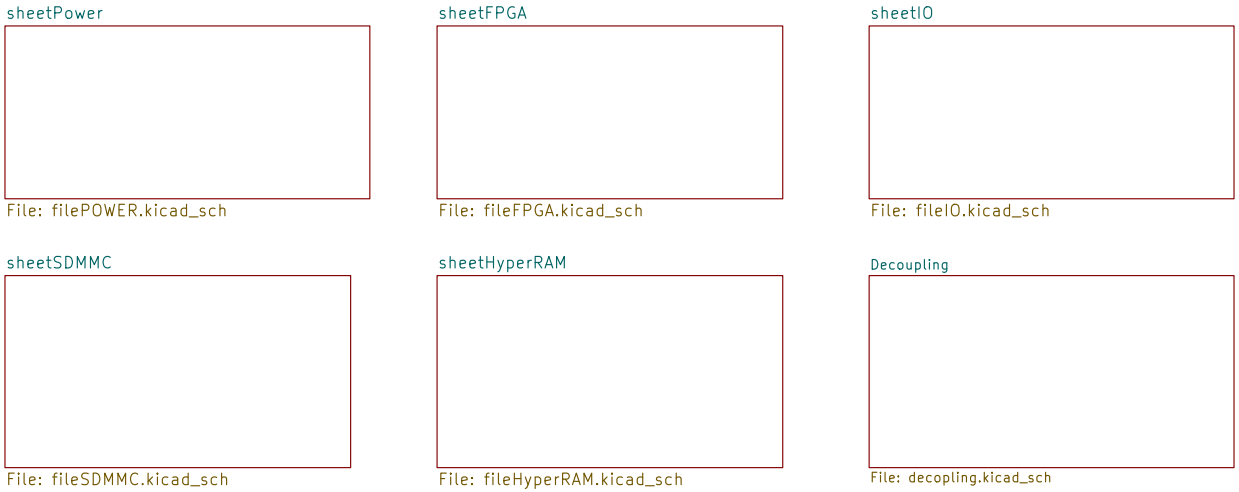
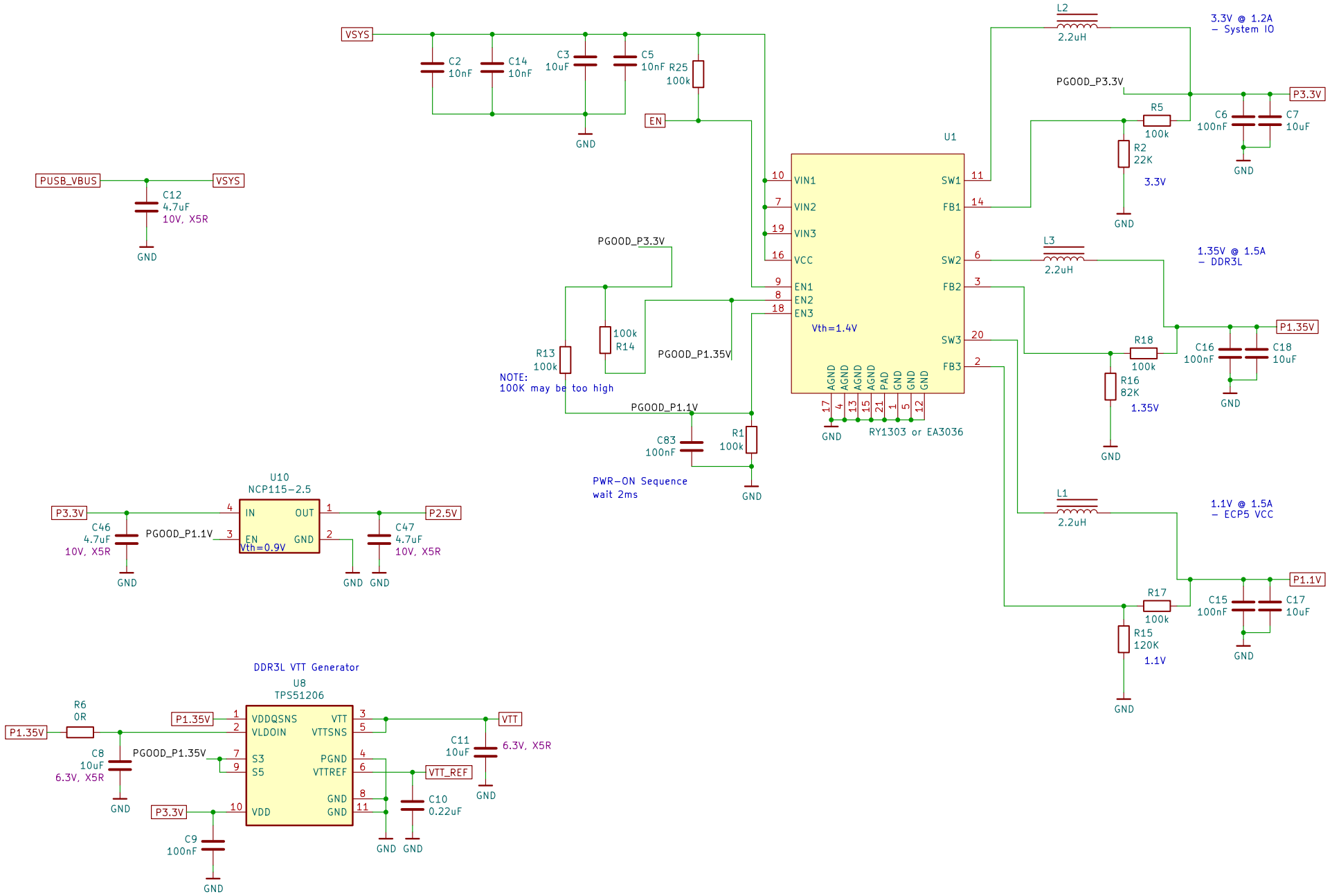
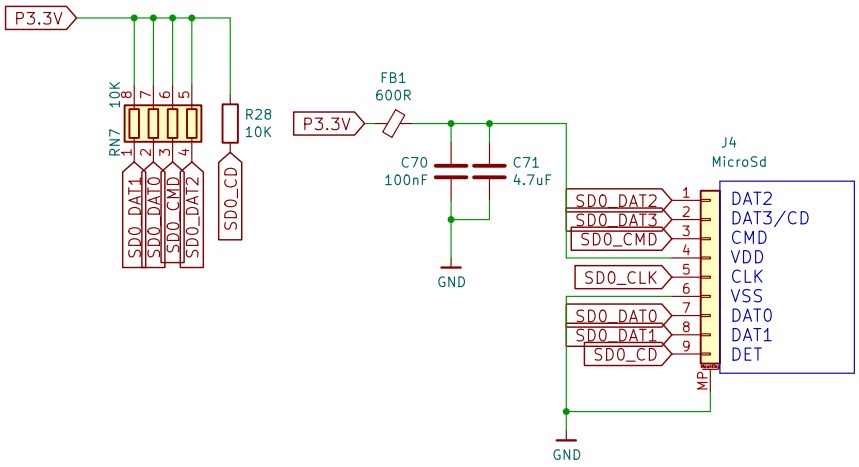
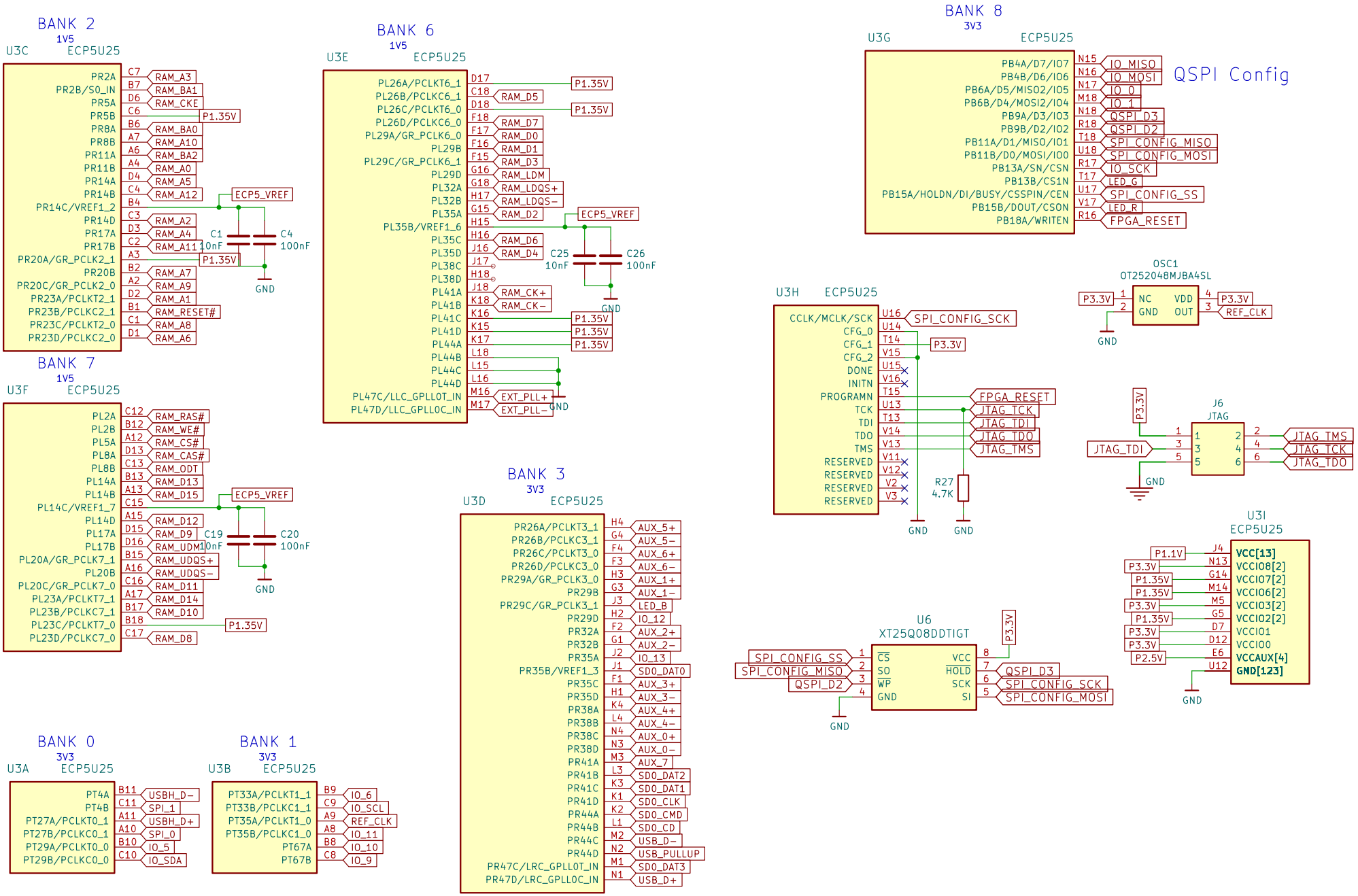
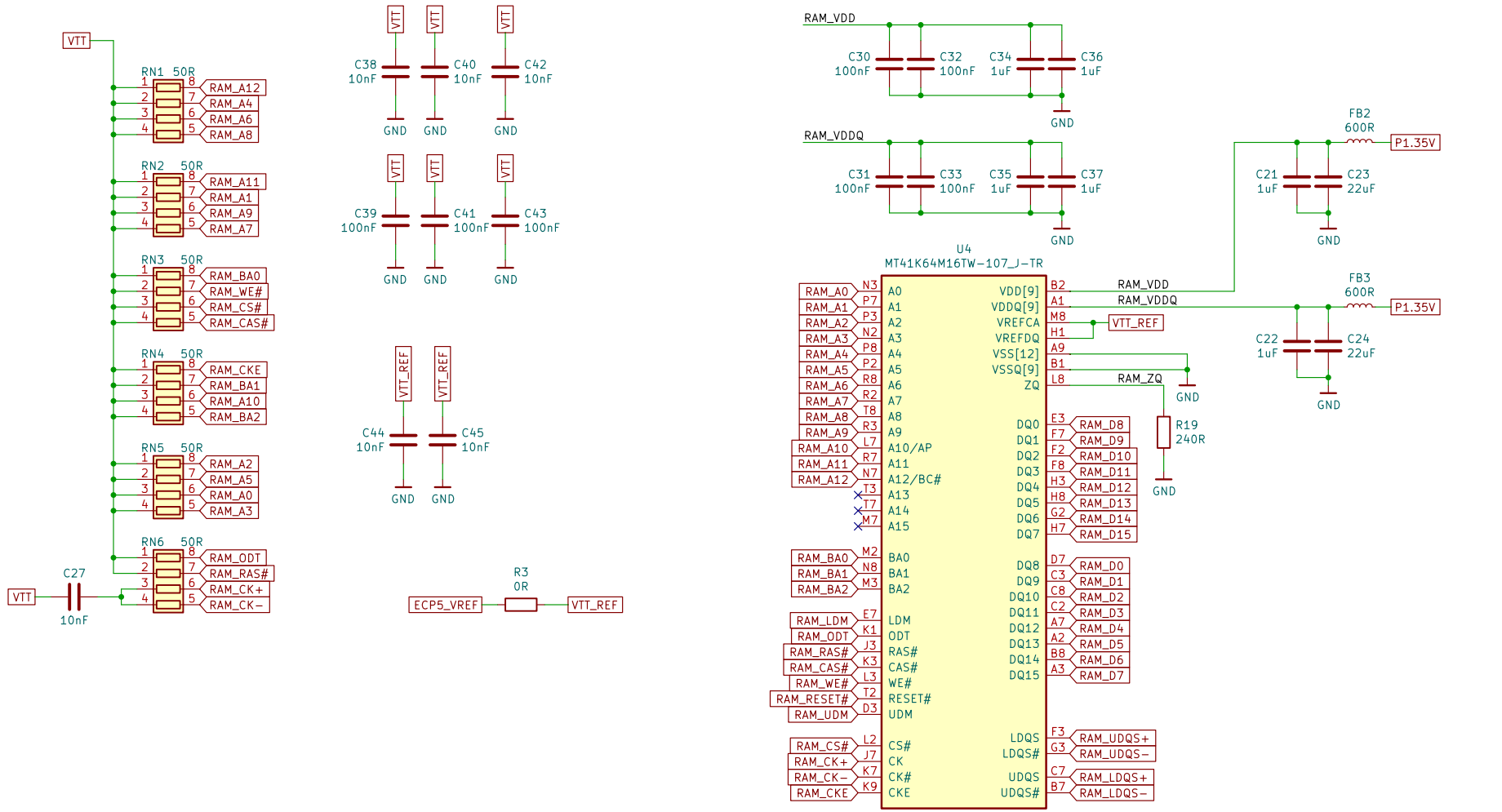
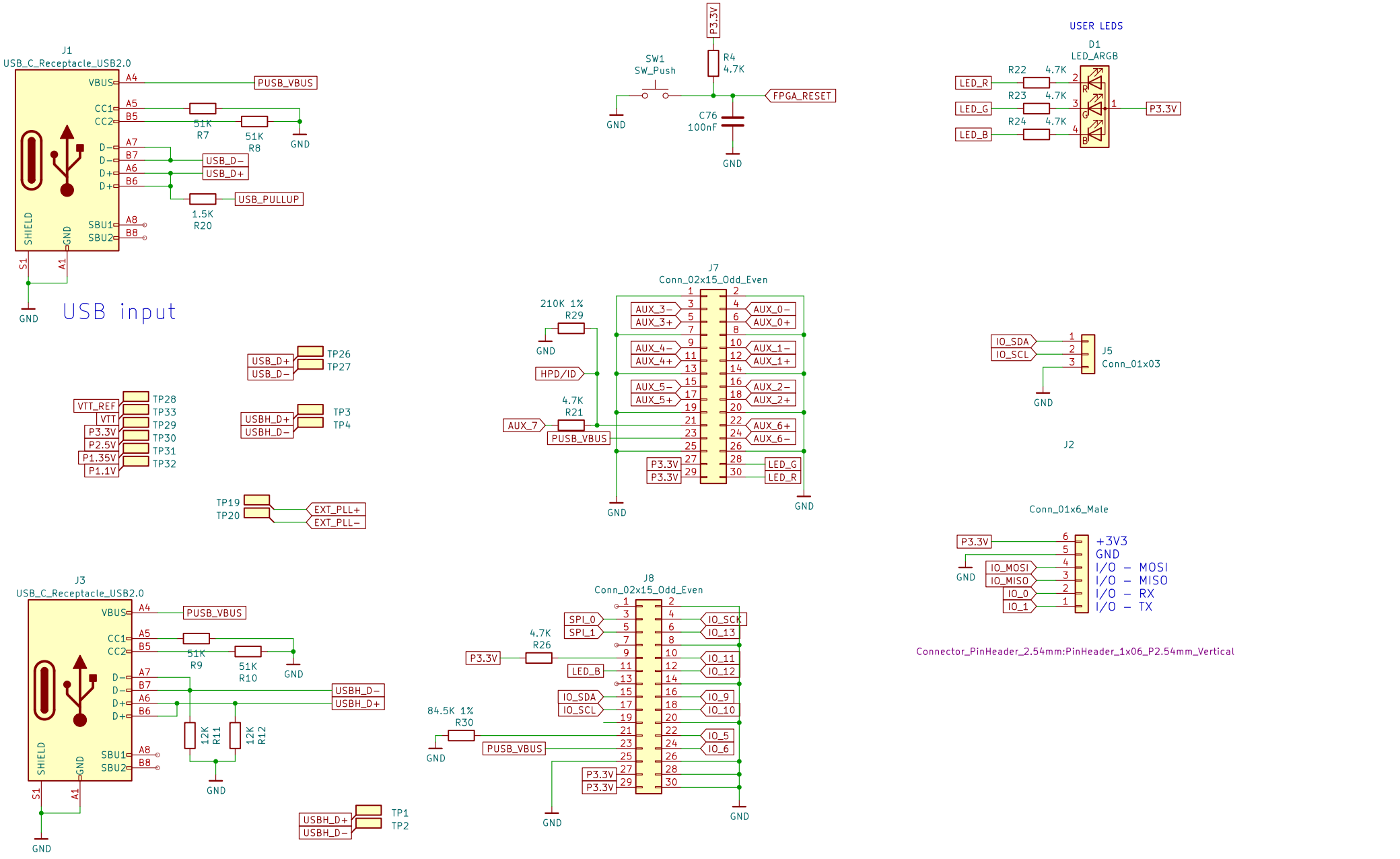

sheetPower
File: filePOWER.kicad_sch
sheetFPGA
File: fileFPGA.kicad_sch
sheetIO
File: fileIO.kicad_sch
sheetSDMMC
File: fileSDMMC.kicad_sch
sheetHyperRAM
File: fileHyperRAM.kicad_sch
Decoupling
File: decopling.kicad_sch

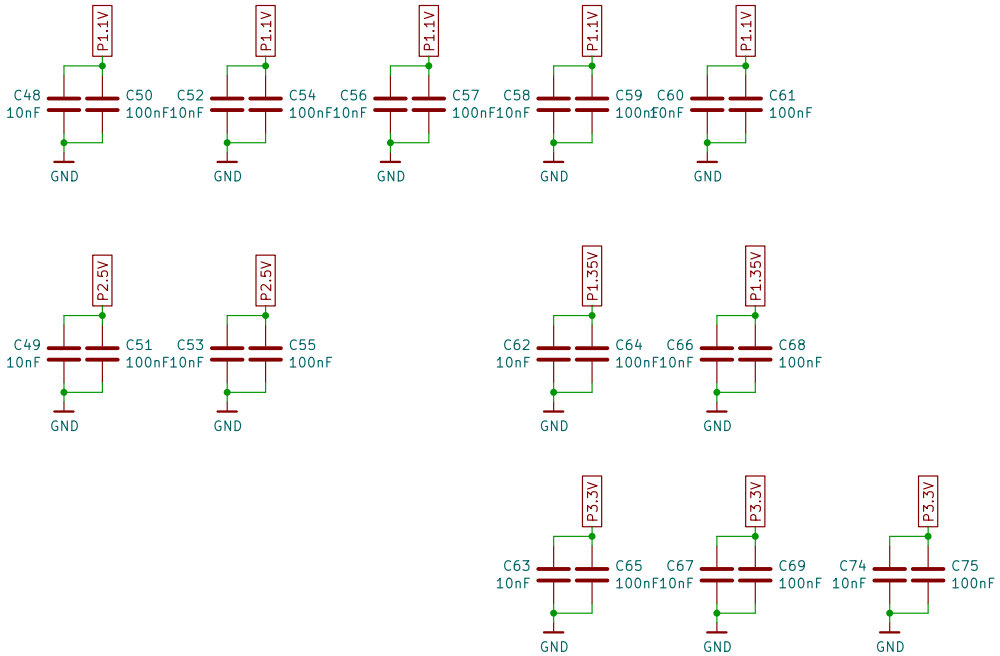

VSYS
C2
10nF
C14
10nF
C3
10uF
C5
10nF
R25
100k
EN
GND
PUSB_VBUS
C12
4.7uF
10V, X5R
GND
U1
VIN1
VIN2
VIN3
VCC
EN1
EN2
EN3
Vth=1.4V
SW1
FB1
SW2
FB2
SW3
FB3
AGND
PAD
GND
RY1303 or EA3036
L2
2.2uH
3.3V @ 1.2A
– System IO
PGOOD_P3.3V
R5
100k
R2
22K
3.3V
C6
100nF
C7
10uF
P3.3V
L3
2.2uH
1.35V @ 1.5A
– DDR3L
R18
100k
R16
82K
1.35V
C16
100nF
C18
10uF
P1.35V
L1
2.2uH
1.1V @ 1.5A
– ECP5 VCC
R17
100k
R15
120K
1.1V
C15
100nF
C17
10uF
P1.1V
R13
100k
R14
100k
NOTE:
100K may be too high
PGOOD_P1.35V
PGOOD_P1.1V
C83
100nF
R1
100k
PWR–ON Sequence
wait 2ms
U10
NCP115–2.5
IN
OUT
EN
GND
Vth=0.9V
P3.3V
P2.5V
C46
4.7uF
10V, X5R
C47
4.7uF
10V, X5R
PGOOD_P1.1V
DDR3L VTT Generator
U8
TPS51206
VDDQSNS
VLDOIN
S3
S5
VDD
VTT
VTTSNS
PGOOD
VTTREF
R6
0R
C8
10uF
6.3V, X5R
C9
100nF
C10
0.22uF
C11
10uF
6.3V, X5R
VTT_REF


P3.3V
RN7
10K
8
7
6
5
1
2
3
4
SD0_DAT1
SD0_DAT0
SD0_CMD
SD0_DAT2
R28
10K
SD0_CD
FB1
600R
P3.3V
C70
100nF
C71
4.7uF
GND
J4
MicroSd
SD0_DAT2
SD0_DAT3
SD0_CMD
SD0_CLK
SD0_DAT0
SD0_DAT1
SD0_CD
1
2
3
4
5
6
7
8
9
MP
DAT2
DAT3/CD
CMD
VDD
CLK
VSS
DAT0
DAT1
DET
GND


BANK 2
1V5
U3C ECP5U25
PR2A C7 RAM_A3
PR2B/SO_IN B7 RAM_BA1
PR5A D6 RAM_CKE
PR5B C6 P1.35V
PR8A B6 RAM_BA0
PR8B A7 RAM_A10
PR11A A6 RAM_BA2
PR11B A4 RAM_A0
PR14A D4 RAM_A5
PR14B C4 RAM_A12
PR14C/VREF1_2 B4 ECP5_VREF
PR14D C3 RAM_A2
PR17A D3 RAM_A4
PR17B C2 RAM_A11
PR20A/GR_PCLK2_1 A3 P1.35V
PR20B B2 RAM_A7
PR20C/GR_PCLK2_0 A2 RAM_A9
PR23A/PCLKT2_1 D2 RAM_A1
PR23B/PCLKC2_1 B1 RAM_RESET#
