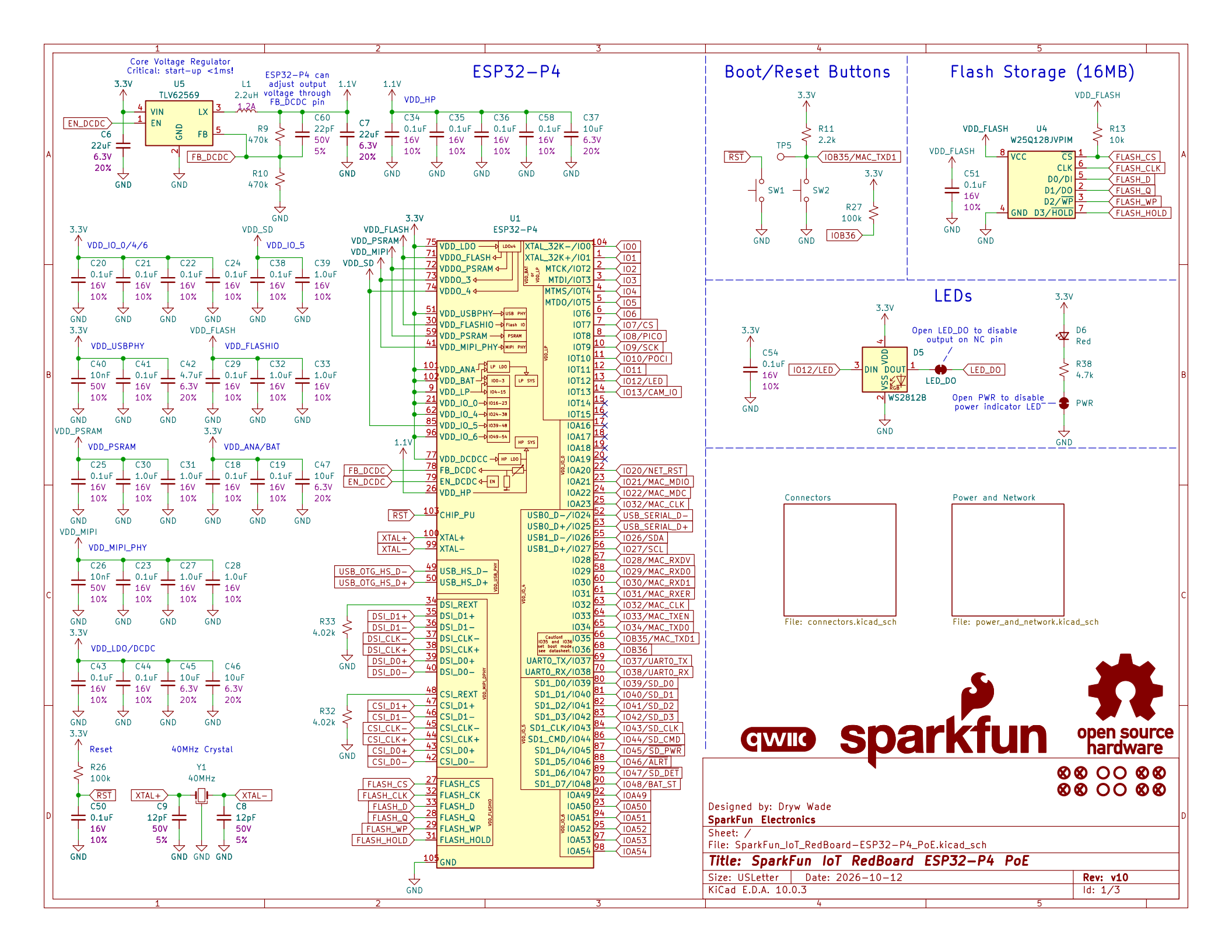
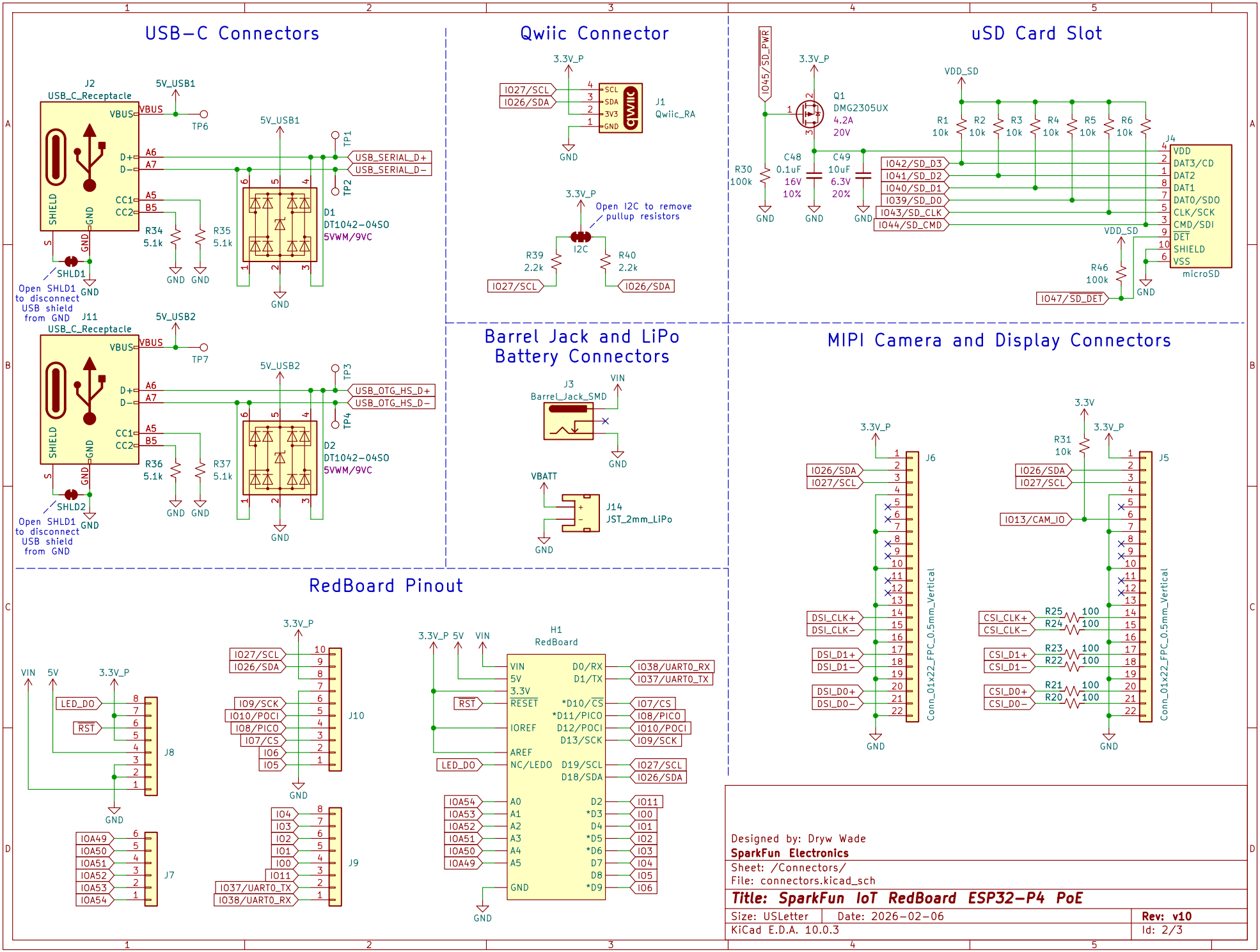
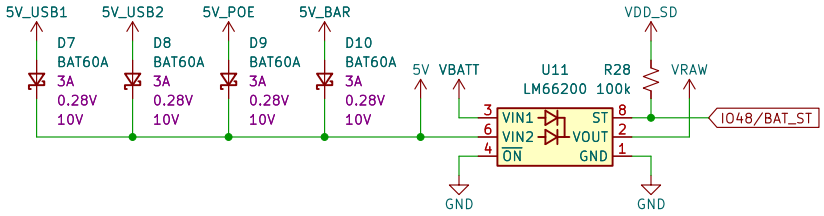
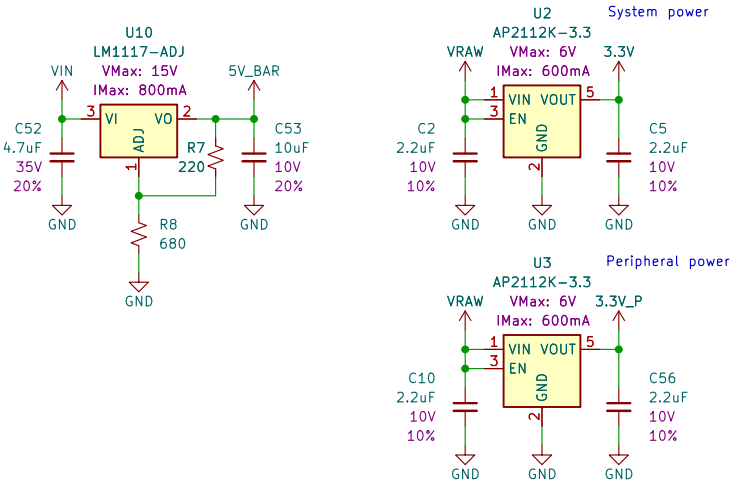

ESP32-P4
Core Voltage Regulator
Critical: start-up <1ms!
U5
TLV62569
ESP32-P4 can adjust output voltage through FB_DCDC pin
L1
2.2uH
1.2A
EN_DCDC
FB_DCDC
R9
470k
R10
470k
C6
22uF
6.3V
20%
C60
22pF
50V
5%
C7
22uF
6.3V
20%
VDD_HP
C34
C35
C36
C58
C37
0.1uF
10uF
16V
6.3V
10%
20%
U1
ESP32-P4
VDD_FLASH
VDD_PSRAM
VDD_MIPI
VDD_SD
VDD_LDO
VDDO_FLASH
VDDO_PSRAM
VDDO_3
VDDO_4
VDD_USBPHY
VDD_FLASHIO
VDD_PSRAM
VDD_MIPI_PHY
VDD_ANA
VDD_BAT
VDD_LP
VDD_IO_0
VDD_IO_4
VDD_IO_5
VDD_IO_6
VDD_DCDCC
FB_DCDC
EN_DCDC
VDD_HP
CHIP_PU
XTAL+
XTAL-
USB_OTG_HS_D-
USB_OTG_HS_D+
USB_HS_D-
USB_HS_D+
DSI_REXT
DSI_D1+
DSI_D1-
DSI_CLK-
DSI_CLK+
DSI_D0+
DSI_D0-
CSI_REXT
