DO NOT REPRODUCE

SPV-MYSTIC

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D C B A

1 2 3 4 5 6 7 8

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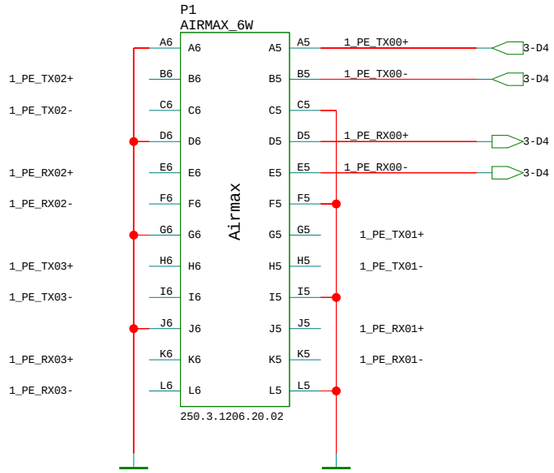
P1
AIRMAX_6W



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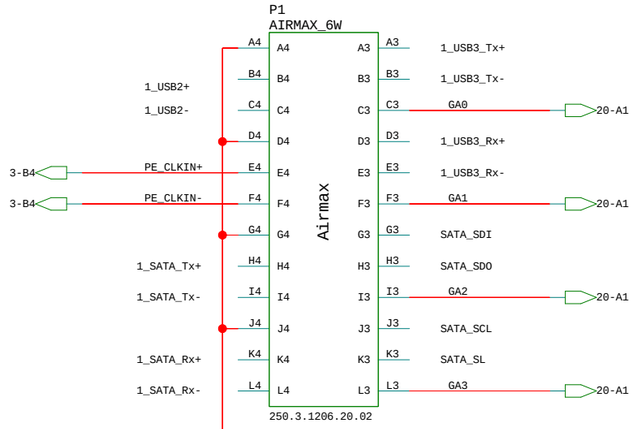
AIRMAX_6W



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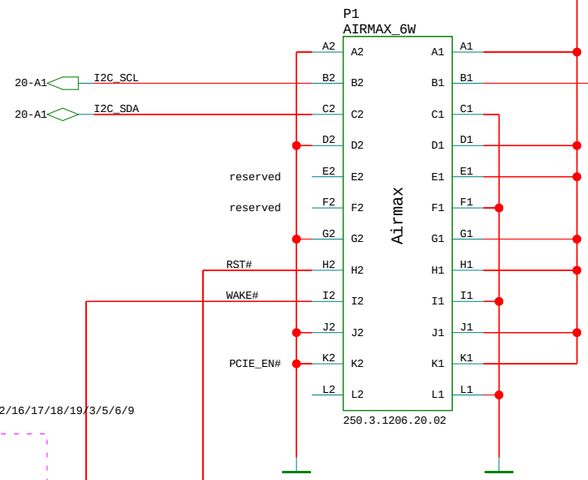
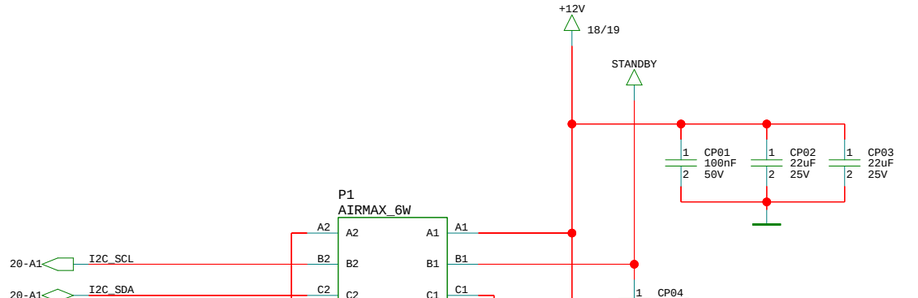
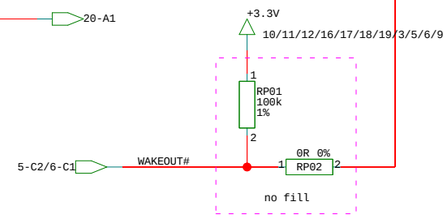
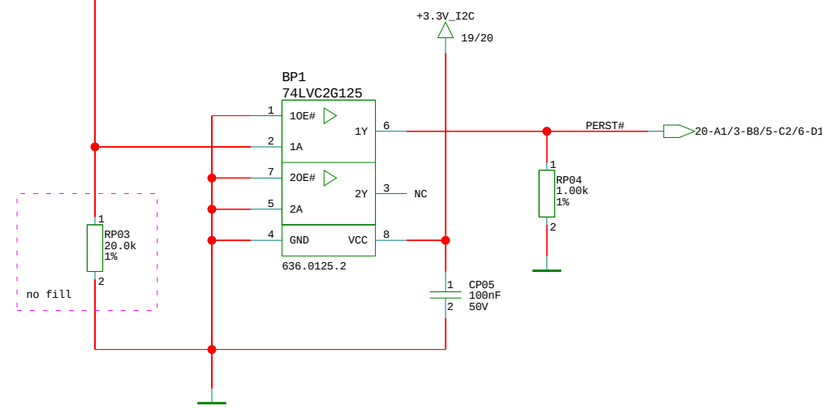
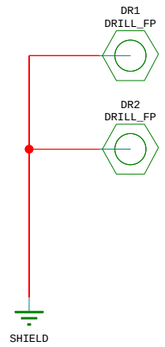
AIRMAX_6W

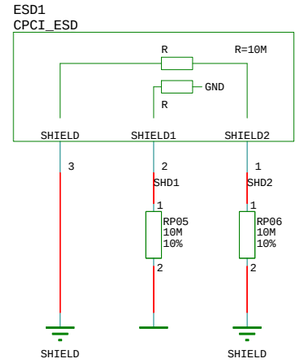


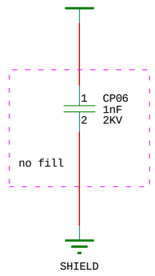












Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	02: Bus Connector P1		P
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D C B A

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CHIP_MODE[1:0]	
00	Normal
01	IDDR/MBIST
10	AC JTAG
11	PHY Testing

Note:
If no board trace is connected to these pins, the internal pull-down resistors of these pins are enough.

PORTCFG2	PORTCFG1	PORTCFG0	Functional Mode
0	0	0	reserved
0	**0**	1	2 Port - 8 Lanes
0	1	0	3 Port - 8 Lanes
0	1	1	4 Port - 8 Lanes
1	0	0	5 Port - 8 Lanes
1	0	1	8 Port - 8 Lanes*
1	1	0	reserved
1	1	1	reserved

+1.8V
19-D4/3-A5/3-B7/3-C2/3-C5/4-B4

RS01 4.70k 1%
RS02 4.70k 1%
RS03 5.11k 1%
RS05 5.11k 1% no stuff
RS07 5.11k 1%
RS09 4.70k 1%
RS10 5.11k 1%
RS27 5.11k 1%
RS04 332R 1% no stuff
RS06 332R 1%
RS08 332R 1% no stuff
RS28 5.11k 1% no stuff

PES1
PI7C9X3G808GP

nc pd	G11	CHIPMODE1	
nc pd	F11	CHIPMODE0	
PORTCFG2	D12	PORTCFG2	
PORTCFG1	C11	PORTCFG1	
PORTCFG0	B12	PORTCFG0	
nc pd	E12	CKMODE	
nc pu	G4	FATAL_ERR_L/HOT_PLUG_EN_L	
PES1_SRAMBP	E4	GPIO30/PHY_SRAM_BYPASS	
nc pu	K8	SMBUS_EN_L	
INTA_L	H4	INTA_L/PM_L11_EN_L	
PES1_SCL1	P4	SHCL_I2C	
PES1_SDA1	P3	SHDA_I2C	
PES1_SHPCINT#	P1	SHPCINT_L	
PES1_EECK	K13	EECK	
PES1_EEDI	K12	EEDI	
PES1_EEDO	J14	EEDO	
PES1_EECS#	K14	EECS_L	

	N2	GPIO7/HP_LED7	
	D14	GPIO6/HP_LED6	
	C12	GPIO5/HP_LED5	
	C14	GPIO4/HP_LED4	
	B13	GPIO3/HP_LED3	
	B14	GPIO2/HP_LED2	
	A12	GPIO1/HP_LED1	
	A13	GPIO0/HP_LED0	
	H1	GPIO23/HP_RST_L7	
	J1	GPIO22/HP_RST_L6	
	J3	GPIO21/HP_RST_L5	
	J2	GPIO20/HP_RST_L4	
	K4	GPIO19/HP_RST_L3	
	K2	GPIO18/HP_RST_L2	
	K3	GPIO17/HP_RST_L1	
	K1	GPIO16/HP_RST_L0	
	E3	GPIO31/SURPRISE_HP	
PES1_SCL0	L14	SCL_I2C	
PES1_SDA0	L13	SDA_I2C	
	M12	I2C_ADDR2	
	M14	I2C_ADDR1	
	L12	I2C_ADDR0	

650.68.93808.10

+1.8V
19-D4/3-A5/3-B7/3-C2/3-D1/4-B4

RS11 4.70k 1%
RS12 4.70k 1%

RESREF E8
RS13 200R 1%
PERST_L D13

CS01 220nF 50V
CS02 220nF 50V
CS03 220nF 50V
CS04 220nF 50V

2-D2 1_PE_TX00+
2-D2 1_PE_TX00-
2-D2 1_PE_RX00+
2-D2 1_PE_RX00-
3-A8 CLK_PE_0+
3-A8 CLK_PE_0-

PES1_PETP0 E10
PES1_PETN0 D10
PES1_REFCLKP0 B8
PES1_REFCLKN0 A8

PES1
PI7C9X3G808GP

PEX_PETP0		
PEX_PETN0		
PEX_PERP0		
PEX_PERN0		
PEX_REFCLKP_0		
PEX_REFCLKN_0		
PEX_REFCLKP_1	N8	
PEX_REFCLKN_1	P8	
RESREF	E8	
PERST_L	D13	

PEX_PETP7	K10	nc		
PEX_PETN7	L10	nc		
PEX_PERP7	N10	nc		
PEX_PERN7	P10	nc		
PEX_PETP6	K9	PES1_PETP6	CS05 220nF	PE_PX_6TX+ 12-B1
PEX_PETN6	L9	PES1_PETN6	CS06 220nF	PE_PX_6TX- 12-B1
PEX_PERP6	N9		50V	PE_PX_6RX+ 12-C1
PEX_PERN6	P9			PE_PX_6RX- 12-C1
PEX_PETP5	K7	PES1_PETP5	CS07 220nF	PE_PX_5TX+ 11-B1
PEX_PETN5	L7	PES1_PETN5	CS08 220nF	PE_PX_5TX- 11-B1
PEX_PERP5	N7		50V	PE_PX_5RX+ 11-C1
PEX_PERN5	P7			PE_PX_5RX- 11-C1
PEX_PETP4	K6	PES1_PETP4	CS09 220nF	PE_PX_4TX+ 10-B1
PEX_PETN4	L6	PES1_PETN4	CS10 220nF	PE_PX_4TX- 10-B1
PEX_PERP4	N6		50V	PE_PX_4RX+ 10-C1
PEX_PERN4	P6			PE_PX_4RX- 10-C1
PEX_PETP3	E6	PES1_PETP3	CS11 220nF	PE_PX_3TX+ 9-B1
PEX_PETN3	D6	PES1_PETN3	CS12 220nF	PE_PX_3TX- 9-B1
PEX_PERP3	B6		50V	PE_PX_3RX+ 9-C1
PEX_PERN3	A6			PE_PX_3RX- 9-C1
PEX_PETP2	E7	PES1_PETP2	CS13 220nF	PE_PX_2TX+ 6-D1
PEX_PETN2	D7	PES1_PETN2	CS14 220nF	PE_PX_2TX- 6-D1
PEX_PERP2	B7		50V	PE_PX_2RX+ 6-D1
PEX_PERN2	A7			PE_PX_2RX- 6-D1
PEX_PETP1	E9	PES1_PETP1	CS15 220nF	PE_PX_1TX+ 5-B2
PEX_PETN1	D9	PES1_PETN1	CS16 220nF	PE_PX_1TX- 5-B2
PEX_PERP1	B9		50V	PE_PX_1RX+ 5-C2
PEX_PERN1	A9			PE_PX_1RX- 5-C2

650.68.93808.10

To M4 · To M3 · To M2 · To M1 · To UC2 · To UC1

+1.8V
19-D4/3-A5/3-B7/3-C5/3-D1/4-B4

+3.3V
10/11/12/16/17/18/19/2/3/5/6/9

RS29 1.00k 1%
RS30 1.00k 1%
RS31 1.00k 1%
RS32 1.00k 1%
RS33 1.00k 1%
RS34 1.00k 1%
RS35 1.00k 1%
RS36 1.00k 1%

LXS1
LSF0204

VCCA	1	VCCB	11
A1	2	B1	10
A2	3	B2	9
A3	4	B3	8
A4	5	B4	7
OE	12	GND	6

670.30.00204.00

SEP1
SPI_EEP_128KBIT

SI	5	VCC	8
SO	2	WP#	3
CE#	1	HOLD#	7
SCK	6		
GND	4		

SEP1_SI
SEP1_SO
SEP1_CE#
SEP1_CK

660.44.00128.03.0

CS19 100nF 50V
CS20 100nF 50V

+1.8V
19-D4/3-A5/3-C2/3-C5/3-D1/4-B4

+3.3V
10/11/12/16/17/18/19/2/3/5/6/9

RS39 1.00k 1%
RS40 1.00k 1%

PES1_PERST_L
PERST# 2-C8/20-A1/5-C2/6-D1

LXS2
LSF0204

VCCA	1	VCCB	11
A1	2	B1	10
A2	3	B2	9
A3	4	B3	8
A4	5	B4	7
OE	12	GND	6

670.30.00204.00

CS21 100nF 50V

JTAG_[TCK,TDI,TDO] may be left open if JTAG is unsed.

