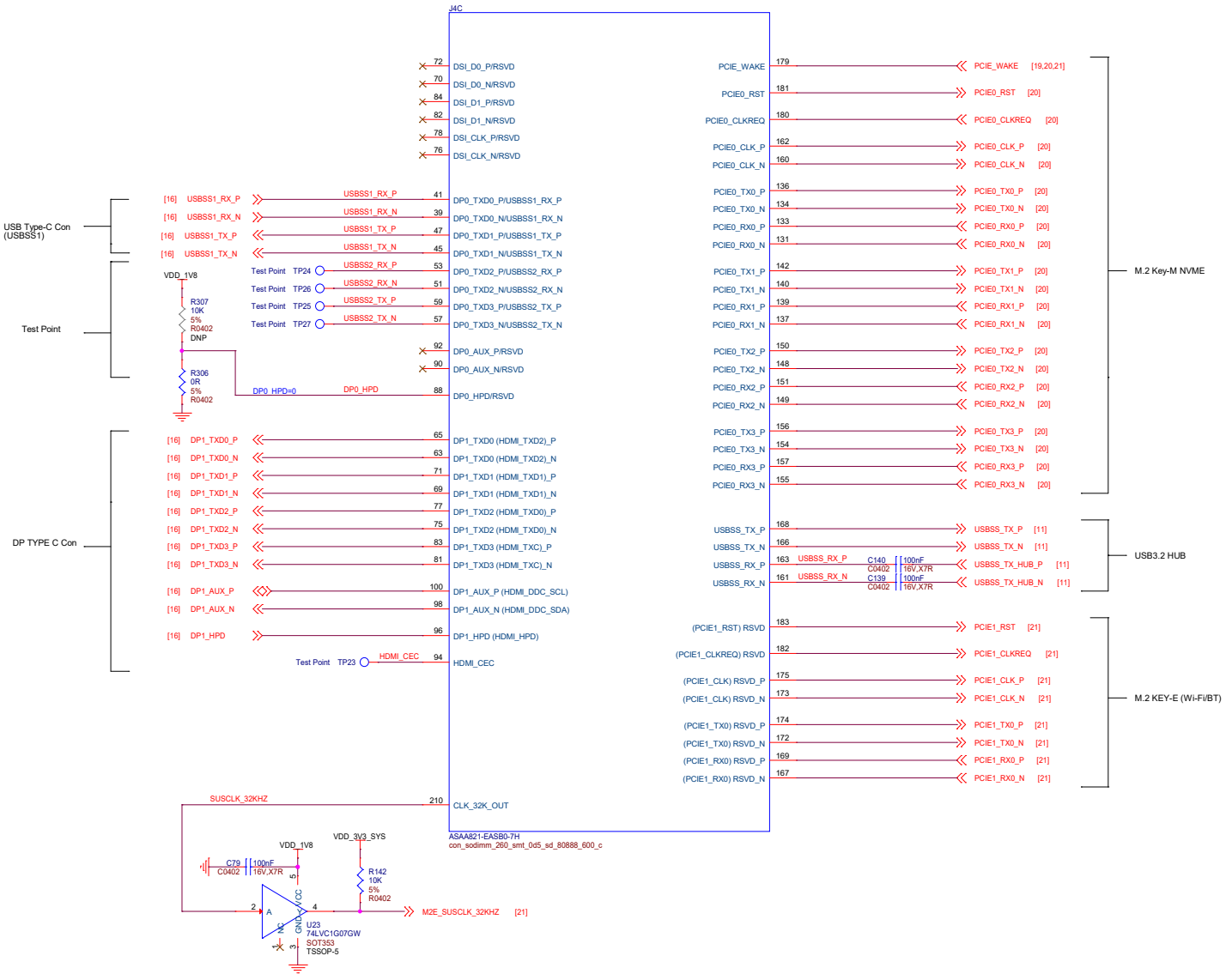
	Title: reComputer Robotics J401		
Size: C	Document Number: 05 SODIMM Connector 2/3		Rev: V1.0
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025		Sheet: 5 of 25

HDMI, DP, DSI, USBSS and PCIe



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	Title: reComputer Robotics J401		
Size: C	Document Number: 06 SODIMM Connector 3/3		Rev: V1.0
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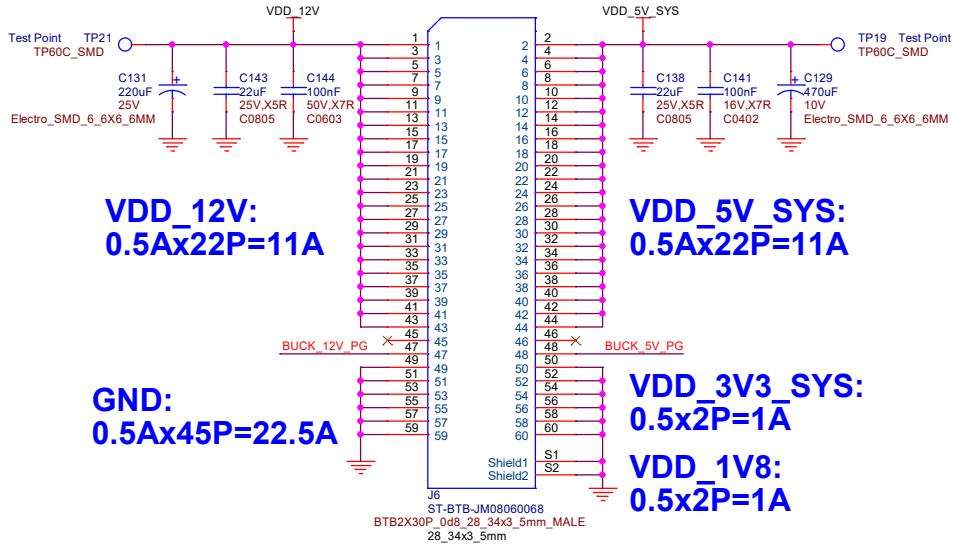