CSI_D1+
CSI_D1-
CSI_CLK-
CSI_CLK+
CSI_D0+
CSI_D0-
FLASH_CS
FLASH_CK
FLASH_D
FLASH_Q
FLASH_WP
FLASH_HOLD
GND
XTAL_32K-/IO0
XTAL_32K+/IO1
MTCK/IOT2
MTDI/IOT3
MTMS/IOT4
MTDO/IOT5
IOT6
IOT7
IOT8
IOT9
IOT10
IOT11
IOT12
IOT13
IOT14
IOT15
IOA16
IOA17
IOA18
IOA19
IOA20
IOA21
IOA22
IOA23
USB0_D-/IO24
USB0_D+/IO25
USB1_D-/IO26
USB1_D+/IO27
IO28
IO29
IO30
IO31
IO32
IO33
IO34
IO35
IO36
UART0_TX/IO37
UART0_RX/IO38
SD1_D0/IO39
SD1_D1/IO40
SD1_D2/IO41
SD1_D3/IO42
SD1_CLK/IO43
SD1_CMD/IO44
SD1_D4/IO45
SD1_D5/IO46
SD1_D6/IO47
SD1_D7/IO48
IOA49
IOA50
IOA51
IOA52
IOA53
IOA54
IO0
IO1
IO2
IO3
IO4
IO5
IO6
IO7/CS
IO8/PICO
IO9/SCK
IO10/POCI
IO11
IO12/LED
IO13/CAM_IO
IO20/NET_RST
IO21/MAC_MDIO
IO22/MAC_MDC
IO32/MAC_CLK
USB_SERIAL_D-
USB_SERIAL_D+
IO26/SDA
IO27/SCL
IO28/MAC_RXDV
IO29/MAC_RXD0
IO30/MAC_RXD1
