01 Descriptions

File: 01 Descriptions.kicad_sch

02 Block Diagram

File: 02 Block Diagram.kicad_sch

03 Power

File: 03 Power.kicad_sch

04 ESP32-S3

File: 04 ESP32-S3.kicad_sch

05 Debug&Interface

File: 05 Debug&Interface.kicad_sch

06 Peripherals

File: 06 Peripherals.kicad_sch

07 50P FPC Connector

File: 07 50P FPC Connector.kicad_sch

08 24P FPC Connector

File: 08 24P FPC Connector.kicad_sch

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Sheet: /
File: reTerminal E1002.kicad_sch

Title: reTerminal E1002			CC BY-SA 4.0
Size: A4	Date: 2025-08-05	Design: Wenkang.Liu	**Rev: v1.0**
KiCad E.D.A. 9.0.3			Id: 1/9

Version	Descriptions	Data	Name
v1.0	First Release	4/30/2025	wenkang.liu

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Sheet: /01 Descriptions/
File: 01 Descriptions.kicad_sch

Title: reTerminal E1002			CC BY-SA 4.0
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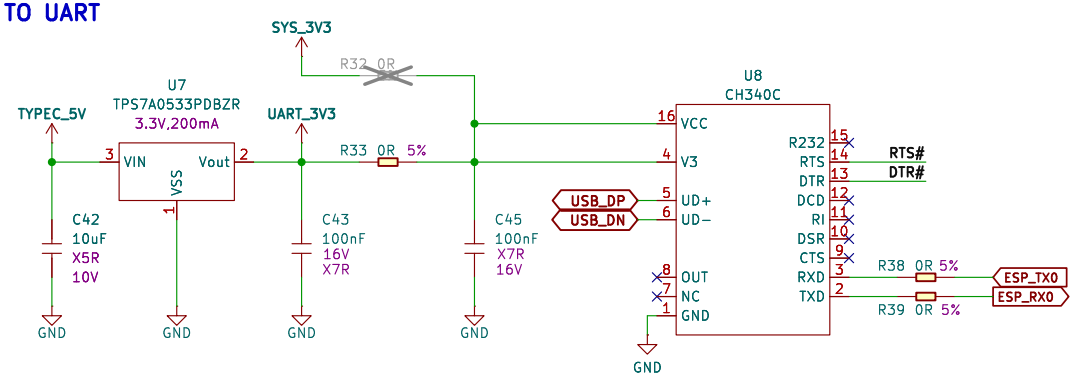
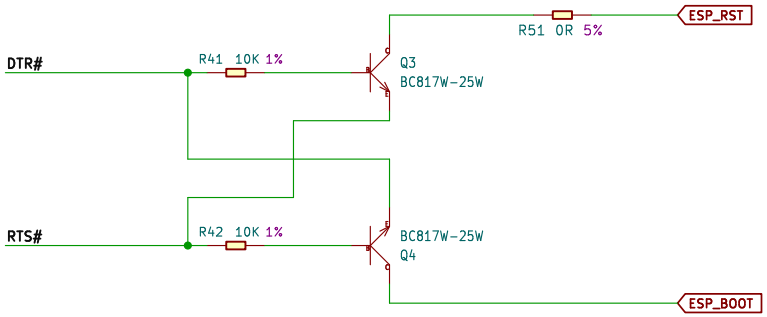
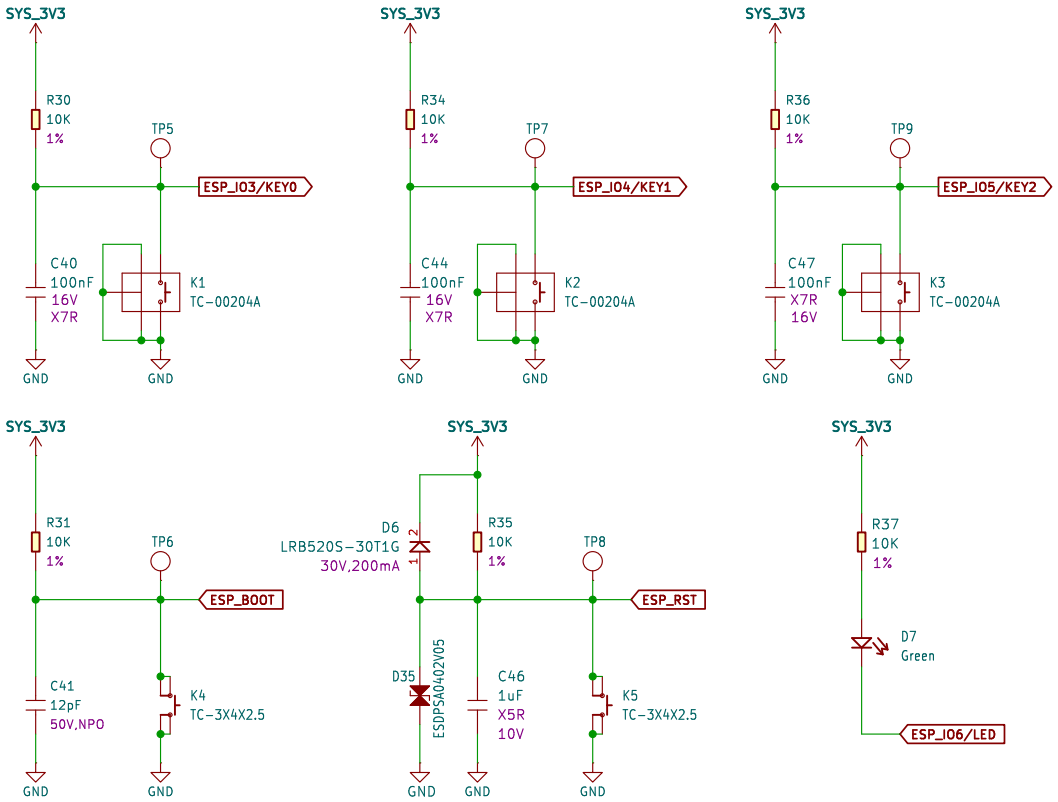
KiCad E.D.A. 9.0.3			Id: 2/9

