Icepi Zero v1.3!

XX000000

TestPoint TP1 GND
TestPoint TP2 GND
TestPoint TP3 +5V
TestPoint TP4 +3V3
TestPoint TP5 +2V5
TestPoint TP6 +1V1

H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole

Power — File: power.kicad_sch
GPDI — File: gpdi.kicad_sch
USB — File: usb.kicad_sch
SDRAM — File: sdram.kicad_sch
Flash — File: flash.kicad_sch
ECP5 — File: ecp5.kicad_sch
uSD — File: sd.kicad_sch

SW1 SW_Push
SW2 SW_Push
SW0
SW1
GND

R1 470 D1 WHITE
R4 470 D4 WHITE
R2 470 D2 WHITE
R3 470 D3 WHITE
R5 470 D5 WHITE
LED0
LED1
LED2
LED3
LED4
GND

SW0 C4
SW1 C5
LED0 E13
LED1 D14
LED2 E12
LED3 C13
LED4 D13
DBG1 C7
DBG2 C8
GLOBAL_CLK M1

PT11A/+
PT15A/+
PT62B/−
PR2D/−/RDQ8
PT58B/−
PT60B/−
PT62A/+
PT27A/+/PCLKT0_1
PT35A/+/PCLKT1_0
PL26C/+/LDQ32/PCLKT6_0

MISC Interface

ECP5-CABGA256

GPIO2 T2 PL38D/−/LDQ44
GPIO3 R2 PL38C/+/LDQ44
GPIO4 R1 PL35B/−/HS/LDQ32/VREF1_6
GPIO17 R3 PL41B/−/HS/LDQ44
GPIO27 P3 PL38B/−/HS/LDQ44
GPIO22 P2 PL32B/−/HS/LDQSN32
GPIO10 L2 PL26B/−/HS/LDQ32/PCLKC6_1
GPIO9 J1 PL23A/+/HS/LDQ20/PCLKT7
GPIO11 G2 PL14B/−/HS/LDQ20
GPIO0 G3 PL14C/+/LDQ20/VREF1_7
GPIO5 E1 PL11D/−/LDQ8
GPIO6 F3 PL5D/−/LDQ8
GPIO13 E3 PL5C/+/LDQ8
GPIO19 E4 PT9A/+
GPIO26 D4 PT9B/−

GPIO Interface

PL35A/+/HS/LDQ32 P1 GPIO14
PL32A/+/HS/LDQS32 N1 GPIO15
PL38A/+/HS/LDQ44 N4 GPIO18
PL26D/−/LDQ32/PCLK6_0 M2 GPIO23
PL26A/+/HS/LDQ32/PCLKT6_1 L1 GPIO24
PL23B/−/HS/LDQ20/PCLKC7_1 J2 GPIO25
PL20C/+/LDQS20/GR_PCLK7_0 H2 GPIO8
PL20A/+/HS/LDQS20/GR_PCLK7_1 G1 GPIO7
PL20D/−/LDQS20 K3 GPIO1
PL20B/−/HS/LDQSN20 J3 GPIO12
PL14D/−/LDQ20 H3 GPIO16
PL14A/+/HS/LDQ20 F1 GPIO20
PL11C/+/LDQ8 F2 GPIO21

ECP5-CABGA256

J1
Conn_02x20_Counter_Clockwise

+3V3	1	2	+5V
GPIO2	3	4	+5V
GPIO3	5	6	GND
GPIO4	7	8	GPIO14
GND	9	10	GPIO15
GPIO17	11	12	GPIO18
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
+3V3	17	18	GPIO24
GPIO10	19	20	GND
GPIO9	21	22	GPIO25
GPIO11	23	24	GPIO8
GND	25	26	GPIO7
GPIO0	27	28	GPIO1
GPIO5	29	30	GND
GPIO6	31	32	GPIO12
GPIO13	33	34	GND
GPIO19	35	36	GPIO16
GPIO26	37	38	GPIO20
GND	39	40	GPIO21

