UL = UnLoaded = normally not mounted component.

Default jumper settings are indicated in the schematic.
However, always check jumper positions on actual boards
since there is no guarantee that all jumpers are in default place.

Rev E1 - also called "V2"
Changed HDMI DDC I2C channel to I2C-C.

Rev E - also called "V2"
Redesign to supporty iMX 8M/8M-Mini COM board and M.2 connectors.

TITLE: COM Carrier Board V2 rev E1

Document Number:

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EACOM Board connector (MXM3)

Short to enable default boot (without fuses blown)
Open to enable boot from fuses

J27
1x2, 100mil pitch

J1B
AS0B826-S78B

MXM3 connector

bottom side				top side
S158	GND			
S157	PCIE_RX_N	VIN	P156	
S156	PCIE_RX_P	VIN	P155	
S155	GND	VIN	P154	
S154	PCIE_TX_N	VIN	P153	
S153	PCIE_TX_P	VIN	P152	
S152	GND	VIN	P151	
S151	PCIE_CLK_N	VIN	P150	
S150	PCIE_CLK_P	VIN	P149	
S149	GND	VIN	P148	
S148	GND/BT_CTRL	VIN	P147	
S147	SATA_RX_P	ISP_EN	P146	
S146	SATA_RX_N	VBAT-RTC	P145	
S145	GND	GND/VIN_SELECT	P144	
S144	SATA_TX_N	RESET_OUT	P143	
S143	SATA_TX_P	RESET_IN	P142	
S142	GND	PERI_PWR_EN	P141	
S141	CSI_CLK_P	GPIO-A	P140	
S140	CSI_CLK_M	GPIO-B	P139	
S139	GND	PWM	P138	
S138	CSI_D0_P	UART-A_TXD	P137	
S137	CSI_D0_M	UART-A_RTS	P136	
S136	GND	UART-A_CTS	P135	
S135	CSI_D1_P	UART-A_RXD	P134	
S134	CSI_D1_M	UART-B_TXD	P133	
S133	GND	UART-B_RTS	P132	
S132	CSI_D2_P	UART-B_CTS	P131	
S131	CSI_D2_M	UART-B_RXD	P130	
S130	GND	UART-C_TXD	P129	
S129	CSI_D3_P	UART-C_RXD	P128	
S128	CSI_D3_M	GND	P127	
S127	GND	SPI-A_CLK	P126	
S126	CSI_D7	SPI-A_MISO	P125	
S125	CSI_D6	SPI-A_MOSI	P124	
S124	CSI_D5	SPI-A_SSEL	P123	
S123	CSI_D4	SPI-B_CLK	P122	
S122	CSI_D3	SPI-B_MISO	P121	
S121	CSI_D2	SPI-B_MOSI	P120	
S120	CSI_D1	SPI-B_SSEL	P119	
S119	CSI_D0	GND	P118	
S118	GND	COM specific	P117	
S117	CSI_PCLK	COM specific	P116	
S116	CSI_MCLK	COM specific	P115	
S115	CSI_VSYNC	COM specific	P114	
S114	CSI_HSYNC	COM specific	P113	
S113	COM specific	COM specific	P112	
S112	COM specific	COM specific	P111	
S111	COM specific	COM specific	P110	
S110	COM specific	COM specific	P109	
S109	COM specific	COM specific	P108	
S108	COM specific	COM specific	P107	
S107	COM specific	COM specific	P106	
S106	COM specific	COM specific	P105	
S105	COM specific	COM specific	P104	
S104	GND	COM specific	P103	
S103	COM specific	COM specific	P102	
S102	COM specific	COM specific	P101	
S101	GND	COM specific	P100	
S100	COM specific	COM specific	P99	
S99	COM specific	COM specific	P98	
S98	GND	COM specific	P97	
S97	AIN0	COM specific	P96	
S96	AIN1	COM specific	P95	
S95	AIN2	COM specific	P94	
S94	AIN3	COM specific	P93	
S93	AIN4	COM specific	P92	
S92	AIN5	GND	P91	
S91	AIN6	USB_H2_DP	P90	
S90	AIN7	USB_H2_DN	P89	
S89	AIN_VREF	GND	P88	
S88	GND	USB_H2_OC	P87	
S87	LCD_ENABLE	USB_H2_PWR_EN	P86	
S86	LCD_VSYNC	USB_H1_VBUS	P85	
S85	LCD_HSYNC	USB_H1_SSRXP	P84	
S84	GPIO-G	USB_H1_SSRXN	P83	
S83	LCD_CLK	GND	P82	
S82	LCD_B7	USB_H1_SSTXP	P81	
S81	LCD_B6	USB_H1_SSTXN	P80	
S80	LCD_B5	USB_H1_DP	P79	
S79	LCD_B4	USB_H1_DN	P78	
S78	LCD_B3	GND	P77	
S77	LCD_B2	USB_H1_OC	P76	
S76	LCD_B1	USB_H1_PWR_EN	P75	

MXM3 connector mounting holes

A1 A2 A3

Note: Replace with 0R05 to measure current

R1 0R R2 0R COM_VIN

C1 100U/10V

JP1

J2
1x2, 100mil pitch
Short to enable ISP (USB)

J3
1x2, 100mil pitch
R3 1K CSI_DATA00
SD1_VSELECT control on iMX7 Dual COM

TP1 TP2 TP3 TP41

SMARC mounting holes

H1 4.3mm
H2 4.3mm
H3 4.3mm
H4 4.3mm
SMTSO-M3-5ET

J1A
AS0B826-S78B

MXM3 connector

bottom side				top side
LCD_DATA00	149	S75	LCD_B0	
	147	S74	GND	USB_O1_OC P74
LCD_DATA15	145	S73	LCD_G7	USB_O1_PWR_EN P73
LCD_DATA14	143	S72	LCD_G6	USB_O1_VBUS P72
LCD_DATA13	141	S71	LCD_G5	USB_O1_SSRXP P71
LCD_DATA12	139	S70	LCD_G4	USB_O1_SSRXN P70
LCD_DATA11	137	S69	LCD_G3	GND P69
LCD_DATA10	135	S68	LCD_G2	USB_O1_SSTXP P68
LCD_DATA09	133	S67	LCD_G1	USB_O1_SSTXN P67
LCD_DATA08	131	S66	LCD_G0	USB_O1_OTG_ID P66
LCD_DATA23	129	S65	LCD_R7	USB_O1_DP P65
LCD_DATA22	127	S64	LCD_R6	USB_O1_DN P64
LCD_DATA21	125	S63	LCD_R5	GND P63
LCD_DATA20	123	S62	LCD_R4	ETH2_MD2_P P62
LCD_DATA19	121	S61	LCD_R3	ETH2_MD2_N P61
LCD_DATA18	119	S60	LCD_R2	GND P60
LCD_DATA17	117	S59	LCD_R1	ETH2_MD3_P P59
LCD_DATA16	115	S58	LCD_R0	ETH2_MD3_N P58
	113	S57	GND	ETH2_LINK P57
BL_CONTRAST_PWM-GPIO	111	S56	BL_PWM	ETH2_ACT P56
BL_PWR_EN-GPIO	109	S55	BL_PWR_EN	ETH2_LINK1000 P55
DISP_PWR_EN-GPIO	107	S54	DISP_PWR_EN	ETH2_MD0_N P54
TP_IRQ-GPIO	105	S53	TP_IRQ	ETH2_MD0_P P53
TP_RST-GPIO	103	S52	TP_RST	GND P52
I2C-C_SCL	101	S51	HDMI/I2C-C_SCL	ETH2_MD1_N P51
I2C-C_SDA	99	S50	HDMI/I2C-C_SDA	ETH2_MD1_P P50
I2C-B_SCL	97	S49	I2C-B_SCL	GND P49
I2C-B_SDA	95	S48	I2C-B_SDA	ETH1_MD2_P P48
I2C-A_SCL	93	S47	I2C-A_SCL	ETH1_MD2_N P47
I2C-A_SDA	91	S46	I2C-A_SDA	GND P46
LVDS0_CLK_N	89	S45	LVDS0_CLK_N	ETH1_MD3_P P45
LVDS0_CLK_P	87	S44	LVDS0_CLK_P	ETH1_MD3_N P44
	85	S43	GND	ETH1_LINK P43
LVDS0_DATA0_N	83	S42	LVDS0_D0_N	ETH1_ACT P42
LVDS0_DATA0_P	81	S41	LVDS0_D0_P	ETH1_LINK1000 P41
	79	S40	GND	ETH1_MD0_N P40
LVDS0_DATA1_N	77	S39	LVDS0_D1_N	ETH1_MD0_P P39
LVDS0_DATA1_P	75	S38	LVDS0_D1_P	GND P38
	73	S37	GND	ETH1_MD1_N P37
LVDS0_DATA2_N	71	S36	LVDS0_D2_N	ETH1_MD1_P P36
LVDS0_DATA2_P	69	S35	LVDS0_D2_P	GND P35
GPIO_H	67	S34	GPIO-H	HDMI_CEC P34
LVDS0_DATA3_N	65	S33	LVDS0_D3_N	HDMI_TXD2_P P33
LVDS0_DATA3_P	63	S32	LVDS0_D3_P	HDMI_TXD2_N P32
	61	S31	GND	GND P31
LVDS1_CLK_N	59	S30	LVDS1_CLK_N	HDMI_TXD1_P P30
LVDS1_CLK_P	57	S29	LVDS1_CLK_P	HDMI_TXD1_N P29
	55	S28	GND	HDMI_HPD P28
LVDS1_DATA0_N	53	S27	LVDS1_D0_N	HDMI_TXD0_P P27
LVDS1_DATA0_P	51	S26	LVDS1_D0_P	HDMI_TXD0_N P26
	49	S25	GND	GND P25
LVDS1_DATA1_N	47	S24	LVDS1_D1_N	HDMI_TXC_P P24
LVDS1_DATA1_P	45	S23	LVDS1_D1_P	HDMI_TXC_N P23
	43	S22	GND	GND P22
LVDS1_DATA2_N	41	S21	LVDS1_D2_N	MMC_D2 P21
LVDS1_DATA2_P	39	S20	LVDS1_D2_P	MMC_D3 P20
GPIO_J	37	S19	GPIO-J	MMC_D4 P19
LVDS1_DATA3_N	35	S18	LVDS1_D3_N	MMC_CMD P18
LVDS1_DATA3_P	33	S17	LVDS1_D3_P	MMC_D5 P17
	31	S16	GND	MMC_CLK P16
CAN1_RD	29	S15	CAN1_RX	MMC_D6 P15
CAN1_TD	27	S14	CAN1_TX	MMC_D7 P14
CAN2_RD	25	S13	CAN2_RX	MMC_D0 P13
CAN2_TD	23	S12	CAN2_TX	MMC_D1 P12
SPDIF_OUT-GPIO	21	S11	SPDIF_OUT	SD_VCC P11
SPDIF_IN-GPIO	19	S10	SPDIF_IN	SD_D2 P10
	17	S9	GND	SD_D3 P9
AUD_MCLK	15	S8	AUDIO_MCLK	SD_CMD P8
AUD_TXD	13	S7	AUDIO_TXD	SD_CLK P7
AUD_TXC	11	S6	AUDIO_TXC	SD_D0 P6
AUD_RXD	9	S5	AUDIO_RXD	SD_D1 P5
AUD_TXFS	7	S4	AUDIO_TXFS	GPIO-C P4
	5	S3	GND	GPIO-D P3
MQS_LEFT-GPIO	3	S2	MQS_LEFT	GPIO-E P2
MQS_RIGHT-GPIO	1	S1	MQS_RIGHT	GPIO-F P1

top side			
148	USB_OTG_OC		
146	USB_OTG_PWR		
144	USB_OTG_VBUS		
142	USB_OTG_SSRXP		
140	USB_OTG_SSRXN		
138	USB_OTG_GND		
136	USB_OTG_SSTXP		
134	USB_OTG_SSTXN		
132	USB_OTG_ID		
130	USB_OTG_DP		
128	USB_OTG_DN		
126			
124	ETH2_TRXP2		
122	ETH2_TRXN2		
120			
118	ETH2_TRXP3		
116	ETH2_TRXN3		
114	ETH2_LED_10_100		
112	ETH2_LED_ACT		
110	ETH2_LED_1000		
108	ETH2_TRXN0		
106	ETH2_TRXP0		
104			
102	ETH2_TRXN1		
100	ETH2_TRXP1		
98			
96	ETH1_TRXP2		
94	ETH1_TRXN2		
92			
90	ETH1_TRXP3		
88	ETH1_TRXN3		
86	ETH1_LED_10_100		
84	ETH1_LED_ACT		
82	ETH1_LED_1000		
80	ETH1_TRXN0		
78	ETH1_TRXP0		
76			
74	ETH1_TRXN1		
72	ETH1_TRXP1		
70			
68	HDMI_CEC_IN		
66	HDMI_D2P		
64	HDMI_D2M		
62			
60	HDMI_D1P		
58	HDMI_D1M		
56	HDMI_HPD		
54	HDMI_D0P		
52	HDMI_D0M		
50			
48	HDMI_CLKP		
46	HDMI_CLKM		
44			
42	MMC_DATA2		
40	MMC_DATA3		
38	MMC_DATA4		
36	MMC_CMD		
34	MMC_DATA5		
32	MMC_CLK		
30	MMC_DATA6		
28	MMC_DATA7		
26	MMC_DATA0		
24	MMC_DATA1		
22	SD_PWR		
20	SD_DATA2		
18	SD_DATA3		
16	SD_CMD		
14	SD_CLK		
12	SD_DATA0		
10	SD_DATA1		
8	GPIO_C-SD_PWR_EN		
6	GPIO_D-SD_CD		
4	GPIO_E-PCIE_CLKREQ_N		
2	GPIO_F-WL_GPIO_1_DEV_WAKE		