PR23C/PCLKT2_0 C1 RAM_A8
PR23D/PCLKC2_0 D1 RAM_A6
C1 10nF
C4 100nF
GND
BANK 7
1V5
U3F ECP5U25
PL2A C12 RAM_RAS#
PL2B B12 RAM_WE#
PL5A A12 RAM_CS#
PL8A D13 RAM_CAS#
PL8B C13 RAM_ODT
PL14A B13 RAM_D13
PL14B A13 RAM_D15
PL14C/VREF1_7 C15 ECP5_VREF
PL14D A15 RAM_D12
PL17A D15 RAM_D9
PL17B D16 RAM_UDM
PL20A/GR_PCLK7_1 B15 RAM_UDQS+
PL20B A16 RAM_UDQS-
PL20C/GR_PCLK7_0 C16 RAM_D11
PL23A/PCLKT7_1 A17 RAM_D14
PL23B/PCLKC7_1 B17 RAM_D10
PL23C/PCLKT7_0 B18 P1.35V
PL23D/PCLKC7_0 C17 RAM_D8
C19 10nF
C20 100nF
GND
BANK 6
1V5
U3E ECP5U25
PL26A/PCLKT6_1 D17 P1.35V
PL26B/PCLKC6_1 C18 RAM_D5
PL26C/PCLKT6_0 D18 P1.35V
PL26D/PCLKC6_0 F18 RAM_D7
PL29A/GR_PCLK6_0 F17 RAM_D0
PL29B F16 RAM_D1
PL29C/GR_PCLK6_1 F15 RAM_D3
PL29D G16 RAM_LDM
PL32A G18 RAM_LDQS+
PL32B H17 RAM_LDQS-
PL35A G15 RAM_D2
PL35B/VREF1_6 H15 ECP5_VREF
PL35C H16 RAM_D6
PL35D J16 RAM_D4
PL38C J17
PL38D H18
PL41A J18 RAM_CK+
PL41B K18 RAM_CK-
PL41C K16 P1.35V
PL41D K15 P1.35V
PL44A K17 P1.35V
PL44B L18
PL44C L15