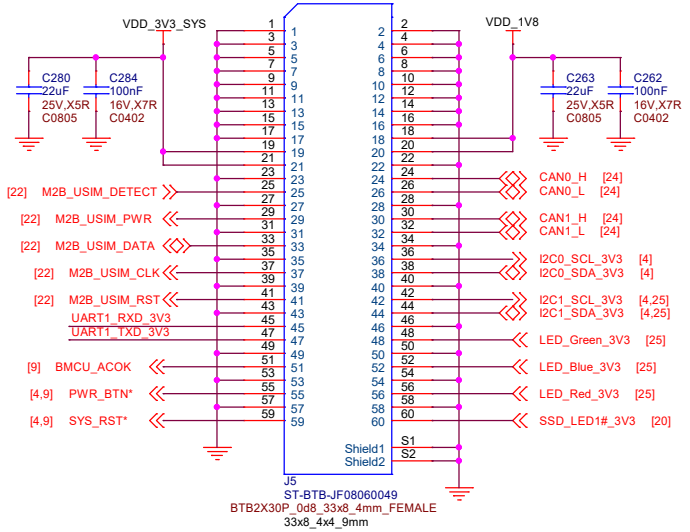

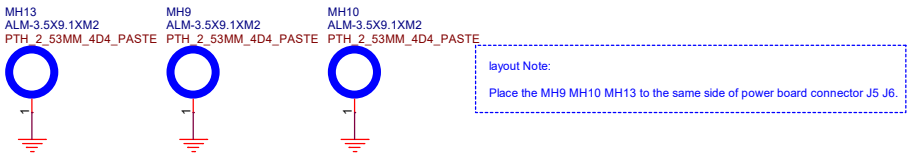

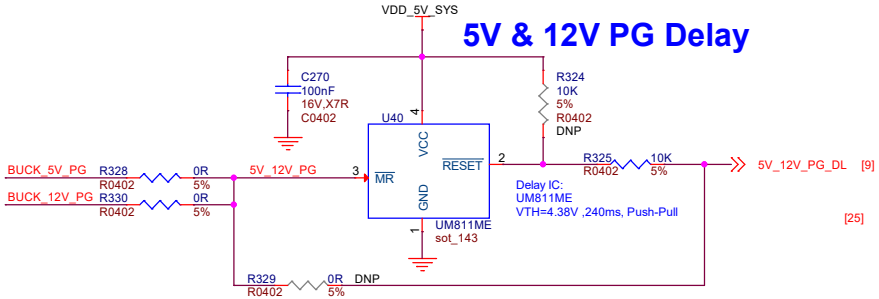

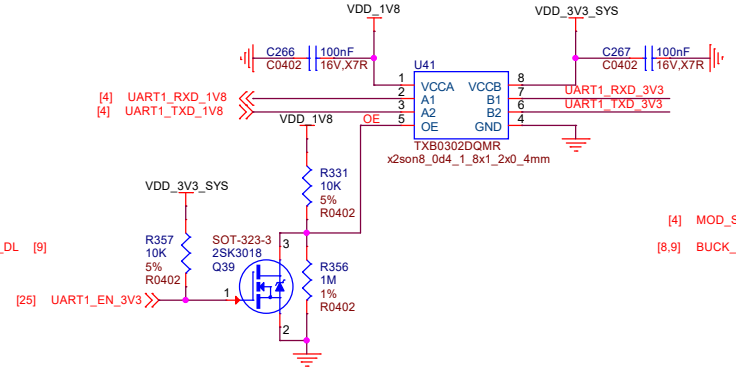

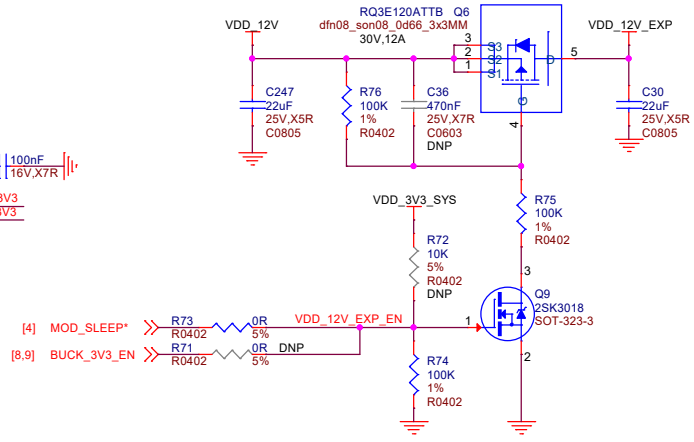

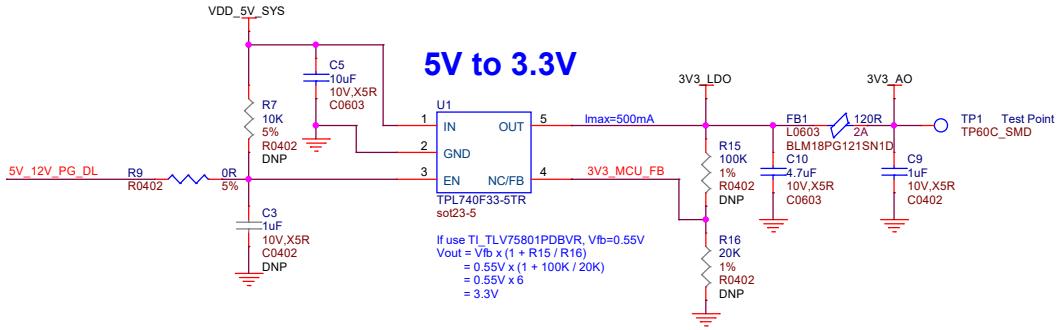

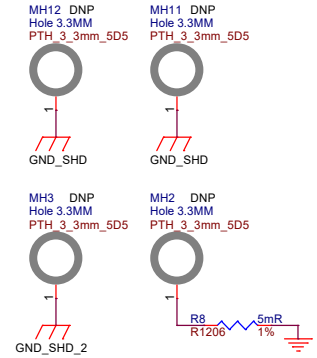

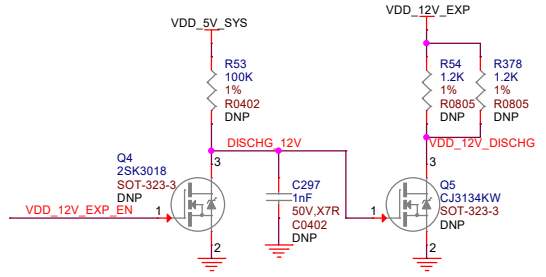

VDD_12V_EXP RAIL DISCHARGE

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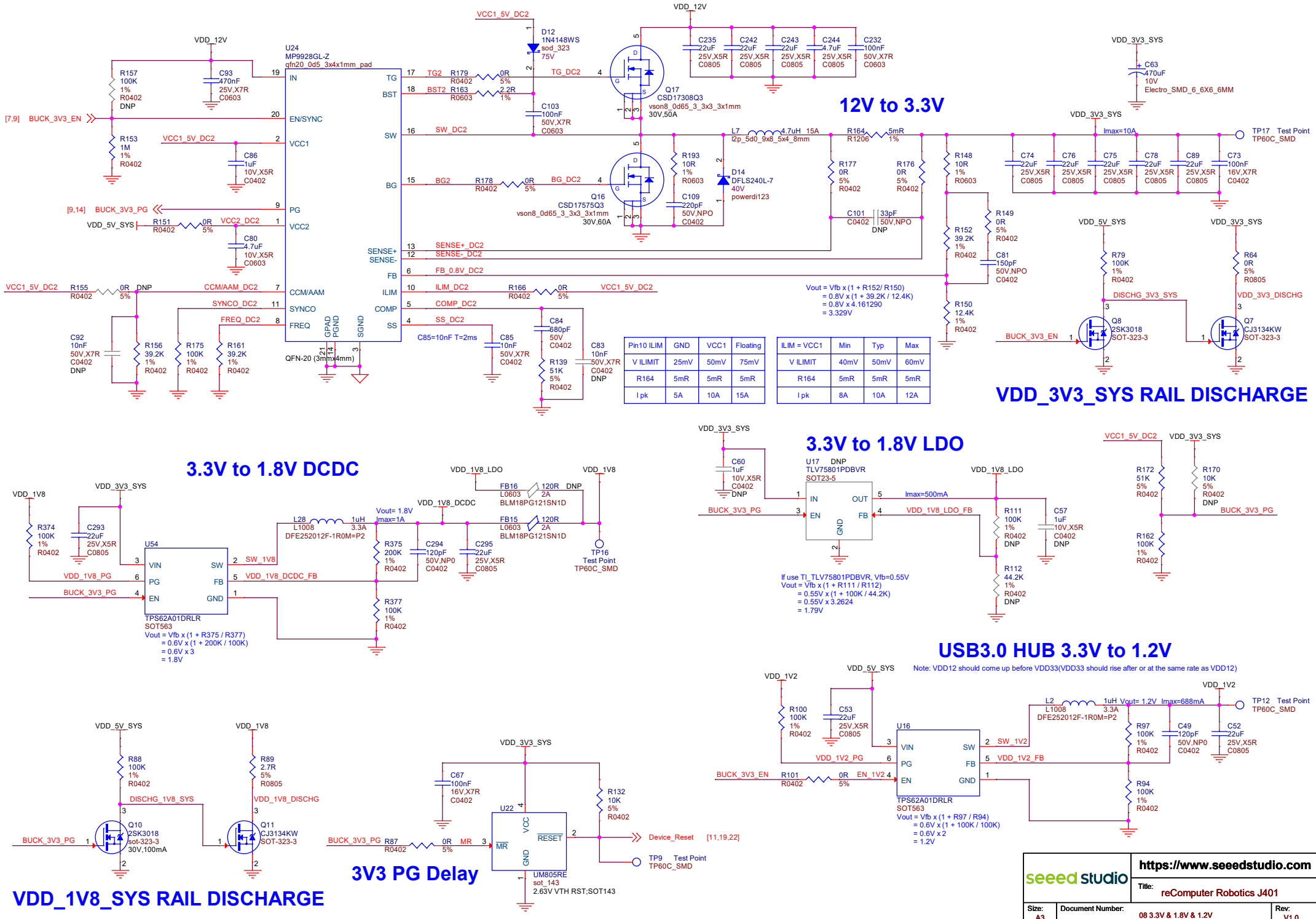
12V to 3.3V
U24
MP9928GL-Z
qfn20_0d5_3x4x1mm_pad
IN
EN/SYNC
VCC1
VCC2
PG
CCM/AAM
SYNCO
FREQ
TG
BST
SW
BG
SENSE+
SENSE-
FB
ILIM
COMP
SS
GPAD
PGND
SGND
QFN-20 (3mmx4mm)
VDD_12V
VCC1_5V_DC2
VDD_5V_SYS
VDD_3V3_SYS
BUCK_3V3_EN
BUCK_3V3_PG
D12
1N4148WS
sod_323
75V
Q17
CSD17308Q3
vson8_0d65_3_3x3_3x1mm
30V,50A
Q16
CSD17575Q3
vson8_0d65_3_3x3_3x1mm
30V,60A
D14
DFLS240L-7
40V
powerdi123
L7
l2p_5d0_9x8_5x4_8mm
4.7uH_15A
Imax=10A
TP17 Test Point
TP60C_SMD
Vout = Vfb x (1 + R152/ R150)
= 0.8V x (1 + 39.2K / 12.4K)
= 0.8V x 4.161290
= 3.329V
Pin10 ILIM | GND | VCC1 | Floating
V ILIMIT | 25mV | 50mV | 75mV
R164 | 5mR | 5mR | 5mR
I pk | 5A | 10A | 15A
ILIM = VCC1 | Min | Typ | Max
V ILIMIT | 40mV | 50mV | 60mV
R164 | 5mR | 5mR | 5mR
I pk | 8A | 10A | 12A
VDD_3V3_SYS RAIL DISCHARGE
DISCHG_3V3_SYS
VDD_3V3_DISCHG
Q8
2SK3018
SOT-323-3
Q7
CJ3134KW
SOT-323-3
3.3V to 1.8V DCDC
VDD_1V8
VDD_1V8_LDO
VDD_1V8_DCDC
TPS62A01DRLR
SOT563
Vout = Vfb x (1 + R375 / R377)
= 0.6V x (1 + 200K / 100K)
= 0.6V x 3
= 1.8V
TP16
Test Point
TP60C_SMD
3.3V to 1.8V LDO
U17 DNP
TLV75801PDBVR
SOT23-5
IN
OUT
EN
FB
GND
Imax=500mA
VDD_1V8_LDO_FB
If use TI_TLV75801PDBVR, Vfb=0.55V
Vout = Vfb x (1 + R111 / R112)
= 0.55V x (1 + 100K / 44.2K)
= 0.55V x 3.2624
= 1.79V
USB3.0 HUB 3.3V to 1.2V
Note: VDD12 should come up before VDD33(VDD33 should rise after or at the same rate as VDD12)
VDD_1V2
U16
TPS62A01DRLR
SOT563
Vout = Vfb x (1 + R97 / R94)
= 0.6V x (1 + 100K / 100K)
= 0.6V x 2
= 1.2V
TP12 Test Point
TP60C_SMD
VDD_1V8_SYS RAIL DISCHARGE
DISCHG_1V8_SYS
VDD_1V8_DISCHG
Q10
2SK3018
sot-323-3
30V,100mA
Q11
CJ3134KW
SOT-323-3
3V3 PG Delay
U22
UM805RE
sot_143
2.63V VTH RST;SOT143
Device_Reset
[11,19,22]
TP9 Test Point
TP60C_SMD
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https://www.seeedstudio.com
Title: reComputer Robotics J401
Size: A3
Document Number: 08 3.3V & 1.8V & 1.2V
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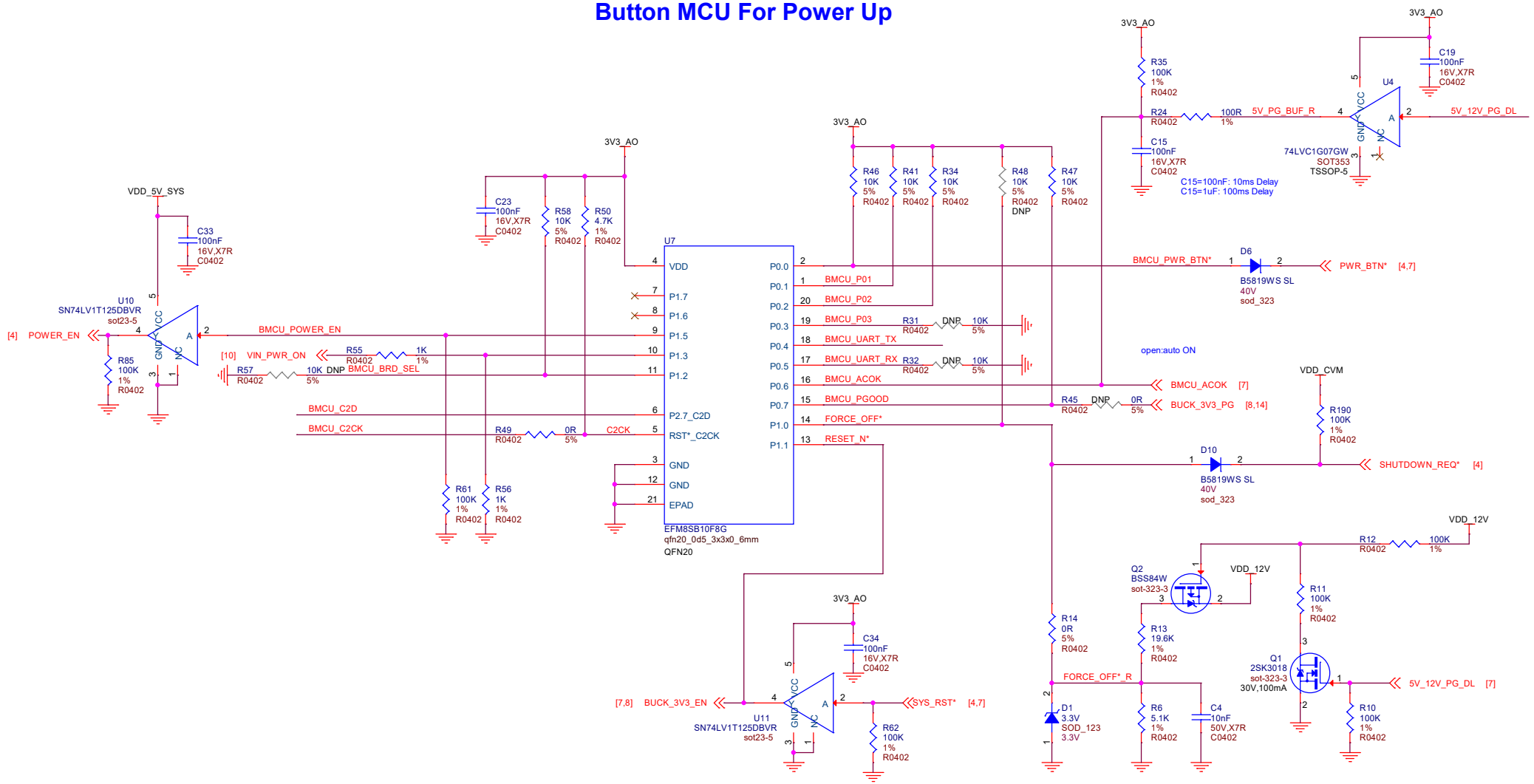
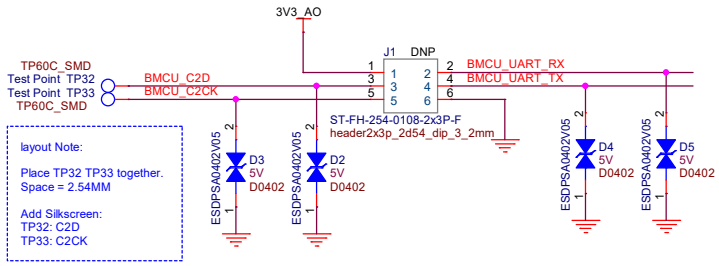
Button MCU For Power Up