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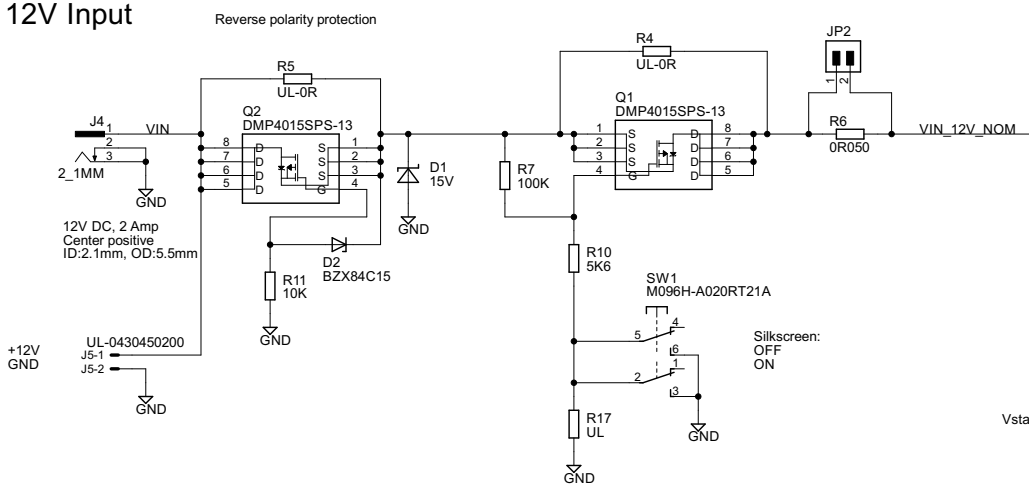
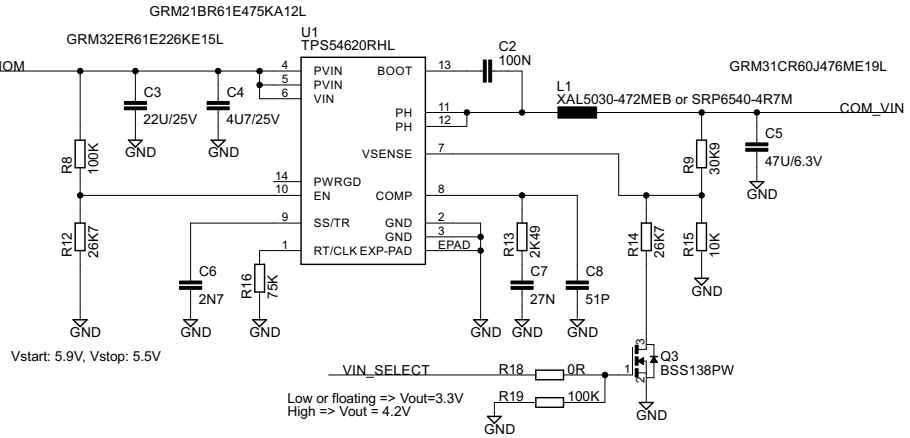
Power Supply Input

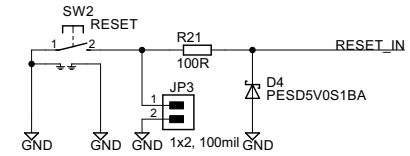
DC 12V Input



3.3V (or 4.2V)/4A supply with 7-17V input range

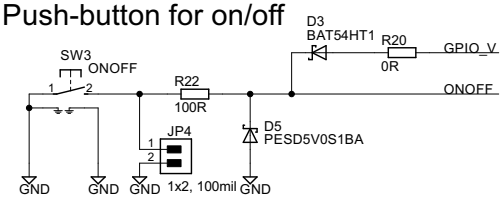


Push-button for reset

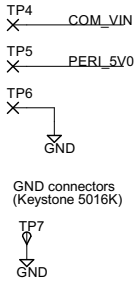


FSMRA2JH (for reset-button, black knob)

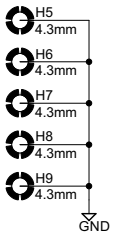
Push-button for on/off



FSMRA3JH (for on/off-button, blue knob)



Mounting Holes



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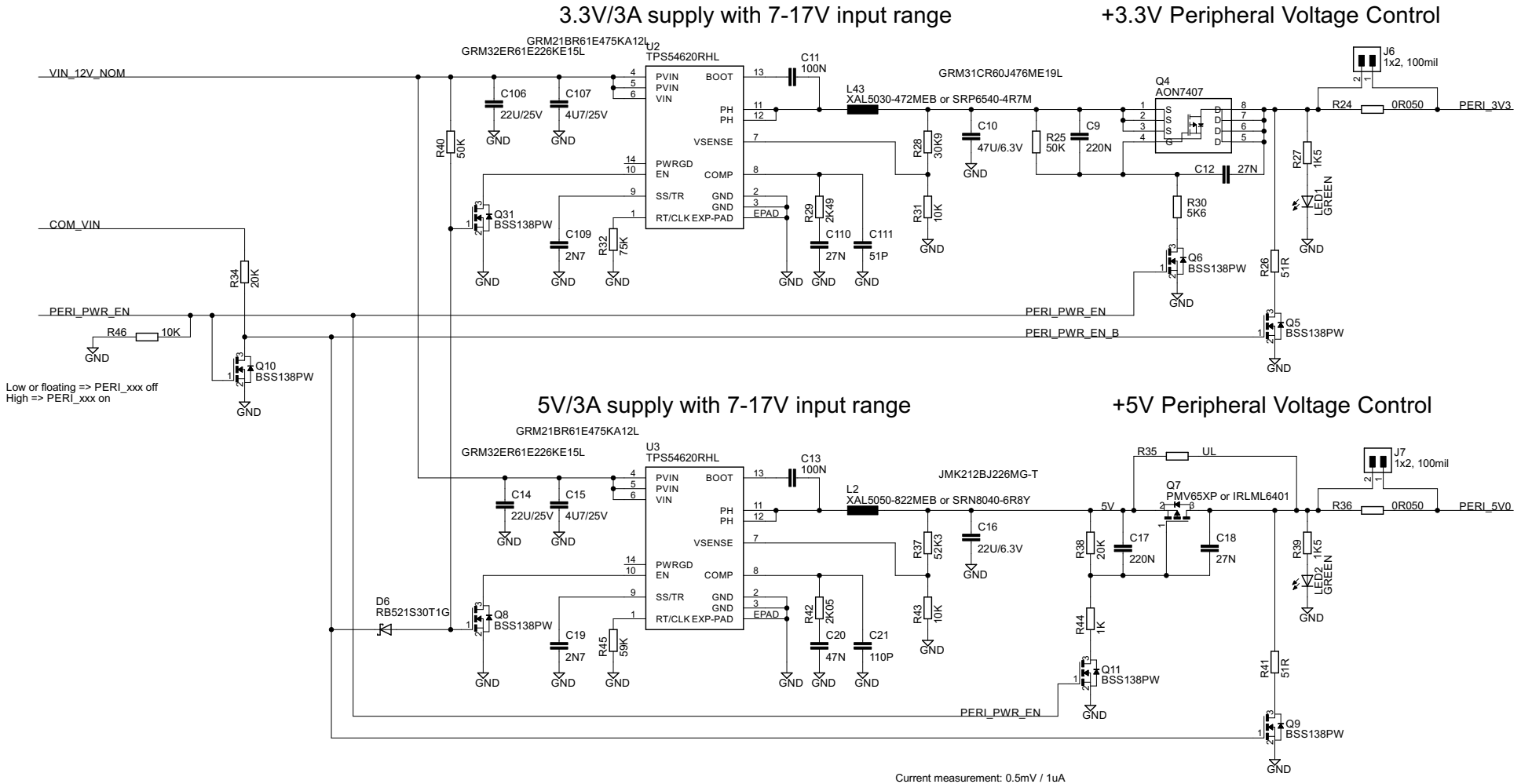
Peripheral Power Supply Control



TITLE: COM Carrier Board V2 rev E1	
Document Number:	
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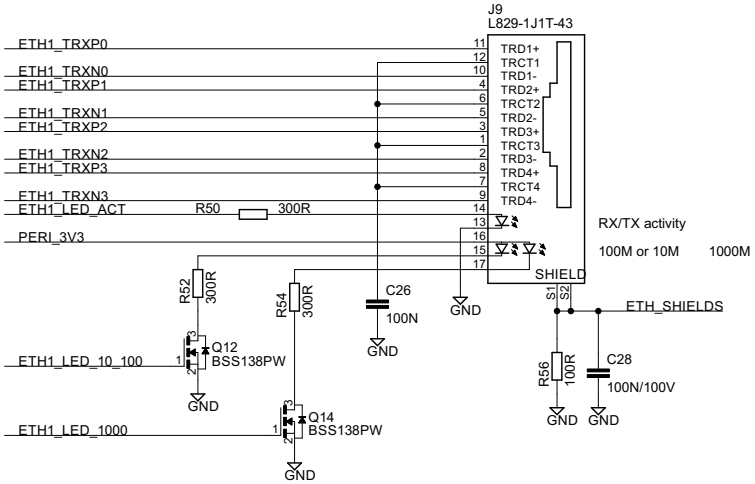
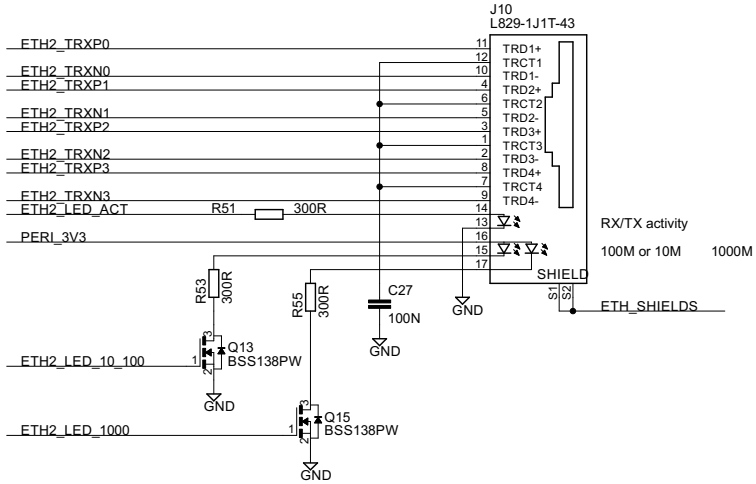
Ethernet interfaces

Ethernet Interface #1



Ethernet Interface #2



Embedded Artists

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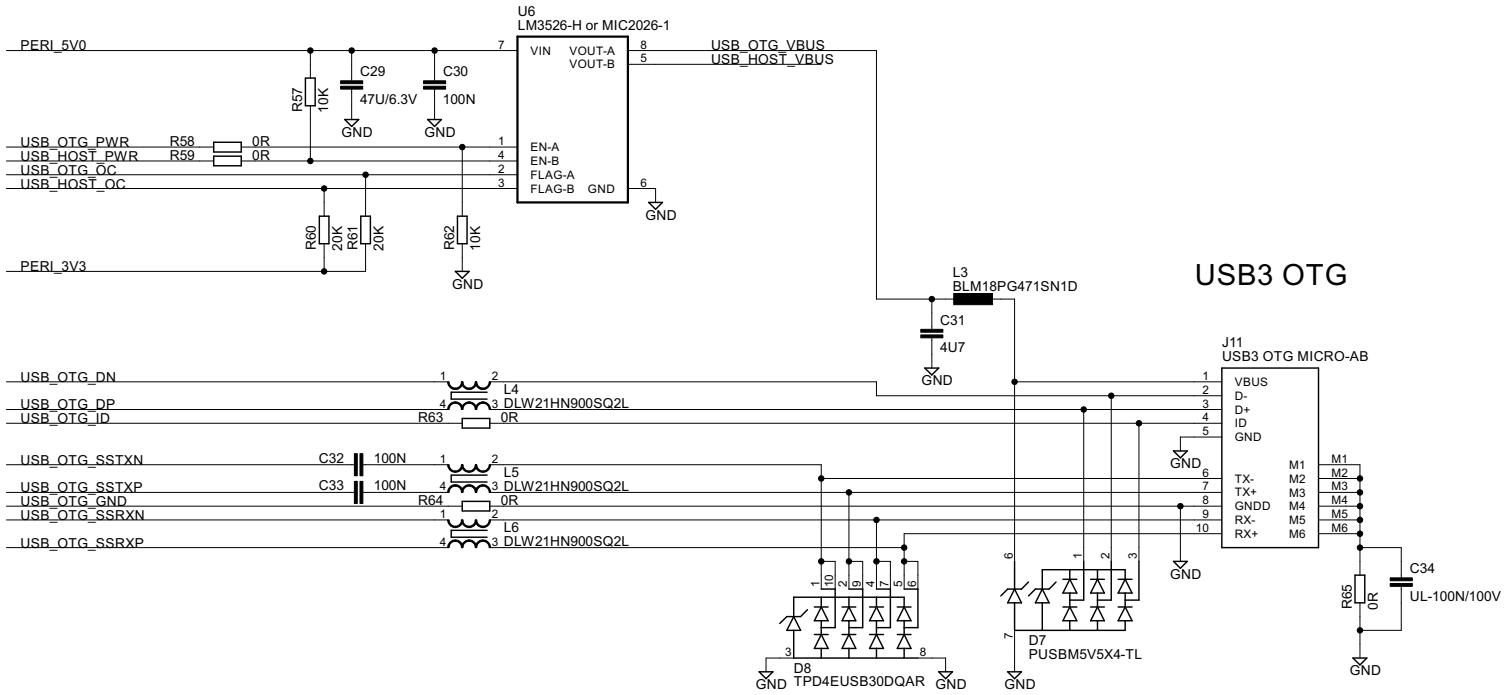
USB OTG Interface