USB TO UART

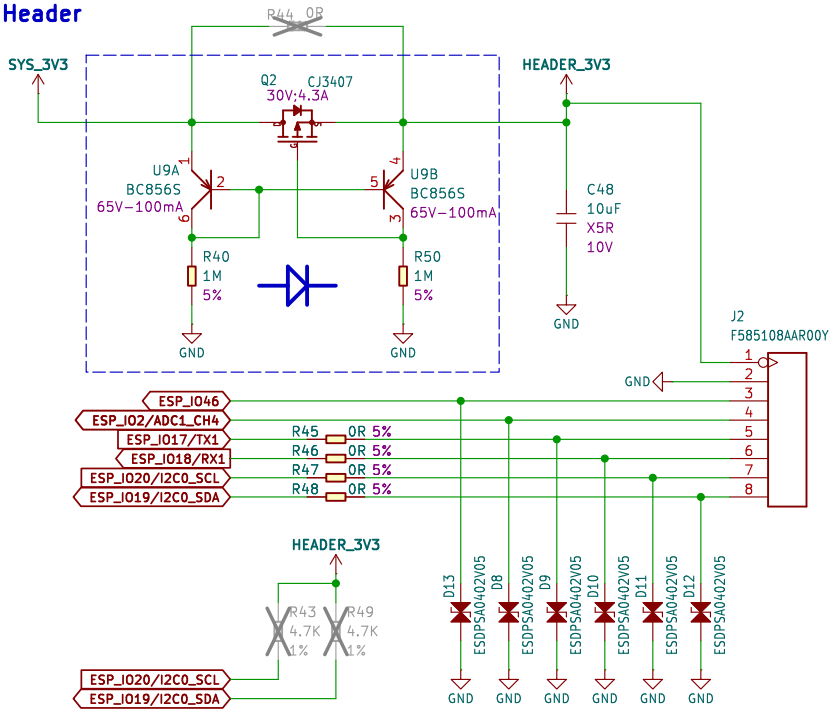




RST & BOOT & USER KEY



Header



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Sheet: /05 Debug&Interface/
File: 05 Debug&Interface.kicad_sch

Title: reTerminal E1002

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Size: A4 | Date: 2025-08-05 | Design: Wenkang.Liu | **Rev: v1.0**