PL44D L16
PL47C/LLC_GPLL0T_IN M16 EXT_PLL+
PL47D/LLC_GPLL0C_IN M17 EXT_PLL-
C25 10nF
C26 100nF
GND
BANK 3
3V3
U3D ECP5U25
PR26A/PCLKT3_1 H4 AUX_5+
PR26B/PCLKC3_1 G4 AUX_5-
PR26C/PCLKT3_0 F4 AUX_6+
PR26D/PCLKC3_0 F3 AUX_6-
PR29A/GR_PCLK3_0 H3 AUX_1+
PR29B G3 AUX_1-
PR29C/GR_PCLK3_1 J3 LED_B
PR29D H2 IO_12
PR32A F2 AUX_2+
PR32B G1 AUX_2-
PR35A J2 IO_13
PR35B/VREF1_3 J1 SDO_DAT0
PR35C F1 AUX_3+
PR35D H1 AUX_3-
PR38A K4 AUX_4+
PR38B L4 AUX_4-
PR38C N4 AUX_0+
PR38D N3 AUX_0-
PR41A M3 AUX_7
PR41B L3 SDO_DAT2
PR41C K3 SDO_DAT1
PR41D K1 SDO_CLK
PR44A K2 SDO_CMD
PR44B L1 SDO_CD
PR44C M2 USB_D-
PR44D N2 USB_PULLUP
PR47C/LRC_GPLL0T_IN M1 SDO_DAT3
PR47D/LRC_GPLL0C_IN N1 USB_D+
BANK 0
3V3
U3A ECP5U25
PT4A B11 USBH_D-
PT4B C11 SPI_1
PT27A/PCLKT0_1 A11 USBH_D+
PT27B/PCLKC0_1 A10 SPI_0
PT29A/PCLKT0_0 B10 IO_5
PT29B/PCLKC0_0 C10 IO_SDA
BANK 1
3V3
U3B ECP5U25
PT33A/PCLKT1_1 B9 IO_6
PT33B/PCLKC1_1 C9 IO_SCL
PT35A/PCLKT1_0 A9 REF_CLK
PT35B/PCLKC1_0 A8 IO_11
PT67A B8 IO_10