(C) Embedded Artists AB	
TITLE: COM Carrier Board V2 rev E1	
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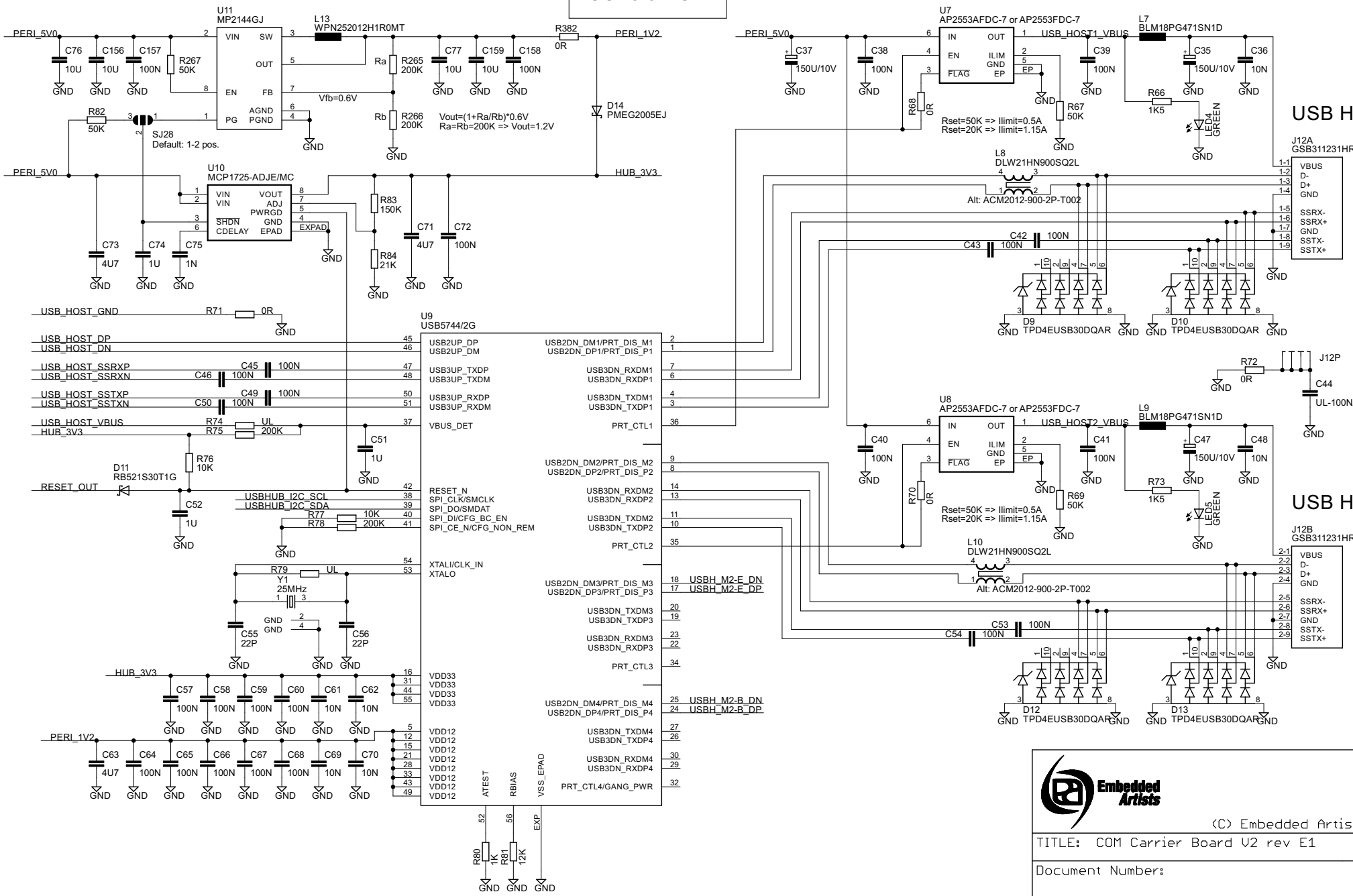
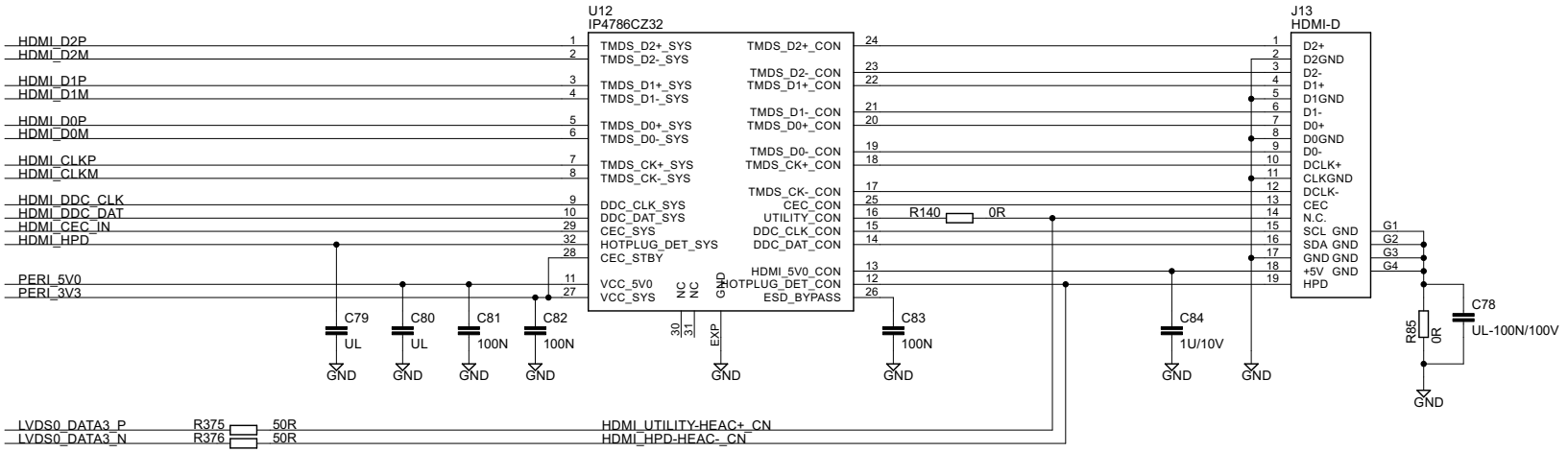
USB3.0 HUB

1.2V / 2A Buck DCDC (700mA needed)



HDMI Interface

HDMI connector



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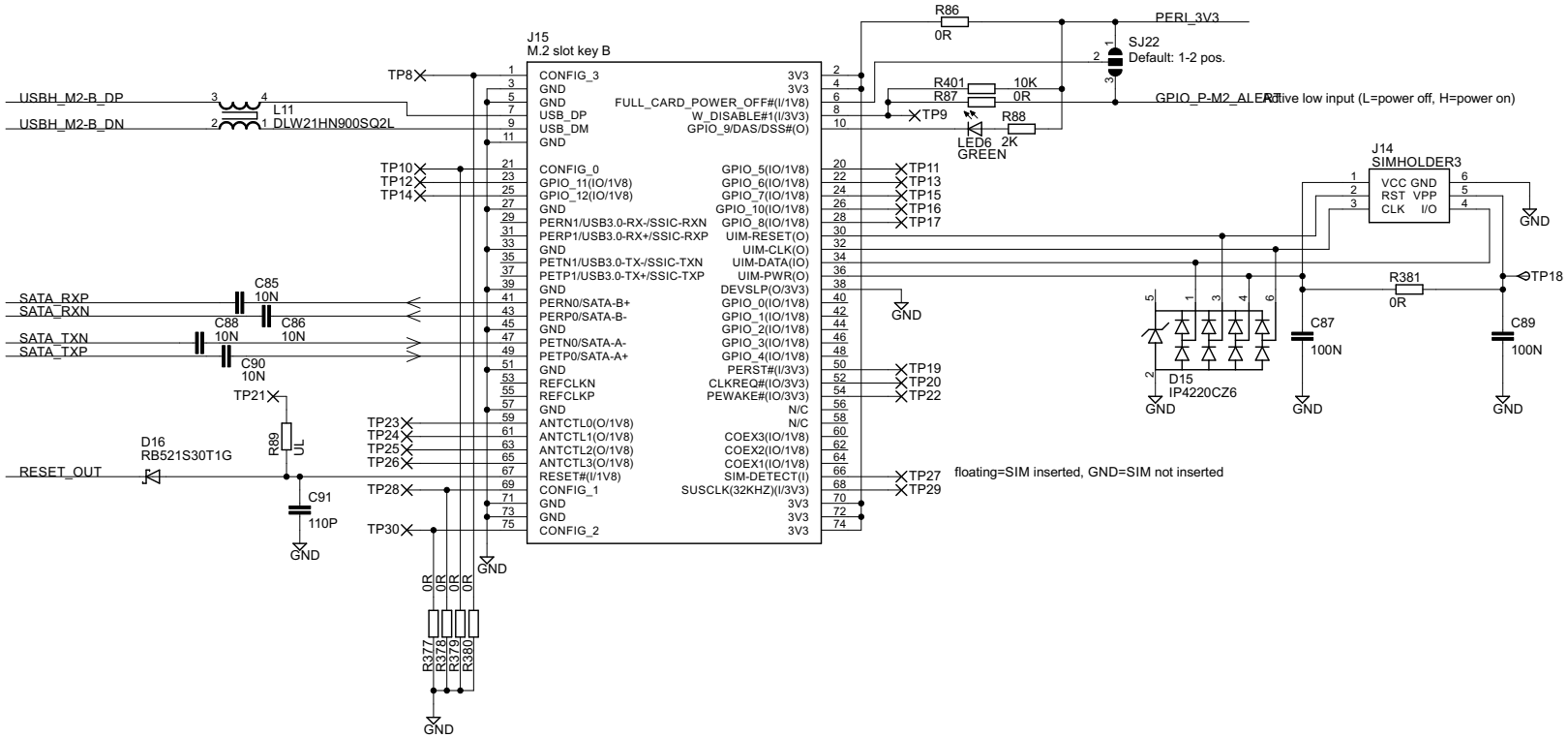
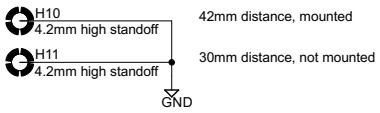
M.2 (NGFF) Key B Connector (USB Host and SATA Interfaces)



Standoffs for M.2 connector, placed at 30mm and 42mm distance from connector



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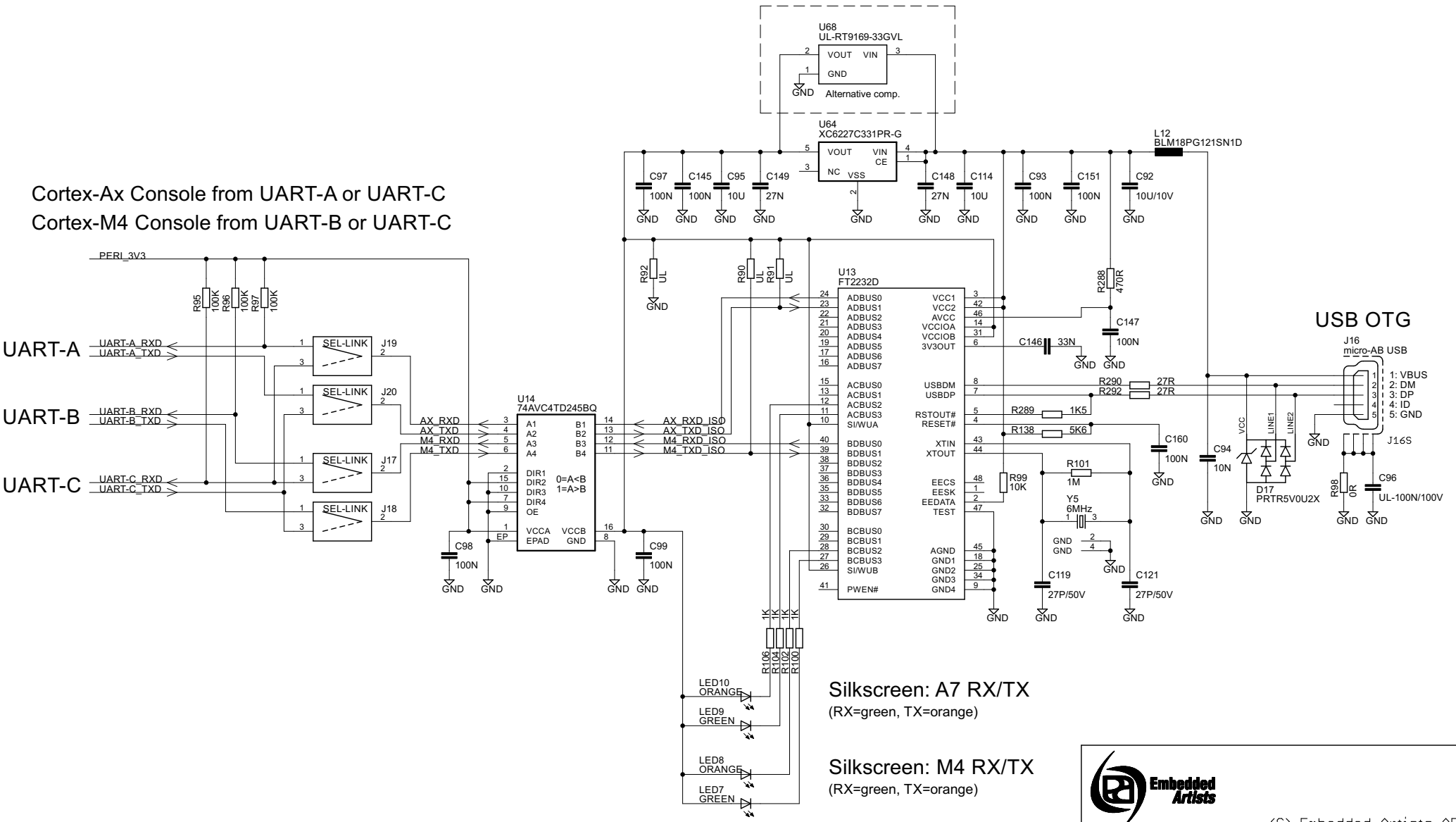
UART Console Interface (virtual COM ports over USB)



For driver installation, please refer to
http://www.ftdichip.com/Documents/InstallGuides.htm