50MHz Clock
Replacable with any 50MHz MEMS 3.3V oscillator

+3V3
C1 100nF
Y1 SG-8018CG 50.000000MHz
OE GND Vdd OUT
GLOBAL_CLK
GND

TestPoint TP13 DBG2
TestPoint TP14 DBG1

PWR_FLAG GND

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Sheet: /
File: icepi-zero.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
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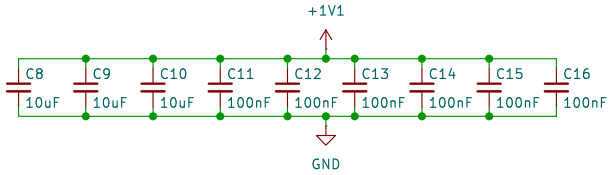
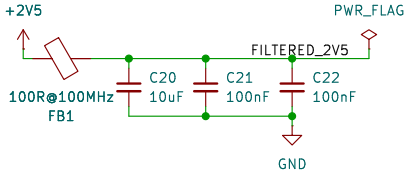
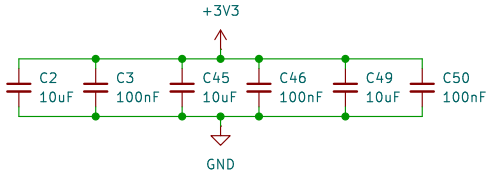
Power up sequence:
1. VCCIO8 > 2.3
2. Vcc > 0.95 & Vccaux > 2.1

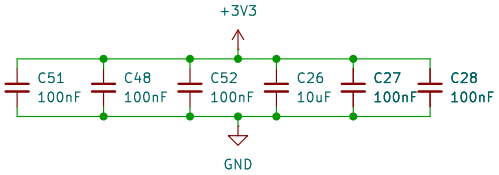
Decoupling capacitors based on FPGA-TN-02038