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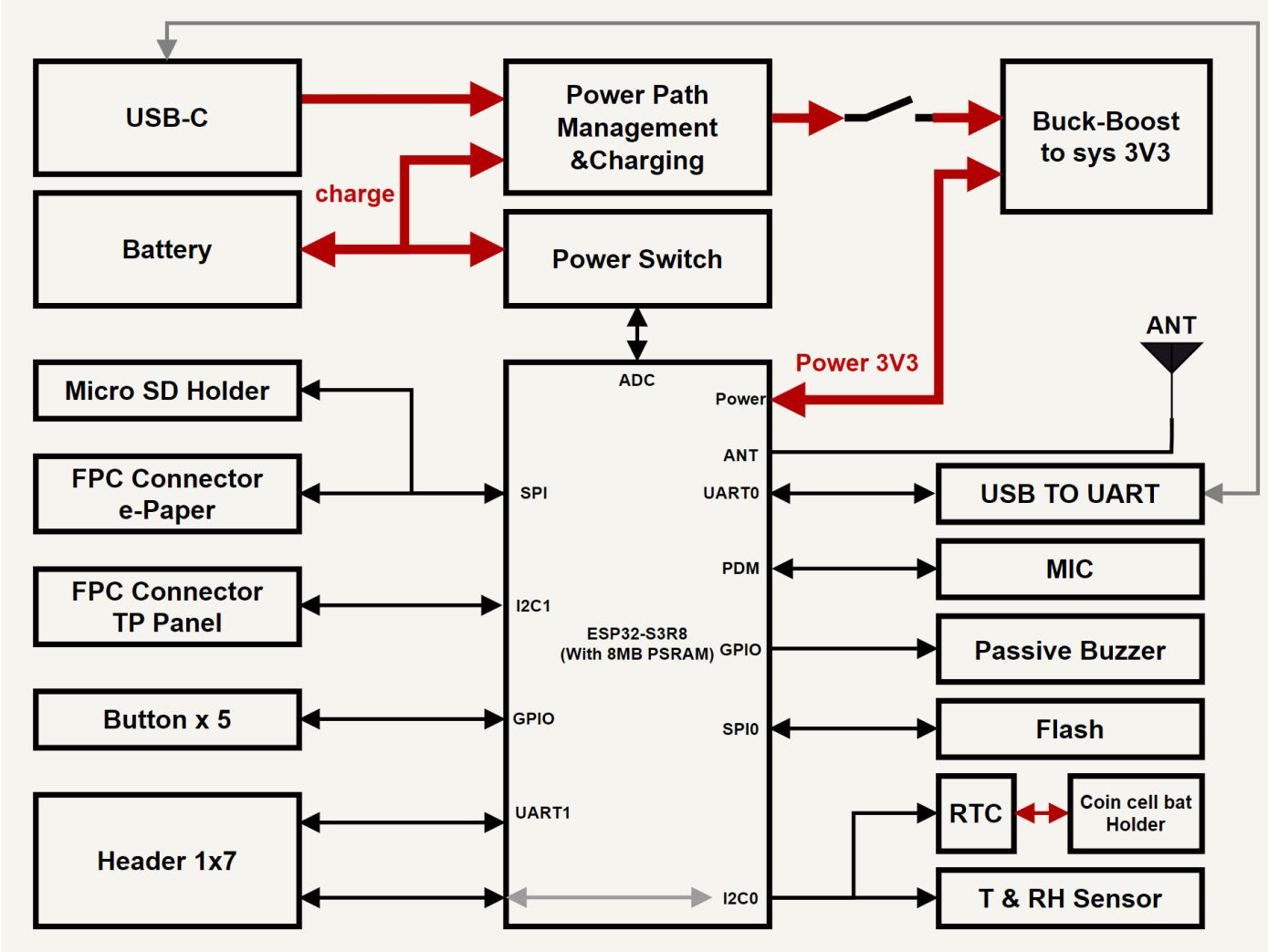

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Sheet: /02 Block Diagram/
File: 02 Block Diagram.kicad_sch