IO31/MAC_RXER
IO32/MAC_CLK
IO33/MAC_TXEN
IO34/MAC_TXD0
IO35/MAC_TXD1
IO36
IO37/UART0_TX
IO38/UART0_RX
IO39/SD_D0
IO40/SD_D1
IO41/SD_D2
IO42/SD_D3
IO43/SD_CLK
IO44/SD_CMD
IO45/SD_PWR
IO46/ALRT
IO47/SD_DET
IO48/BAT_ST
Boot/Reset Buttons
TP5
R11
2.2k
R27
100k
SW1
SW2
IO35/MAC_TXD1
IO36
Flash Storage (16MB)
U4
W25Q128JVPIM
R13
10k
C51
0.1uF
16V
10%
FLASH_CS
FLASH_CLK
FLASH_D
FLASH_Q
FLASH_WP
FLASH_HOLD
LEDs
C54
0.1uF
16V
10%
IO12/LED
D5
WS2812B
LED_DO
Open LED_DO to disable output on NC pin
D6
Red
R38
4.7k
PWR
Open PWR to disable power indicator LED
Reset
R26
100k
C50
0.1uF
16V
10%
40MHz Crystal
Y1
40MHz
C9
12pF
50V
5%
C8
12pF
50V
5%
R33
4.02k
R32
4.02k
VDD_IO_0/4/6
VDD_IO_5
VDD_USBPHY
VDD_FLASHIO
VDD_PSRAM
VDD_ANA/BAT
VDD_MIPI_PHY
VDD_LDO/DCDC
Connectors
File: connectors.kicad_sch
Power and Network