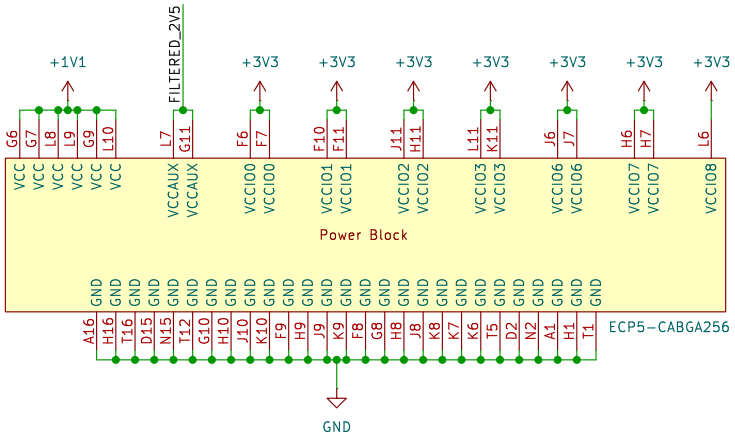




1x 10u and 1x 100n per I/O bank pin

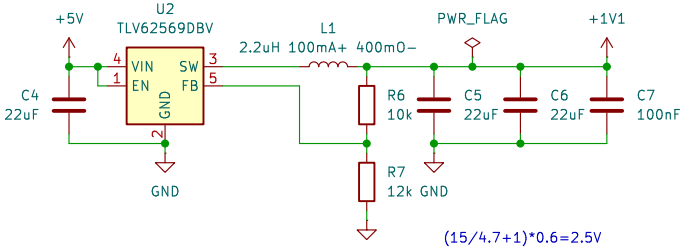




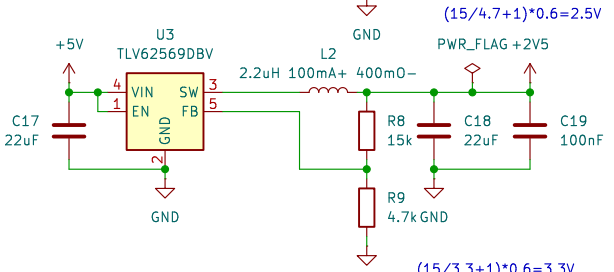


Voltage Regulators

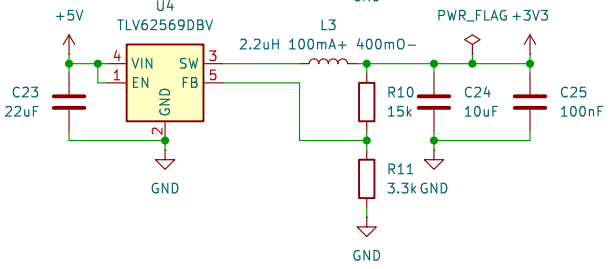
(10/12+1)*0.6=1.1V



(15/4.7+1)*0.6=2.5V



(15/3.3+1)*0.6=3.3V



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Sheet: /Power/
File: power.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
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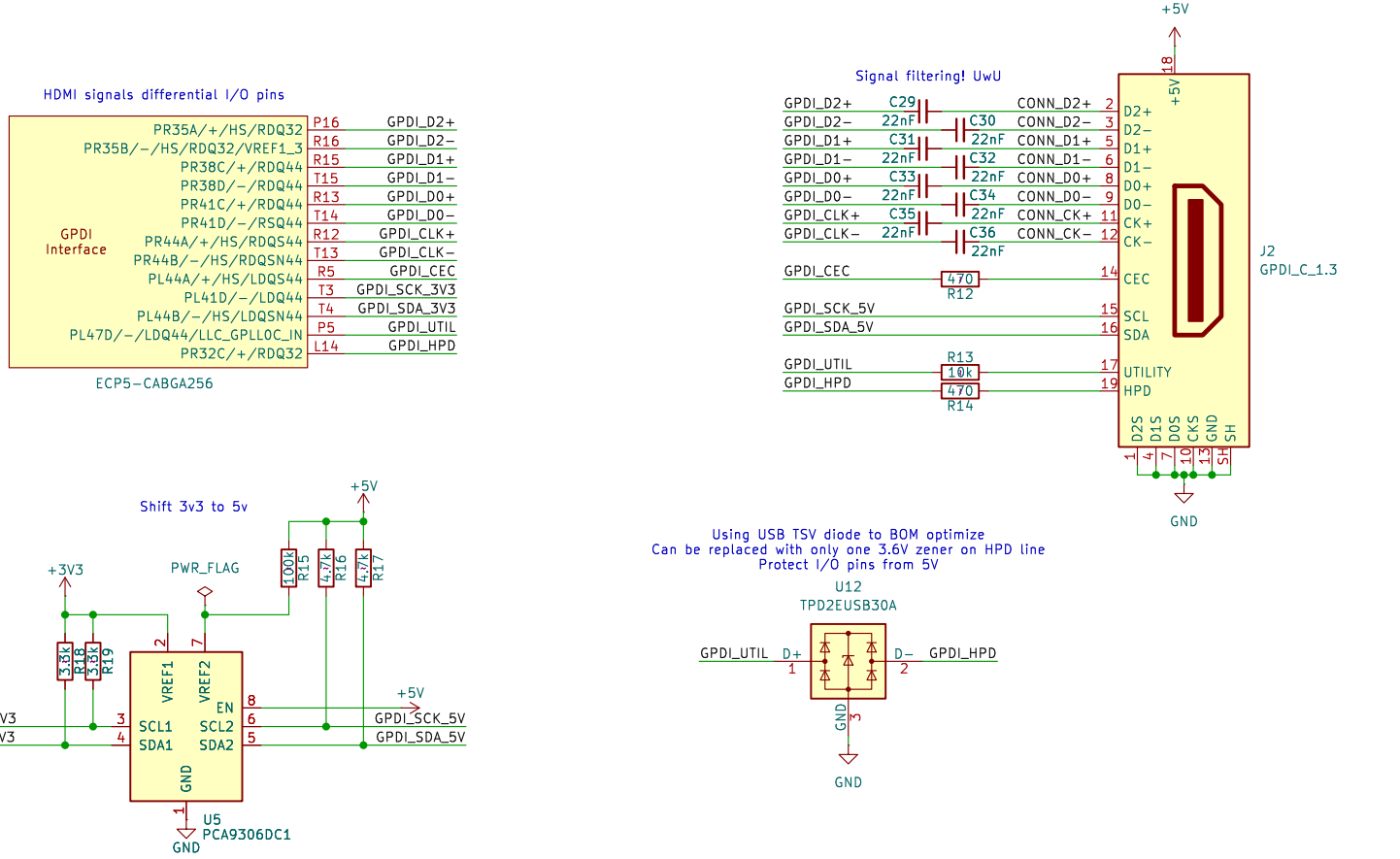