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Size: A4	Date: 2025-08-05	Design: Wenkang.Liu	Rev: v1.0
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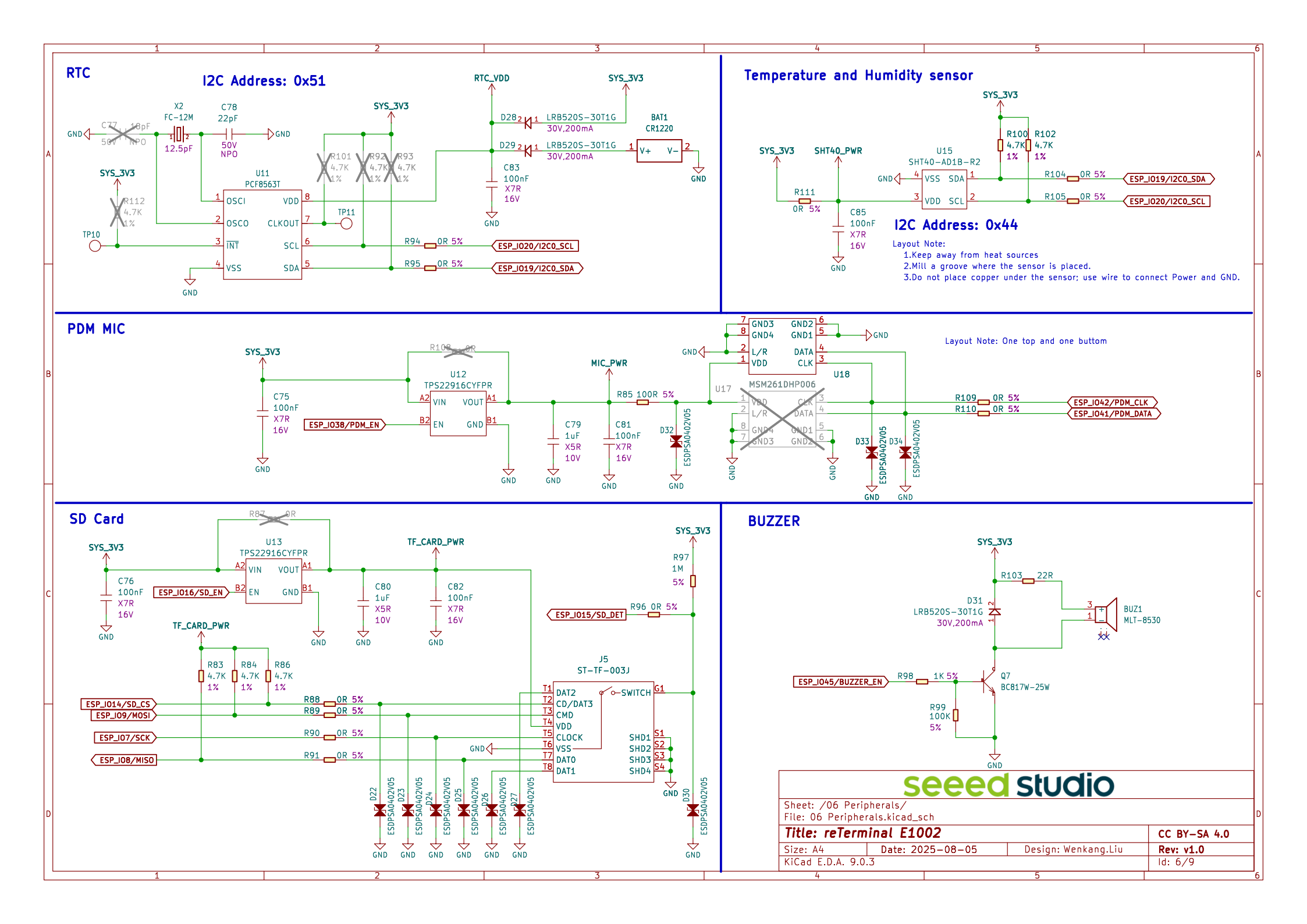
RTC
I2C Address: 0x51
X2
FC-12M
12.5pF
C78
22pF
50V
NPO
C77
18pF
50V
NPO
GND
SYS_3V3
U11
PCF8563T
OSCI
OSCO
INT
VSS
VDD
CLKOUT
SCL
SDA
R112
4.7K
1%
TP10
TP11
R101
4.7K
1%
R92
4.7K
1%
R93
4.7K
1%
RTC_VDD
D28
D29
LRB520S-30T1G
30V,200mA
BAT1
CR1220
V+
V-
C83
100nF
X7R
16V
R94
0R 5%
R95
0R 5%
ESP_IO20/I2C0_SCL
ESP_IO19/I2C0_SDA
Temperature and Humidity sensor
SHT40_PWR
U15
SHT40-AD1B-R2
VSS
SDA
VDD
SCL
R100
4.7K
1%
R102
4.7K
1%
R104
0R 5%
R105
0R 5%
ESP_IO19/I2C0_SDA
ESP_IO20/I2C0_SCL
R111
0R 5%
C85
100nF
X7R
16V
I2C Address: 0x44
Layout Note:
1.Keep away from heat sources
2.Mill a groove where the sensor is placed.
3.Do not place copper under the sensor; use wire to connect Power and GND.
PDM MIC
R108 0R
U12
TPS22916CYFPR
VIN
VOUT
EN
GND
ESP_IO38/PDM_EN
C75
100nF
X7R
16V
MIC_PWR
R85 100R 5%
C79
1uF