PES1
PI7C9X3G808GP

	N4	PDC_L7	
	M11	PDC_L6	
	N12	PDC_L5	
	N13	PDC_L4	
	N14	PDC_L3	
	P12	PDC_L2	
	P14	PDC_L1	
	P13	PDC_L0	
PES1_TMS	J11	TCK	
	J12	TDI	
	H13	TDO	
PES1_TRST#	H12	TMS	
	H11	TRST_L	
	A14	JTAG_SEL_L	

	F4	GPIO29	
	F3	GPIO28	
	G3	GPIO27	
	G1	GPIO25	
	H3	GPIO24	
	H14	PORTGOOD_L7	
	G13	PORTGOOD_L6	
	G12	PORTGOOD_L5	
	G14	PORTGOOD_L4	
	F12	PORTGOOD_L3	
	F14	PORTGOOD_L2	
	E14	PORTGOOD_L1	
	E13	PORTGOOD_L0	
PES1_TEST	J4	TEST	

650.68.93808.10

RS16 1.00k 1%
RS17 1.00k 1%
RS18 332R 1%

100nF 50V CS17
100nF 50V CS18

2-D3 PE_CLKIN+
2-D3 PE_CLKIN-

PES1_REFCLKIP A4
PES1_REFCLKIN A3

PES1
PI7C9X3G808GP

PEX_REFCLKIP			
PEX_REFCLKIN			
GPIO15/CLKREQ_L7	L1	PES1_CLKREQ6	
GPIO14/CLKREQ_L6	M1	PES1_CLKREQ5	
GPIO13/CLKREQ_L5	M3	PES1_CLKREQ4	
GPIO12/CLKREQ_L4	M2	PES1_CLKREQ3	
GPIO11/CLKREQ_L3	M4	PES1_CLKREQ2	
GPIO10/CLKREQ_L2	M5	PES1_CLKREQ1	
GPIO9/CLKREQ_L1	N1	PES1_CLKREQ0	
GPIO8/CLKREQ_L0	N3		
GPIO26/CKBUFPD_L	G2	PES1_CKBUFPD#	
CLKBUF_INPUT_SEL	L3	PES1_CLKBUF_SEL	

PEX_REFCLKOP_7	F2	nc		
PEX_REFCLKON_7	F1	nc		
PEX_REFCLKOP_6	D1	CLK_PE_6+		12-B1
PEX_REFCLKON_6	E1	CLK_PE_6-		12-B1
PEX_REFCLKOP_5	D3	CLK_PE_5+		11-B1
PEX_REFCLKON_5	D2	CLK_PE_5-		11-B1
PEX_REFCLKOP_4	B1	CLK_PE_4+		10-B1
PEX_REFCLKON_4	C1	CLK_PE_4-		10-B1
PEX_REFCLKOP_3	C3	CLK_PE_3+		9-B1
PEX_REFCLKON_3	C2	CLK_PE_3-		9-B1
PEX_REFCLKOP_2	C5	CLK_PE_2+		6-D1
PEX_REFCLKON_2	C4	CLK_PE_2-		6-D1
PEX_REFCLKOP_1	B4	CLK_PE_1+		5-B2
PEX_REFCLKON_1	B3	CLK_PE_1-		5-B2
PEX_REFCLKOP_0	A2	CLK_PE_0+		3-D4
PEX_REFCLKON_0	A1	CLK_PE_0-		3-D4

650.68.93808.10

To M4 · To M3 · To M2 · To M1 · To UC2 · To UC1 · To PES1

+1.8V
19-D4/3-B7/3-C2/3-C5/3-D1/3-B4

RS20 5.11k 1%
RS21 5.11k 1%
RS22 5.11k 1%
RS23 5.11k 1%
RS24 5.11k 1%
RS25 5.11k 1%
RS26 5.11k 1%

+1.8V
19-D4/3-B7/3-C2/3-C5/3-D1/3-B4

RS15 5.11k 1%
RS19 5.11k 1%

PES1_CKBUFPD#
PES1_CLKBUF_SEL

Board	SPV-MYSTIC	Rev. 0.0
Sheet Name	03: PCIe 6-Port Switch (1 of 2)	S
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A B C D

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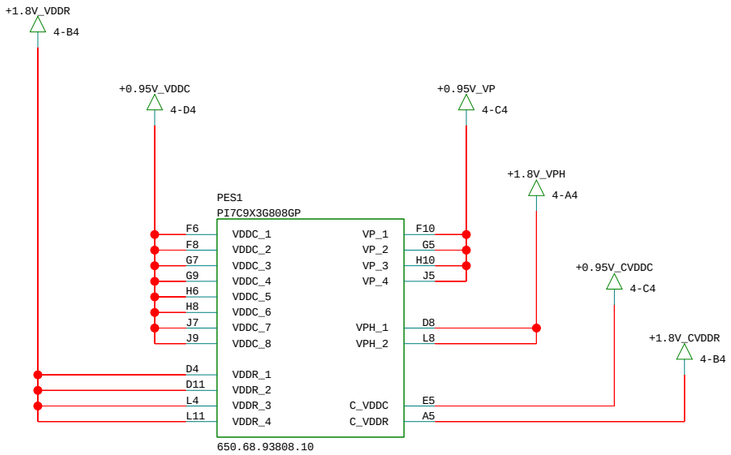

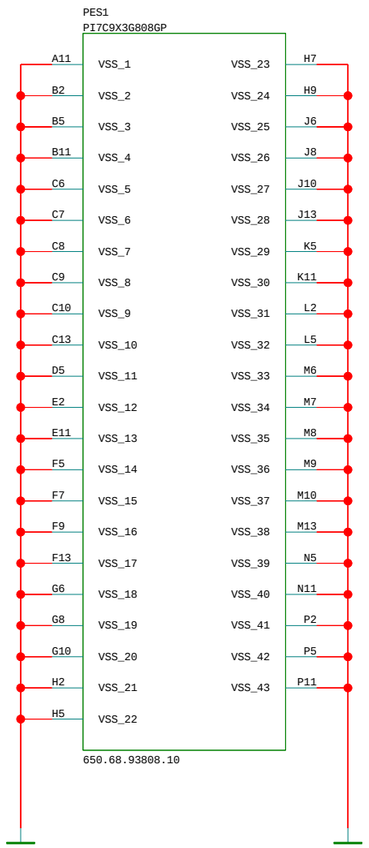

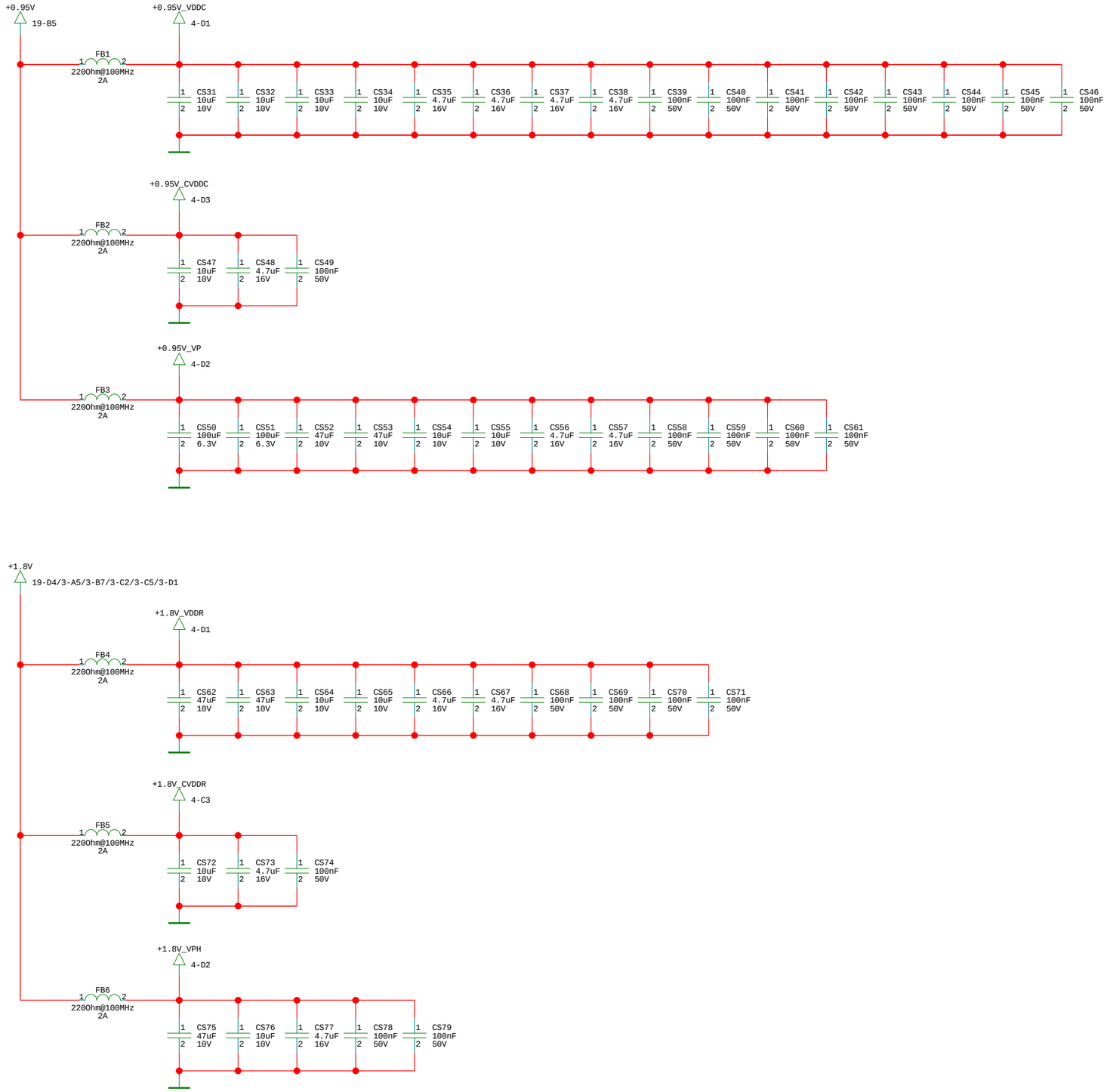

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Sheet Name	04: PCIe 6-Port Switch (2 of 2)		S
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USB 3.0 HOST Controller uPD720201

+3.3V 10/11/12/16/17/18/19/2/3/5/6/9

RU01 10.0k 1%
RU02 10.0k 1%
RU04 10.0k 1%
RU05 10.0k 1%
RU06 10.0k 1%
RU07 10.0k 1%

SU1
SPI_FLASH_4MBIT
660.45.00004.50.2
VCC, WP#, HOLD#, GND, SI, SO, CE#, SCK
SU1_WP#
SU1_HOLD#

CU01 2,2uF 16V
no stuff

UC1_SPISO
UC1_SPICSB
UC1_SPISCK
UC1_SPISI

+1.05V 19-D8/5-A1/6-B5/6-D5
+3.3V_UC1 5-A7

VDD10_1 … VDD10_9
VDD33_1 … VDD33_6
AVDD33_1 … AVDD33_2

2-C8/20-A1/3-B8/6-D1 PERST#
2-C5/6-C1 WAKEOUT#
RU08 0R 0%
CU03 1nF 50V
no stuff

NSR0130 DU01
RU10 10.0k 1%
19-A1/6-C1 PWREN
RU09 0R 0%
CU02 1uF 25V
no stuff

UC1_WAKE#
UC1_PONRSTB

SMIB, PERSTB, PEWAKEB, PECREQB, PONRSTB

CU04 100nF 50V
CU05 100nF 50V
3-C8 PE_PX_1RX+
3-C8 PE_PX_1RX-
UC1_PETXP
UC1_PETXN
PETXP, PETXN

3-C8 PE_PX_1TX+
3-C8 PE_PX_1TX-
PERXP, PERXN

3-A8 CLK_PE_1+
3-A8 CLK_PE_1-
PECLKP, PECLKN

UC1_XT2
UC1_XT1
XT2, XT1

QU1 24.0MHz
RU11 680R 1%
CU06 8,2pF 50V
CU07 8,2pF 50V

RU18 1.50k 1%
RREF, ICL

GND 69

UC1
650.51.720201.2
UPD720201

U3TXDP1 35 UC1_TXDP1 → 9-C1
U3TXDN1 36 UC1_TXDN1 → 9-C1
U3RXDP1 38 UC1_RXDP1 → 9-C1
U3RXDN1 39 UC1_RXDN1 → 9-C1
U2DP1 41 UC1_DP1 → 9-D1
U2DM1 42 UC1_DM1 → 9-D1
OCI1B 26 — RU13 1.00k 1% — 27 PPON1 UC1_PPON1 → 16-D2

U3TXDP2 44 UC1_TXDP2 → 10-C1
U3TXDN2 45 UC1_TXDN2 → 10-C1
U3RXDP2 47 UC1_RXDP2 → 10-C1
U3RXDN2 48 UC1_RXDN2 → 10-C1
U2DP2 50 UC1_DP2 → 10-D1
U2DM2 51 UC1_DM2 → 10-D1
OCI2B 24 — RU14 1.00k 1% — 25 PPON2 UC1_PPON2 → 16-C2