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Sheet: /GPDI/
File: gpdi.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
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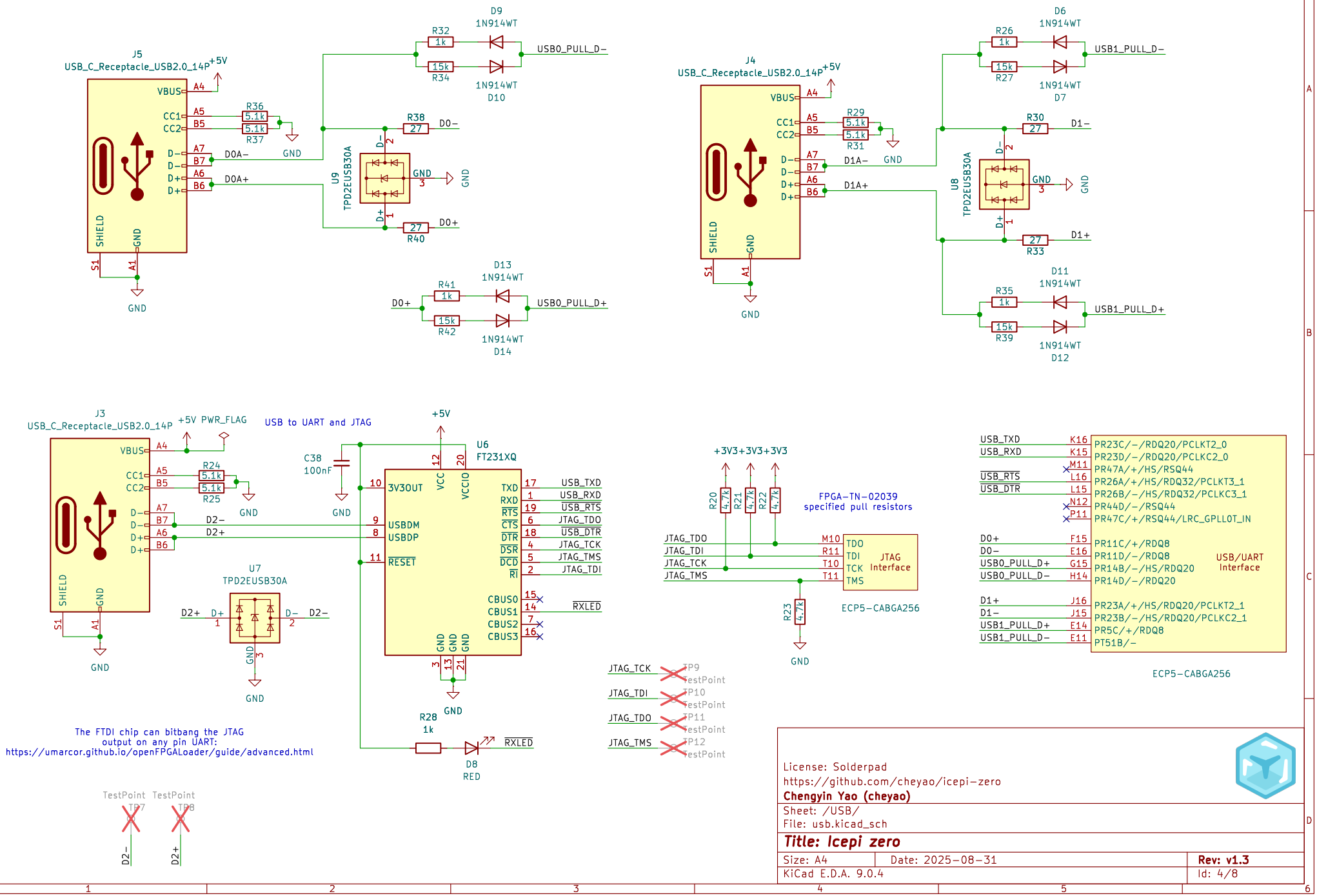
J5
USB_C_Receptacle_USB2.0_14P
+5V
VBUS
CC1
CC2
D-
D+
SHIELD
GND
R36 5.1k
R37 5.1k
D0A-
D0A+
R38 27
R40 27
D0-
D0+
U9
TPD2EUSB30A
D9 1N914WT
D10 1N914WT
R32 1k
R34 15k
USB0_PULL_D-
D13 1N914WT
D14 1N914WT
R41 1k
R42 15k
USB0_PULL_D+
J4
R29 5.1k
R31 5.1k
D1A-
D1A+
U8
R26 1k
R27 15k
D6 1N914WT
D7 1N914WT
USB1_PULL_D-
R30 27
R33 27
D1-
D1+
R35 1k
R39 15k
D11 1N914WT
D12 1N914WT
USB1_PULL_D+
J3
USB_C_Receptacle_USB2.0_14P
+5V PWR_FLAG
R24 5.1k
R25 5.1k
D2-
D2+
U7
TPD2EUSB30A
USB to UART and JTAG
C38 100nF
U6
FT231XQ
3V3OUT
VCC
VCCIO
USBDM
USBDP
RESET
TXD
RXD
RTS
CTS
DTR
DSR
DCD
RI
CBUS0
CBUS1
CBUS2
CBUS3
USB_TXD
USB_RXD
USB_RTS
USB_DTR
JTAG_TDO
JTAG_TDI
JTAG_TCK
JTAG_TMS
RXLED
R28 1k
D8 RED
The FTDI chip can bitbang the JTAG
output on any pin UART:
https://umarcor.github.io/openFPGALoader/guide/advanced.html
TP7 TestPoint
TP8 TestPoint
+3V3+3V3+3V3
R20 4.7k
R21 4.7k
R22 4.7k
R23 4.7k
FPGA-TN-02039
specified pull resistors
TDO
TDI
TCK
TMS
JTAG Interface
ECP5-CABGA256
TP9 TestPoint
TP10 TestPoint
TP11 TestPoint
TP12 TestPoint
USB_TXD K16 PR23C/-/RDQ20/PCLKT2_0
USB_RXD K15 PR23D/-/RDQ20/PCLKC2_0
M11 PR47A/+/HS/RSQ44
USB_RTS L16 PR26A/+/HS/RDQ32/PCLKT3_1
USB_DTR L15 PR26B/-/HS/RDQ32/PCLKC3_1
N12 PR44D/-/RSQ44
P11 PR47C/+/RSQ44/LRC_GPLL0T_IN
D0+ F15 PR11C/+/RDQ8
D0- E16 PR11D/-/RDQ8
USB0_PULL_D+ G15 PR14B/-/HS/RDQ20
USB0_PULL_D- H14 PR14D/-/RDQ20
D1+ J16 PR23A/+/HS/RDQ20/PCLKT2_1
D1- J15 PR23B/-/HS/RDQ20/PCLKC2_1
USB1_PULL_D+ E14 PR5C/+/RDQ8
USB1_PULL_D- E11 PT51B/-
USB/UART Interface
ECP5-CABGA256
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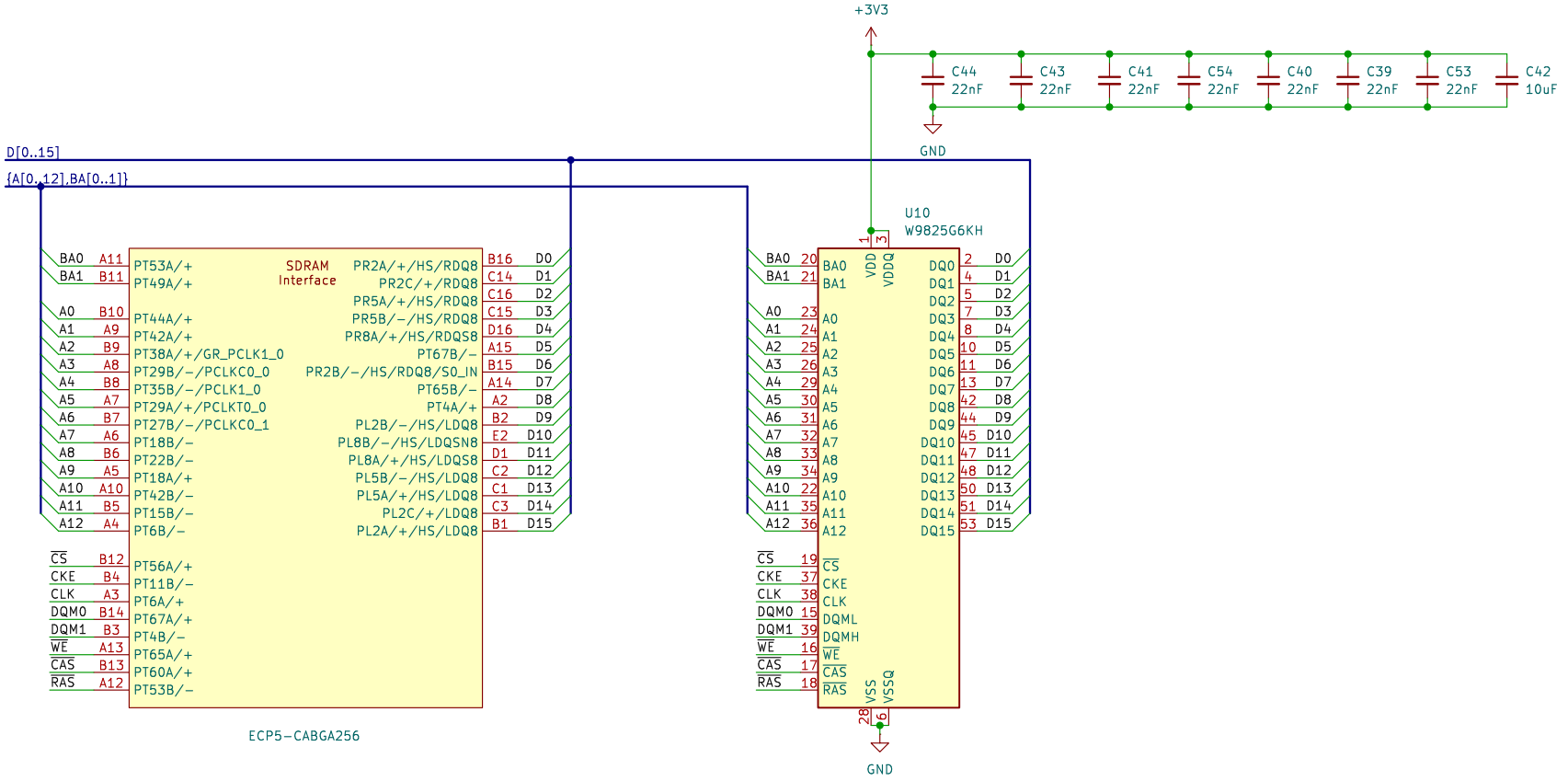
Sheet: /USB/
File: usb.kicad_sch
Title: Icepi zero
Size: A4
Date: 2025-08-31
Rev: v1.3
KiCad E.D.A. 9.0.4
Id: 4/8