X5R
10V
C81
100nF
X7R
16V
D32
ESDPSA0402V05
U17
MSM261DHP006
U18
GND1
GND2
GND3
GND4
L/R
DATA
CLK
VDD
D33
D34
R109
0R 5%
R110
0R 5%
ESP_IO42/PDM_CLK
ESP_IO41/PDM_DATA
Layout Note: One top and one buttom
SD Card
R87 0R
U13
TPS22916CYFPR
C76
100nF
X7R
16V
ESP_IO16/SD_EN
C80
1uF
X5R
10V
C82
100nF
X7R
16V
TF_CARD_PWR
R83
4.7K
1%
R84
4.7K
1%
R86
4.7K
1%
R88
0R 5%
R89
0R 5%
R90
0R 5%
R91
0R 5%
ESP_IO14/SD_CS
ESP_IO9/MOSI
ESP_IO7/SCK
ESP_IO8/MISO
R97
1M
5%
R96 0R 5%
ESP_IO15/SD_DET
J5
ST-TF-003J
DAT2
CD/DAT3
CMD
VDD
CLOCK
VSS
DAT0
DAT1
SWITCH
SHD1
SHD2
SHD3
SHD4
D22
D23
D24
D25
D26
D27
D30
BUZZER
R103
22R
D31
LRB520S-30T1G
30V,200mA
BUZ1
MLT-8530
ESP_IO45/BUZZER_EN
R98
1K 5%
Q7
BC817W-25W
R99
100K
5%
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Sheet: /06 Peripherals/
File: 06 Peripherals.kicad_sch
Title: reTerminal E1002
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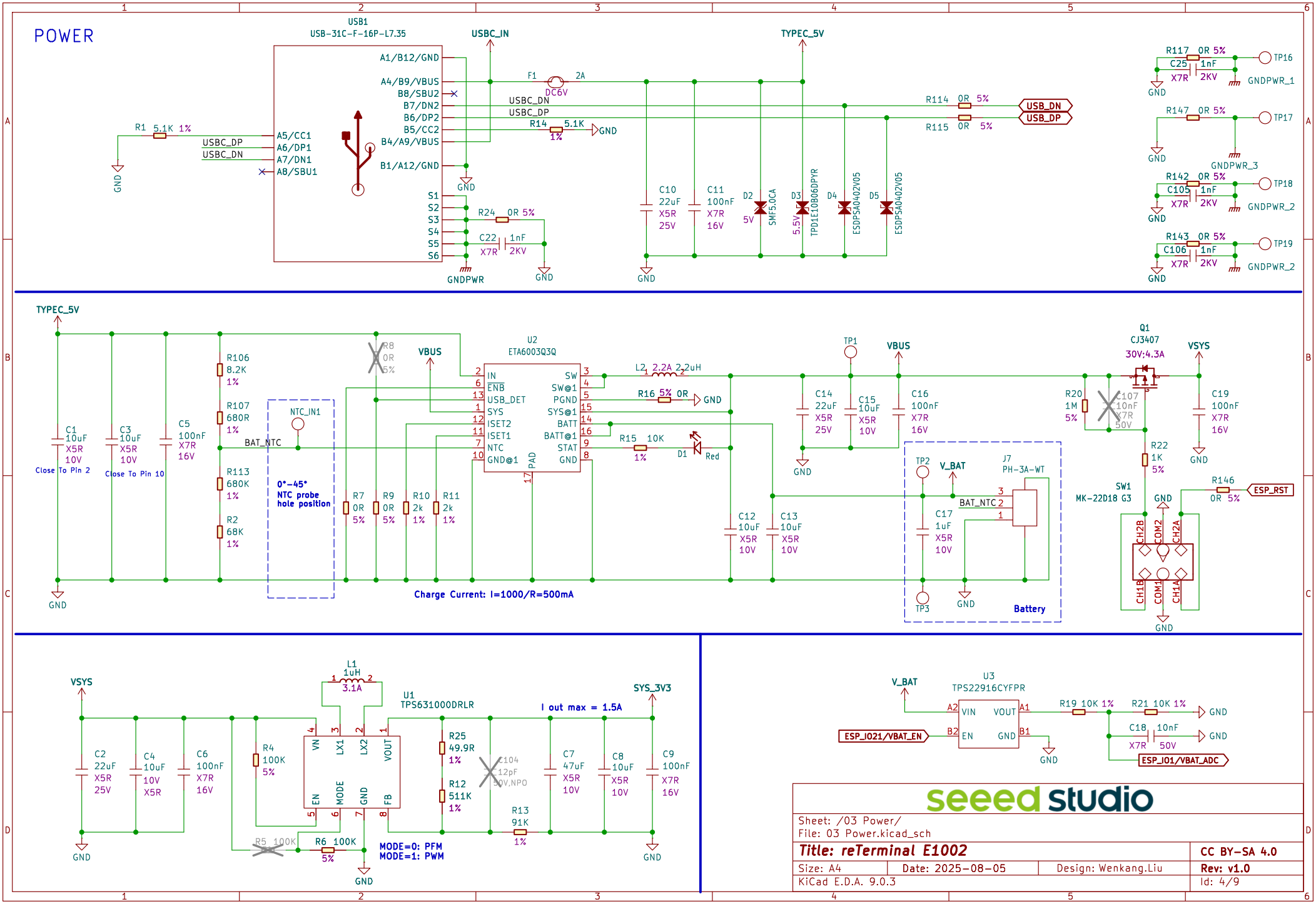
Size: A4
Date: 2025-08-05
Design: Wenkang.Liu
Rev: v1.0
KiCad E.D.A. 9.0.3
Id: 6/9