PT67B C8 IO_9
BANK 8
3V3
U3G ECP5U25
PB4A/D7/IO7 N15 IO_MISO
PB4B/D6/IO6 N16 IO_MOSI
PB6A/D5/MISO2/IO5 N17 IO_0
PB6B/D4/MOSI2/IO4 M18 IO_1
PB9A/D3/IO3 N18 QSPI_D3
PB9B/D2/IO2 R18 QSPI_D2
PB11A/D1/MISO/IO1 T18 SPI_CONFIG_MISO
PB11B/D0/MOSI/IO0 U18 SPI_CONFIG_MOSI
PB13A/SN/CSN R17 IO_SCK
PB13B/CS1N T17 LED_G
PB15A/HOLDN/DI/BUSY/CSSPIN/CEN U17 SPI_CONFIG_SS
PB15B/DOUT/CSON V17 LED_R
PB18A/WRITEN R16 FPGA_RESET
QSPI Config
U3H ECP5U25
CCLK/MCLK/SCK U16 SPI_CONFIG_SCK
CFG_0 U14
CFG_1 T14 P3.3V
CFG_2 V15
DONE U15
INITN V16
PROGRAMN T15 FPGA_RESET
TCK U13 JTAG_TCK
TDI T13 JTAG_TDI
TDO V14 JTAG_TDO
TMS V13 JTAG_TMS
RESERVED V11
RESERVED V12
RESERVED V2
RESERVED V3
R27 4.7K
GND
GND
OSC1
OT252048MJBA4SL
P3.3V 1 NC VDD 4 P3.3V
2 GND OUT 3 REF_CLK
GND
P3.3V
J6
JTAG
JTAG_TDI
1 2 JTAG_TMS
3 4 JTAG_TCK
5 6 JTAG_TDO
GND
U6
XT25Q08DDTIGT
SPI_CONFIG_SS 1 CS VCC 8 P3.3V
SPI_CONFIG_MISO 2 SO HOLD 7 QSPI_D3
QSPI_D2 3 WP SCK 6 SPI_CONFIG_SCK
4 GND SI 5 SPI_CONFIG_MOSI
GND
U3I
ECP5U25