256MiB Memory
Can be replaced by digikey 512MiB Memory there is the $$$



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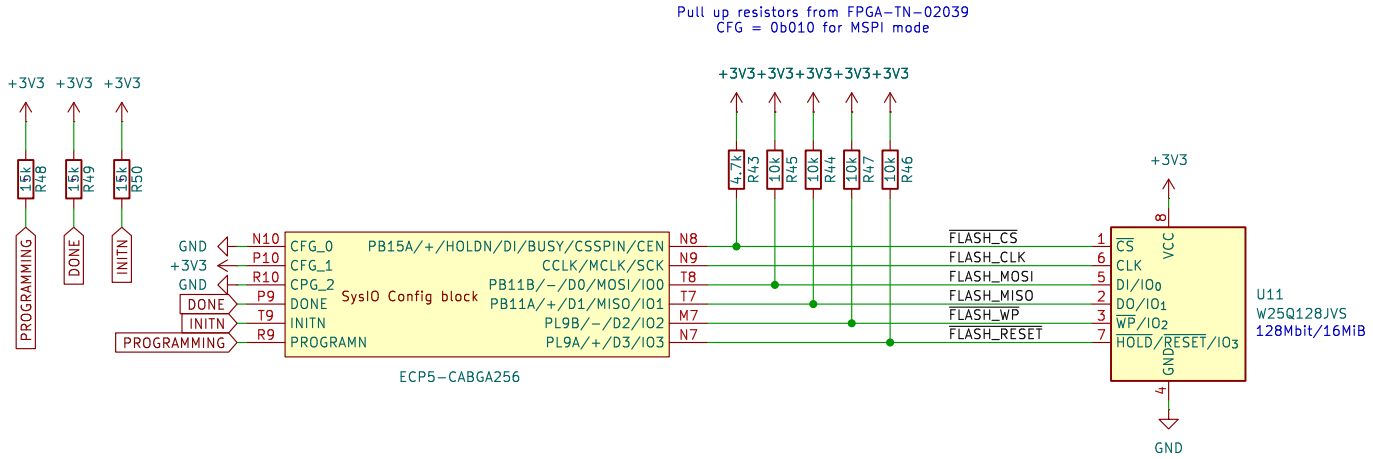
Sheet: /SDRAM/
File: sdram.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
KiCad E.D.A. 9.0.4		Id: 5/8