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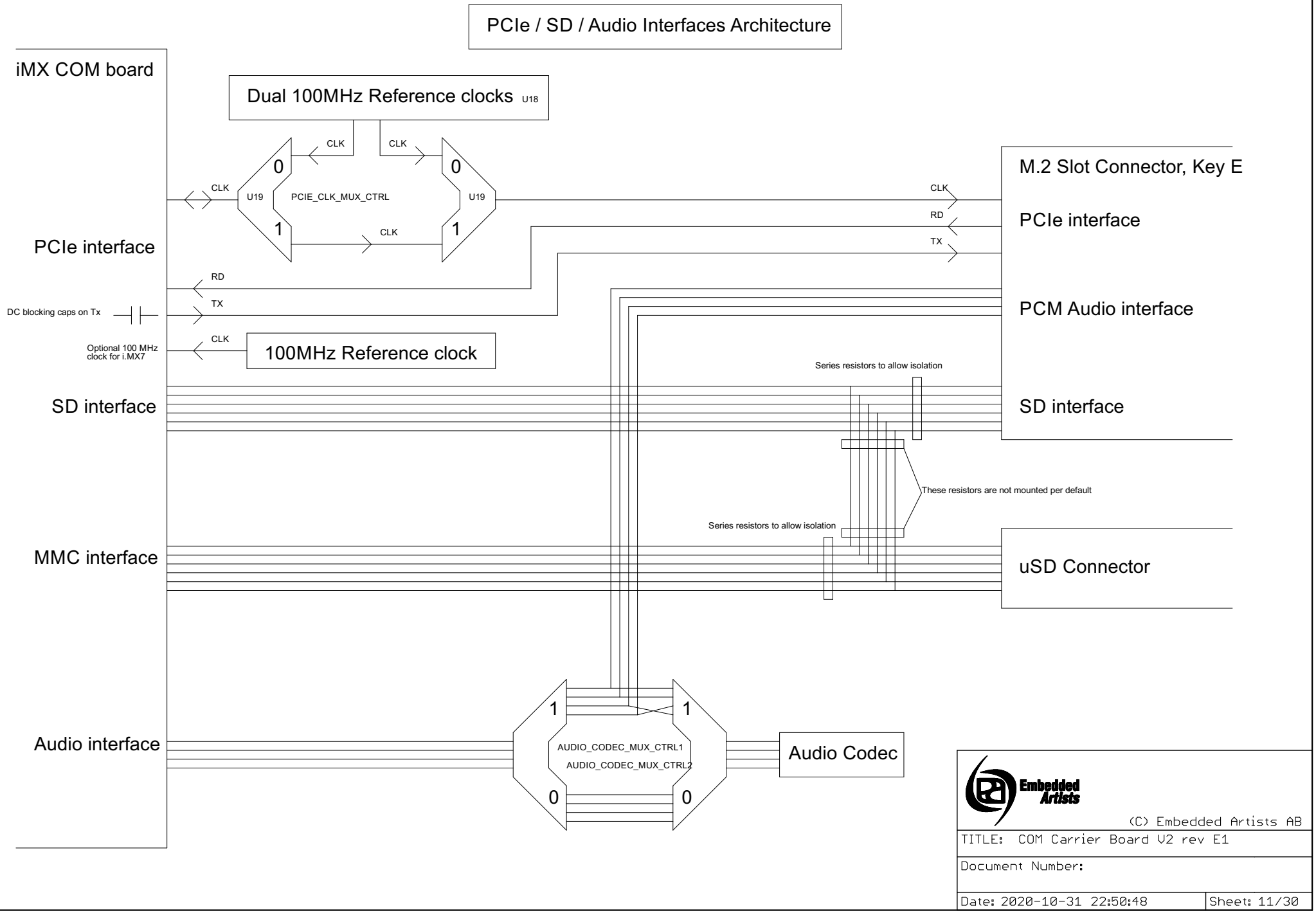
PCIe / SD / Audio Interfaces Architecture



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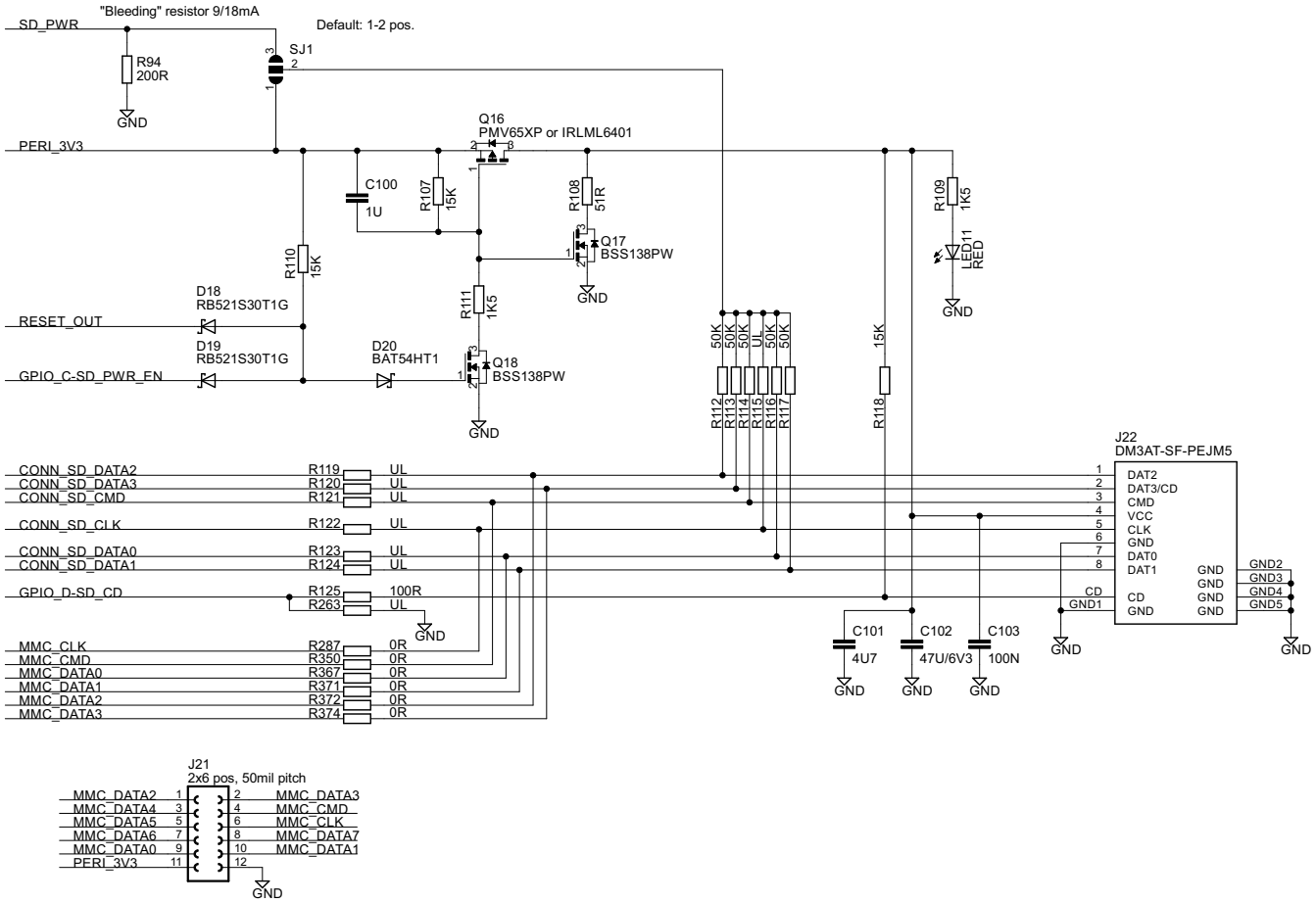
SD/MMC Memory Card Interface



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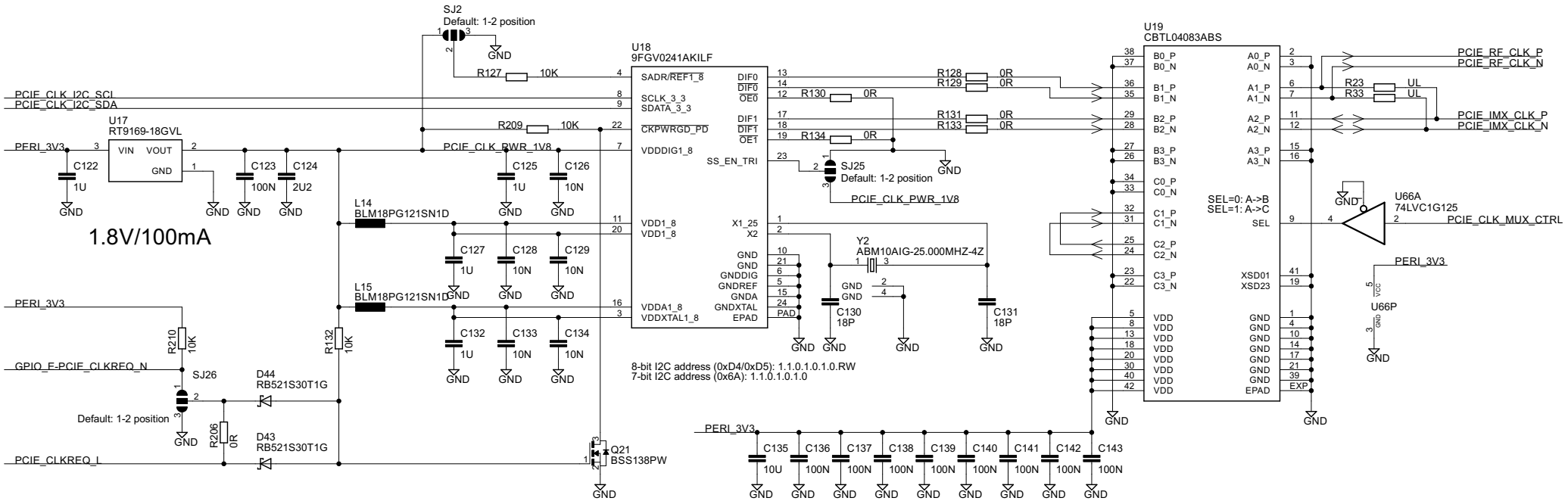
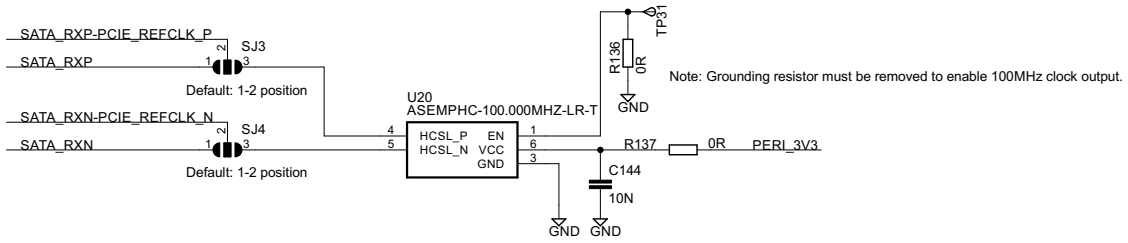
PCIe Reference Clock Multiplexing



Optional 100MHz PCIe reference clock (for i.MX 7Dual)



TITLE: COM Carrier Board V2 rev E1	
Document Number:	
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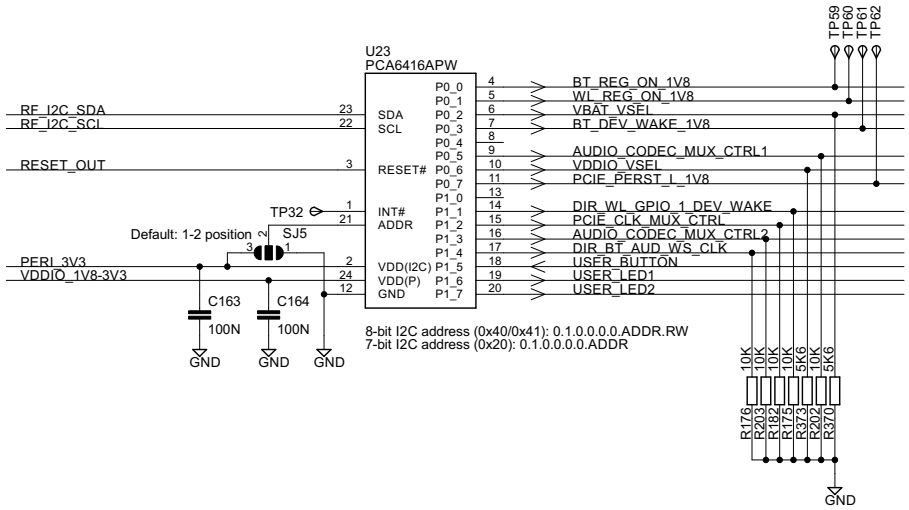
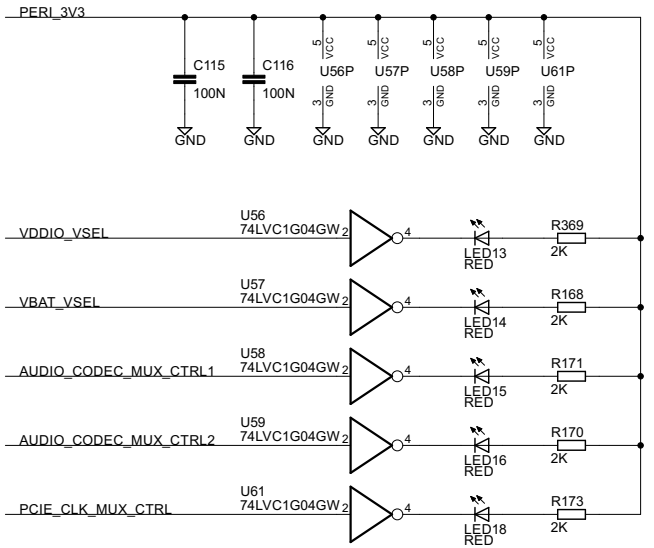
Control Signals and Indicators