POWER
USB1
USB-31C-F-16P-L7.35
USBC_IN
TYPEC_5V
A1/B12/GND
A4/B9/VBUS
B8/SBU2
B7/DN2
B6/DP2
B5/CC2
B4/A9/VBUS
B1/A12/GND
A5/CC1
A6/DP1
A7/DN1
A8/SBU1
S1
S2
S3
S4
S5
S6
GNDPWR
F1
2A
DC6V
USBC_DN
USBC_DP
R1 5.1K 1%
R14 5.1K 1%
R24 0R 5%
C22 1nF X7R 2KV
R114 0R 5%
R115 0R 5%
USB_DN
USB_DP
C10 22uF X5R 25V
C11 100nF X7R 16V
D2 5V SMF5.0CA
D3 5.5V TPD1E10B06DPYR
D4 ESDPSA0402V05
D5 ESDPSA0402V05
R117 0R 5%
C25 1nF X7R 2KV
TP16
GNDPWR_1
R147 0R 5%
TP17
GNDPWR_3
R142 0R 5%
C105 1nF X7R 2KV
TP18
GNDPWR_2
R143 0R 5%
C106 1nF X7R 2KV
TP19
GNDPWR_2
GND
TYPEC_5V
C1 10uF X5R 10V
Close To Pin 2
C3 10uF X5R 10V
Close To Pin 10
C5 100nF X7R 16V
R106 8.2K 1%
R107 680R 1%
R113 680K 1%
R2 68K 1%
BAT_NTC
NTC_IN1
0°-45° NTC probe hole position
R8 0R 5%
VBUS
U2
ETA6003Q3Q
IN
ENB
USB_DET
SYS
ISET2
ISET1
NTC
GND@1
PAD
SW
SW@1
PGND
SYS@1
BATT
BATT@1
STAT
GND
L2 2.2A 2.2uH
R16 5% 0R
R15 10K 1%
D1 Red
R7 0R 5%
R9 0R 5%
R10 2k 1%
R11 2k 1%
C12 10uF X5R 10V
C13 10uF X5R 10V
C14 22uF X5R 25V
C15 10uF X5R 10V
C16 100nF X7R 16V
TP1
TP2
V_BAT
TP3
J7
PH-3A-WT
BAT_NTC
C17 1uF X5R 10V
Battery
Charge Current: I=1000/R=500mA
Q1
CJ3407
30V;4.3A
VSYS
R20 1M 5%
C107 10nF X7R 50V
C19 100nF X7R 16V
R22 1K 5%
SW1
MK-22D18 G3
CH2B
COM2
CH2A
CH1B
COM1
CH1A
R146 0R 5%
ESP_RST
VSYS
L1 1uH 3.1A
U1
TPS631000DRLR
I out max = 1.5A
SYS_3V3
C2 22uF X5R 25V
C4 10uF 10V X5R
C6 100nF X7R 16V
R4 100K 5%
VN
LX1
LX2
VOUT
EN
MODE
GND
FB
R25 49.9R 1%
R12 511K 1%
C104 12pF 50V,NPO
R13 91K 1%
C7 47uF X5R 10V
C8 10uF X5R 10V
C9 100nF X7R 16V
R5 100K
R6 100K 5%
MODE=0: PFM
MODE=1: PWM
V_BAT
U3
TPS22916CYFPR
A2
VIN
VOUT
A1
B2
EN
GND
B1
ESP_IO21/VBAT_EN
R19 10K 1%
R21 10K 1%
C18 10nF X7R 50V
ESP_IO1/VBAT_ADC
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Sheet: /03 Power/
File: 03 Power.kicad_sch
Title: reTerminal E1002
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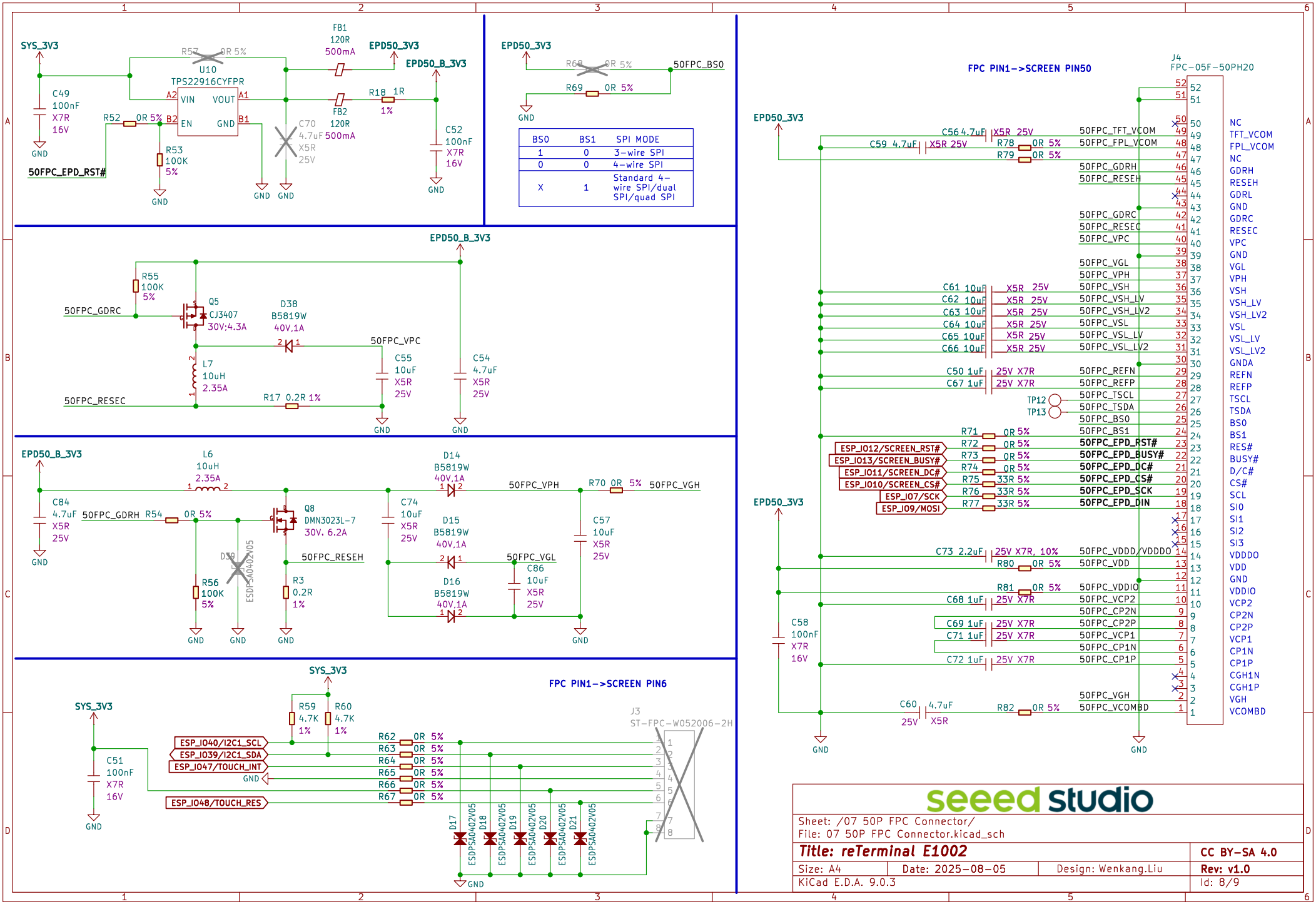
Size: A4
Date: 2025-08-05
Design: Wenkang.Liu
Rev: v1.0
KiCad E.D.A. 9.0.3
Id: 4/9