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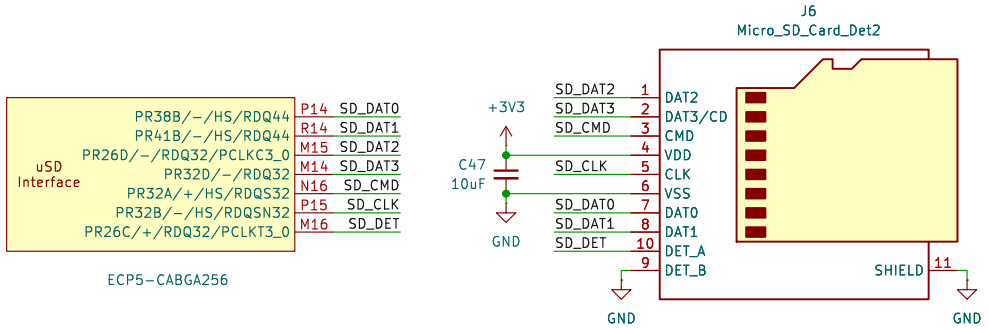
Sheet: /Flash/
File: flash.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
KiCad E.D.A. 9.0.4		Id: 6/8



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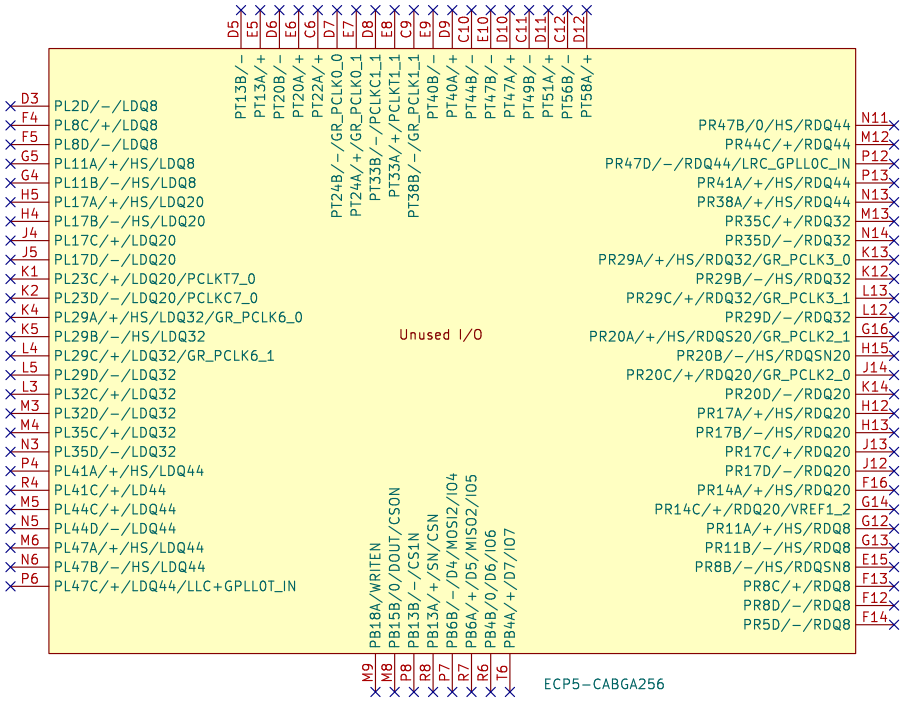
Sheet: /uSD/
File: sd.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
KiCad E.D.A. 9.0.4		Id: 7/8



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Sheet: /ECP5/
File: ecp5.kicad_sch

Title: Icepi zero

Size: A4	Date: 2025-08-31	**Rev: v1.3**
KiCad E.D.A. 9.0.4		Id: 8/8