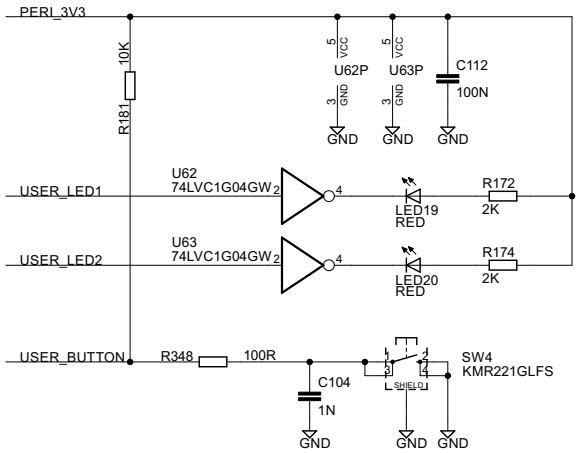
I2C GPIO Expander



Control signal indicators



User LEDs and Push-button



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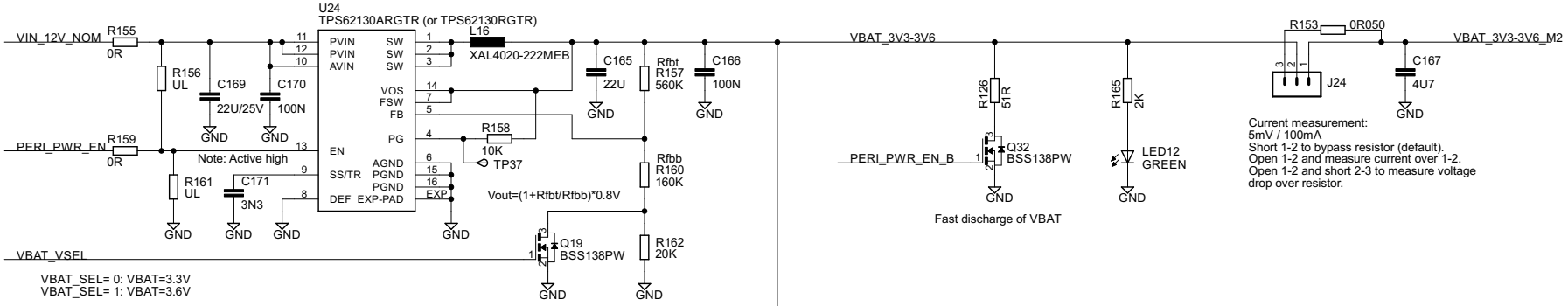
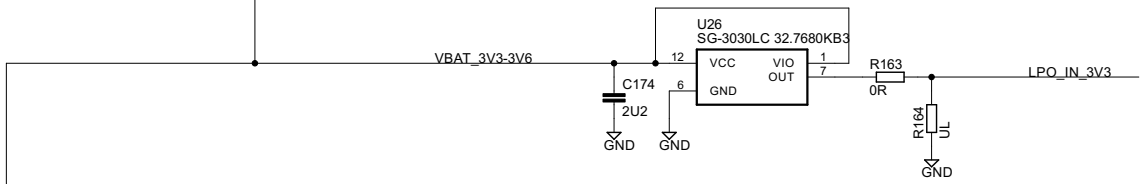
M.2-E Powering

Note: Set VDDIO to 1.8V and VBAT to 3.3V when using M.2 interface!
Only use other settings with extreme care!

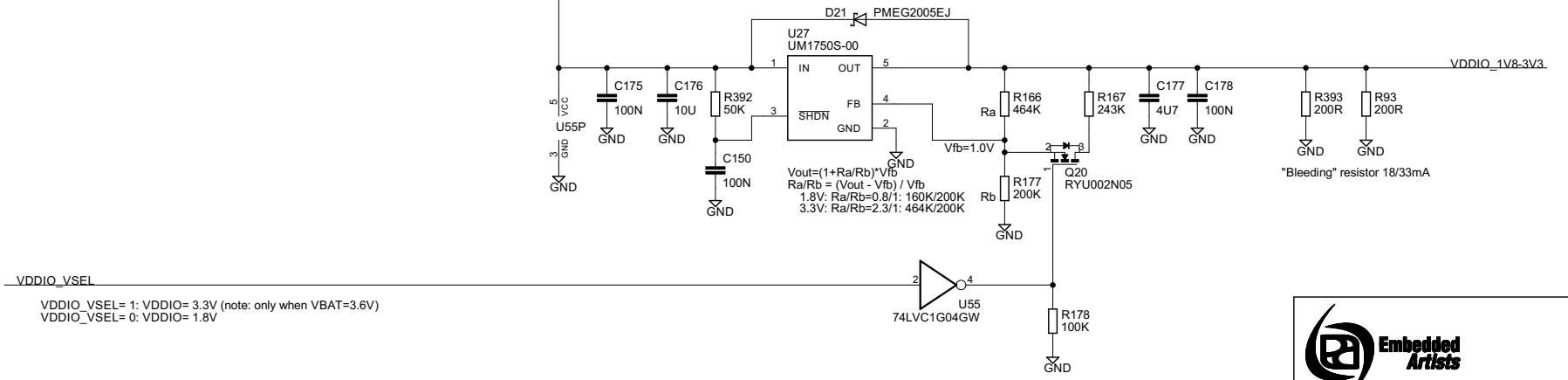
3.6 or 3.3V / 3A VBAT



32.768 kHz oscillator



1.8V or 3.3V/350mA VDDIO



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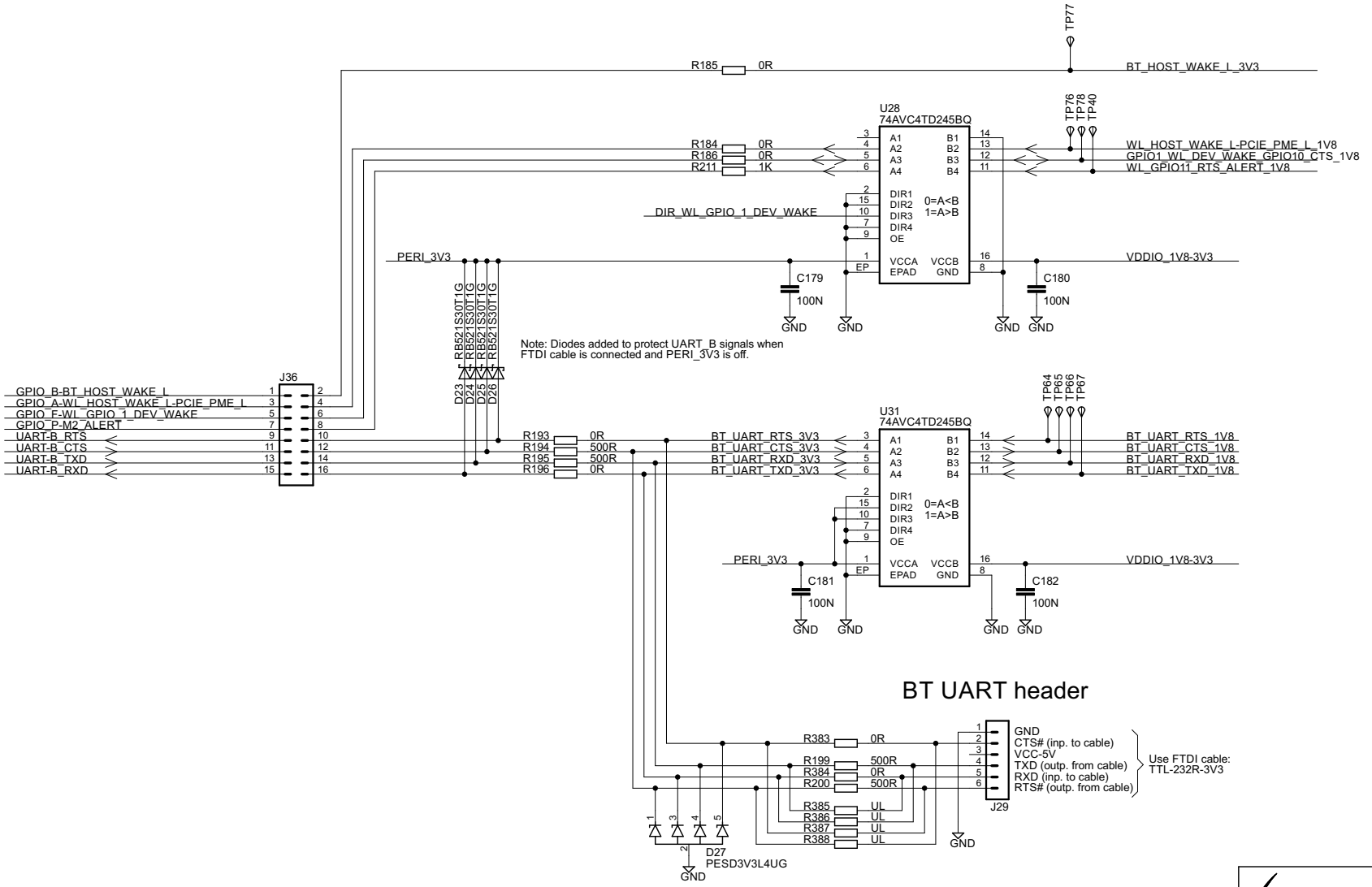
Level Translation for BT UART and Control Signals



Embedded Artists

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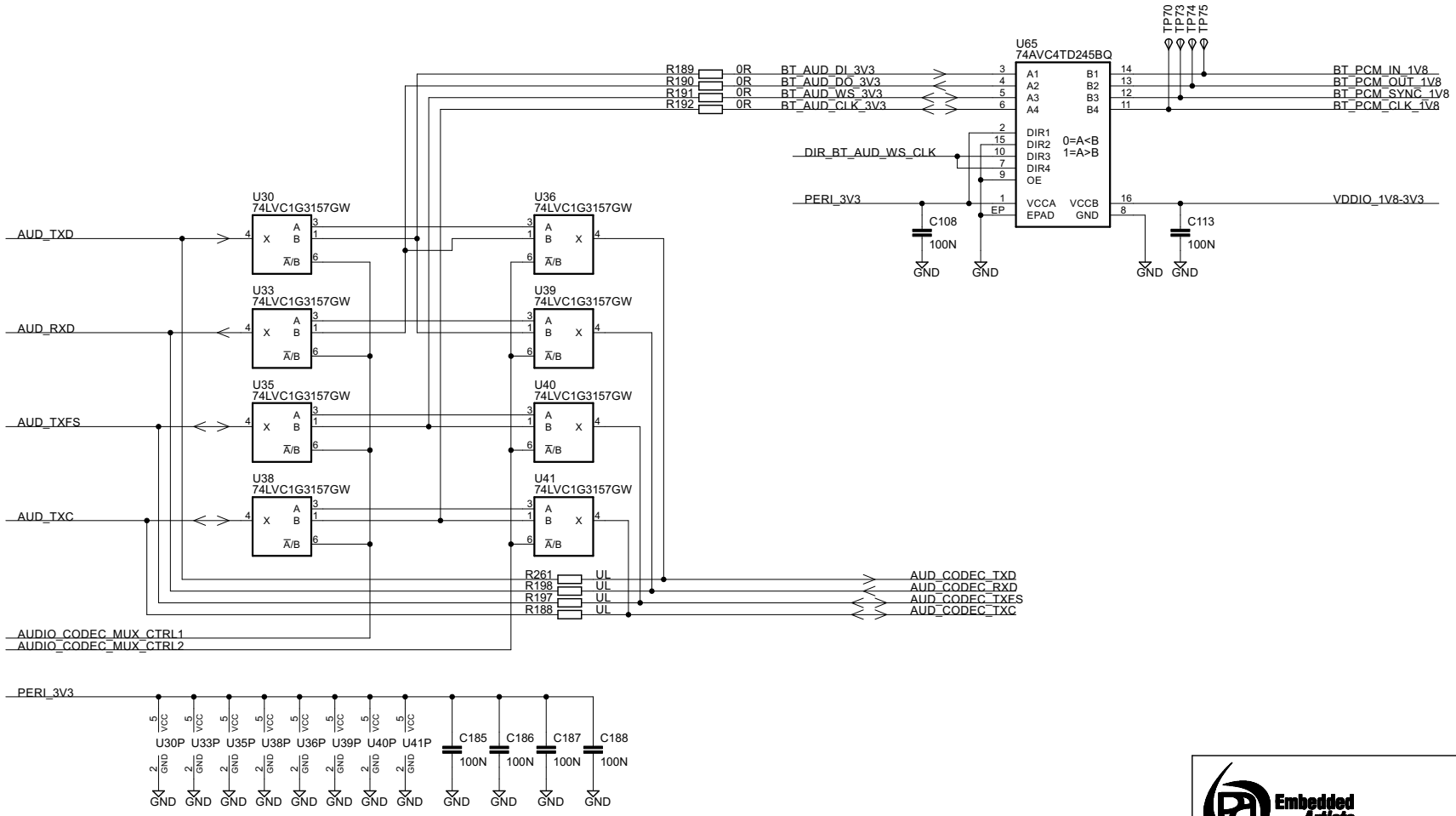
Level Translation and Audio Signal Multiplexing



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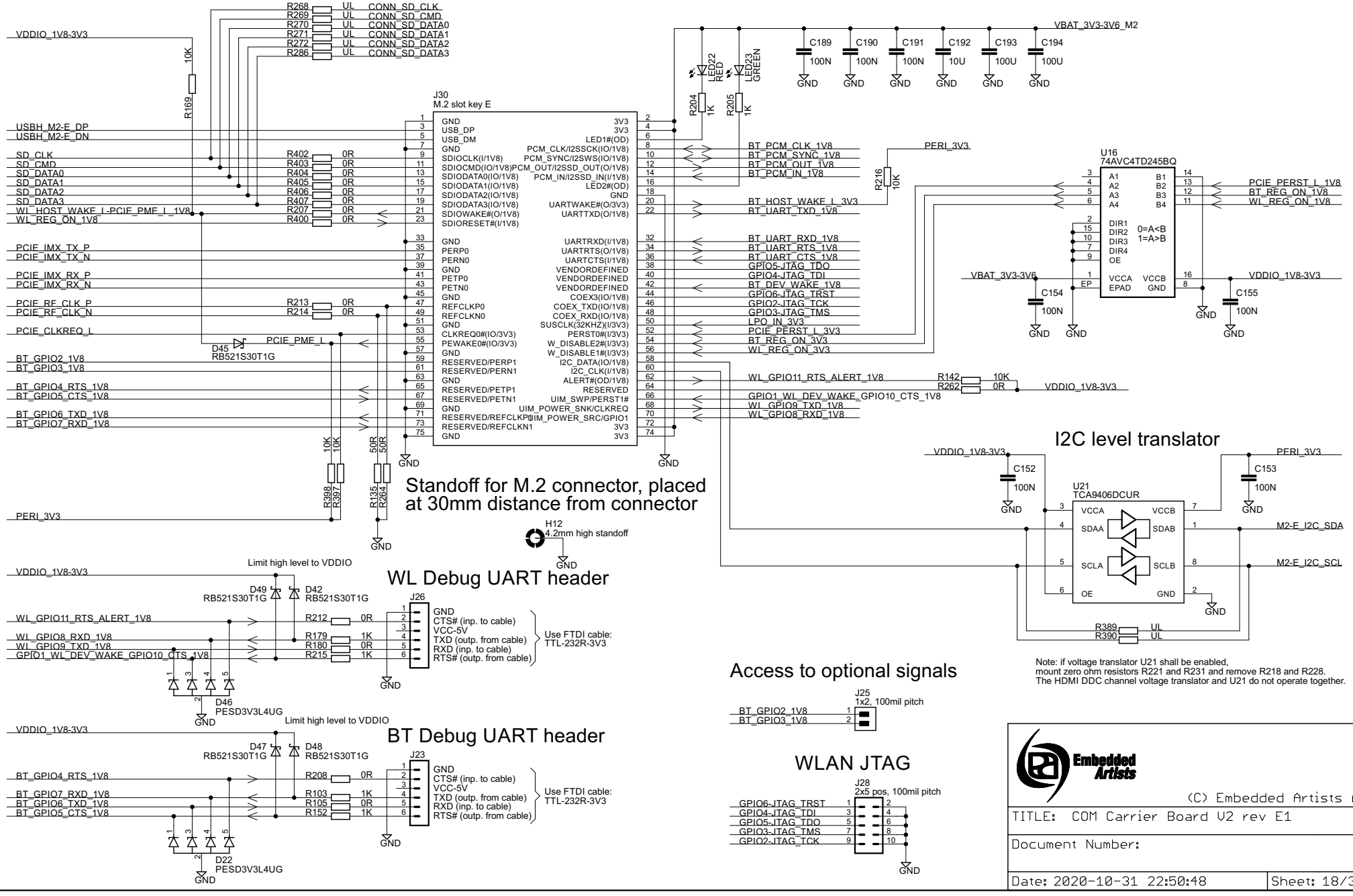
M.2 (NGFF) Key E Connector

Note: Set VDDIO to 1.8V and VBAT to 3.3V.
Only use other settings with extreme care!