VDD_DCIN	FORCE_OFF*
12V	2.477V

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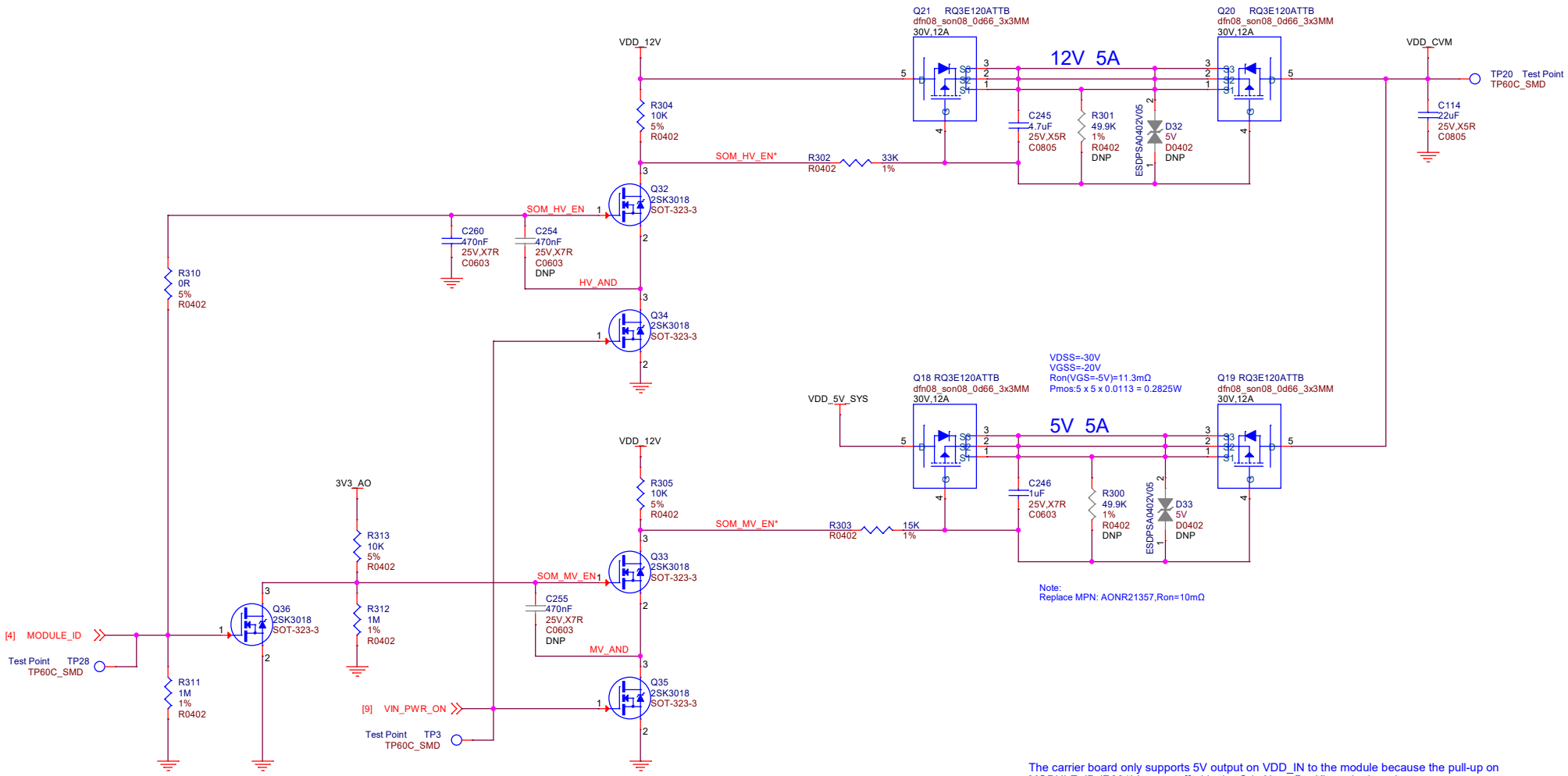

VIN_PWR_ON	MODULE_ID	VDD_CVM
0	0	OFF
0	0	OFF
1	0	5V
1	1	12V

The carrier board only supports 5V output on VDD_IN to the module because the pull-up on MODULE_ID (R231) is not stuffed in the Orin Nano DevKit carrier board.

A 10kOhm, 0402 R231 Resistor can be added to support 5V, and up to 19V. As stated in the design guide, please be aware that Hot Plugging is not supported. Jetson Orin Nano modules have 5V Input Voltage, and hot plugging may cause an incorrect input voltage to be sent to the module if this resistor is added.

Please make sure the carrier board power is removed and adequate time has elapsed for the various power rails to fully discharge before when plugging in the Jetson Orin Nano module. R231 (to pull MODULE_ID high) is located on the SODIMM Connector 1/3 (page 4).

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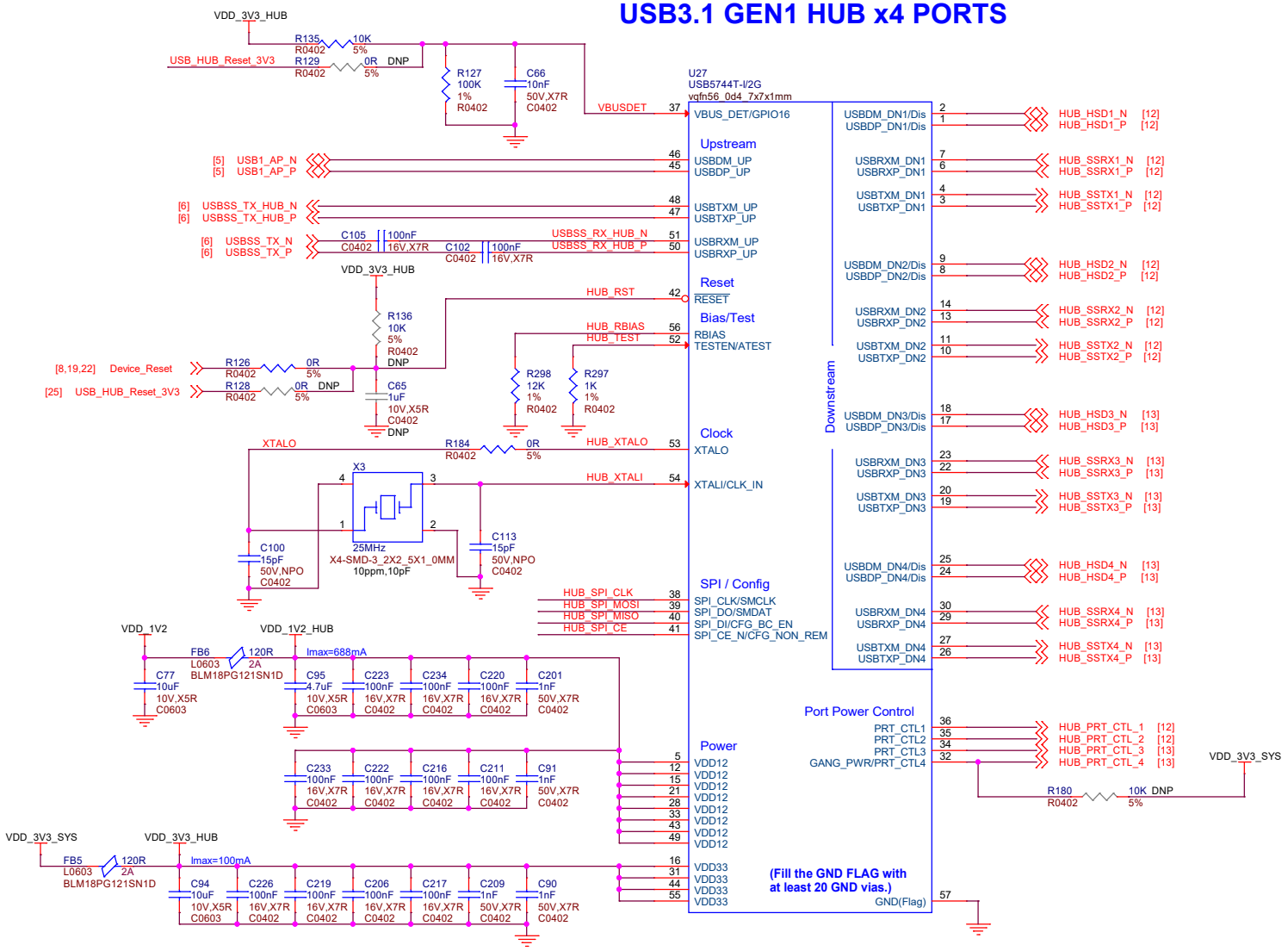
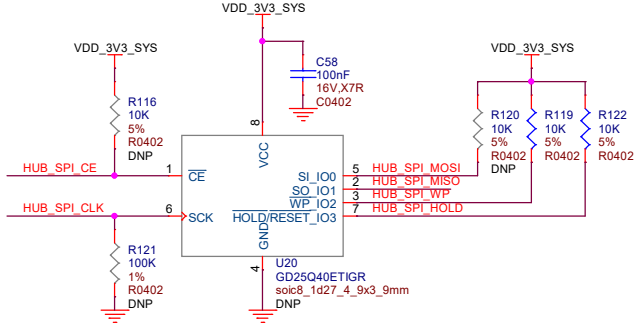
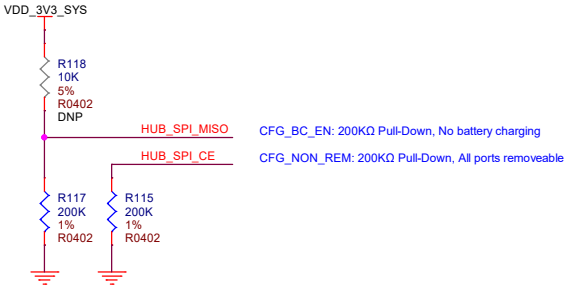
USB3.1 GEN1 HUB x4 PORTS



QSPI Flash





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	Title: reComputer Robotics J401	
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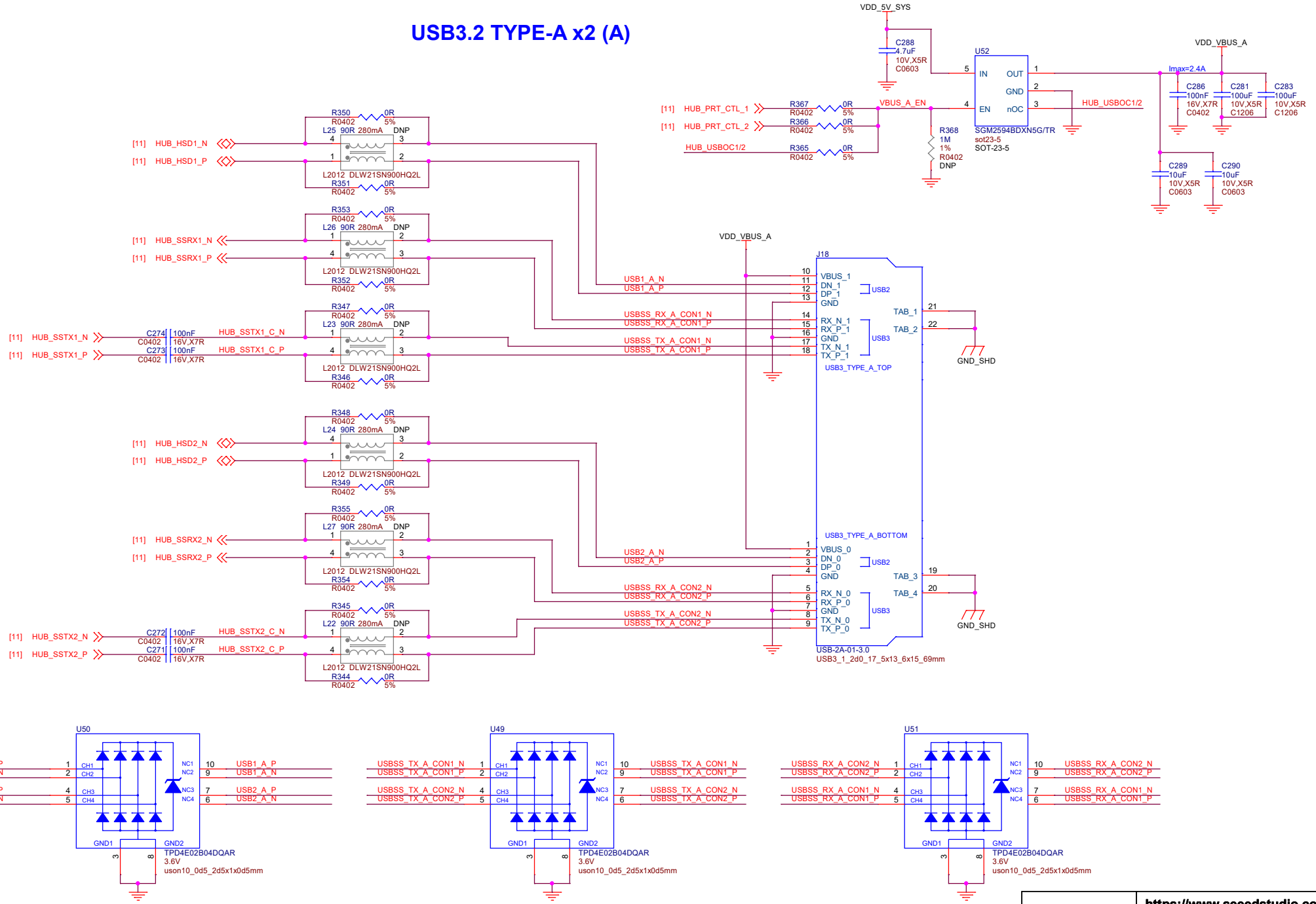
USB3.2 TYPE-A x2 (A)