U3TXDP3 52 UC1_TXDP3 → 11-C1
U3TXDN3 53 UC1_TXDN3 → 11-C1
U3RXDP3 55 UC1_RXDP3 → 11-C1
U3RXDN3 56 UC1_RXDN3 → 11-C1
U2DP3 58 UC1_DP3 → 11-D1
U2DM3 59 UC1_DM3 → 11-D1
OCI3B 22 — RU15 1.00k 1% — 23 PPON3 UC1_PPON3 → 16-B2

U3TXDP4 61 UC1_TXDP4 → 12-C1
U3TXDN4 62 UC1_TXDN4 → 12-C1
U3RXDP4 64 UC1_RXDP4 → 12-C1
U3RXDN4 65 UC1_RXDN4 → 12-C1
U2DP4 67 UC1_DP4 → 12-D1
U2DM4 68 UC1_DM4 → 12-D1
OCI4B 20 — RU16 1.00k 1% — 21 PPON4 UC1_PPON4 → 16-A2

To M1
To M2
To M3
To M4

+1.05V 19-D8/5-D5/6-B5/6-D5
CU08 22uF 10V
CU09 100nF 50V
CU10 100nF 50V
CU11 100nF 50V
CU12 100nF 50V
CU13 10nF 50V
CU14 10nF 50V
CU15 10nF 50V
CU16 10nF 50V
CU17 10nF 50V
CU18 10nF 50V
CU19 10nF 50V
CU20 10nF 50V
CU21 10nF 50V

+3.3V 10/11/12/16/17/18/19/2/3/5/6/9
CU22 100nF 50V
CU23 100nF 50V
CU24 10nF 50V
CU25 10nF 50V
CU26 10nF 50V
CU27 10nF 50V
CU28 10nF 50V

+3.3V_UC1 5-D6
LU01 2200hm@100MHz 2A
CU29 100nF 50V
CU30 100nF 50V
CU31 10nF 50V
CU32 10nF 50V

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	05: Four Port USB3.0 Host Controller		U
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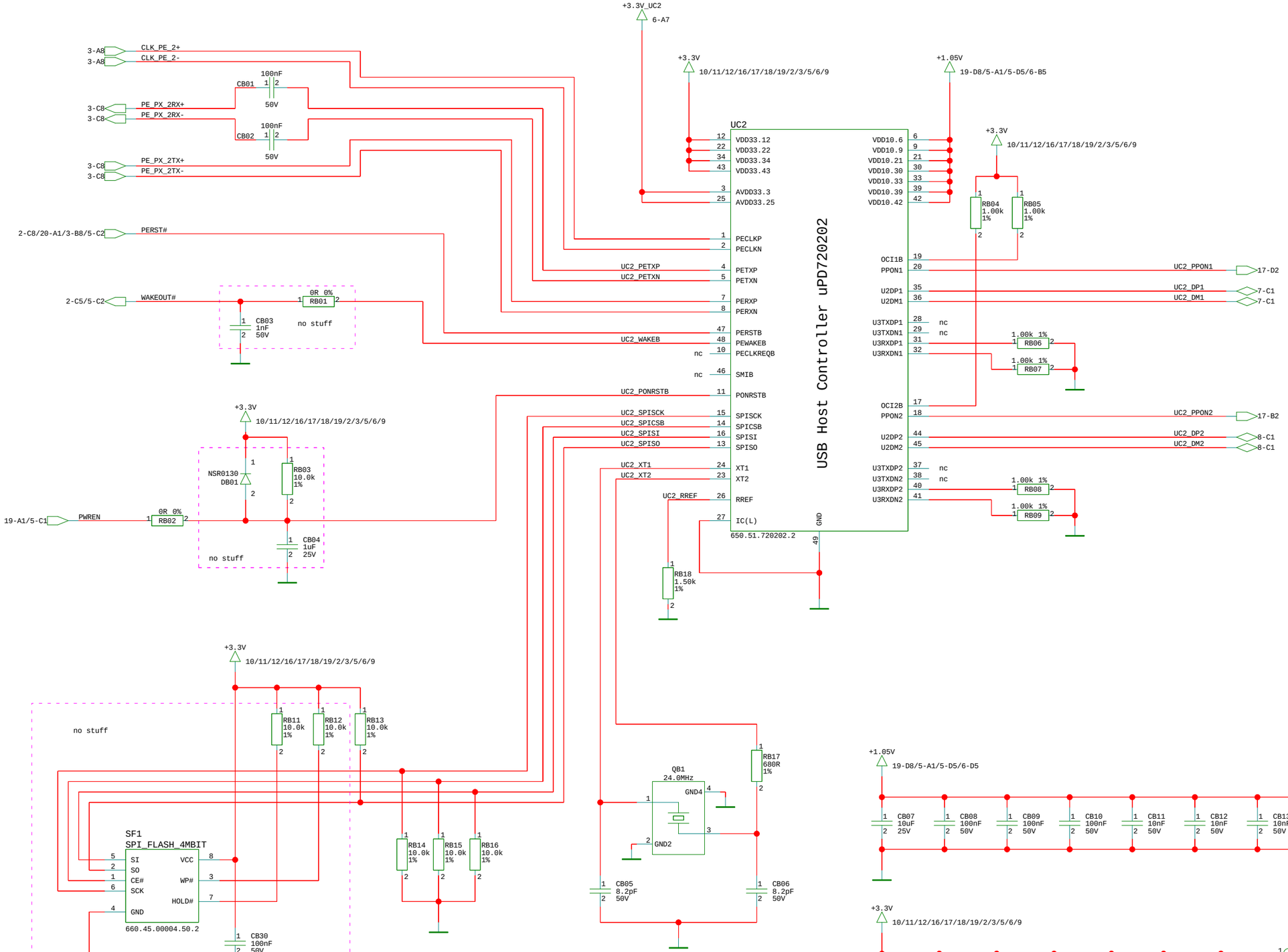

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Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	06: Two Port USB3.0 Host Controller		B
Date, Design	2023-10-18 am	Sheet 6 of 20	

DO NOT REPRODUCE

WWAN Embedded Module

WM1
LE910C
810.41.LE910C.01

+3.8V_WM1
17-D5/7-A1/7-A2/7-A4/7-A6

M1 VBATT.M1
M2 VBATT.M2
N1 VBATT_PA.N1
N2 VBATT_PA.N2
P1 VBATT_PA.P1
P2 VBATT_PA.P2

J12 SD/MMC_CMD
F12 SD/MMC_CLK
E12 SD/MMC_DATA0
G12 SD/MMC_DATA1
K12 SD/MMC_DATA2
H12 SD/MMC_DATA3
G13 SD/MMC_CD
F13 VMMC

6-C7 UC2_DP1 — B15 USB_D+
6-C7 UC2_DM1 — C15 USB_D-
A13 USB_VBUS
A14 USB_ID

USB_VBUS: Voltage Range 2.5V...5.5V.

N15 TXD
M15 RXD
L14 RTS
P15 CTS
P14 DSR
M14 DTR
N14 DCD
R14 RING

E4 SGMII_RX_P
F4 SGMII_RX_M
D5 SGMII_TX_P
D6 SGMII_TX_M

B9 DVI_WAO
B6 DVI_RX
B7 DVI_TX
B8 DVI_CLK
B12 REF_CLK

F15 SPI_CLK
E15 SPI_MISO
D15 SPI_MOSI
H14 SPI_CS/GPIO11

B11 I2C_SCL
B10 I2C_SDA

A12 HSIC_DATA
A11 HSIC_STB

RSVD.A8 A8, RSVD.A9 A9, RSVD.A10 A10, RSVD.B2 B2, RSVD.B3 B3, RSVD.B4 B4, RSVD.B5 B5, RSVD.C3 C3, RSVD.C4 C4, RSVD.C5 C5, RSVD.C6 C6, RSVD.C7 C7, RSVD.C14 C14, RSVD.D3 D3, RSVD.D8 D8, RSVD.D9 D9, RSVD.D10 D10, RSVD.D11 D11, RSVD.D12 D12, RSVD.D13 D13, RSVD.D14 D14, RSVD.E3 E3, RSVD.F3 F3, RSVD.F14 F14, RSVD.G3 G3, RSVD.G14 G14, RSVD.H3 H3, RSVD.H15 H15, RSVD.J3 J3, RSVD.J4 J4, RSVD.J14 J14, RSVD.J15 J15, RSVD.K3 K3, RSVD.K4 K4, RSVD.K14 K14, RSVD.L3 L3, RSVD.M5 M5, RSVD.M6 M6, RSVD.M7 M7, RSVD.M10 M10, RSVD.N7 N7, RSVD.N8 N8, RSVD.N10 N10, RSVD.N11 N11, RSVD.N12 N12, RSVD.P7 P7, RSVD.P11 P11, RSVD.P12 P12

GND.A2 A2, GND.B13 B13, GND.D4 D4, GND.E1 E1, GND.E2 E2, GND.E14 E14, GND.F2 F2, GND.G1 G1, GND.G2 G2, GND.G7 G7, GND.G8 G8, GND.G9 G9, GND.H1 H1, GND.H2 H2, GND.H7 H7, GND.H8 H8, GND.H9 H9, GND.J1 J1, GND.J2 J2, GND.J7 J7, GND.J8 J8, GND.J9 J9, GND.K2 K2, GND.L1 L1, GND.L2 L2, GND.M3 M3, GND.M4 M4, GND.M12 M12, GND.N3 N3, GND.N4 N4, GND.N5 N5, GND.N6 N6, GND.P3 P3, GND.P4 P4, GND.P5 P5, GND.P6 P6, GND.P8 P8, GND.P9 P9, GND.P10 P10, GND.P13 P13, GND.R2 R2, GND.R3 R3, GND.R5 R5, GND.R6 R6, GND.R8 R8, GND.R10 R10, GND.RFU R4

Antenna K1
ANT_DIV F1
ANT_GPS R9

WIFI_SD_CMD N13
WIFI_SD_CLK L13
WIFI_SD_DATA0 J13
WIFI_SD_DATA1 M13
WIFI_SD_DATA2 K13
WIFI_SD_DATA3 H13
WIFI_SDRST L12
WIFI_SLEEP_CLK M11
WOW L4

WCI_TX M8
WCI_RX M9

SIMCLK1 A6 — WM1_SIMCLK1
SIMRST1 A7 — WM1_SIMRST1
SIMIO1 A5 — WM1_SIMIO1
SIMIN1 A4
SIMVCC1 A3 — WM1_SIMVCC1

SIMCLK2 C1
SIMRST2 D1
SIMIO2 C2
SIMIN2 G4
SIMVCC2 D2

GPIO_01/STAT_LED C8 — WM1_STATLED
GPIO_02 C9
GPIO_03 C10
GPIO_04 C11
GPIO_05 B14
GPIO_06 C12
GPIO_07 C13
GPIO_08/SW_RDY K15
GPIO_09 L15
GPIO_010 G15

VIO_1V8 E13
ON_OF_N R12 — WM1_ON_OFF#
HW_SHUTDOWN_N R13 — WM1_SHUTDOWN#
VAUX/PWRMON R11 — WM1_STATUS
GPS_LNA_EN R7
GPS_SYNC N9
ADC_IN1 B1
ADC_IN2 H4
ADC_IN3 D7

WM1_ANT — 15-C2

WM1_ANTDIV — HSC26 HSC_COAX 268.4.01.3 (1 RF; 4 S.4; 3 S.3; 2 S.2)

WM1_GPS — CA01 100pF 50V — WM1_RF — HSC27 HSC_COAX 268.4.01.3 (1 RF; 4 S.4; 3 S.3; 2 S.2)

NUT9 NUT_M2.5_6.0_SMT 440.45.025.017
NUT10 NUT_M2.5_6.0_SMT 440.45.025.017

FLTRW1 EMI_FILTER_SIM 690.74.00303.00
GSM: 1 RST_OUT, 2 CLK_OUT, 3 DAT_OUT, 4 NC
SIM: 8 RST_IN, 7 CLK_IN, 6 DAT_IN, 5 VCC
GND: 9
CW01 100nF 50V
TVSW1 TVS_24V

SIM9 SIM_NANO6_FL 219.53.006.01
C5 GND, C1 VCC, C6 VPP (nc), C2 RST, C7 IO, C3 CLK, S1 GND.S1, S2 GND.S2, S3 GND.S3, S4 GND.S4, S5 GND.S5, S6 GND.S6

SIM9_RST
SIM9_CLK
SIM9_IO

RW01 10.0k 1% — no stuff
CW03 10nF 50V
TW01 BSH103 — WM1_PWR — 20-D8
RW02 10.0k 1%
To turn on, WM1_PWR must be tied high for at least 1s and then released.

TW02 BSH103 — WM1_RESET — 20-D8
RW03 10.0k 1%
To reset, drive WM1_RESET high for at least 200 ms and then released.