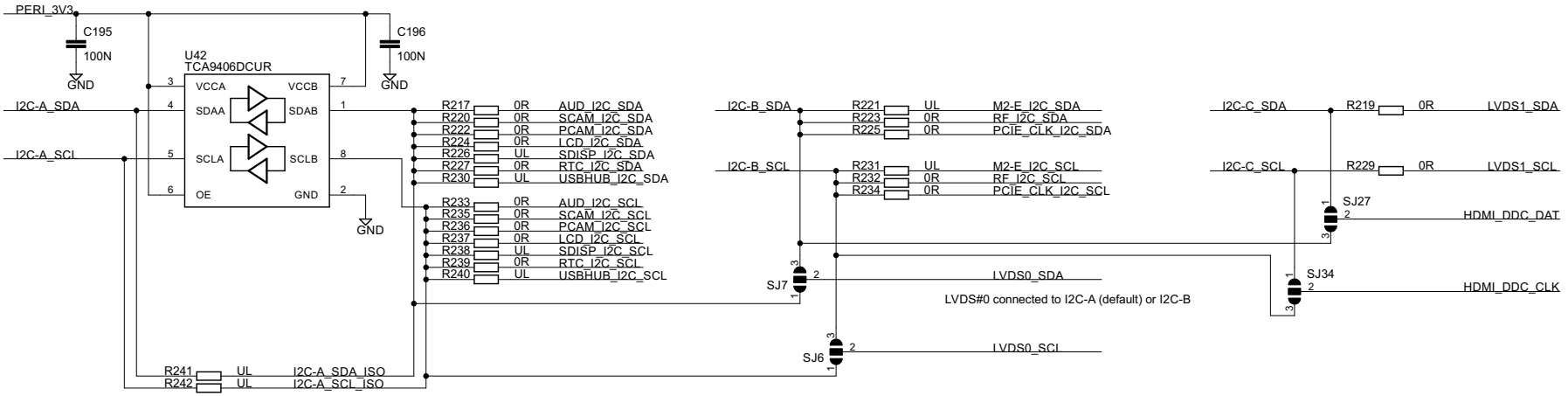


I2C Connections

I2C-A

I2C-B

I2C-C



Audio codec: WM8731SEDS
8-bit I2C address (0x34/0x35): 0.0.1.1.0.1.0.RW
7-bit I2C address (0x1A): 0.0.1.1.0.1.0

RTC: PCF8523
8-bit I2C address (0xD0/0xD1): 1.1.0.1.0.0.0.RW
7-bit I2C address (0x68): 1.1.0.1.0.0.0

GPIO expander: PCA6416APW
8-bit I2C address (0x40/0x41): 0.1.0.0.0.0.0.ADDR.RW
7-bit I2C address (0x20): 0.1.0.0.0.0.0.ADDR

Clock generator: 9FGV0241AKILF
8-bit I2C address (0xD4/0xD5): 1.1.0.1.0.1.0.RW
7-bit I2C address (0x6A): 1.1.0.1.0.1.0

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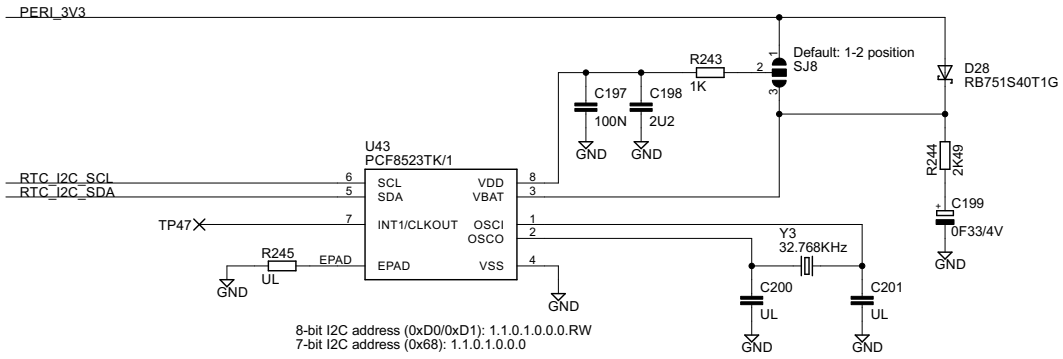
Real-Time Clock

Real Time Clock (PCF8523) with I2C interface
Standby mode: 150nA (typ)



Backup time calculation:

Super capacitor voltage: 3.3-Vf down to 1.0V = 3.0 - 1.0 Volt
RTC current: 150nA typically at 25 degrees C (up to 500nA over temperature range)
Diode leakage: 10nA at 25 degrees C up to 300nA at 60 degrees C

$$t = \frac{C\,(V_{max}-V_{min})}{I_{max}} = \frac{0.33\,(3.0 - 1.0)}{0.000\,000\,8} = 825\,000 \text{ sec} = 229 \text{ hours} = 9.5 \text{ days}$$

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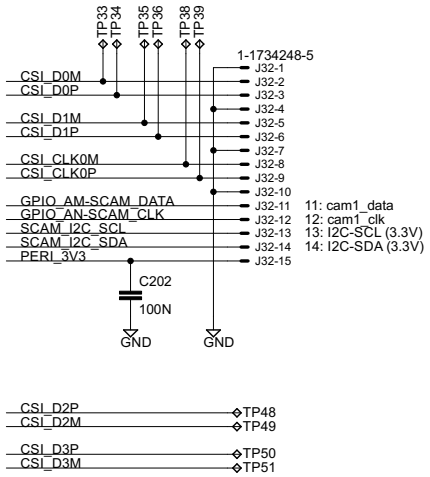
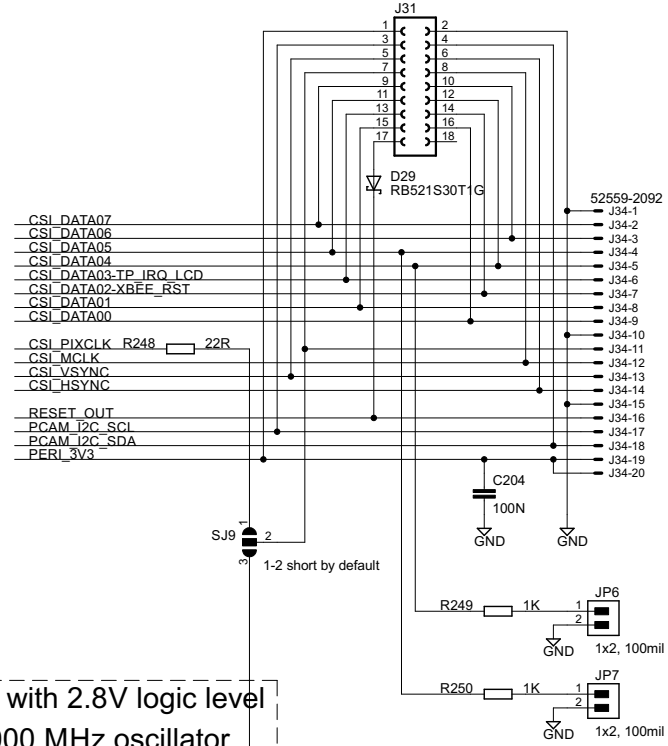
Camera / Display Interfaces

RPI serial camera (MIPI)



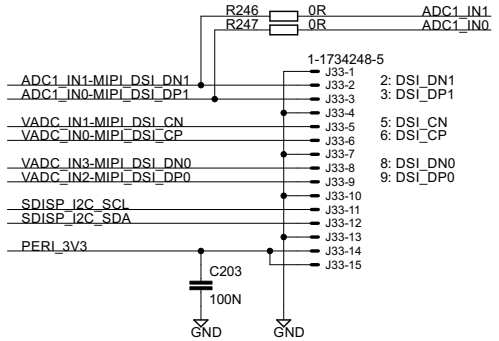
Parallel camera interface (+3.3V logic levels)



Note: Place resistors so that stubs on camera signals are minimized.

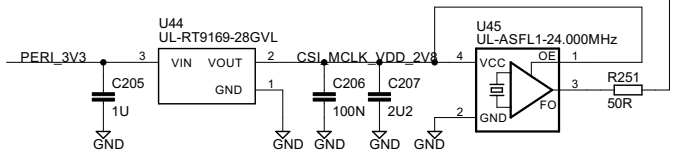
RPI serial display (MIPI) or VADC signals

Note: Place resistors so that stubs on displays signals are minimized.



Alternative CSI_MCLK, 24MHz with 2.8V logic level

2.8V/100mA 24.000 MHz oscillator



Not mounted. Just pads on pcb.

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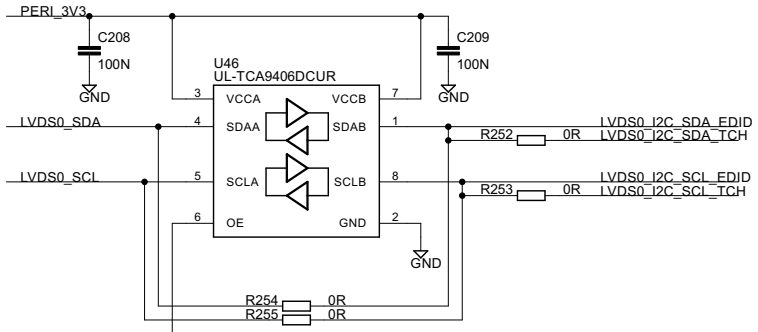
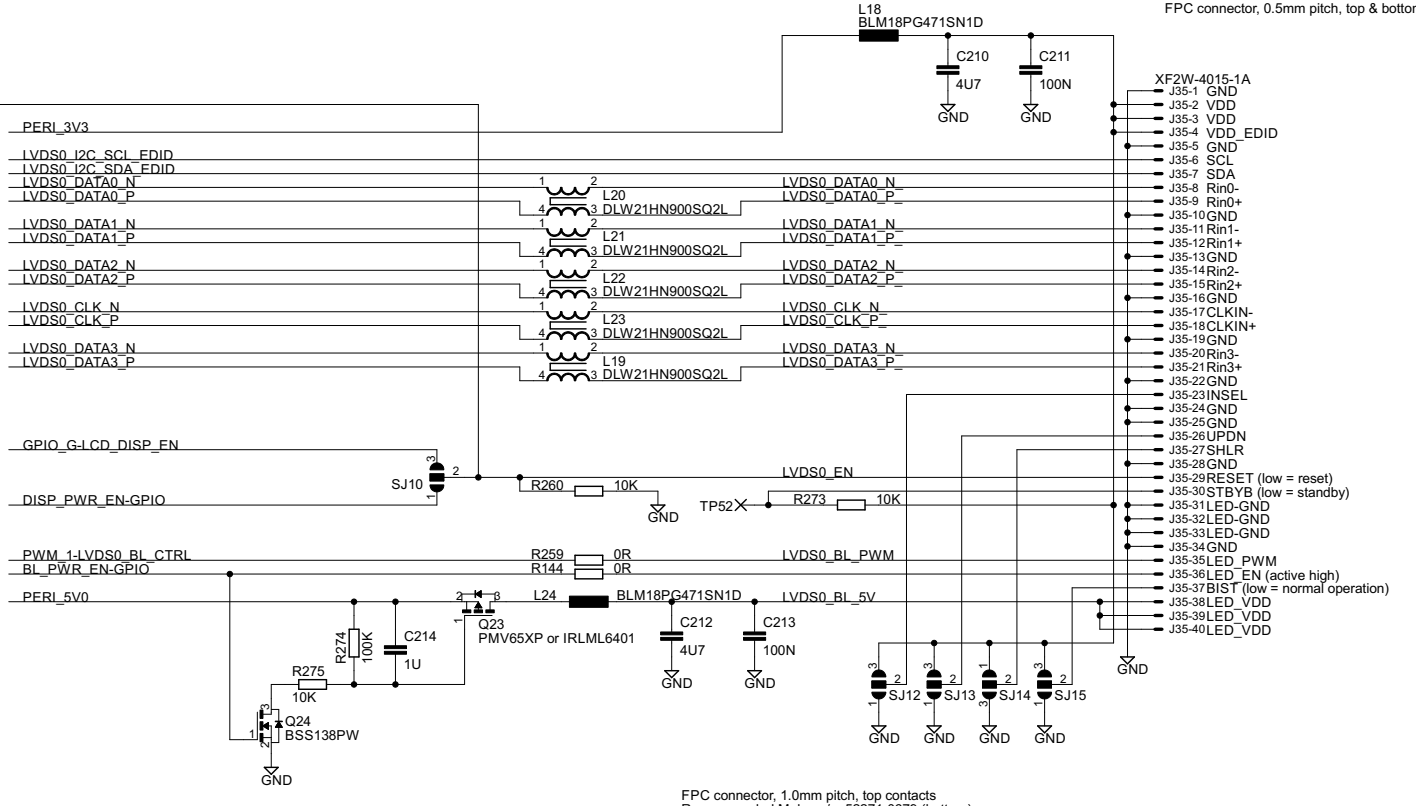
LVDS Interface #0