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	Title: reComputer Robotics J401	
Size: A3	Document Number: 12 USB3.2 Type-A x2 (A)	Rev: V1.0
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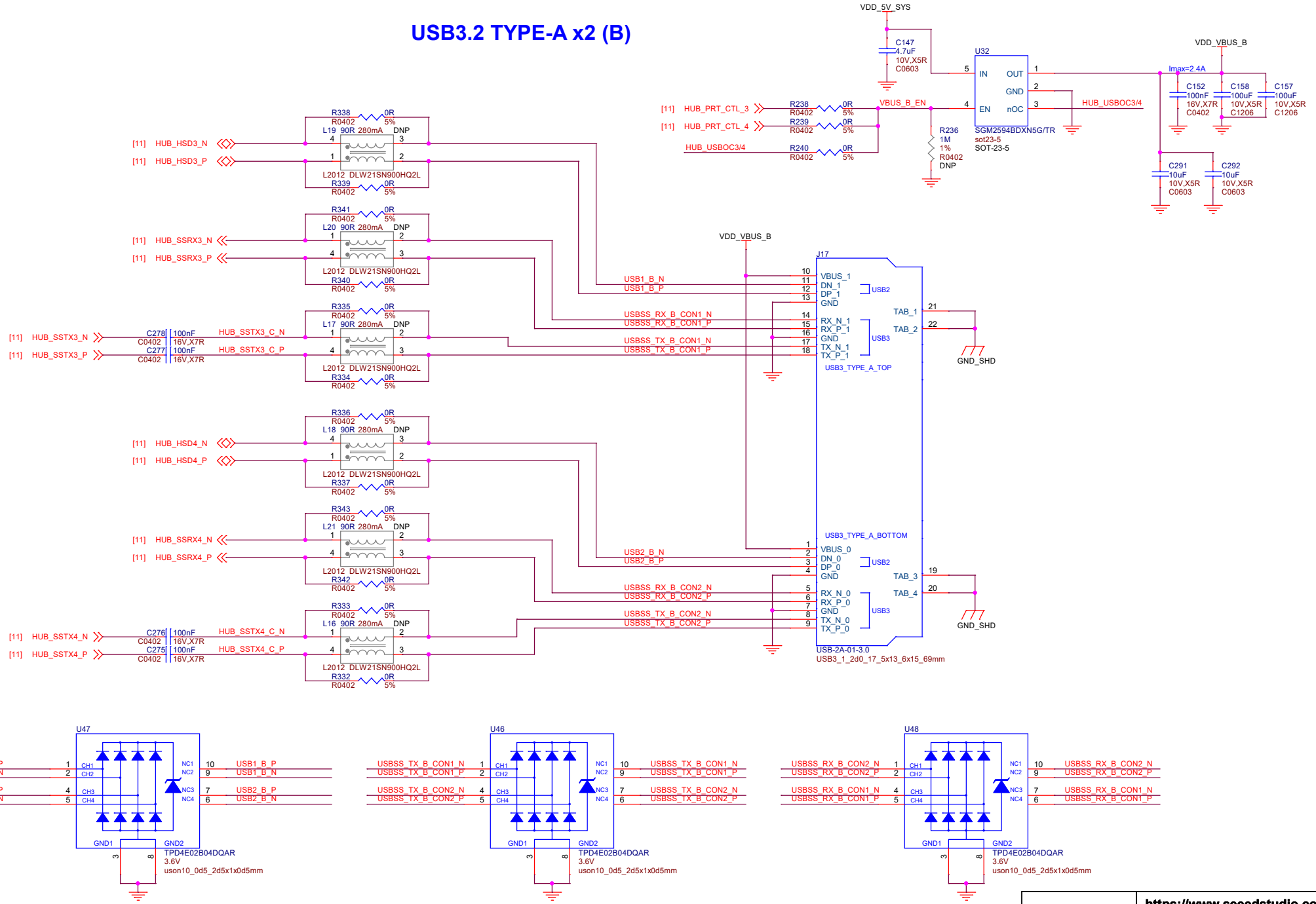
USB3.2 TYPE-A x2 (B)



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	Title: reComputer Robotics J401		
Size: A3	Document Number: 13 USB3.2 Type-A x2 (B)		Rev: V1.0
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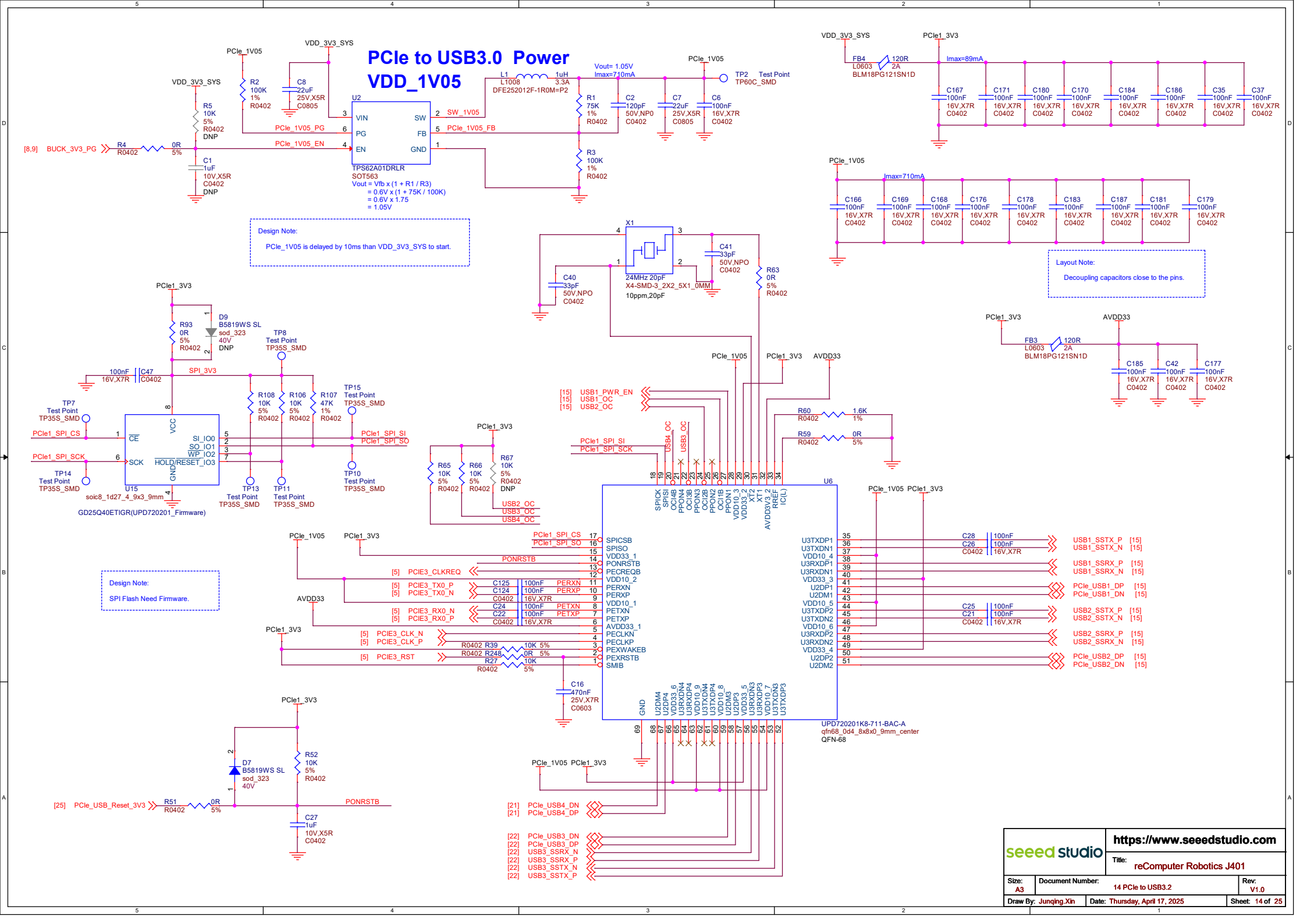
PCIe to USB3.0 Power
VDD_1V05
VDD_3V3_SYS
PCIe_1V05
PCIe1_3V3
AVDD33
U2
VIN
SW
PG
FB
EN
GND
TPS62A01DRLR
SOT563
Vout = Vfb x (1 + R1 / R3)
= 0.6V x (1 + 75K / 100K)
= 0.6V x 1.75
= 1.05V
Vout= 1.05V
Imax=710mA
Imax=89mA
Design Note:
PCIe_1V05 is delayed by 10ms than VDD_3V3_SYS to start.
Layout Note:
Decoupling capacitors close to the pins.
Design Note:
SPI Flash Need Firmware.
U15
GD25Q40ETIGR(UPD720201_Firmware)
U6
UPD720201K8-711-BAC-A
qfn68_0d4_8x8x0_9mm_center
QFN-68
seeed studio
https://www.seeedstudio.com
Title: reComputer Robotics J401
Size: A3
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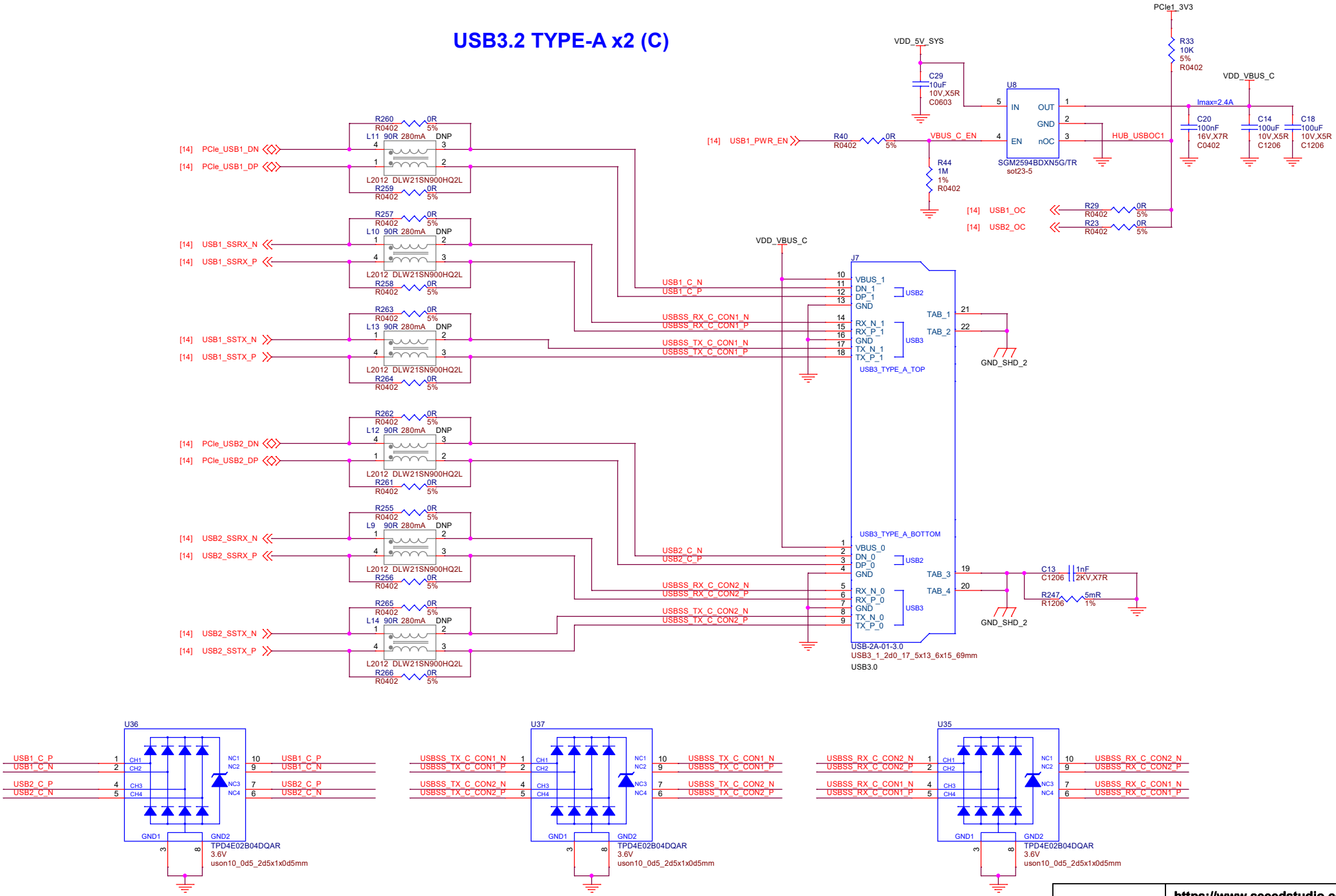
USB3.2 TYPE-A x2 (C)