File: power_and_network.kicad_sch
sparkfun
open source hardware
Designed by: Dryw Wade
SparkFun Electronics
Sheet: /
File: SparkFun_IoT_RedBoard-ESP32-P4_PoE.kicad_sch
Title: SparkFun IoT RedBoard ESP32-P4 PoE
Size: USLetter
Date: 2026-10-12
Rev: v10
KiCad E.D.A. 10.0.3
Id: 1/3


USB-C Connectors
J2
USB_C_Receptacle
5V_USB1
VBUS
TP6
D+
D-
A6
A7
USB_SERIAL_D+
USB_SERIAL_D-
TP1
TP2
SHIELD
GND
CC1
CC2
A5
B5
R34
5.1k
R35
5.1k
D1
DT1042-04SO
5VWM/9VC
SHLD1
Open SHLD1 to disconnect USB shield from GND
J11
USB_C_Receptacle
5V_USB2
TP7
USB_OTG_HS_D+
USB_OTG_HS_D-
TP3
TP4
R36
5.1k
R37
5.1k
D2
DT1042-04SO
5VWM/9VC
SHLD2
Qwiic Connector
3.3V_P
IO27/SCL
IO26/SDA
SCL
SDA
3V3
GND
J1
Qwiic_RA
I2C
Open I2C to remove pullup resistors
R39
2.2k
R40
2.2k
uSD Card Slot
IO45/SD_PWR
Q1
DMG2305UX
4.2A
20V
R30
100k
C48