+3.8V_WM1
17-D5/7-A1/7-A2/7-A4/7-A6/7-D1
CW04 100uF 16V
CW05 100nF 50V
CW06 33pF 50V
CW07 10pF 50V
close to pins M1, M2

+3.8V_WM1
17-D5/7-A1/7-A4/7-A6/7-D1
CW08 100uF 16V
CW09 100nF 50V
CW10 33pF 50V
CW11 10pF 50V
close to pins N1, N2; P1, P2

+3.8V_WM1
17-D5/7-A1/7-A2/7-D1
RW08 1.20k 1% — no stuff
LEDW1 LED_G (GRN)
TW05 BSH103
RW09 10.0k 1%

RW06 10.0k 1%

+3.8V_WM1
17-D5/7-A1/7-A2/7-A4/7-D1
RW04 1.00k 1%
RW05 1.00k 1%
TW03 BSH103
TW04 BSH103
WM1_PWRMON — 20-A8
RW07 10.0k 1%

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	07: WWAN Module 1		W
Date, Design	2023-10-20 am	Sheet	7 of 20

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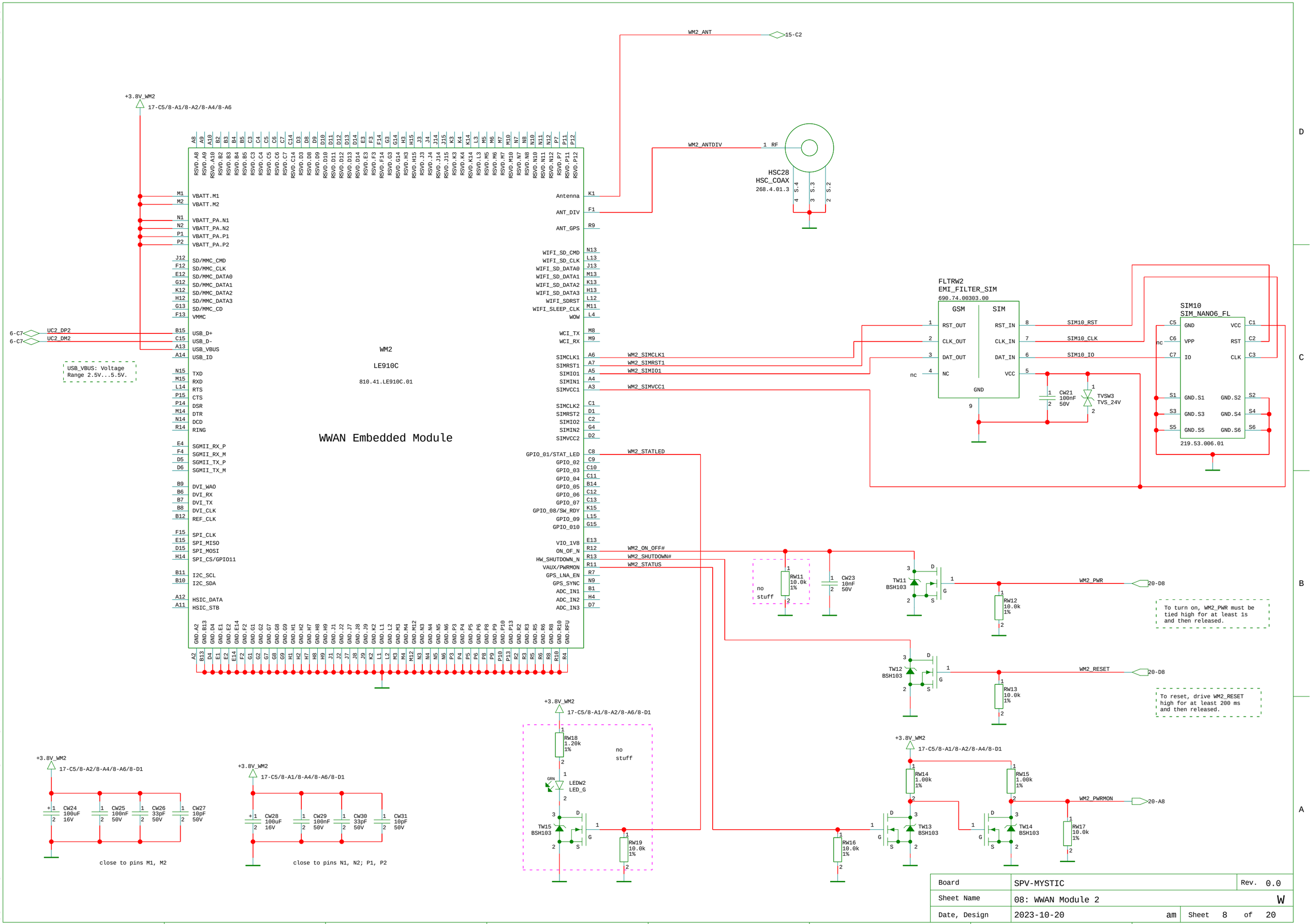

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	08: WWAN Module 2		W
Date, Design	2023-10-20 am	Sheet 8 of 20	

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DO NOT REPRODUCE

+3.3V_M1
16-D6/9-A2/9-D4

no stuff
10.0k 1%
RM01

M1
M.2_B_USB

		1	CFG_3
		3	GND.3
		5	GND.5
5-C7	UC1_DP1	7	USB_D+
5-C7	UC1_DM1	9	USB_D-
		11	GND.11

no stuff
10.0k 1%
RM02

		21	CFG_0
	nc	23	GPIO_11-WoWWAN#
	nc	25	DPR
		27	GND.27
5-C7	UC1_RXDN1	29	USB3.0-Tx-
5-C7	UC1_RXDP1	31	USB3.0-Tx+
		33	GND.33
5-C7	UC1_TXDN1 (CM01 100nF 50V)	35	USB3.0-Rx- (M1_USB_Rx-)
5-C7	UC1_TXDP1 (CM02 100nF 50V)	37	USB3.0-Rx+ (M1_USB_Rx+)
		39	GND.39
3-C8	PE_PX_3RX-	41	NC.41
3-C8	PE_PX_3RX+	43	NC.43
		45	GND.45
3-C8	PE_PX_3TX-	47	NC.47
3-C8	PE_PX_3TX+	49	NC.49
		51	GND.51
3-A8	CLK_PE_3-	53	NC.53
3-A8	CLK_PE_3+	55	NC.55
		57	GND.57
	nc	59	ANTCTL0
	nc	61	ANTCTL1
	nc	63	ANTCTL2
	nc	65	ANTCTL3
		67	RESET#
		69	CFG_1_GND
		71	GND.71
		73	GND.73
		75	CFG_2

M.2 Connector Key B
Socket 2 USB3.0 WWAN

	3.3V.2	2	+3.3V_M1 (16-D6/9-A2/9-D2)
	3.3V.4	4	+3.3V_M1
	FULL_CARD_PWR_OFF#	6	RM05 47.0k 1% to +3.3V_M1
	W_DISABLE1#	8	RM10 10.0k 1% to +3.3V_M1
	GPIO_9-LED_1#	10	nc
	GPIO_5-AUDIO_0	20	nc
	GPIO_6-AUDIO_1	22	nc
	GPIO_7-AUDIO_2	24	nc
	GPIO_10-W_DISABLE2#	26	nc
	GPIO_8-AUDIO_3	28	nc
	UIM-RESET	30	M1_UIM_RST
	UIM-CLK	32	M1_UIM_CLK
	UIM-DATA	34	M1_UIM_DATA
	UIM-PWR	36	M1_UIM_PWR
	NC.38	38	nc
	GPIO_0-GNSS_SCL	40	
	GPIO_1-GNSS_SDA	42	M1_UIM_DATA2
	GPIO_2-GNSS_IRQ	44	M1_UIM_CLK2
	GPIO_3-SYSCLK	46	M1_UIM_RST2
	GPIO_4-TX_BLK	48	M1_UIM_PWR2
	NC.50	50	nc
	NC.52	52	nc
	NC.54	54	nc
	NC.56	56	nc
	NC.58	58	nc
	COEX3	60	nc
	COEX2	62	nc
	COEX1	64	nc
	SIM_DETECT	66	
	SUSCLK	68	nc
	3.3V.70	70	+3.3V_M1
	3.3V.71	72	+3.3V_M1
	3.3V.74	74	+3.3V_M1

255.50.1.2242.99
GND.M1
GND.M2

RM06 47.0k 1% — M1_PWR_OFF# → 20-C8
RM07 0R 0% — M1_PWRSW → 16-D2/20-A8
no stuff

For optional use of M1_PSRSW signal to control W_DISABLE1# stuff RM07 and remove RN03 (pg. 16).

+3.3V
10/11/12/16/17/18/19/2/3/5/6

BM1
74LVC2G125
636.0125.2
20-B8 M1_RESET# → OE#
A ← M1_RST#
Y → M1_RST#
GND
VCC
CM15 100nF 50V
no stuff

10.0k 1% RM03 — M1_CFG1
10.0k 1% RM04 — M1_CFG2
no stuff

RM08 5.11k 1%
RM09 5.11k 1%
no stuff

FLTRM1
EMI_FILTER_SIM
690.74.00303.00

GSM		SIM	
RST_OUT	1	RST_IN	8
CLK_OUT	2	CLK_IN	7
DAT_OUT	3	DAT_IN	6
NC	4	VCC	5
GND	9		

M1_UIM_RST → SIM1_RST
M1_UIM_CLK → SIM1_CLK
M1_UIM_DATA → SIM1_IO
M1_UIM_PWR → VCC
CM03 100nF 50V
TVSM1 TVS_24V

SIM1
SIM_NANO6_FL
219.53.006.01

C5	GND	VCC	C1
nc C6	VPP	RST	C2
C7	IO	CLK	C3
S1	GND.S1	GND.S2	S2
S3	GND.S3	GND.S4	S4
S5	GND.S5	GND.S6	S6

FLTRM2
EMI_FILTER_SIM
690.74.00303.00

GSM		SIM	
RST_OUT	1	RST_IN	8
CLK_OUT	2	CLK_IN	7
DAT_OUT	3	DAT_IN	6
NC	4	VCC	5
GND	9		

SIM2_RST
SIM2_CLK
SIM2_IO
CM04 100nF 50V
TVSM2 TVS_24V

SIM2
SIM_NANO6_FL
219.53.006.01

C5	GND	VCC	C1
nc C6	VPP	RST	C2
C7	IO	CLK	C3
S1	GND.S1	GND.S2	S2
S3	GND.S3	GND.S4	S4
S5	GND.S5	GND.S6	S6

NUT1
NUT_M3_6.5
710.9.M_2.1

NUT2
NUT_M3_6.5
710.9.M_2.1

+3.3V_M1
16-D6/9-D2/9-D4

CM05 10uF 25V
CM06 10uF 25V
CM07 10uF 25V
CM08 10uF 25V
CM09 10uF 25V
CM10 1uF 25V
CM11 1uF 25V
CM12 1uF 25V
CM13 1uF 25V
CM14 1uF 25V

close to M.2 socket pins 2 - 4 - 70 - 72 - 74

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	09: M.2 Socket 1		M
Date, Design	2023-10-18 am	Sheet	9 of 20

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1 2 3 4 5 6 7 8

D C B A

DO NOT REPRODUCE

+3.3V_M2
10-A2/10-D4/16-C6

no stuff
10.0k 1%
RM21

M2
M.2_B_USB

1 CFG_3
3 GND.3
5 GND.5
7 USB_D+ ← UC1_DP2 ← 5-C7
9 USB_D- ← UC1_DM2 ← 5-C7
11 GND.11

no stuff
10.0k 1%
RM22

21 CFG_0
nc 23 GPIO_11-WoWWAN#
nc 25 DPR
27 GND.27
29 USB3.0-Tx- ← UC1_RXDN2 ← 5-C7
31 USB3.0-Tx+ ← UC1_RXDP2 ← 5-C7
33 GND.33
35 USB3.0-Rx- ← M2_USB_Rx- ← CM21 100nF 50V ← UC1_TXDN2 ← 5-C7
37 USB3.0-Rx+ ← M2_USB_Rx+ ← CM22 100nF 50V ← UC1_TXDP2 ← 5-C7
39 GND.39
41 NC.41 ← PE_PX_4RX- ← 3-C8
43 NC.43 ← PE_PX_4RX+ ← 3-C8
45 GND.45
47 NC.47 ← PE_PX_4TX- ← 3-D8
49 NC.49 ← PE_PX_4TX+ ← 3-D8
51 GND.51
53 NC.53 ← CLK_PE_4- ← 3-A8
55 NC.55 ← CLK_PE_4+ ← 3-A8
57 GND.57
nc 59 ANTCTL0
nc 61 ANTCTL1
nc 63 ANTCTL2
nc 65 ANTCTL3
67 RESET# ← M2_RST#
69 CFG_1_GND ← M2_CFG1
71 GND.71
73 GND.73
75 CFG_2 ← M2_CFG2

+3.3V
11/12/16/17/18/19/2/3/5/6/9

BM2
74LVC2G125
636.0125.2
20-B8 ← M2_RESET# ← 1 OE#
2 A
4 GND
8 VCC
6 Y → M2_RST#
CM35 100nF 50V
no stuff

10.0k 1% RM23 → M2_CFG1
10.0k 1% RM24 → M2_CFG2
no stuff

M.2 Connector Key B
Socket 2 USB3.0 WWAN

255.50.1.2242.99
GND.M1
GND.M2

+3.3V_M2
10-D2/10-D4/16-C6

2 3.3V.2
4 3.3V.4
6 FULL_CARD_PWR_OFF# ← RM25 47.0k 1%
8 W_DISABLE1# ← RM30 10.0k 1%
10 GPIO_9-LED_1# nc

47.0k 1% RM26 → M2_PWR_OFF# → 20-C8
0R 0% RM27 → M2_PWRSW → 16-C2/20-A8
no stuff

For optional use of M2_PSRSW signal
to control W_DISABLE1# stuff RM27
and remove RN07 (pg. 16).