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	Title: reComputer Robotics J401	
Size: A3	Document Number: 15 USB3.2 Type-A x2 (C)	Rev: V1.0
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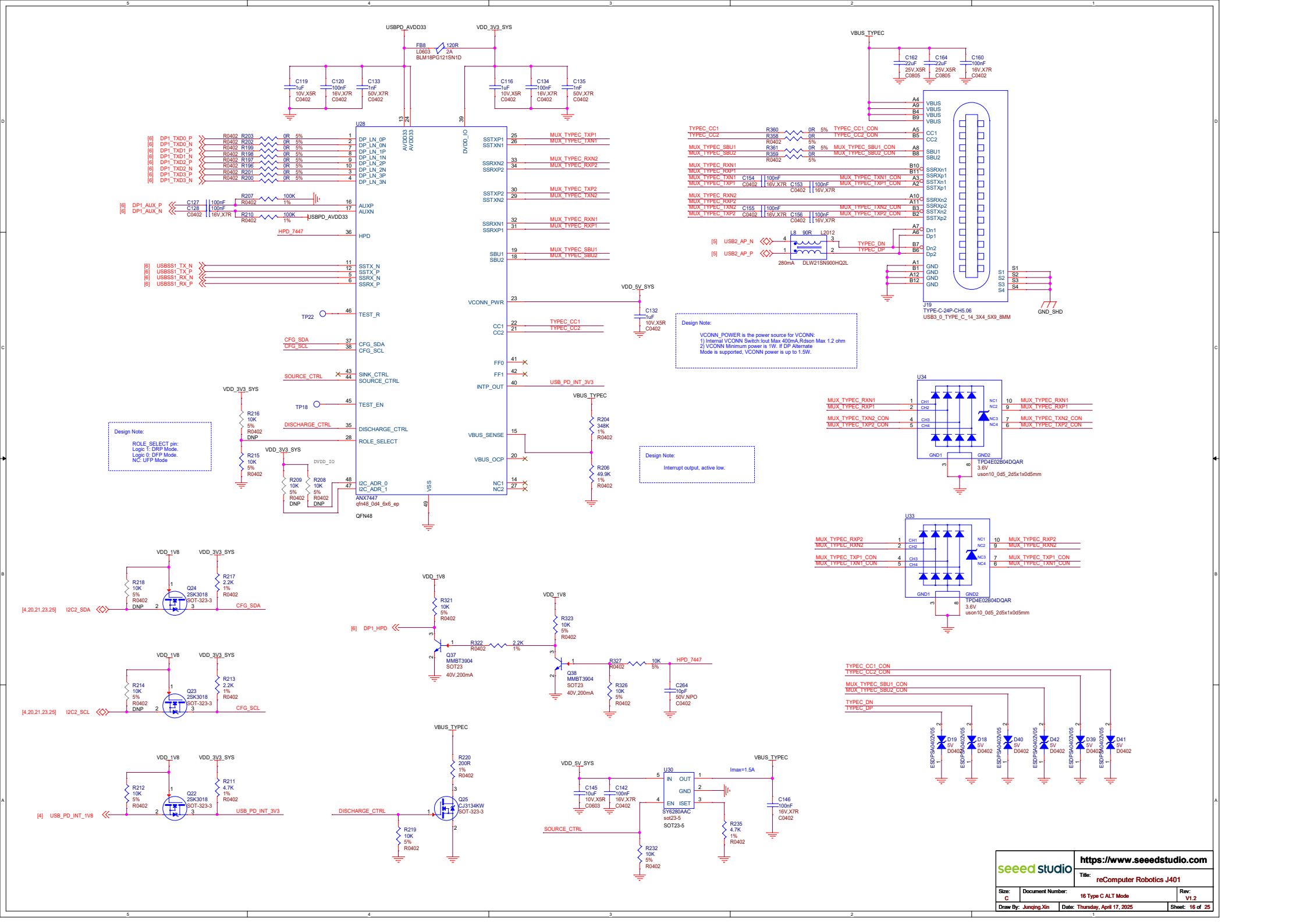
USBPD_AVDD33
VDD_3V3_SYS
FB8
L0603
BLM18PG121SN1D
120R
2A
C119 1uF 10V,X5R C0402
C120 100nF 16V,X7R C0402
C133 1nF 50V,X7R C0402
C116 1uF 10V,X5R C0402
C134 100nF 16V,X7R C0402
C135 1nF 50V,X7R C0402
U28
AVDD33
DVDD_IO
VSS
DP_LN_0P
DP_LN_0N
DP_LN_1P
DP_LN_1N
DP_LN_2P
DP_LN_2N
DP_LN_3P
DP_LN_3N
AUXP
AUXN
HPD
SSTX_N
SSTX_P
SSRX_N
SSRX_P
TEST_R
CFG_SDA
CFG_SCL
SINK_CTRL
SOURCE_CTRL
TEST_EN
DISCHARGE_CTRL
ROLE_SELECT
I2C_ADR_0
I2C_ADR_1
SSTXP1
SSTXN1
SSRXN2
SSRXP2
SSTXP2
SSTXN2
SSRXN1
SSRXP1
SBU1
SBU2
VCONN_PWR
CC1
CC2
FF0
FF1
INTP_OUT
VBUS_SENSE
VBUS_OCP
NC1
NC2
ANX7447
qfn48_0d4_6x6_ep
QFN48
MUX_TYPEC_TXP1
MUX_TYPEC_TXN1
MUX_TYPEC_RXN2
MUX_TYPEC_RXP2
MUX_TYPEC_TXP2
MUX_TYPEC_TXN2
MUX_TYPEC_RXN1
MUX_TYPEC_RXP1
MUX_TYPEC_SBU1
MUX_TYPEC_SBU2
TYPEC_CC1
TYPEC_CC2
USB_PD_INT_3V3
VDD_5V_SYS
C132 1uF 10V,X5R C0402
VBUS_TYPEC
R204 348K 1% R0402
R206 49.9K 1% R0402
R216 10K 5% R0402 DNP
R215 10K 5% R0402
R209 10K 5% R0402 DNP
R208 10K 5% R0402 DNP
TP22
TP18
Design Note:
ROLE_SELECT pin:
Logic 1: DRP Mode.
Logic 0: DFP Mode.
NC: UFP Mode
Design Note:
VCONN_POWER is the power source for VCONN:
1) Internal VCONN Switch:Iout Max 400mA,Rdson Max 1.2 ohm
2) VCONN Minimum power is 1W. If DP Alternate
Mode is supported, VCONN power is up to 1.5W.
Design Note:
Interrupt output, active low.
VBUS_TYPEC
C162 22uF 25V,X5R C0805
C164 22uF 25V,X5R C0805
C160 100nF 16V,X7R C0402
J19
TYPE-C-24P-CH5.06
USB3_0_TYPE_C_14_3X4_5X9_8MM
GND_SHD
L8 90R L2012
280mA DLW21SN900HQ2L
U34
TPD4E02B04DQAR
3.6V
uson10_0d5_2d5x1x0d5mm
U33
TPD4E02B04DQAR
3.6V
uson10_0d5_2d5x1x0d5mm
Q24 2SK3018 SOT-323-3
Q23 2SK3018 SOT-323-3
Q22 2SK3018 SOT-323-3
Q37 MMBT3904 SOT23 40V,200mA
Q38 MMBT3904 SOT23 40V,200mA
Q25 CJ3134KW SOT-323-3
U30
SY6280AAC
sot23-5
SOT23-5
Imax=1.5A
D19 D18 D40 D42 D39 D41
ESDPSA0402/05
5V
D0402
I2C2_SDA
I2C2_SCL
DP1_HPD
USB_PD_INT_1V8
USB_PD_INT_3V3
DISCHARGE_CTRL
SOURCE_CTRL
HPD_7447
USB2_AP_N
USB2_AP_P
TYPEC_DN
TYPEC_DP
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Size: C
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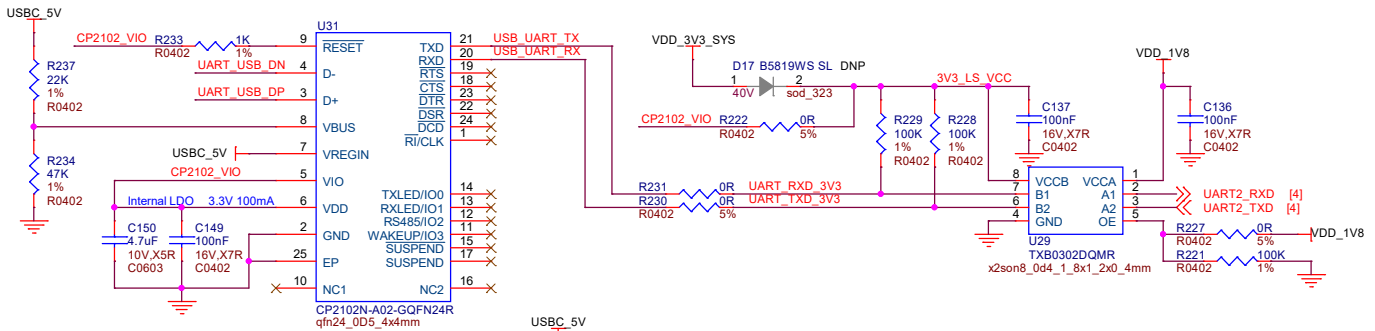
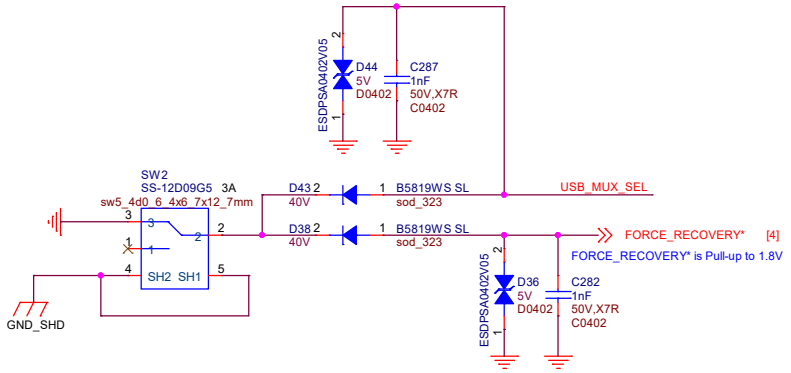
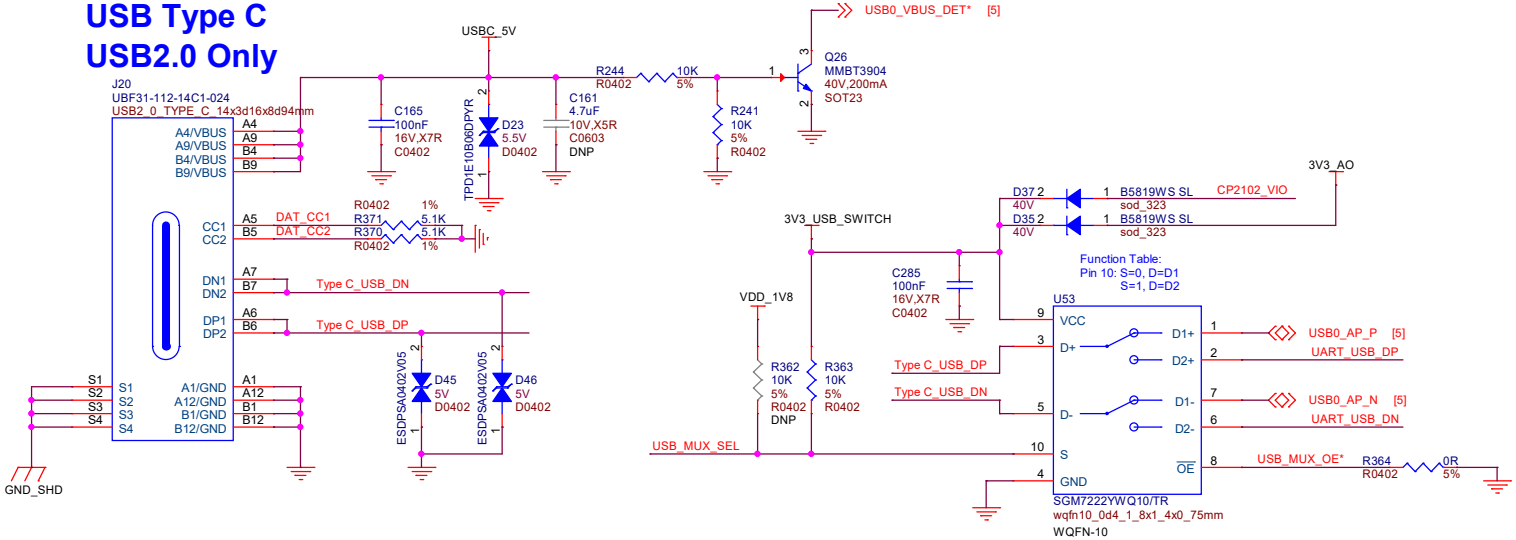
CP2102N