0.1uF
16V
10%
C49
10uF
6.3V
20%
VDD_SD
R1
10k
R2
10k
R3
10k
R4
10k
R5
10k
R6
10k
IO42/SD_D3
IO41/SD_D2
IO40/SD_D1
IO39/SD_D0
IO43/SD_CLK
IO44/SD_CMD
J4
VDD
DAT3/CD
DAT2
DAT1
DAT0/SDO
CLK/SCK
CMD/SDI
DET
SHIELD
VSS
microSD
R46
100k
IO47/SD_DET
Barrel Jack and LiPo Battery Connectors
J3
Barrel_Jack_SMD
VIN
VBATT
J14
JST_2mm_LiPo
MIPI Camera and Display Connectors
J6
J5
IO26/SDA
IO27/SCL
IO13/CAM_IO
DSI_CLK+
DSI_CLK-
DSI_D1+
DSI_D1-
DSI_D0+
DSI_D0-
CSI_CLK+
CSI_CLK-
CSI_D1+
CSI_D1-
CSI_D0+
CSI_D0-
R31
10k
R25
100
R24
100
R23
100
R22
100
R21
100
R20
100
Conn_01x22_FPC_0.5mm_Vertical
RedBoard Pinout
J8
LED_DO
RST
J10
IO9/SCK
IO10/POCI
IO8/PICO
IO7/CS
IO6
IO5
J7
IOA49
IOA50
IOA51
IOA52
IOA53
IOA54
J9
IO4
IO3
IO2
IO1
IO0
IO11
IO37/UART0_TX
IO38/UART0_RX
H1
RedBoard
VIN
5V
3.3V
RESET
IOREF
AREF
NC/LEDO