P1.1V J4 VCC[13]
P3.3V N13 VCCIO8[2]
P1.35V G14 VCCIO7[2]
P1.35V M14 VCCIO6[2]
P3.3V M5 VCCIO3[2]
P1.35V G5 VCCIO2[2]
P3.3V D7 VCCIO1
P3.3V D12 VCCIO0
P2.5V E6 VCCAUX[4]
U12 GND[123]
GND


VTT
RN1 50R
RAM_A12
RAM_A4
RAM_A6
RAM_A8
RN2 50R
RAM_A11
RAM_A1
RAM_A9
RAM_A7
RN3 50R
RAM_BA0
RAM_WE#
RAM_CS#
RAM_CAS#
RN4 50R
RAM_CKE
RAM_BA1
RAM_A10
RAM_BA2
RN5 50R
RAM_A2
RAM_A5
RAM_A0
RAM_A3
RN6 50R
RAM_ODT
RAM_RAS#
RAM_CK+
RAM_CK−
C27
10nF
C38 10nF
C40 10nF
C42 10nF
C39 100nF
C41 100nF
C43 100nF
GND
VTT_REF
C44 10nF
C45 10nF
R3
0R
ECP5_VREF
RAM_VDD
C30 100nF
C32 100nF
C34 1uF
C36 1uF
RAM_VDDQ
C31 100nF
C33 100nF
C35 1uF
C37 1uF
U4
MT41K64M16TW-107_J-TR
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10/AP
A11
A12/BC#
A13
A14
A15
BA0
BA1
BA2
LDM
ODT
RAS#
CAS#
WE#
RESET#
UDM
CS#
CK
CK#
CKE
VDD[9]
VDDQ[9]
VREFCA
VREFDQ
VSS[12]
VSSQ[9]
ZQ
DQ0
DQ1
DQ2
DQ3
DQ4
DQ5
DQ6
DQ7
DQ8
DQ9
DQ10
DQ11
DQ12
DQ13
DQ14
DQ15
LDQS
LDQS#
UDQS
UDQS#
RAM_A0
RAM_A1
RAM_A2
RAM_A3
RAM_A4
RAM_A5