USB to UART



USB Type C
USB2.0 Only



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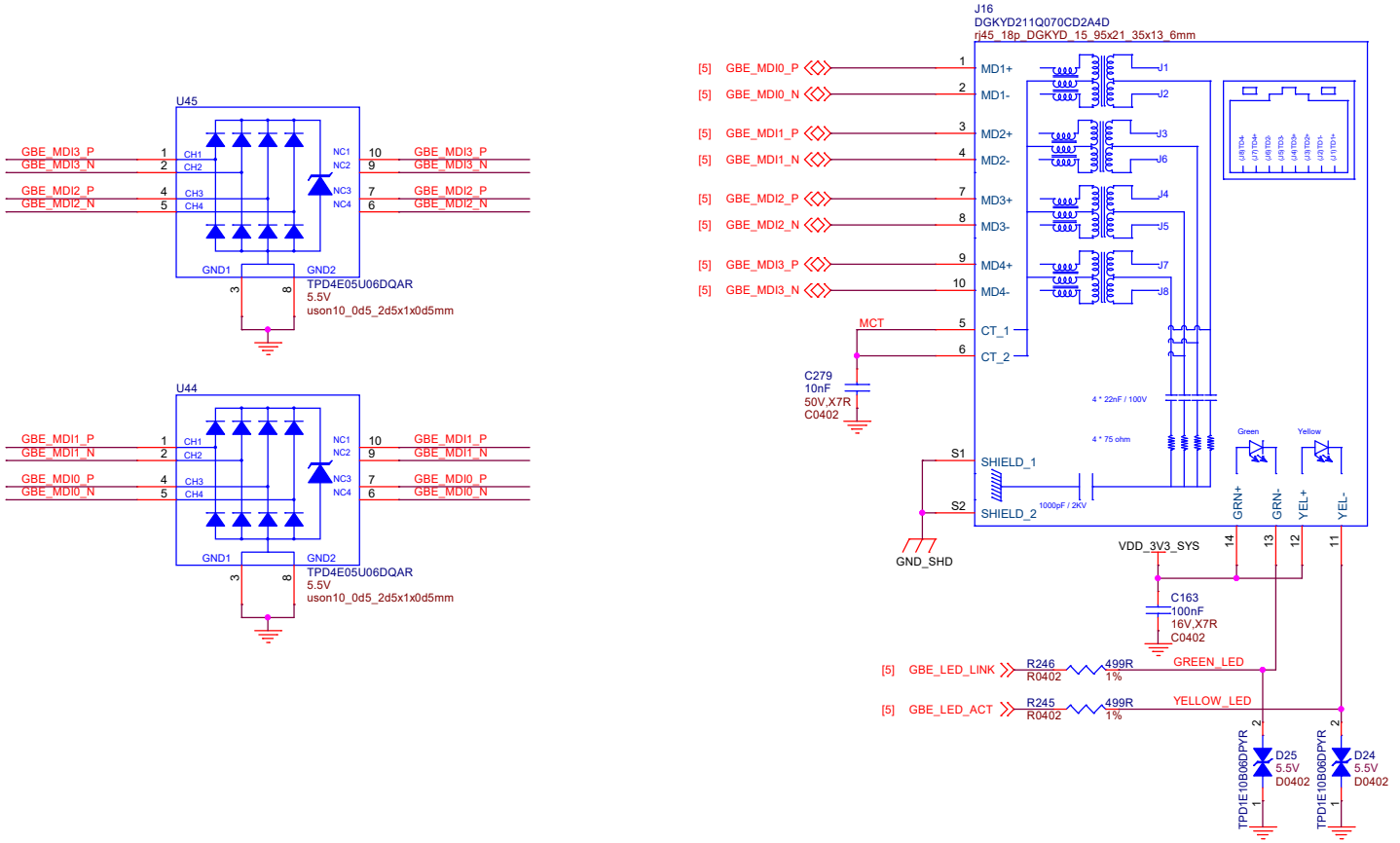
	Title: reComputer Robotics J401	
Size: A3	Document Number: 17 Type C, USB to UART	Rev: V1.0
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025	Sheet: 17 of 25

Gigabit Ethernet



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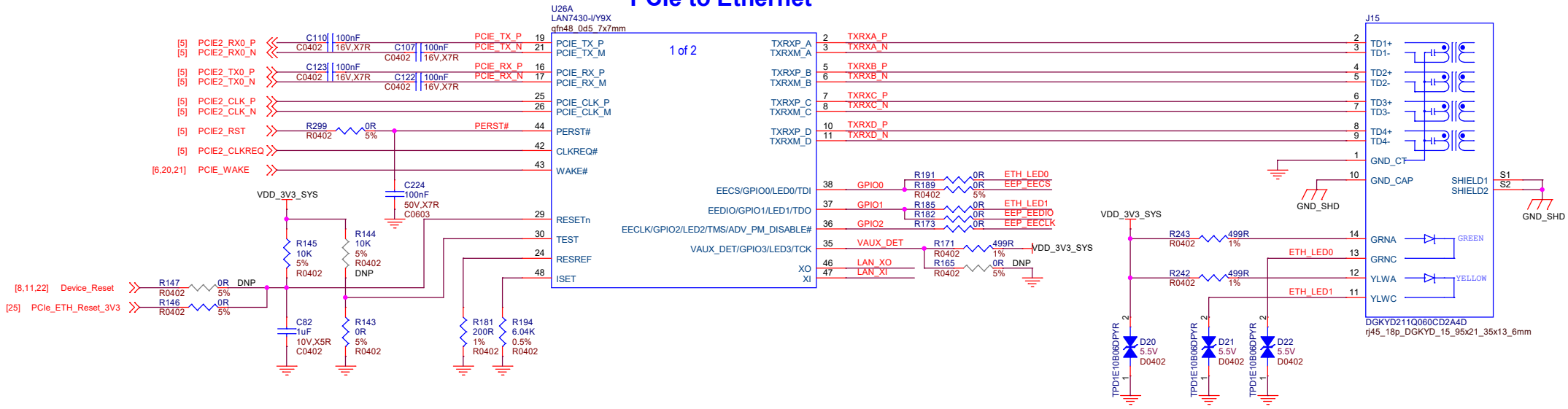
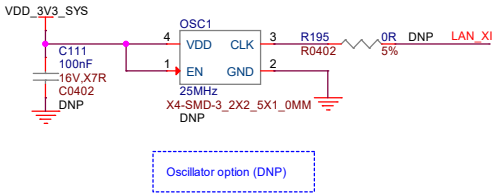
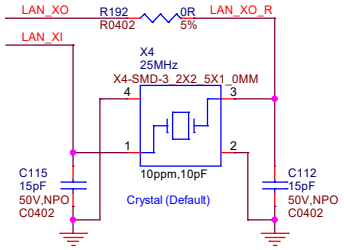
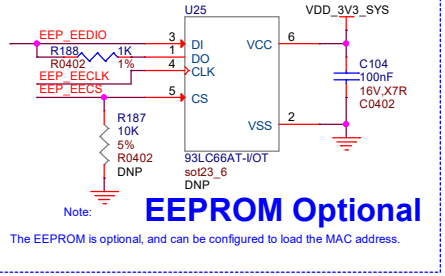
Size: A3	Document Number: 18 Gigabit Ethernet	Rev: V1.0
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025	Sheet: 18 of 25