A0
A1
A2
A3
A4
A5
GND
D0/RX
D1/TX
*D10/CS
*D11/PICO
D12/POCI
D13/SCK
D19/SCL
D18/SDA
D2
*D3
D4
*D5
*D6
D7
D8
*D9
IO7/CS
IO8/PICO
IO10/POCI
IO9/SCK
IO11
IO0
IO1
IO2
IO3
IO4
IO5
IO6
Designed by: Dryw Wade
SparkFun Electronics
Sheet: /Connectors/
File: connectors.kicad_sch
Title: SparkFun IoT RedBoard ESP32-P4 PoE
Size: USLetter
Date: 2026-02-06
Rev: v10
KiCad E.D.A. 10.0.3
Id: 2/3

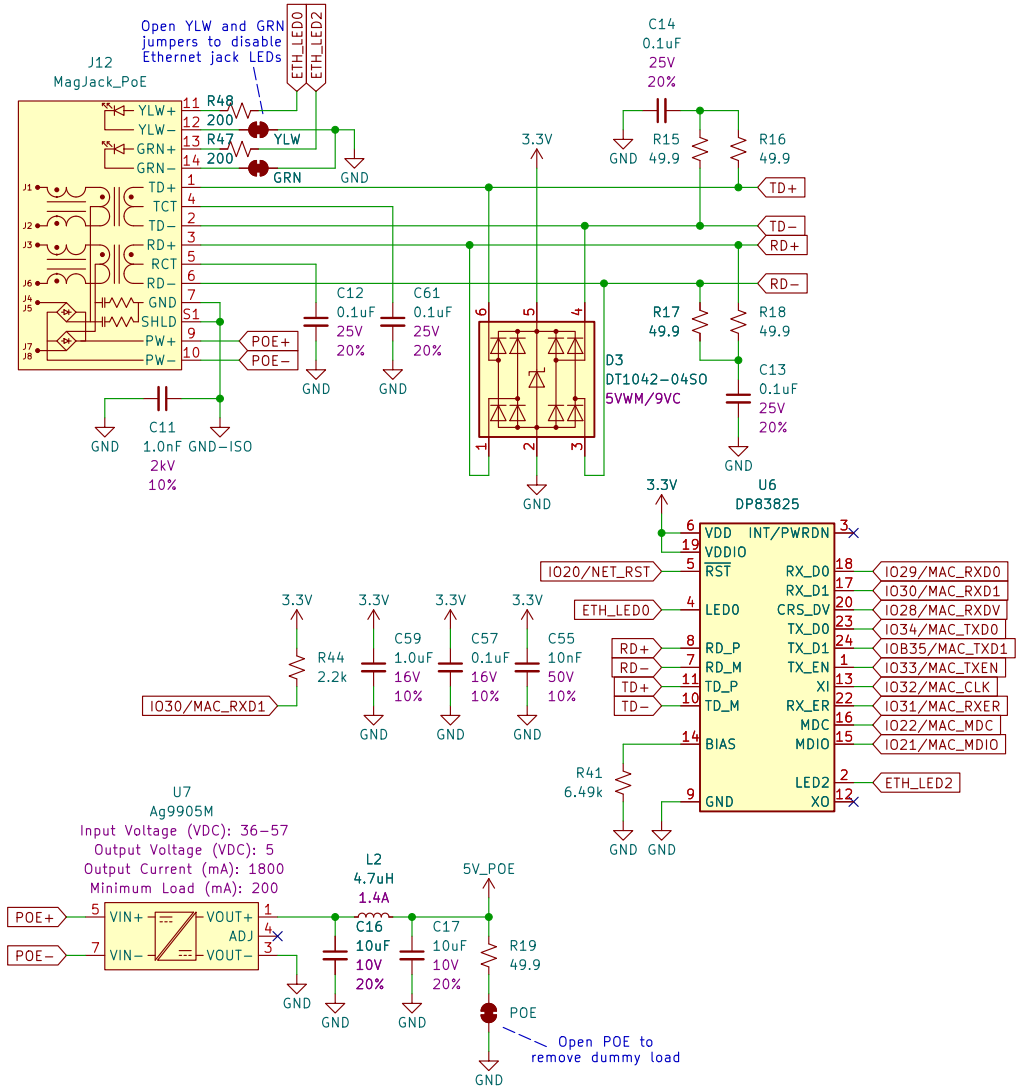
Power Flow



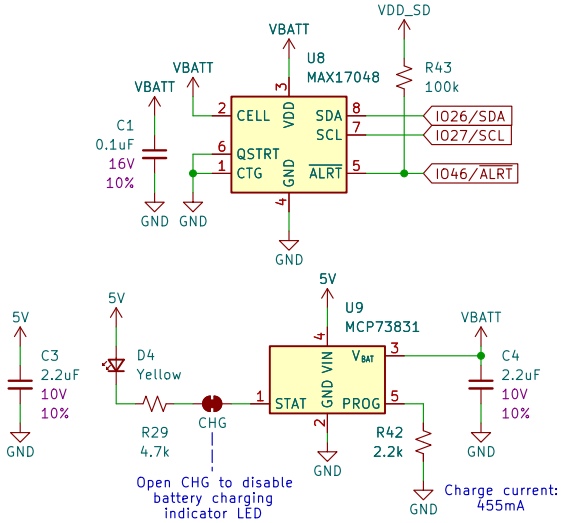
Voltage Regulators



Network – Ethernet and PoE



LiPo Battery



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SparkFun Electronics
Sheet: /Power and Network/
File: power_and_network.kicad_sch

Title: SparkFun IoT RedBoard ESP32-P4 PoE

Size: USLetter	Date: 2026-02-06	**Rev: v10**
KiCad E.D.A. 10.0.3		Id: 3/3