GPIO_5-AUDIO_0 20 nc
GPIO_6-AUDIO_1 22 nc
GPIO_7-AUDIO_2 24 nc
GPIO_10-W_DISABLE2# 26 nc
GPIO_8-AUDIO_3 28 nc
UIM-RESET 30 ← M2_UIM_RST
UIM-CLK 32 ← M2_UIM_CLK
UIM-DATA 34 ← M2_UIM_DATA
UIM-PWR 36 ← M2_UIM_PWR
NC.38 38 nc
GPIO_0-GNSS_SCL 40
GPIO_1-GNSS_SDA 42 ← M2_UIM_DATA2
GPIO_2-GNSS_IRQ 44 ← M2_UIM_CLK2
GPIO_3-SYSCLK 46 ← M2_UIM_RST2
GPIO_4-TX_BLK 48 ← M2_UIM_PWR2
NC.50 50 nc
NC.52 52 nc
NC.54 54 nc
NC.56 56 nc
NC.58 58 nc
COEX3 60 nc
COEX2 62 nc
COEX1 64 nc
SIM_DETECT 66
SUSCLK 68 nc
3.3V.70 70
3.3V.71 72
3.3V.74 74

RM28 5.11k 1%
RM29 5.11k 1%
no stuff

FLTRM3
EMI_FILTER_SIM
690.74.00303.00
GSM: 1 RST_OUT, 2 CLK_OUT, 3 DAT_OUT, 4 NC
SIM: 8 RST_IN, 7 CLK_IN, 6 DAT_IN, 5 VCC
GND: 9
M2_UIM_RST ↔ SIM3_RST
M2_UIM_CLK ↔ SIM3_CLK
M2_UIM_DATA ↔ SIM3_IO
M2_UIM_PWR
CM23 100nF 50V
TVSM3 TVS_24V

SIM3
SIM_NANO6_FL
219.53.006.01
C5 GND, C6 VPP, C7 IO, VCC C1, RST C2, CLK C3, S1 GND.S1, S3 GND.S3, S5 GND.S5, GND.S2 S2, GND.S4 S4, GND.S6 S6

FLTRM4
EMI_FILTER_SIM
690.74.00303.00
GSM: 1 RST_OUT, 2 CLK_OUT, 3 DAT_OUT, 4 NC
SIM: 8 RST_IN, 7 CLK_IN, 6 DAT_IN, 5 VCC
GND: 9
SIM4_RST
SIM4_CLK
SIM4_IO
CM24 100nF 50V
TVSM4 TVS_24V

SIM4
SIM_NANO6_FL
219.53.006.01
C5 GND, C6 VPP, C7 IO, VCC C1, RST C2, CLK C3, S1 GND.S1, S3 GND.S3, S5 GND.S5, GND.S2 S2, GND.S4 S4, GND.S6 S6

NUT3
NUT_M3_6.5
710.9.M_2.1

NUT4
NUT_M3_6.5
710.9.M_2.1

+3.3V_M2
10-D2/10-D4/16-C6

CM25 10uF 25V
CM26 10uF 25V
CM27 10uF 25V
CM28 10uF 25V
CM29 10uF 25V
CM30 1uF 25V
CM31 1uF 25V
CM32 1uF 25V
CM33 1uF 25V
CM34 1uF 25V

close to M.2 socket pins 2 - 4 - 70 - 72 - 74

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	10: M.2 Socket 1		M
Date, Design	2023-10-18 am	Sheet	10 of 20

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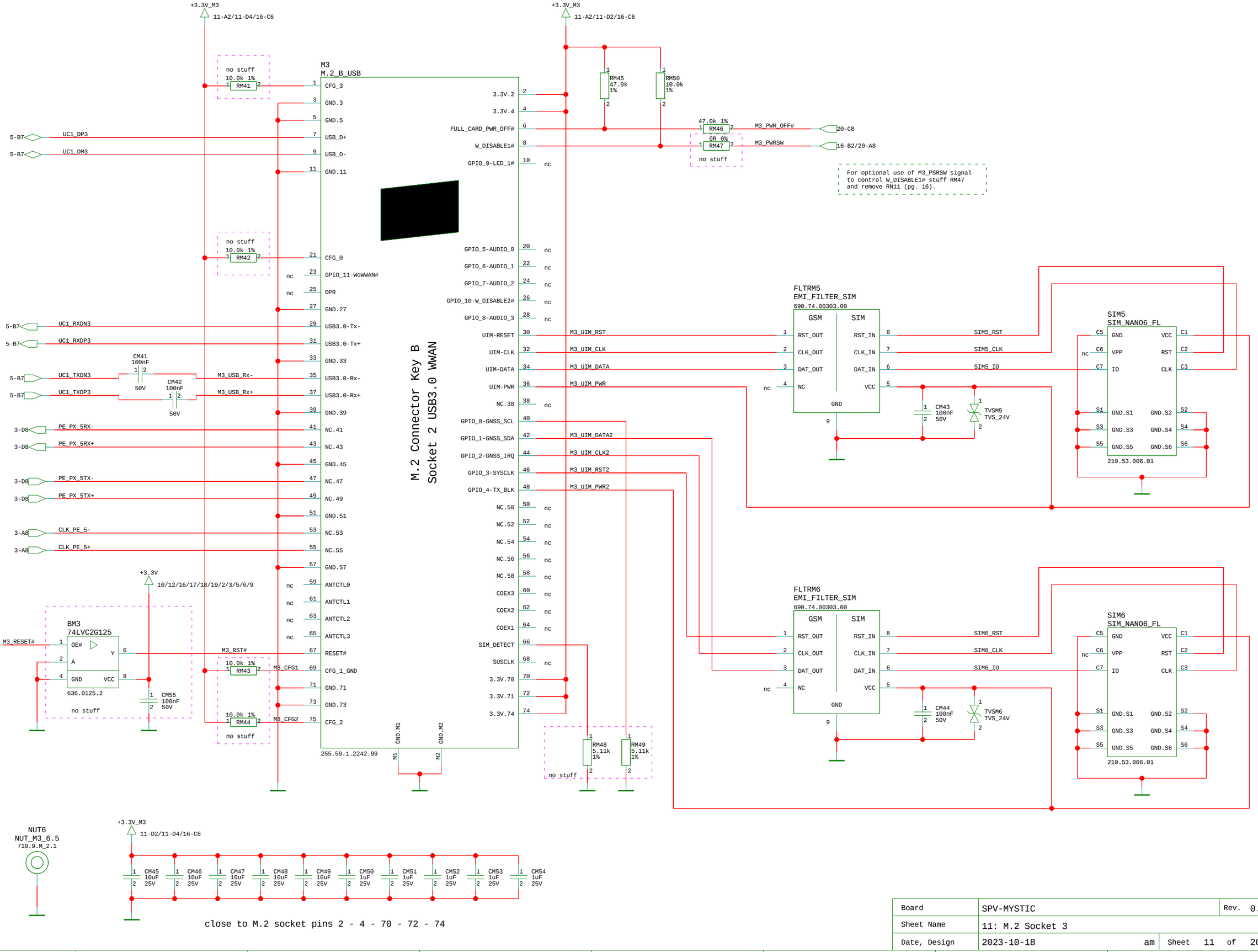

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Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	11: M.2 Socket 3		M
Date, Design	2023-10-18 am	Sheet	11 of 20

DO NOT REPRODUCE

+3.3V_M4
12-A2/12-D4/16-B6

no stuff
10.0k 1%
RM61

M4
M.2_B_USB

CFG_3 1
GND.3 3
GND.5 5
USB_D+ 7 ← UC1_DP4 ← 5-B7
USB_D- 9 ← UC1_DM4 ← 5-B7
GND.11 11

no stuff
10.0k 1%
RM62

CFG_0 21
nc GPIO_11-WoWWAN# 23
nc DPR 25
GND.27 27
USB3.0-Tx- 29 ← UC1_RXDN4 ← 5-B7
USB3.0-Tx+ 31 ← UC1_RXDP4 ← 5-B7
GND.33 33
USB3.0-Rx- 35 ← M4_USB_Rx- ← CM61 100nF 50V ← UC1_TXDN4 ← 5-B7
USB3.0-Rx+ 37 ← M4_USB_Rx+ ← CM62 100nF 50V ← UC1_TXDP4 ← 5-B7
GND.39 39
NC.41 41 ← PE_PX_6RX- ← 3-D8
NC.43 43 ← PE_PX_6RX+ ← 3-D8
GND.45 45
NC.47 47 ← PE_PX_6TX- ← 3-D8
NC.49 49 ← PE_PX_6TX+ ← 3-D8
GND.51 51
NC.53 53 ← CLK_PE_6- ← 3-A8
NC.55 55 ← CLK_PE_6+ ← 3-B8
GND.57 57
nc ANTCTL0 59
nc ANTCTL1 61
nc ANTCTL2 63
nc ANTCTL3 65
RESET# 67 ← M4_RST# ← BM4 74LVC2G125 ← M4_RESET# ← 20-B8
CFG_1_GND 69 ← M4_CFG1 ← RM63 10.0k 1% (no stuff)
GND.71 71
GND.73 73
CFG_2 75 ← M4_CFG2 ← RM64 10.0k 1% (no stuff)

BM4
74LVC2G125
636.0125.2
no stuff
+3.3V
10/11/16/17/18/19/2/3/5/6/9
CM75 100nF 50V

255.50.1.2242.99
GND.M1
GND.M2

M.2 Connector Key B
Socket 2 USB3.0 WWAN

+3.3V_M4
12-A2/12-D2/16-B6

3.3V.2 2
3.3V.4 4
FULL_CARD_PWR_OFF# 6 ← RM65 47.0k 1% ← +3.3V_M4
W_DISABLE1# 8 ← RM70 10.0k 1% ← +3.3V_M4
GPIO_9-LED_1# 10 nc

47.0k 1% RM66 → M4_PWR_OFF# → 20-C8
0R 0% RM67 → M4_PWRSW → 16-A2/20-A8
no stuff

For optional use of M4_PSRSW signal
to control W_DISABLE1# stuff RM67
and remove RN15 (pg. 16).

GPIO_5-AUDIO_0 20 nc
GPIO_6-AUDIO_1 22 nc
GPIO_7-AUDIO_2 24 nc
GPIO_10-W_DISABLE2# 26 nc
GPIO_8-AUDIO_3 28 nc
UIM-RESET 30 ← M4_UIM_RST
UIM-CLK 32 ← M4_UIM_CLK
UIM-DATA 34 ← M4_UIM_DATA
UIM-PWR 36 ← M4_UIM_PWR
NC.38 38 nc
GPIO_0-GNSS_SCL 40
GPIO_1-GNSS_SDA 42 ← M4_UIM_DATA2
GPIO_2-GNSS_IRQ 44 ← M4_UIM_CLK2
GPIO_3-SYSCLK 46 ← M4_UIM_RST2
GPIO_4-TX_BLK 48 ← M4_UIM_PWR2
NC.50 50 nc
NC.52 52 nc
NC.54 54 nc
NC.56 56 nc
NC.58 58 nc
COEX3 60 nc
COEX2 62 nc
COEX1 64 nc
SIM_DETECT 66
SUSCLK 68 nc
3.3V.70 70
3.3V.71 72
3.3V.74 74

RM68 5.11k 1% (no stuff)
RM69 5.11k 1% (no stuff)

FLTRM7
EMI_FILTER_SIM
690.74.00303.00
GSM: RST_OUT 1, CLK_OUT 2, DAT_OUT 3, NC 4 (nc), GND 9
SIM: RST_IN 8 ← SIM7_RST, CLK_IN 7 ← SIM7_CLK, DAT_IN 6 ← SIM7_IO, VCC 5
CM63 100nF 50V
TVSM7 TVS_24V

SIM7
SIM_NANO6_FL
C5 GND, C6 VPP (nc), C7 IO, C1 VCC, C2 RST, C3 CLK, S1 GND.S1, S3 GND.S3, S5 GND.S5, S2 GND.S2, S4 GND.S4, S6 GND.S6
219.53.006.01

FLTRM8
EMI_FILTER_SIM
690.74.00303.00
GSM: RST_OUT 1, CLK_OUT 2, DAT_OUT 3, NC 4 (nc), GND 9
SIM: RST_IN 8 ← SIM8_RST, CLK_IN 7 ← SIM8_CLK, DAT_IN 6 ← SIM8_IO, VCC 5
CM64 100nF 50V
TVSM8 TVS_24V

SIM8
SIM_NANO6_FL
C5 GND, C6 VPP (nc), C7 IO, C1 VCC, C2 RST, C3 CLK, S1 GND.S1, S3 GND.S3, S5 GND.S5, S2 GND.S2, S4 GND.S4, S6 GND.S6
219.53.006.01

NUT7
NUT_M3_6.5
710.9.M_2.1

NUT8
NUT_M3_6.5
710.9.M_2.1

+3.3V_M4
12-D2/12-D4/16-B6

CM65 10uF 25V
CM66 10uF 25V
CM67 10uF 25V
CM68 10uF 25V
CM69 10uF 25V
CM70 1uF 25V
CM71 1uF 25V
CM72 1uF 25V
CM73 1uF 25V
CM74 1uF 25V

close to M.2 socket pins 2 - 4 - 70 - 72 - 74

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	12: M.2 Socket 4		M
Date, Design	2023-10-18 am	Sheet	12 of 20