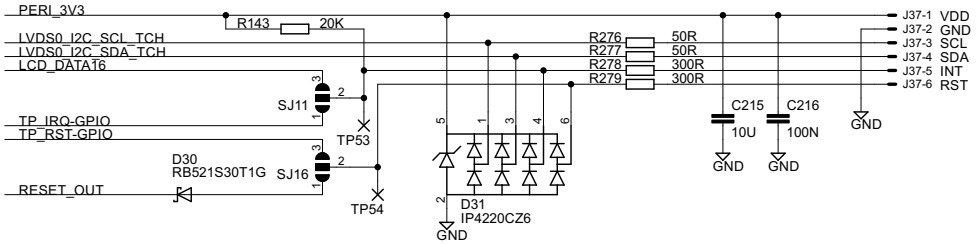
New Haven Displays
NHD-10.1-1024600AF-LSXV-CTP

NHD-10.1-1024600:24:29232073,1024,600,160,160,23,12,0,0,0,0,0,0

FPC connector, 0.5mm pitch, top & bottom contacts



FPC connector, 1.0mm pitch, top contacts
Recommended Molex p/n: 52271-0679 (bottom)



TITLE: COM Carrier Board V2 rev E1

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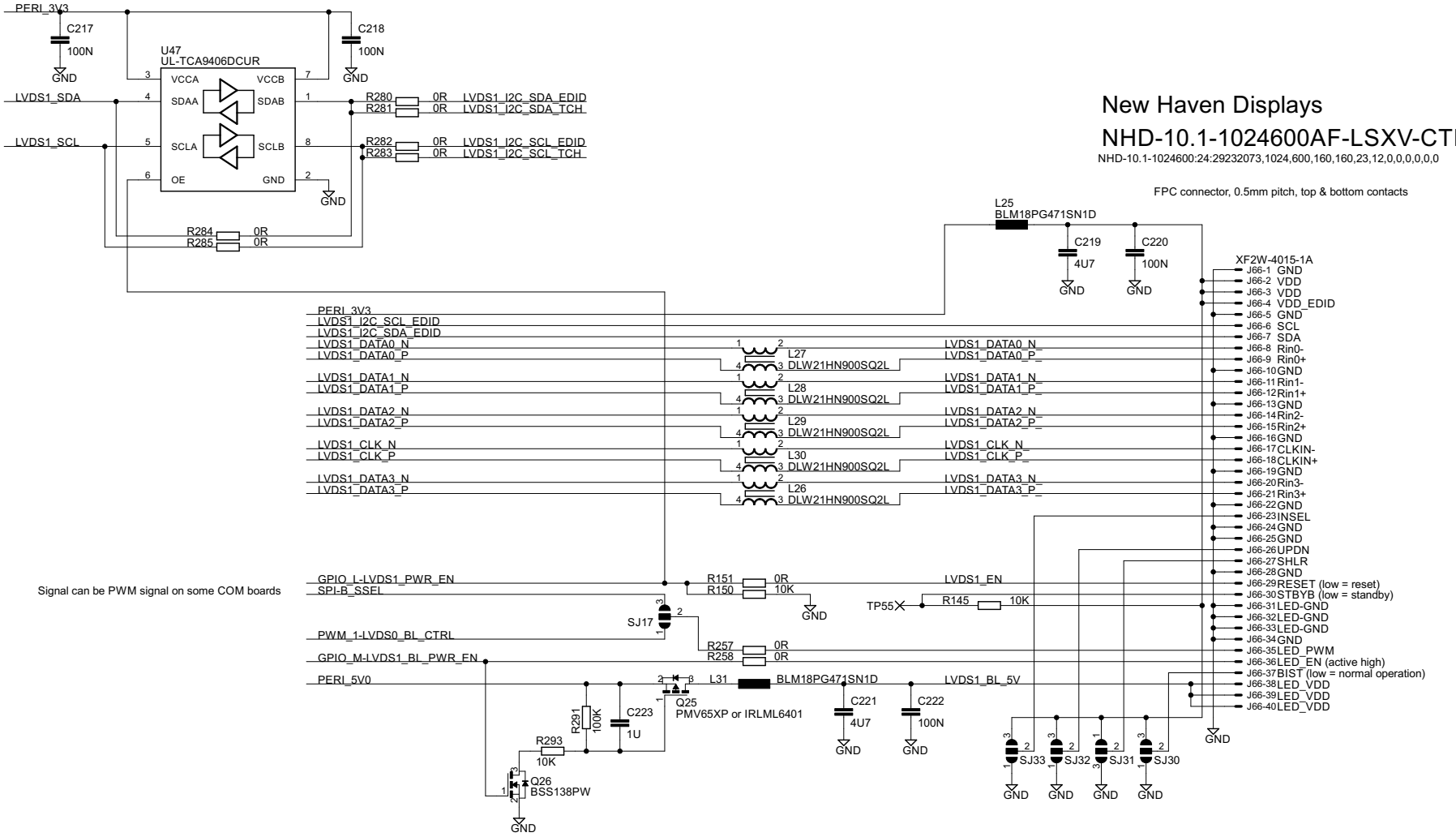
LVDS Interface #1



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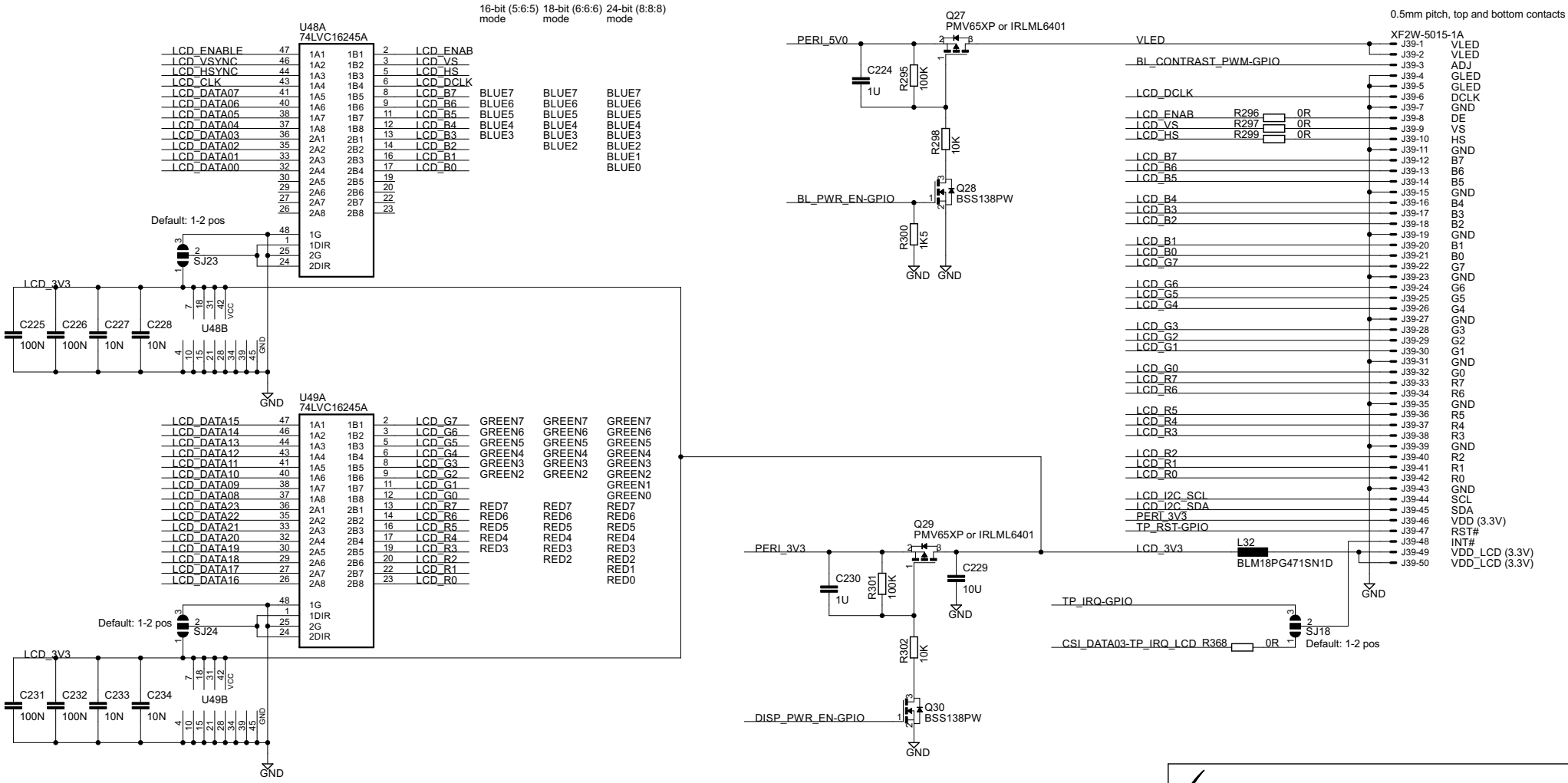
Parallel LCD Interface



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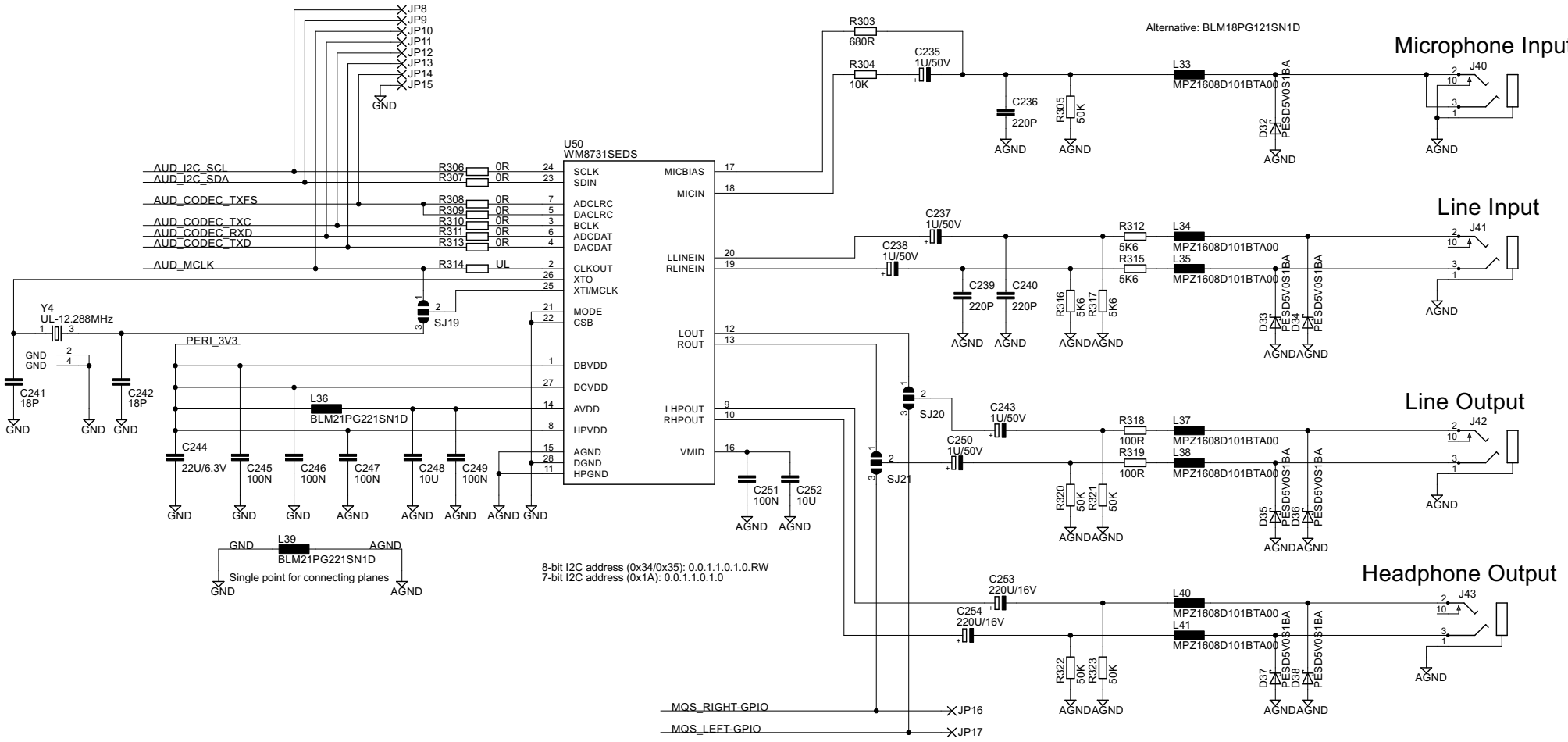
Audio Interface



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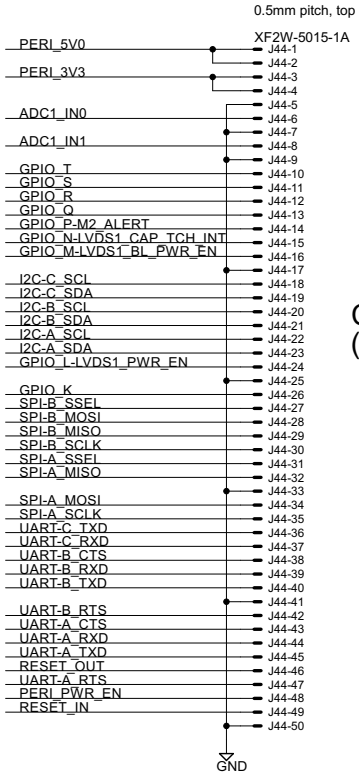
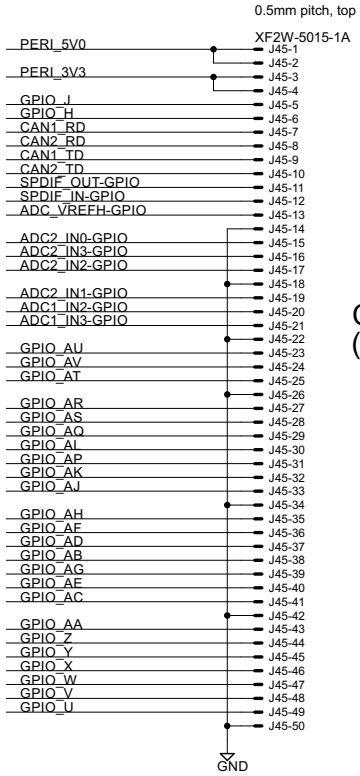
Expansion Connectors