RAM_A6
RAM_A7
RAM_A8
RAM_A9
RAM_A10
RAM_A11
RAM_A12
RAM_BA0
RAM_BA1
RAM_BA2
RAM_LDM
RAM_ODT
RAM_RAS#
RAM_CAS#
RAM_WE#
RAM_RESET#
RAM_UDM
RAM_CS#
RAM_CK+
RAM_CK−
RAM_CKE
RAM_D8
RAM_D9
RAM_D10
RAM_D11
RAM_D12
RAM_D13
RAM_D14
RAM_D15
RAM_D0
RAM_D1
RAM_D2
RAM_D3
RAM_D4
RAM_D5
RAM_D6
RAM_D7
RAM_UDQS+
RAM_UDQS−
RAM_LDQS+
RAM_LDQS−
R19
240R
FB2
600R
FB3
600R
P1.35V
C21 1uF
C23 22uF
C22 1uF
C24 22uF


J1
USB_C_Receptacle_USB2.0
VBUS
CC1
CC2
D−
D−
D+
D+
SHIELD
GND
SBU1
SBU2
S1
A1
A4
A5
B5
A7
B7
A6
B6
A8
B8
PUSB_VBUS
51K
R7
51K
R8
GND
USB_D−
USB_D+
1.5K
R20
USB_PULLUP
GND
USB input
P3.3V
SW1
SW_Push
R4
4.7K
FPGA_RESET
C76
100nF
GND
USER LEDS
D1
LED_ARGB
LED_R
LED_G
LED_B
R22
R23
R24
4.7K
P3.3V
TP26
TP27
USB_D+
USB_D−
TP28
TP33
TP29
TP30
TP31
TP32
VTT_REF
VTT
P3.3V
P2.5V
P1.35V
P1.1V
TP3
TP4
USBH_D+
USBH_D−
TP19
TP20
EXT_PLL+
EXT_PLL−
J7
Conn_02x15_Odd_Even
210K 1%
R29
HPD/ID
4.7K
R21
AUX_7
PUSB_VBUS
AUX_3−
AUX_3+
AUX_4−
AUX_4+
AUX_5−
AUX_5+
AUX_0−
AUX_0+
AUX_1−
AUX_1+