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1 2 3 4 5 6 7 8

D C B A

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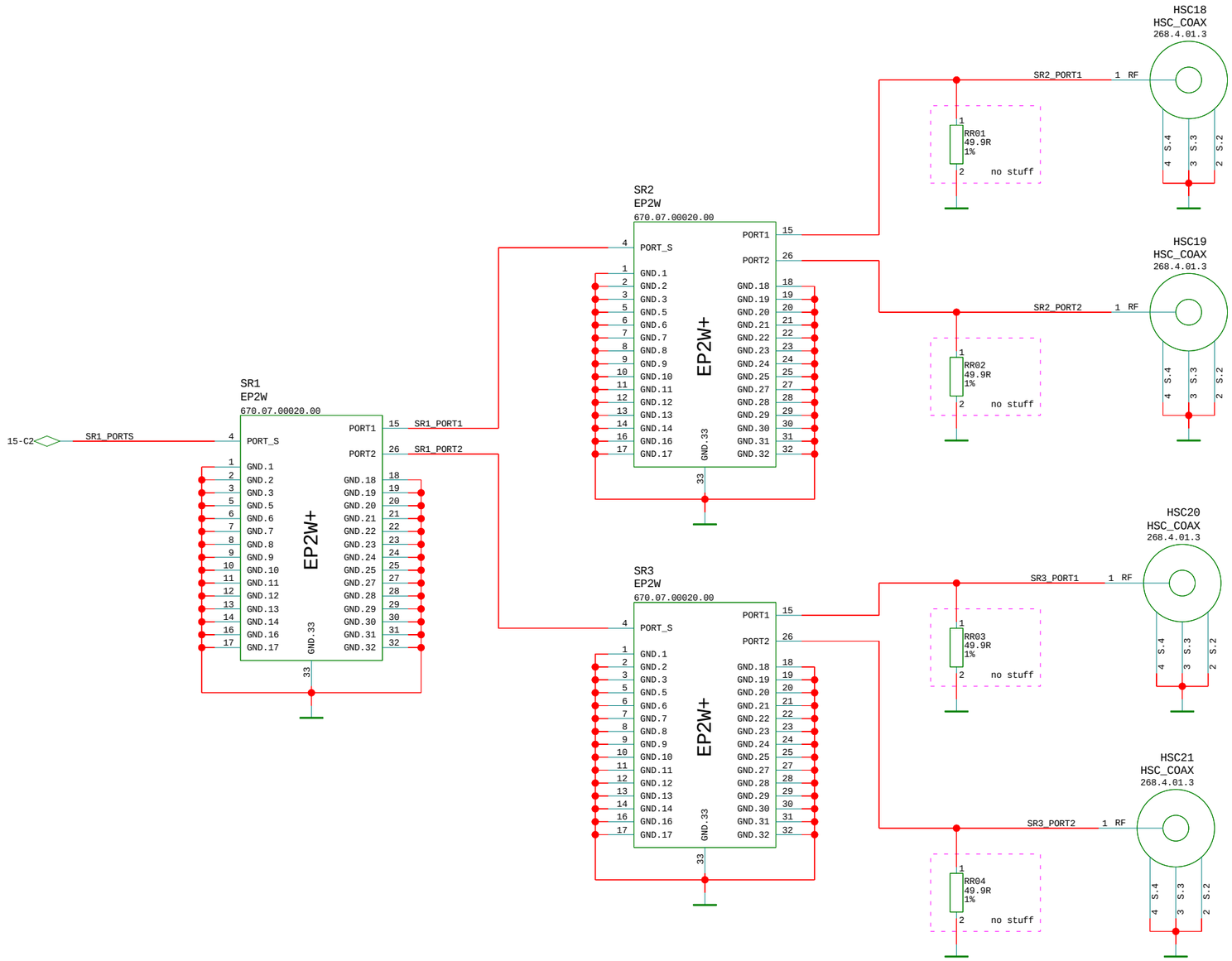

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Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	13: RF Combiner 1		R
Date, Design	2023-10-18 am	Sheet	13 of 20

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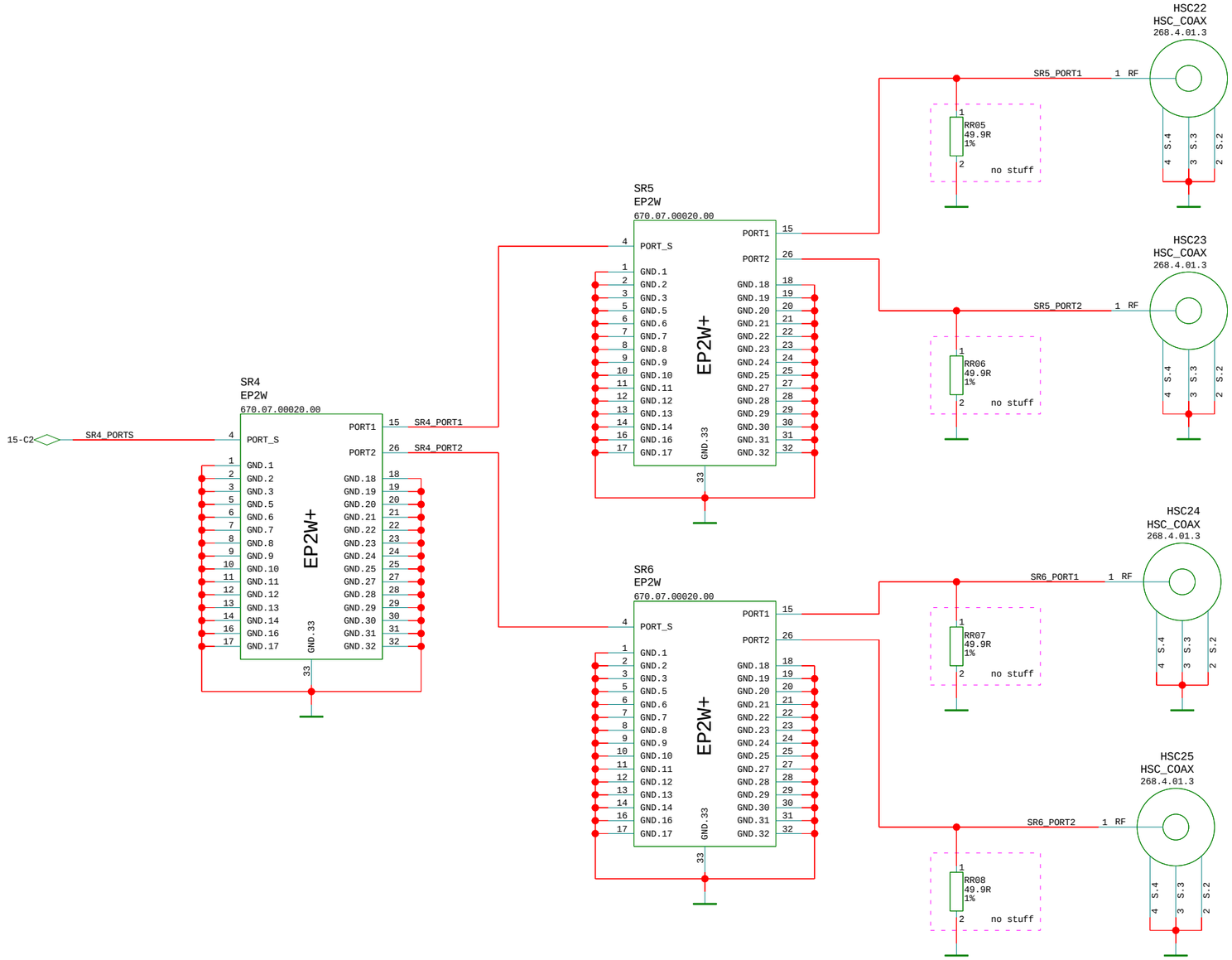

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Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	14: RF Combiner 2		R
Date, Design	2023-10-18 am	Sheet 14 of 20	

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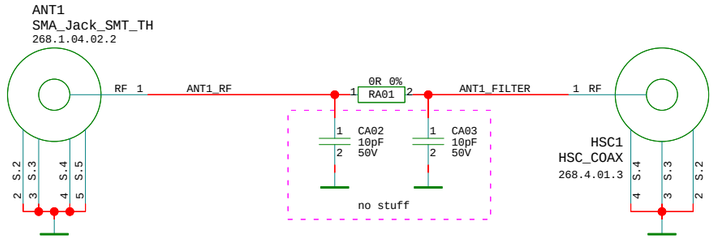

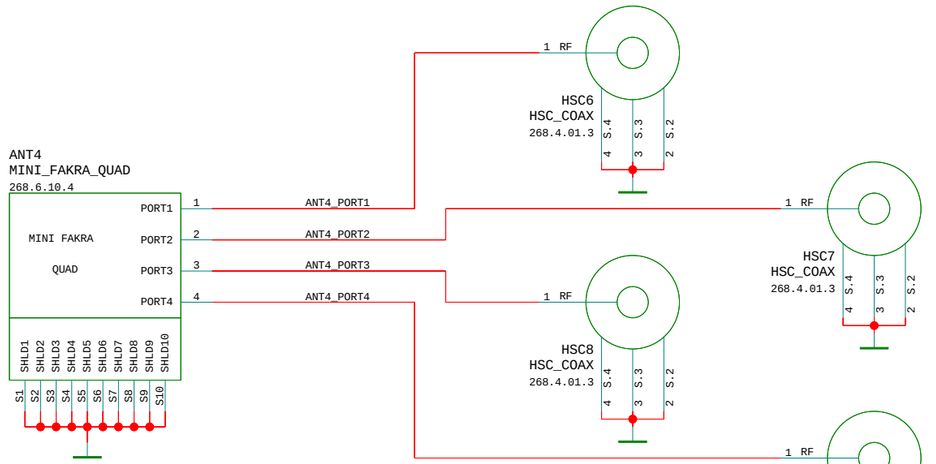

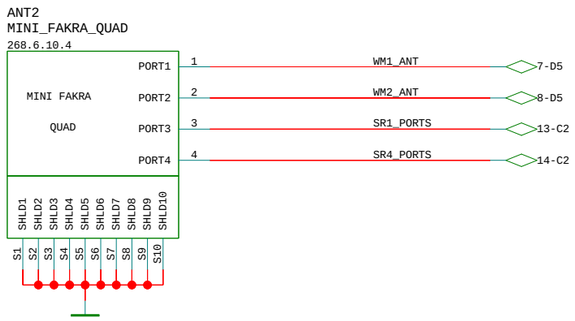

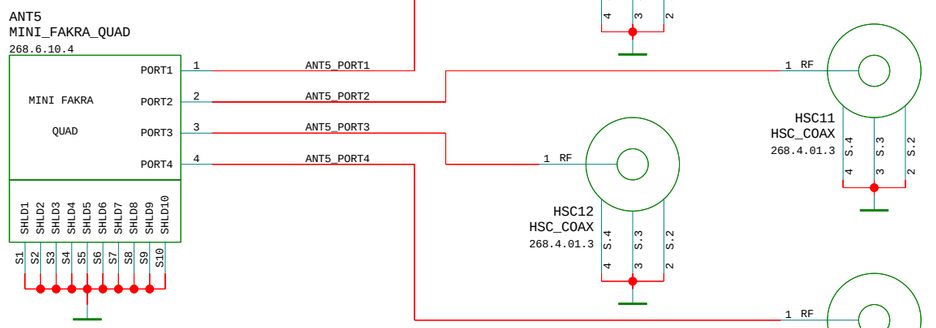

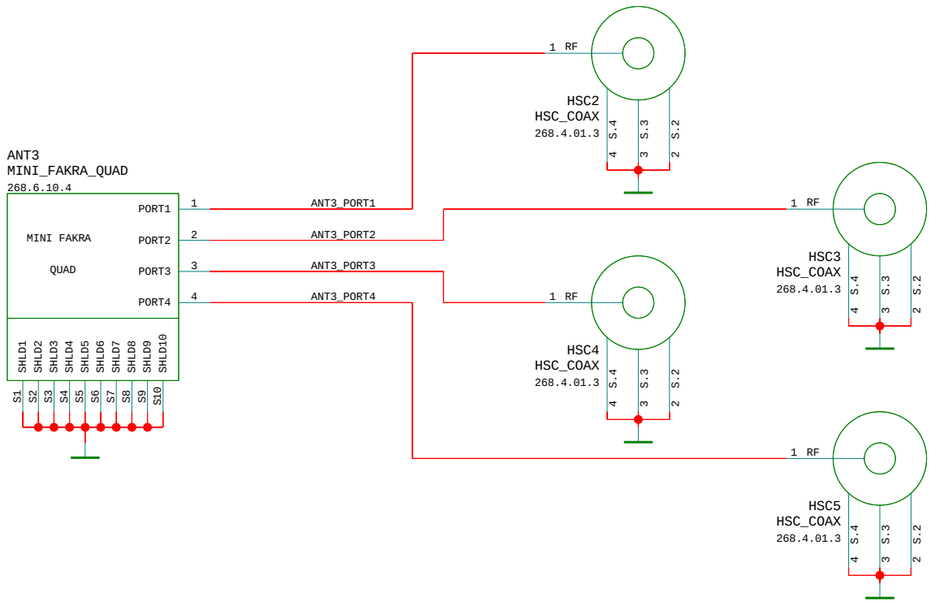

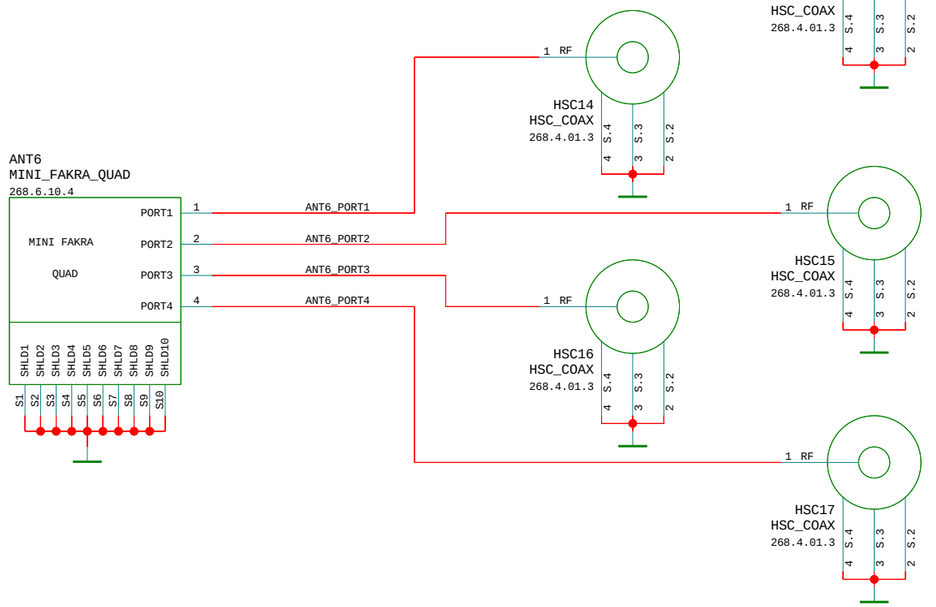

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	15: F/P Antenna Connectors		A
Date, Design	2023-10-23 am	Sheet 15 of 20	