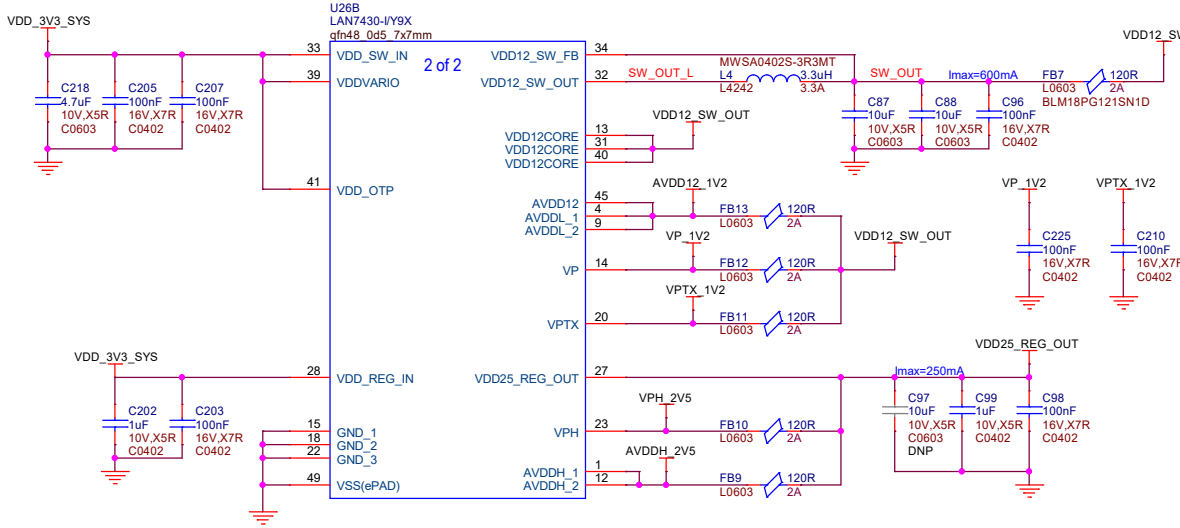
PCIe to Ethernet

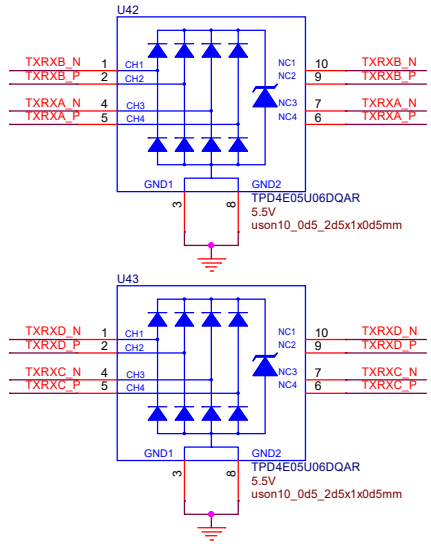












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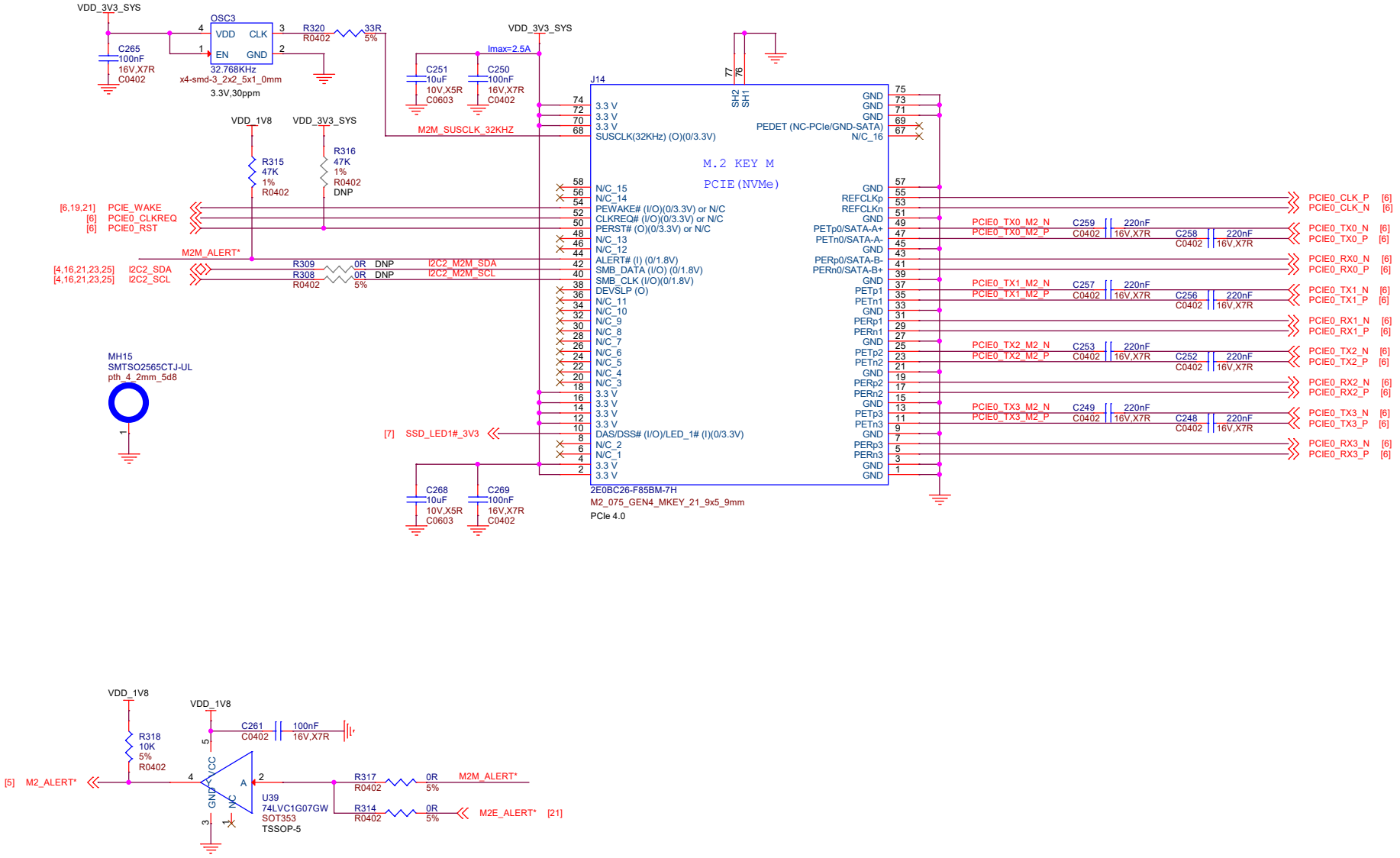
Size: A3	Document Number: 19 PCIe to Ethernet	Rev: V1.2
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025	Sheet: 19 of 25

M.2 KEY-M (NVME)



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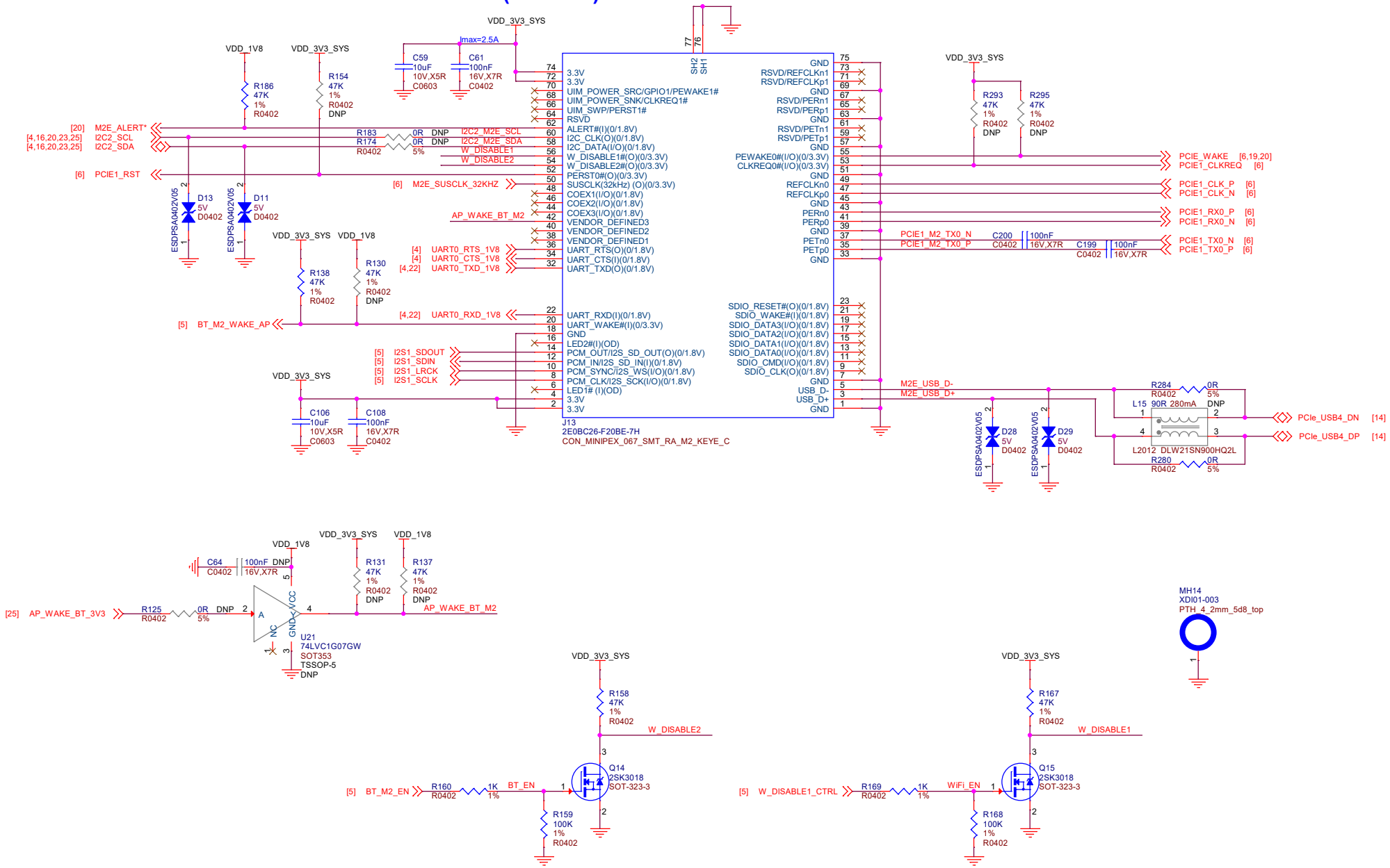
	Title: reComputer Robotics J401	
Size: A3	Document Number: 20 M.2 KEY-M (NVME)	Rev: V1.0
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025	Sheet: 20 of 25

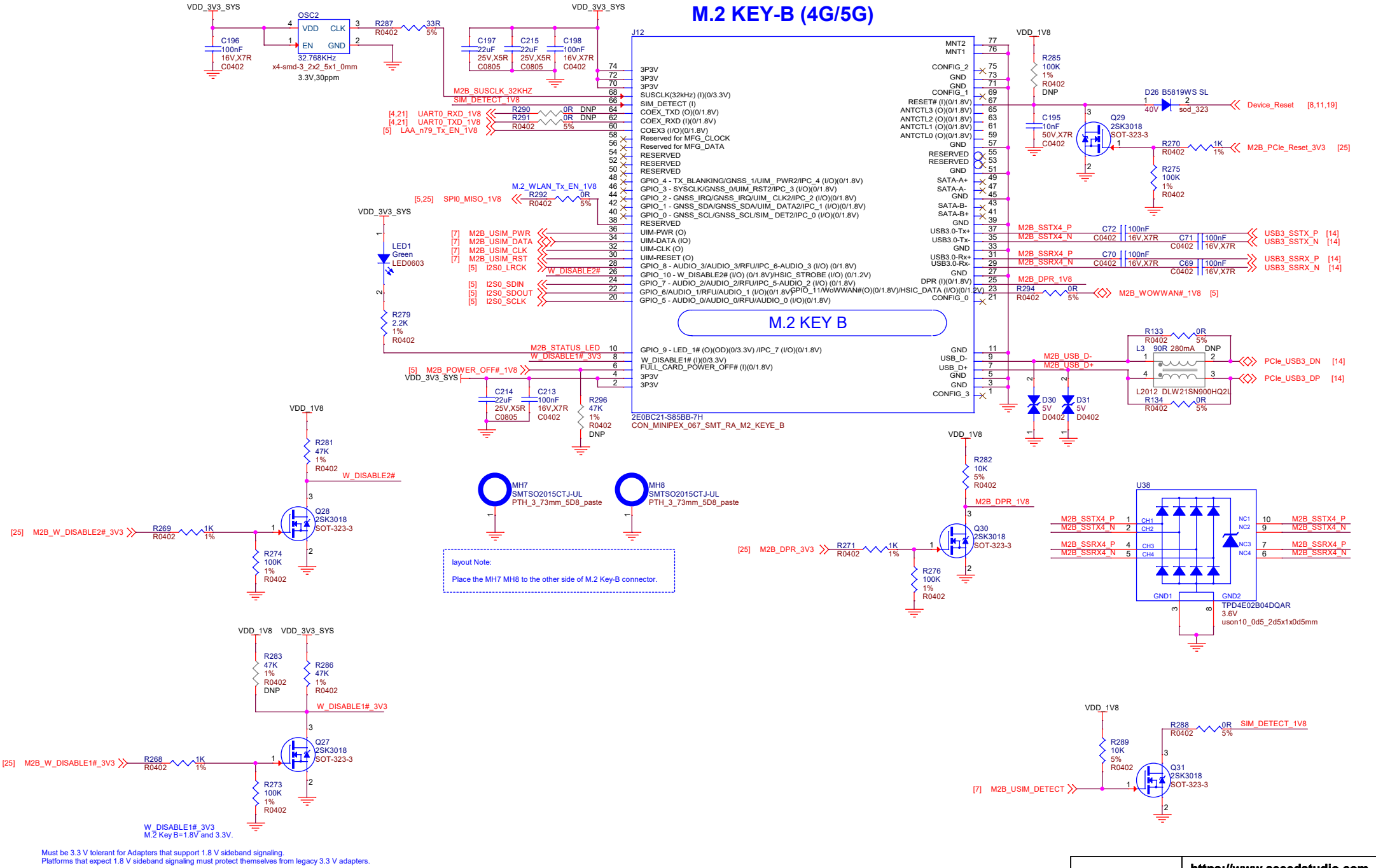
M.2 KEY-E (WIFI/BT)