Dual 50-pos FPC Connectors (0.50mm pitch)



Connector "A"
(in silkscreen on PCB)



Connector "B"
(in silkscreen on PCB)

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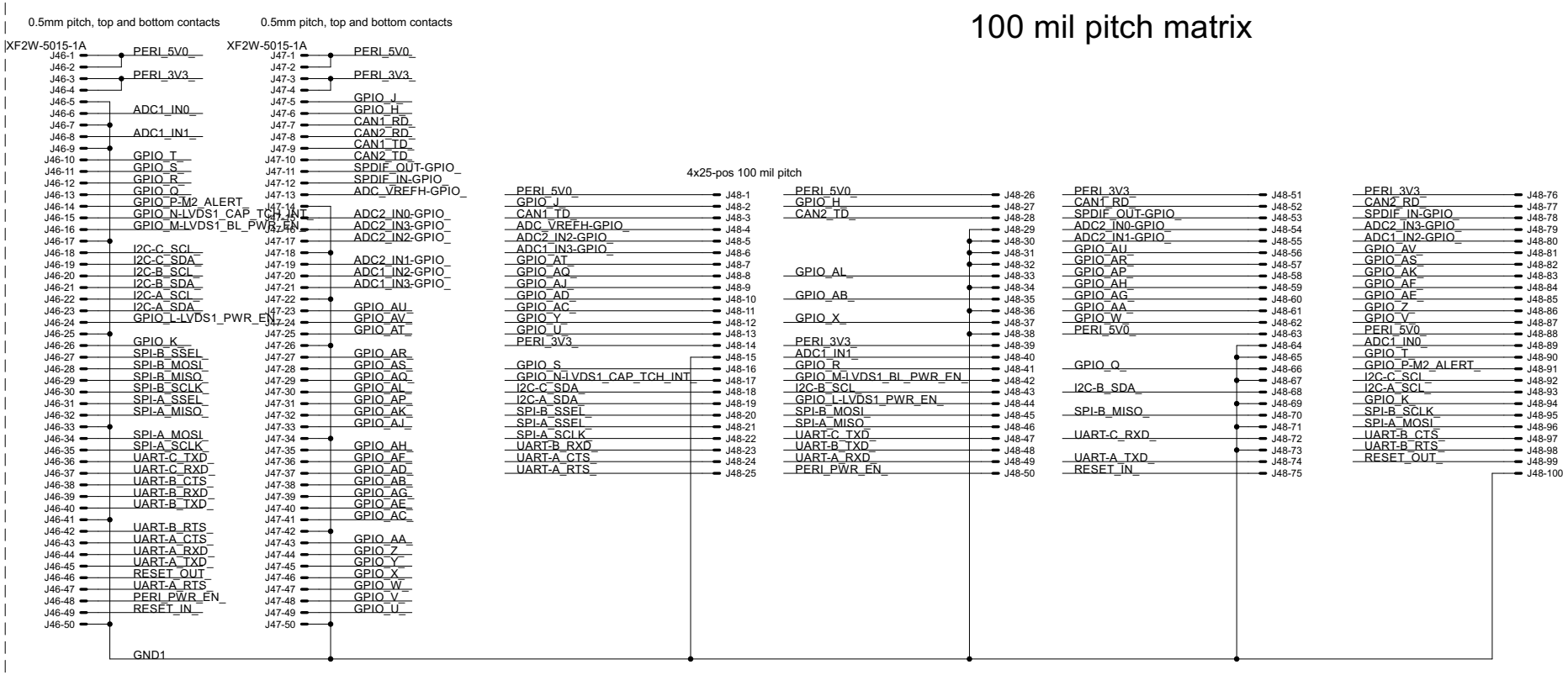
Break-off Board for Expansion Connectors

Break-off Board with 100 mil pich access to all signals



100 mil pitch matrix

Connector "A" (in silkscreen on PCB)

Connector "B" (in silkscreen on PCB)

TITLE: COM Carrier Board V2 rev E1

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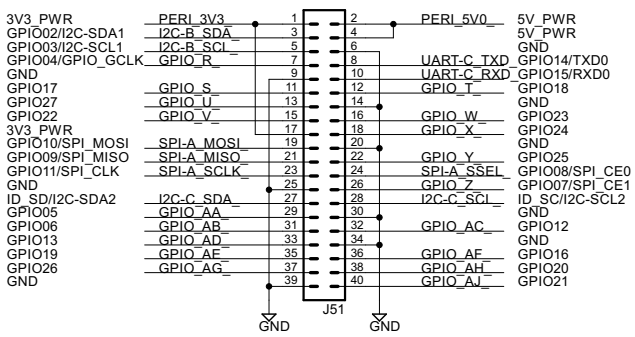
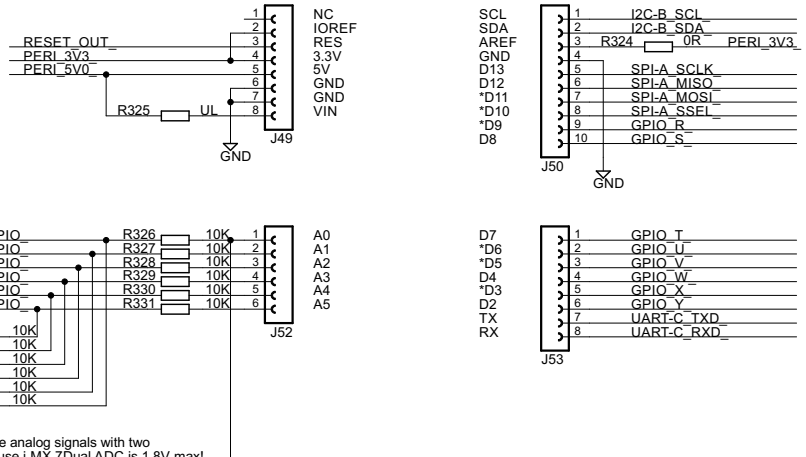
Multiple Expansion Connectors

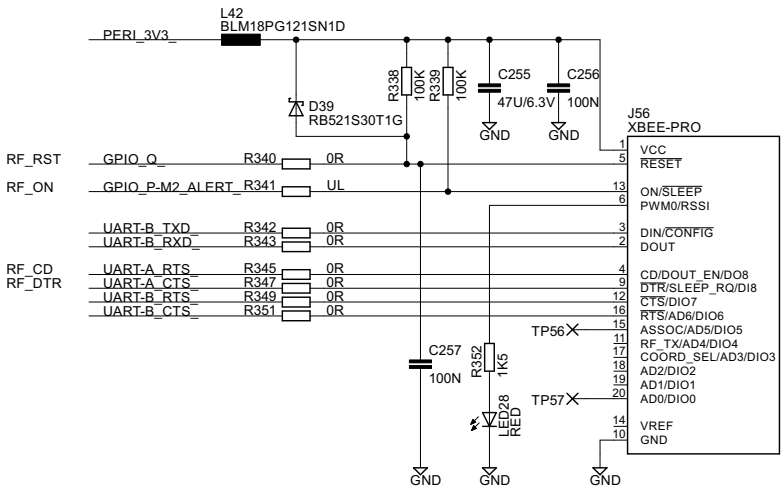
RPi Expansion Connector



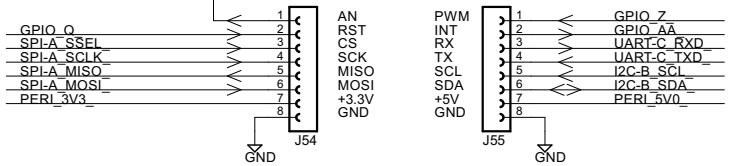
Arduino Shield receptacles R3



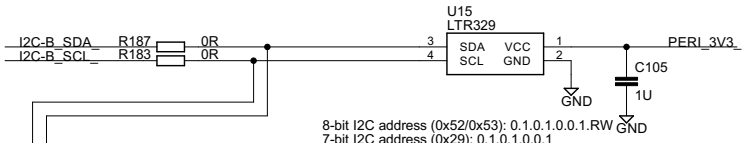
Digi XBee(R) RF-module



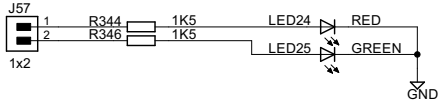
Click Module



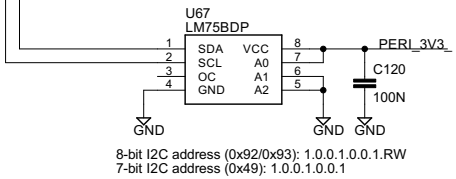
LTR329 I2C Light Sensor



LEDs



LM75 I2C Temperature Sensor



Embedded Artists

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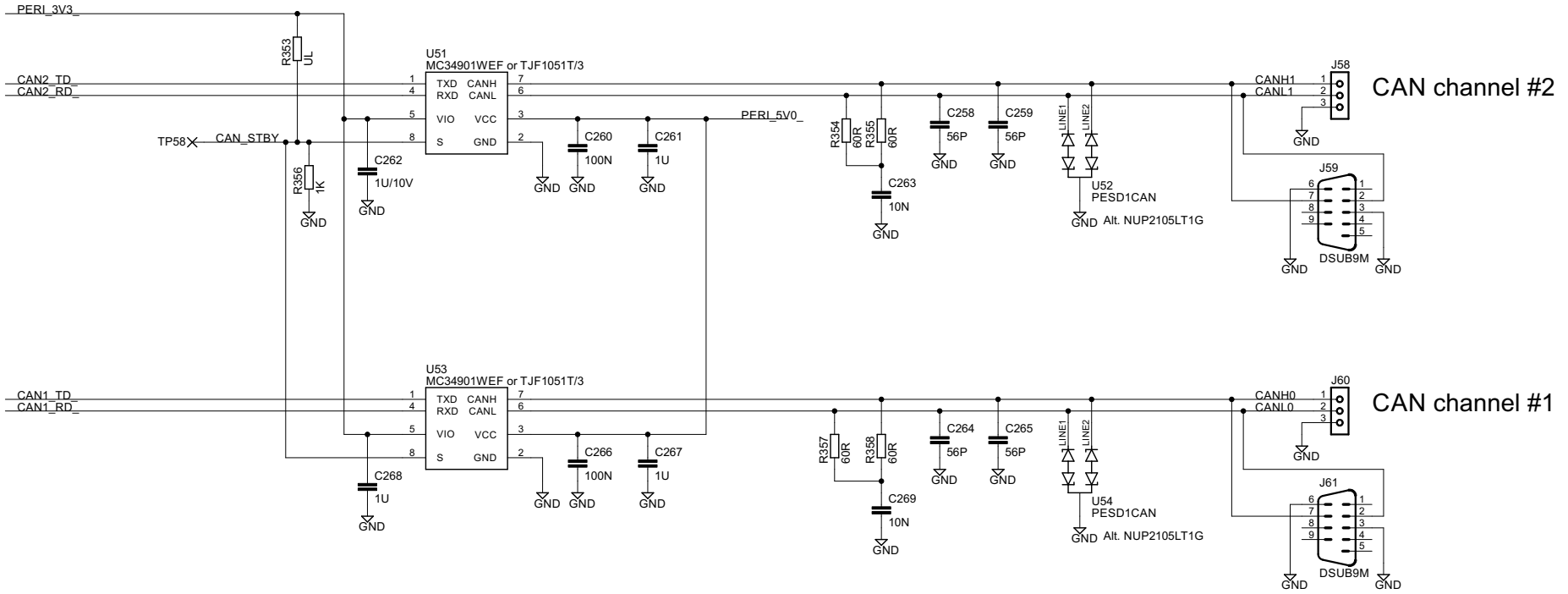
CAN Interfaces

CAN transceivers



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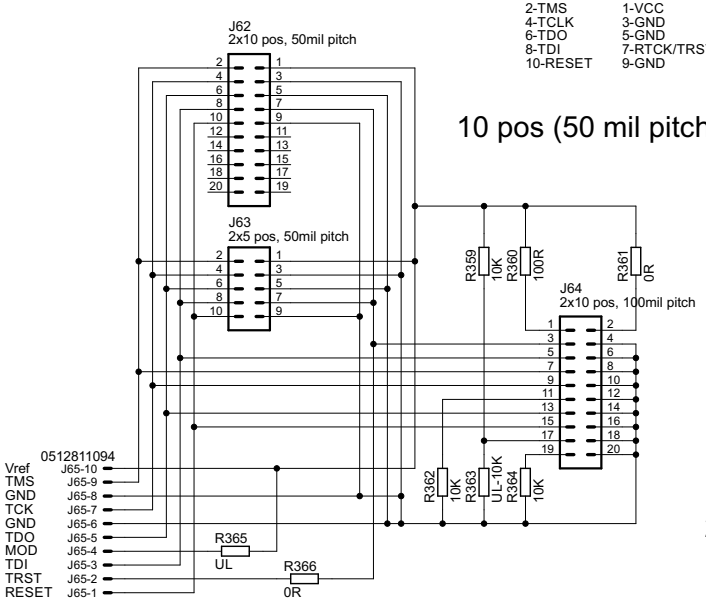
Debug Interface

JTAG Debug Interfaces ARM 10-pin interface JTAG Mode

2-TMS	1-VCC
4-TCLK	3-GND
6-TDO	5-GND
8-TDI	7-RTCK/TRST
10-RESET	9-GND



10 pos (50 mil pitch) connector

ARM 20-pin interface JTAG Mode

1-VCC (Vtref)	2-N/C
3-N/C (TRST)	4-GND
5-TDI	6-GND
7-TMS	8-GND
9-TCLK	10-GND
11-RTCK	12-GND
13-TDO	14-GND
15-RESET	16-GND
17-N/C	18-GND
19-N/C	20-GND

20 pos (100 mil pitch) connector

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