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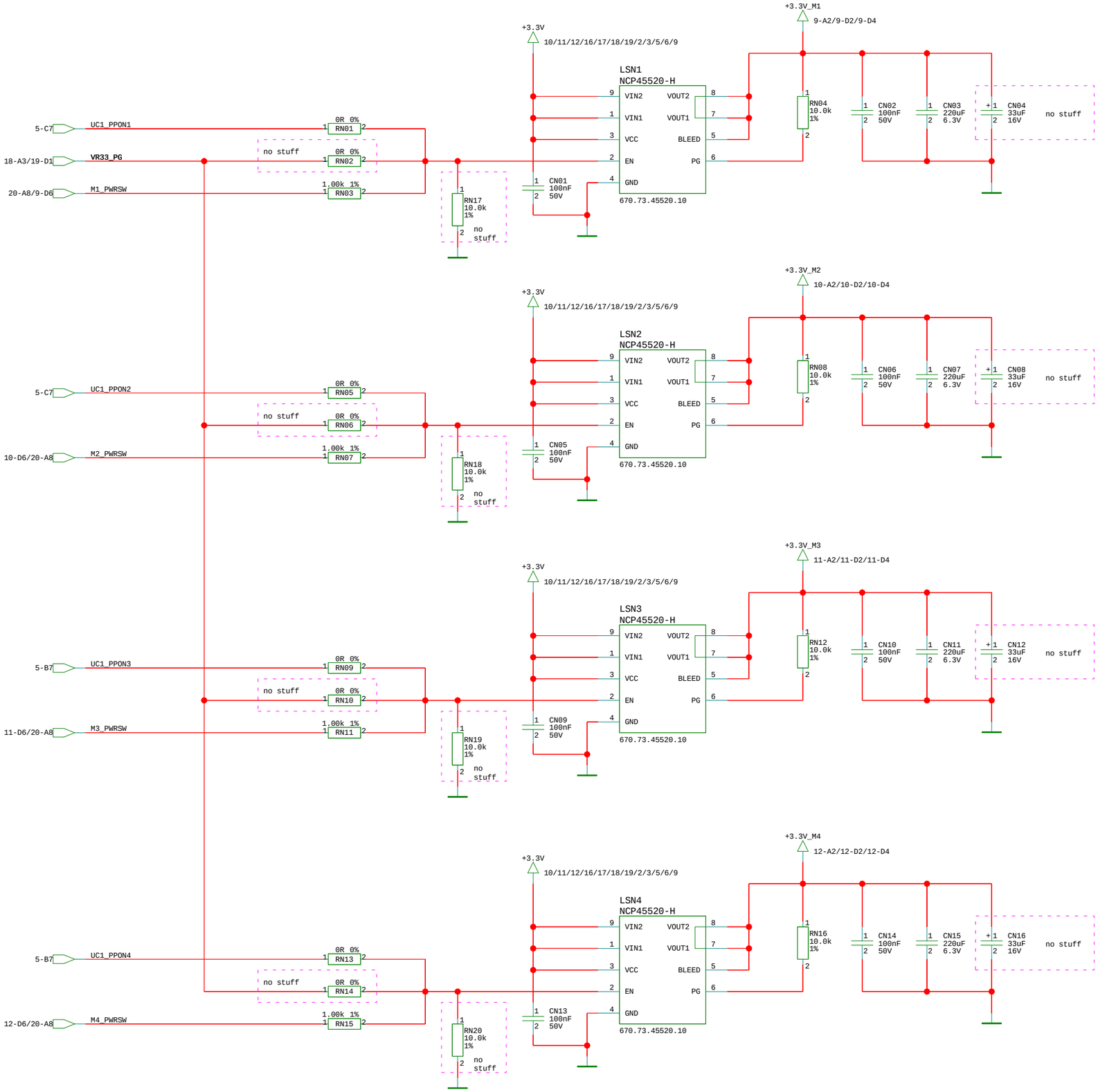

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	16: Power Switches - M.2 Sockets		N
Date, Design	2023-10-23 am	Sheet	16 of 20

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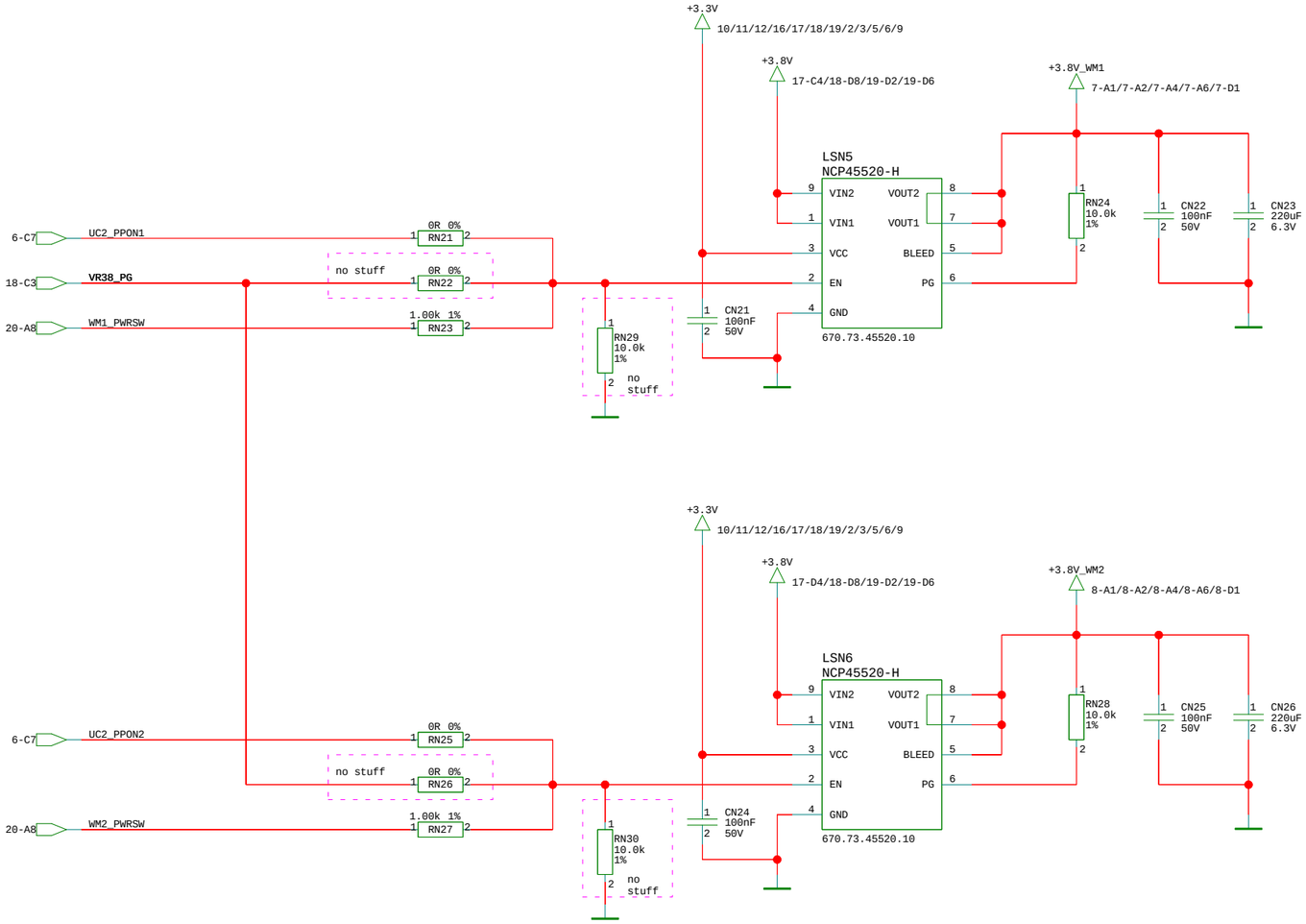

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Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	17: Power Switches - M.2 Sockets		N
Date, Design	2023-10-18 am	Sheet	17 of 20

1 2 3 4 5 6 7 8

D C B A

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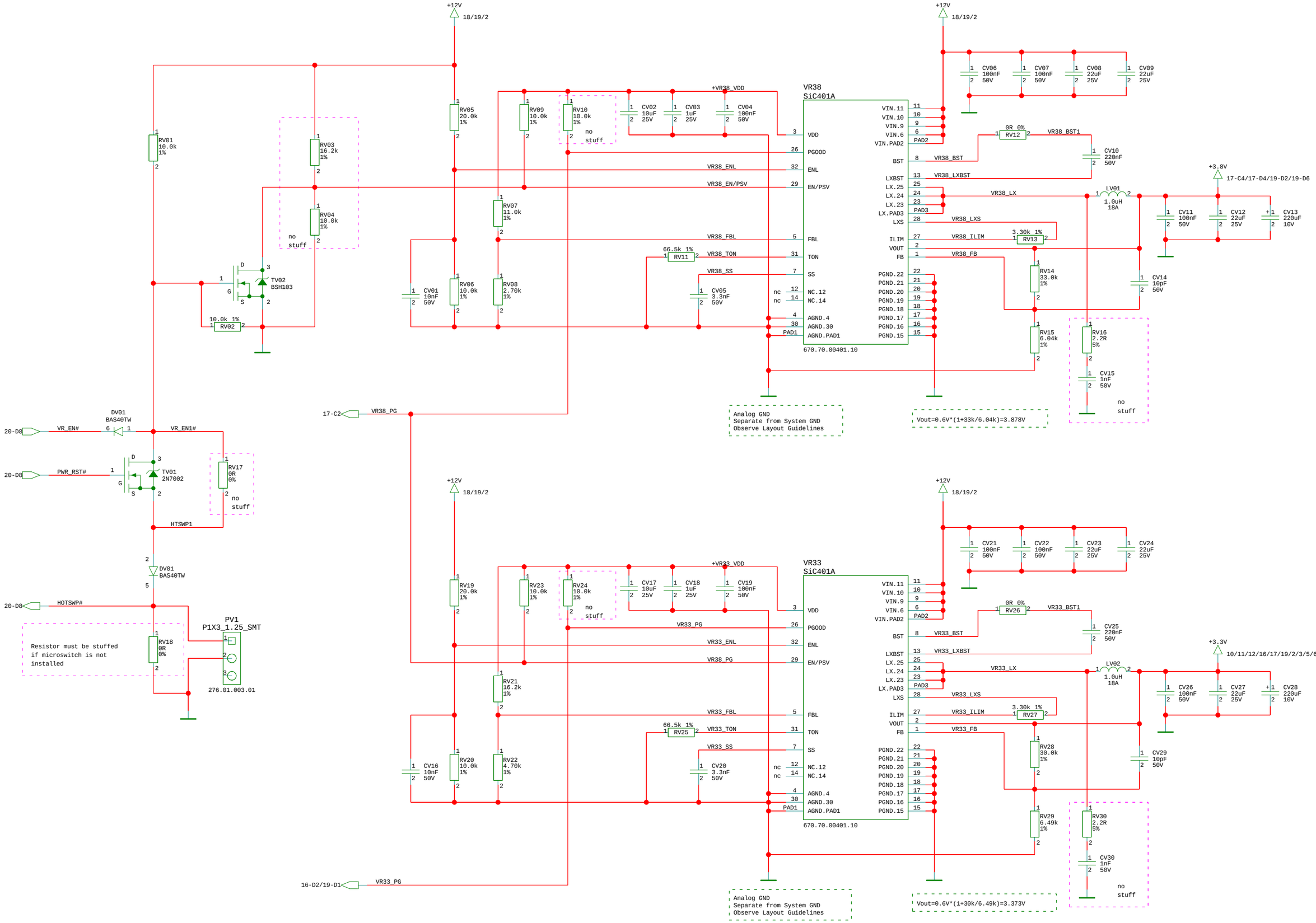

Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	18: Voltage Regulators 1/2		V
Date, Design	2023-10-18 am	Sheet	18 of 20