SYS_3V3
U10
TPS22916CYFPR
VIN
VOUT
EN
GND
A2
A1
B2
B1
C49 100nF X7R 16V
R52 0R 5%
R53 100K 5%
50FPC_EPD_RST#
R57 0R 5%
FB1 120R 500mA
FB2 120R 500mA
EPD50_3V3
EPD50_B_3V3
R18 1R 1%
C70 4.7uF X5R 25V
C52 100nF X7R 16V
R68 0R 5%
R69 0R 5%
50FPC_BS0
BS0 BS1 SPI MODE
1 0 3-wire SPI
0 0 4-wire SPI
X 1 Standard 4-wire SPI/dual SPI/quad SPI
R55 100K 5%
50FPC_GDRC
Q5 CJ3407 30V;4.3A
D38 B5819W 40V,1A
L7 10uH 2.35A
50FPC_VPC
50FPC_RESEC
R17 0.2R 1%
C55 10uF X5R 25V
C54 4.7uF X5R 25V
L6 10uH 2.35A
C84 4.7uF X5R 25V
50FPC_GDRH
R54 0R 5%
Q8 DMN3023L-7 30V, 6.2A
D39 ESDPSA0402V05
R56 100K 5%
R3 0.2R 1%
50FPC_RESEH
D14 B5819W 40V,1A
D15 B5819W 40V,1A
D16 B5819W 40V,1A
C74 10uF X5R 25V
50FPC_VPH
R70 0R 5%
50FPC_VGH
50FPC_VGL
C86 10uF X5R 25V
C57 10uF X5R 25V
FPC PIN1->SCREEN PIN6
J3
ST-FPC-W052006-2H
C51 100nF X7R 16V
R59 4.7K 1%
R60 4.7K 1%
ESP_IO040/I2C1_SCL
ESP_IO039/I2C1_SDA
ESP_IO047/TOUCH_INT
ESP_IO048/TOUCH_RES
R62 0R 5%
R63 0R 5%
R64 0R 5%
R65 0R 5%
R66 0R 5%
R67 0R 5%
D17 ESDPSA0402V05
D18 ESDPSA0402V05
D19 ESDPSA0402V05
D20 ESDPSA0402V05
D21 ESDPSA0402V05
FPC PIN1->SCREEN PIN50
J4
FPC-05F-50PH20
C56 4.7uF X5R 25V
C59 4.7uF X5R 25V
R78 0R 5%
R79 0R 5%
50FPC_TFT_VCOM
50FPC_FPL_VCOM
50FPC_GDRH
50FPC_RESEH
50FPC_GDRC
50FPC_RESEC
50FPC_VPC
50FPC_VGL
50FPC_VPH
50FPC_VSH
50FPC_VSH_LV
50FPC_VSH_LV2
50FPC_VSL
50FPC_VSL_LV
50FPC_VSL_LV2
C61 10uF X5R 25V
C62 10uF X5R 25V
C63 10uF X5R 25V
C64 10uF X5R 25V
C65 10uF X5R 25V
C66 10uF X5R 25V
C50 1uF 25V X7R
C67 1uF 25V X7R
50FPC_REFN
50FPC_REFP
TP12
TP13
50FPC_TSCL
50FPC_TSDA
50FPC_BS0
50FPC_BS1
R71 0R 5%
R72 0R 5%
R73 0R 5%
R74 0R 5%
R75 33R 5%
R76 33R 5%
R77 33R 5%
ESP_IO12/SCREEN_RST#
ESP_IO13/SCREEN_BUSY#
ESP_IO11/SCREEN_DC#
ESP_IO10/SCREEN_CS#
ESP_IO7/SCK
ESP_IO9/MOSI
50FPC_EPD_RST#
50FPC_EPD_BUSY#
50FPC_EPD_DC#
50FPC_EPD_CS#
50FPC_EPD_SCK
50FPC_EPD_DIN
C73 2.2uF 25V X7R, 10%
R80 0R 5%
50FPC_VDDD/VDDDO
50FPC_VDD
R81 0R 5%
50FPC_VDDIO
C68 1uF 25V X7R
50FPC_VCP2
50FPC_CP2N
C69 1uF 25V X7R
50FPC_CP2P
C71 1uF 25V X7R
50FPC_VCP1
50FPC_CP1N
C72 1uF 25V X7R
50FPC_CP1P
C58 100nF X7R 16V
C60 4.7uF 25V X5R
R82 0R 5%
50FPC_VGH
50FPC_VCOMBD
NC
TFT_VCOM
FPL_VCOM
NC
GDRH
RESEH
GDRL
GND
GDRC
RESEC
VPC
GND
VGL
VPH
VSH
VSH_LV
VSH_LV2
VSL
VSL_LV
VSL_LV2
GNDA
REFN
REFP
TSCL
TSDA
BS0
BS1
RES#
BUSY#
D/C#
CS#
SCL
SIO
SI1
SI2
SI3
VDDDO
VDD
GND
VDDIO
VCP2
CP2N
CP2P
VCP1
CP1N
CP1P
CGH1N
CGH1P
VGH
VCOMBD
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Sheet: /07 50P FPC Connector/
File: 07 50P FPC Connector.kicad_sch
Title: reTerminal E1002
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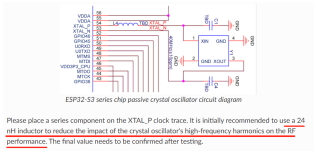