SIZE: 2230



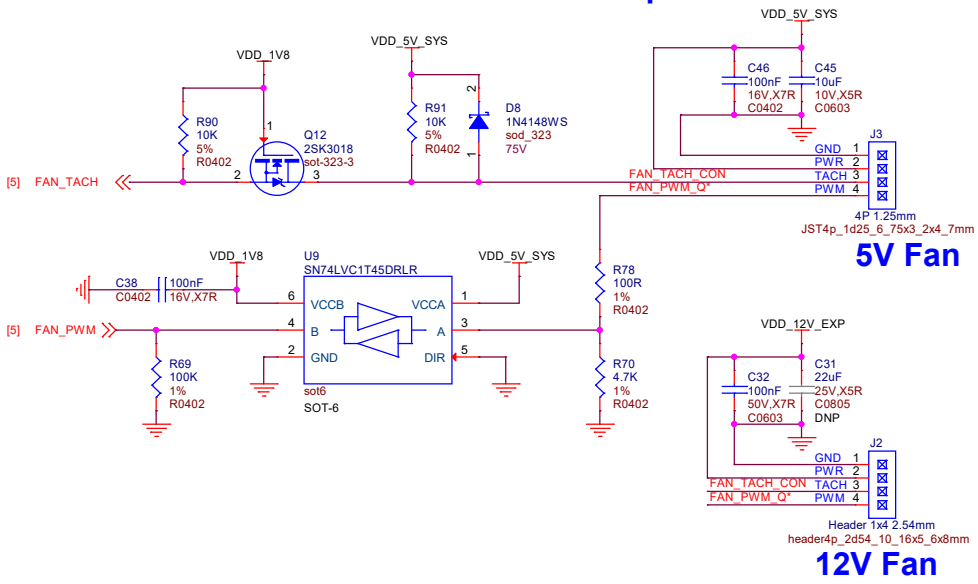
seeed studio	https://www.seeedstudio.com	
	Title: reComputer Robotics J401	
Size: A3	Document Number: 21 M.2 KEY-E (WIFI/BT)	Rev: V1.0
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025	Sheet: 21 of 25

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

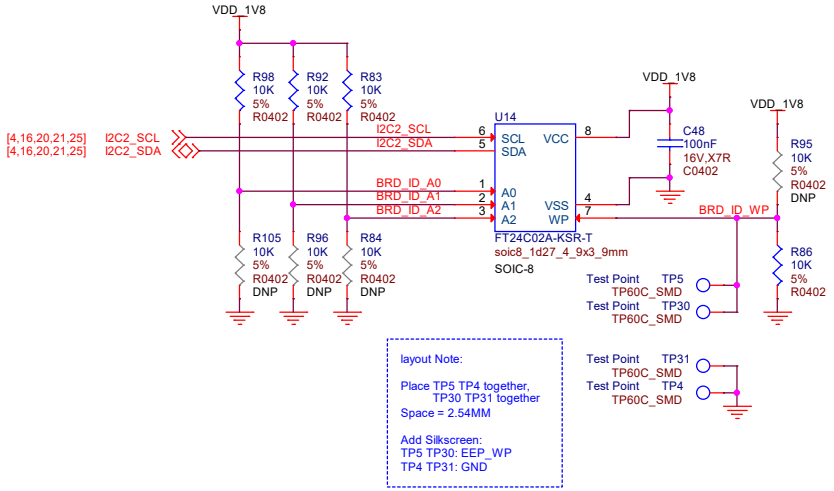


seeed studio	https://www.seeedstudio.com	
Title: reComputer Robotics J401		
Size: A3	Document Number: 22 M.2 KEY-B (4G/5G)	Rev: V1.2
Draw By: Junqing.Xin	Date: Thursday, April 17, 2025	Sheet: 22 of 25

SoC Fan Header 4pin



Carrier Board Config



seeed studio	https://www.seeedstudio.com	
	Title: reComputer Robotics J401	
Size: A3	Document Number: 23 Fan, EEPROM	Rev: V1.0
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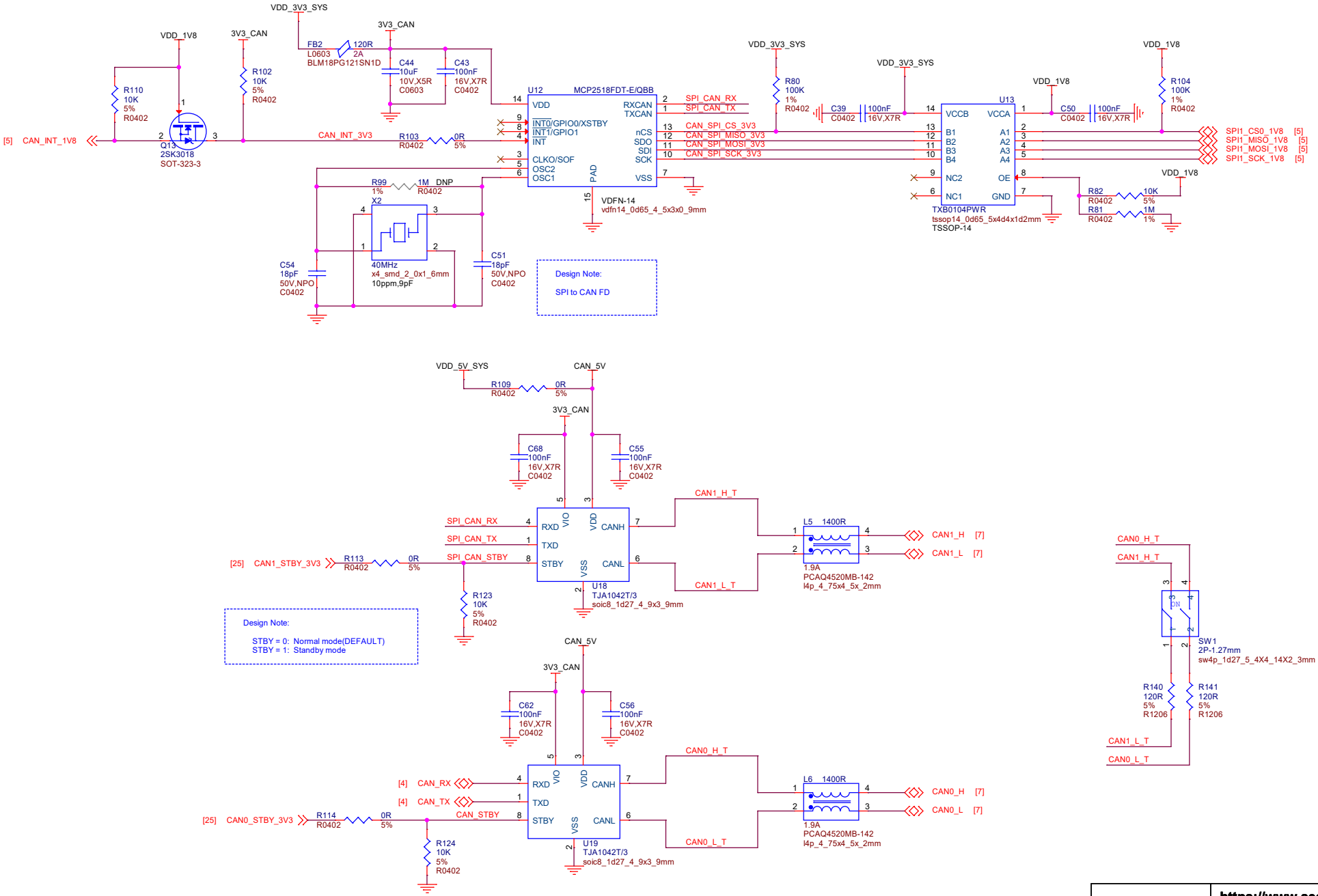

seeed studio	https://www.seeedstudio.com	
	Title: reComputer Robotics J401	
Size: A3	Document Number: 24 CAN x2	Rev: V1.0
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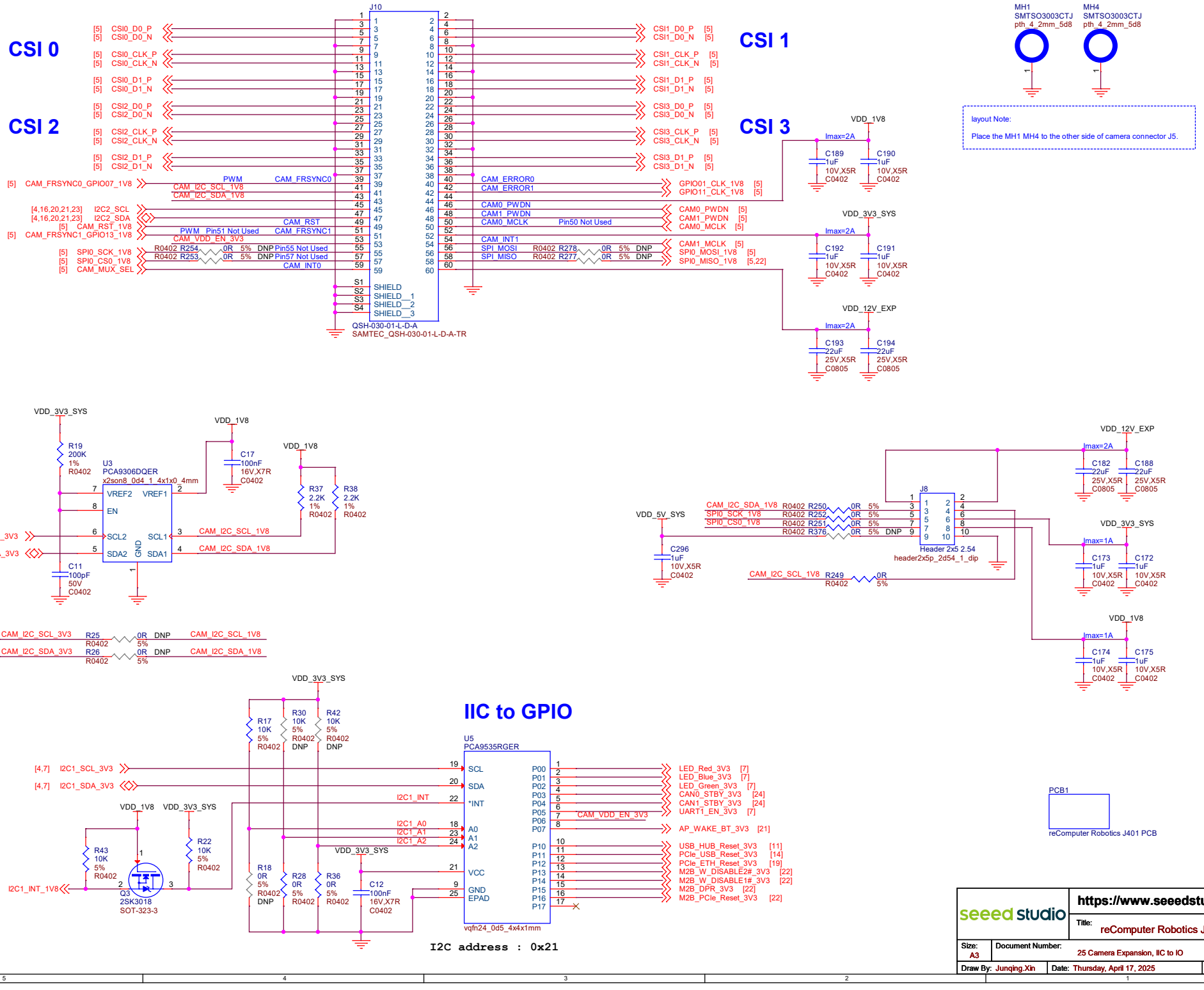
CSI 0
CSI 1
CSI 2
CSI 3
J10
QSH-030-01-L-D-A
SAMTEC_QSH-030-01-L-D-A-TR
MH1
SMTSO3003CTJ
pth_4_2mm_5d8
MH4
SMTSO3003CTJ
pth_4_2mm_5d8
layout Note:
Place the MH1 MH4 to the other side of camera connector J5.
VDD_1V8
VDD_3V3_SYS
VDD_12V_EXP
U3
PCA9306DQER
x2son8_0d4_1_4x1x0_4mm
J8
Header 2x5 2.54
header2x5p_2d54_1_dip
IIC to GPIO
U5
PCA9535RGER
vqfn24_0d5_4x4x1mm
Q3
2SK3018
SOT-323-3
PCB1
reComputer Robotics J401 PCB
I2C address : 0x21
seeed studio
https://www.seeedstudio.com
Title: reComputer Robotics J401
Size: A3
Document Number: 25 Camera Expansion, IIC to IO
Rev: V1.0
Draw By: Junqing.Xin
Date: Thursday, April 17, 2025
Sheet: 25 of 25