AUX_2−
AUX_2+
AUX_6+
AUX_6−
P3.3V
P3.3V
LED_G
LED_R
GND
GND
IO_SDA
IO_SCL
J5
Conn_01x03
GND
J2
Conn_01x6_Male
P3.3V
GND
IO_MOSI
IO_MISO
IO_0
IO_1
+3V3
GND
I/O − MOSI
I/O − MISO
I/O − RX
I/O − TX
Connector_PinHeader_2.54mm:PinHeader_1x06_P2.54mm_Vertical
J3
USB_C_Receptacle_USB2.0
VBUS
CC1
CC2
D−
D−
D+
D+
SHIELD
GND
SBU1
SBU2
S1
A1
A4
A5
B5
A7
B7
A6
B6
A8
B8
PUSB_VBUS
51K
R9
51K
R10
GND
USBH_D−
USBH_D+
12K
R11
12K
R12
GND
TP1
TP2
USBH_D+
USBH_D−
GND
HOST−only USB
J8
Conn_02x15_Odd_Even
4.7K
R26
P3.3V
LED_B
84.5K 1%
R30
PUSB_VBUS
SPI_0
SPI_1
IO_SDA
IO_SCL
P3.3V
P3.3V
IO_SCK
IO_13
IO_11
IO_12
IO_9
IO_10
IO_5
IO_6
GND
GND


P1.1V
C48
10nF
C50
100nF
GND
P1.1V
C52
10nF
C54
100nF
GND
P1.1V
C56
10nF
C57
100nF
GND
P1.1V
C58
10nF
C59
100nF
GND
P1.1V
C60
10nF
C61
100nF
GND
P2.5V
C49
10nF
C51
100nF
GND
P2.5V
C53
10nF
C55
100nF
GND
P1.35V
C62
10nF
C64
100nF
GND
P1.35V
C66
10nF
C68
100nF
GND
P3.3V
C63
10nF
C65
100nF
GND
P3.3V
C67
10nF
C69
100nF
GND
P3.3V
C74
10nF
C75
100nF
GND