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+3.8V
17-C4/17-D4/18-D8/19-D6
VR18
TPS82822
VIN.1
VIN.2
EN
PG
GND.9
GND.10
VOUT.5
VOUT.6
VOUT.7
FB
670.70.82822.10
16-D2/18-A3
VR33_PG
CV41 22uF 25V
RV41 20.0k 1%
RV42 15.0k 1%
VR18_FB
CV42 680pF 50V
CV43 22uF 25V
CV44 22uF 25V
+1.8V
3-A5/3-B7/3-C2/3-C5/3-D1/4-B4
VR18_PG
Vout= 0.6V * (1+20kOhm/15kOhm) = 1.82V
+3.3V
10/11/12/16/17/18/19/2/3/5/6/9
RV43 10.0k 1%
RV44 10.0k 1%
+3.8V
17-C4/17-D4/18-D8/19-D2
VR10
TPS82822
670.70.82822.10
CV45 22uF 25V
RV45 20.0k 1%
RV46 15.0k 1%
VR10_FB
CV46 680pF 50V
CV47 22uF 25V
CV48 22uF 25V
+1.05V
5-A1/5-D5/6-B5/6-D5
Vout= 0.6V * (1+20kOhm/15kOhm) = 1.82V
VR10_PG
+3.3V
10/11/12/16/17/18/19/2/3/5/6/9
RV47 10.0k 1%
PWREN
5-C1/6-C1
+12V
18/19/2
CV49 22uF 25V
CV50 22uF 25V
CV51 22uF 25V
CV52 22uF 25V
CV53 100nF 50V
VR09
MPM3650
VIN
PGND1
PGND2
PGND3
PGND4
PGND5
VCC
PG
EN
SS
AGND
OUT
BST
SW2
SW1
FB
670.70.03650.10
VR09_SS
0R 0%
RV48
CV54 15nF 50V
AGND
AGND
+0.95V
4-D4
CV55 33pF 50V
RV49 6.04k 1%
CV56 47uF 10V
CV57 47uF 10V
VR09_FB
RV50 10.0k 1%
AGND
STANDBY
18/19/2
DV02 SS14
+12V
18/19/2
DV03 SS14
VRI2C
LT3088_DFN
670.70.03088.50
IN.8
IN.7
NC.6
NC.5
OUT.1
OUT.2
OUT.3
OUT.TP
SET
nc
nc
+3.3V_I2C
2/20
CV61 10uF 25V
VRI2C_SET
100k 1%
RV54
no stuff
RV53 1.50k 1%
CV62 10uF 25V
CV63 10uF 25V
Vout = 50uA * 66.5kOhm = 3.325V

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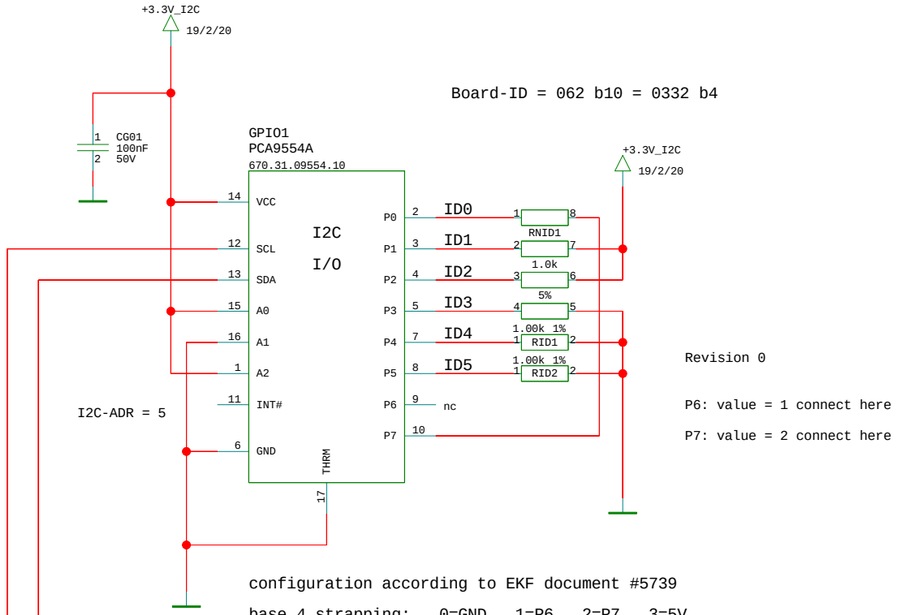
Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	19: Voltage Regulators 2/2		V
Date, Design	2023-10-18 am	Sheet	19 of 20

DO NOT REPRODUCE



Board-ID = 062 b10 = 0332 b4

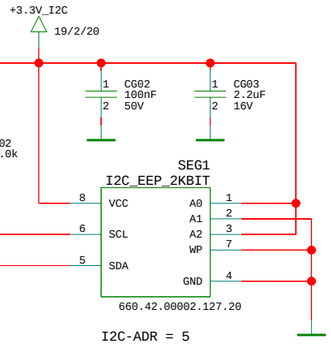
Revision 0

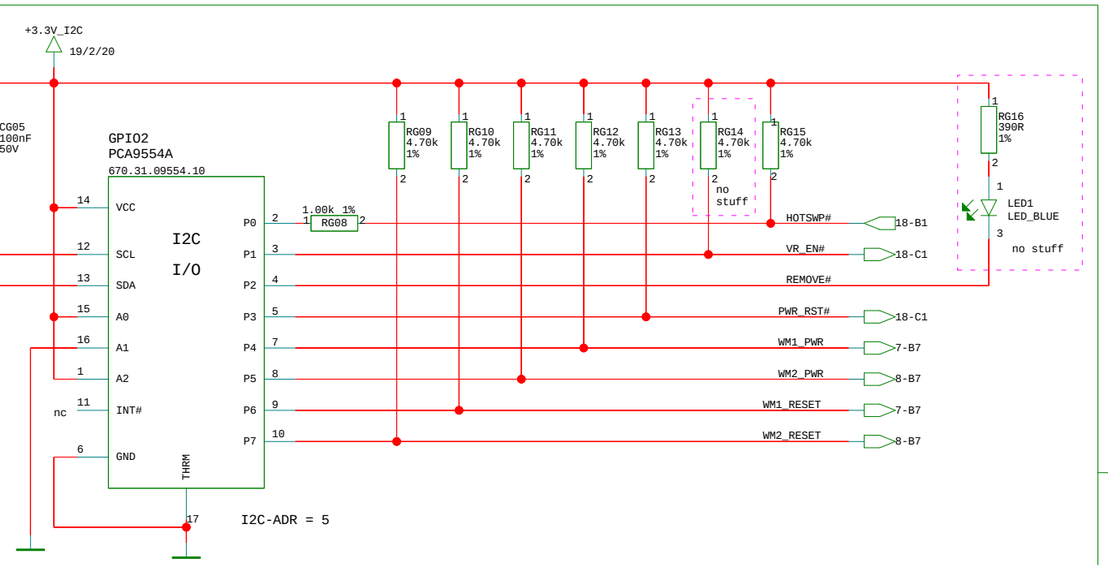
P6: value = 1 connect here

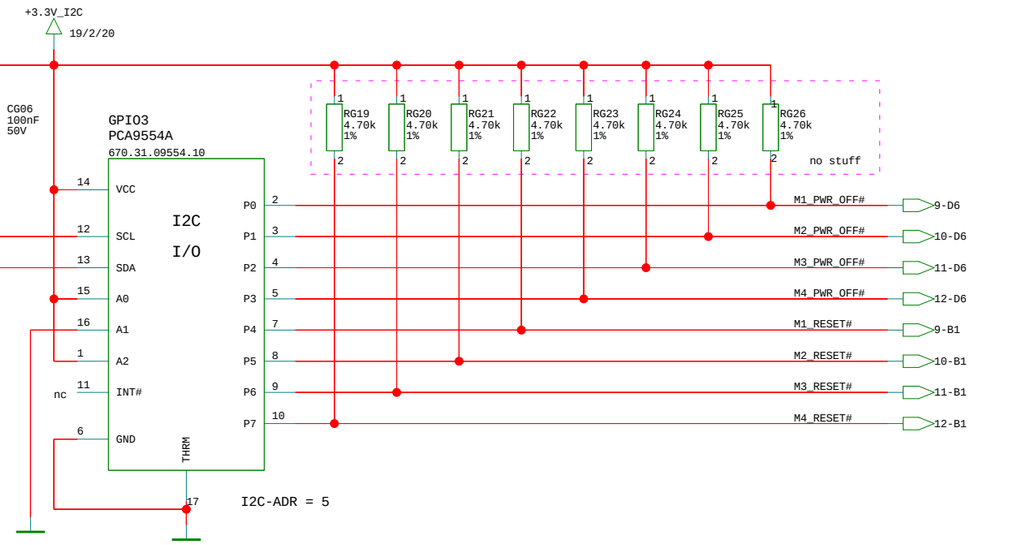
P7: value = 2 connect here

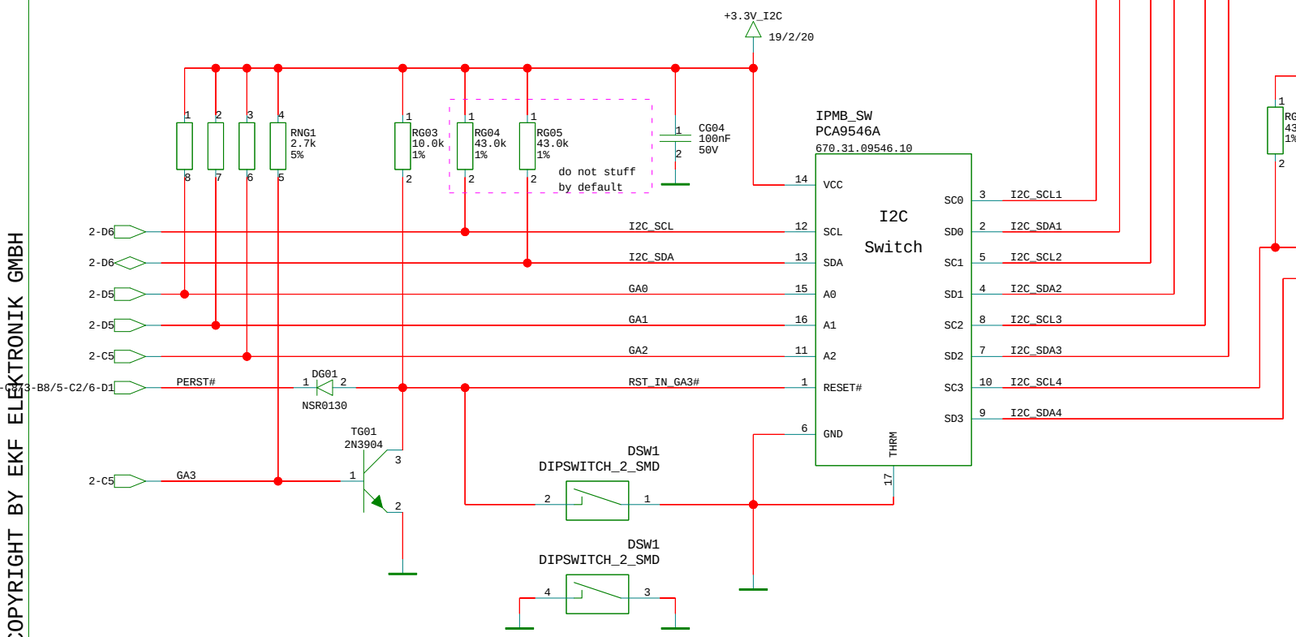
configuration according to EKF document #5739

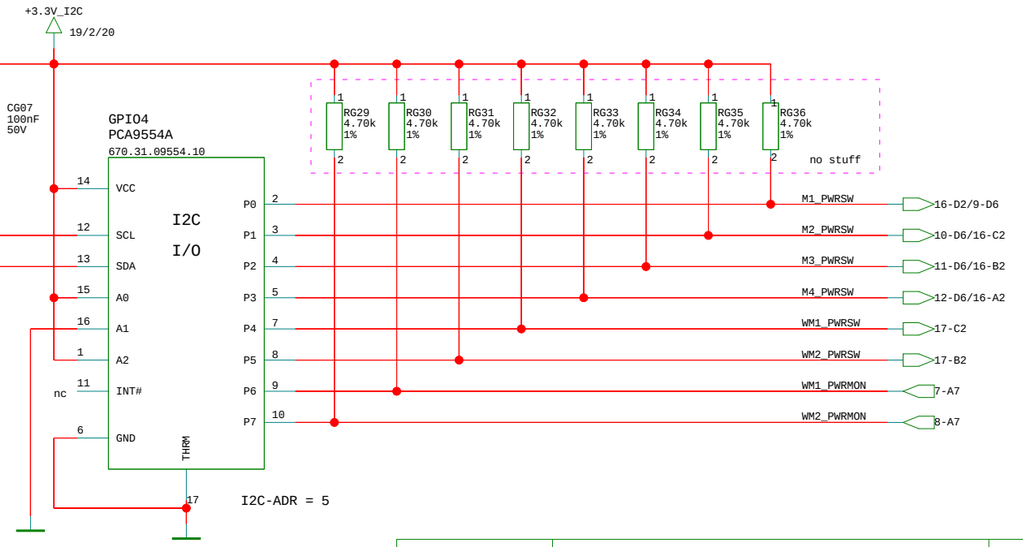
base 4 strapping: 0=GND 1=P6 2=P7 3=5V











Board	SPV-MYSTIC	Rev.	0.0
Sheet Name	20: I2C Logic		G
Date, Design	2023-10-18 am	Sheet 20 of 20	

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