Layout Note: Close to Pin 2,3; 45*lead out

SYS_3V3 FB3 120R 1.3A R144 0R 5% ESP_3V3_PA
C20 100nF X7R 16V
C23 10uF X5R 10V
C24 1uF X5R 10V
C26 1pf 50V NPO
L4 2.2nH 1A
C29 100nF X7R 16V
C30 2.4pF NPO 50V

SYS_3V3 FB4 120R 1.3A R145 0R 5% ESP_3V3_DA
C102 100nF X7R 16V

X1 40MHz 10ppm
C35 12pF NPO 50V
C36 12pF NPO 50V

ESP_3V3_DA
C32 1uF X5R 10V
C34 10nF X7R 50V
L28 27nH 5% 300mA
C37 100nF X7R 16V

ANT2 U.FL-R-SMT-1
L3 L
C103 VALUE
R141 0R 5%
C21 VALUE
R139 0R 5%
C91 VALUE
L9 2.4nH 850mA
C31 1.5pF 50V, NPO 50V
C27 1.5pF 50V, NPO 50V
RF_IN

U19 can clipL2.9*W1.7*H1.65

U6 ESP32-S3R8

1	LNA_IN	57	GND
2	VDD3P3@1	56	VDDA@2
3	VDD3P3@2	55	VDDA@1
4	CHIP_PU	54	XTAL_P
5	GPIO0	53	XTAL_N
6	GPIO1	52	GPIO46
7	GPIO2	51	GPIO45
8	GPIO3	50	U0RXD
9	GPIO4	49	U0TXD
10	GPIO5	48	MTMS
11	GPIO6	47	MTDI
12	GPIO7	46	VDD3P3_CPU
13	GPIO8	45	MTDO
14	GPIO9	44	MTCK
15	GPIO10	43	GPIO38
16	GPIO11	42	GPIO37/DQS/DM
17	GPIO12	41	GPIO36/DQ7
18	GPIO13	40	GPIO35/DQ6
19	GPIO14	39	GPIO34/DQ5
20	VDD3P3_RTC	38	GPIO33/DQ4
21	XTAL_32K_P	37	SPICLK_P
22	XTAL_32K_N	36	SPICLK_N
23	GPIO17	35	SPID/DQ0
24	GPIO18	34	SPIQ/DQ1
25	GPIO19	33	SPICLK/CLK
26	GPIO20	32	SPICS0
27	GPIO21	31	SPIWP/DQ2
28	SPICS1/CE#	30	SPIHD/DQ3
		29	VDD_SPI

ESP_RST ESP_BOOT ESP_IO1/VBAT_ADC ESP_IO2/ADC1_CH4 ESP_IO3/KEY0 ESP_IO4/KEY1 ESP_IO5/KEY2 ESP_IO6/LED ESP_IO7/SCK ESP_IO8/MISO ESP_IO9/MOSI
ESP_IO46 ESP_IO45/BUZZER_EN ESP_RX0 ESP_TX0 R26 499R 1%
ESP_IO42/PDM_CLK ESP_IO41/PDM_DATA ESP_IO40/I2C1_SCL ESP_IO39/I2C1_SDA ESP_IO38/PDM_EN
ESP_IO47/TOUCH_INT ESP_IO48/TOUCH_RES
SPI_D SPI_Q SPI_CLK SPI_CS0 SPI_WP SPI_HD
ESP_IO10/SCREEN_CS# ESP_IO11/SCREEN_DC# ESP_IO12/SCREEN_RST# ESP_IO13/SCREEN_BUSY# ESP_IO14/SD_CS ESP_IO15/SD_DET ESP_IO16/SD_EN ESP_IO17/TX1 ESP_IO18/RX1 ESP_IO19/I2C0_SDA ESP_IO20/I2C0_SCL ESP_IO21/VBAT_EN

C38 100nF X7R 16V
C39 1uF X5R 10V
C33 100nF X7R 16V

Flash

R23 100K 5%
U4 ZB25VQ128DSJG
U5 W25Q256JVEIQ
SPI_CS0 SPI_Q SPI_WP SPI_HD SPI_CLK SPI_D
C28 100nF X7R 16V

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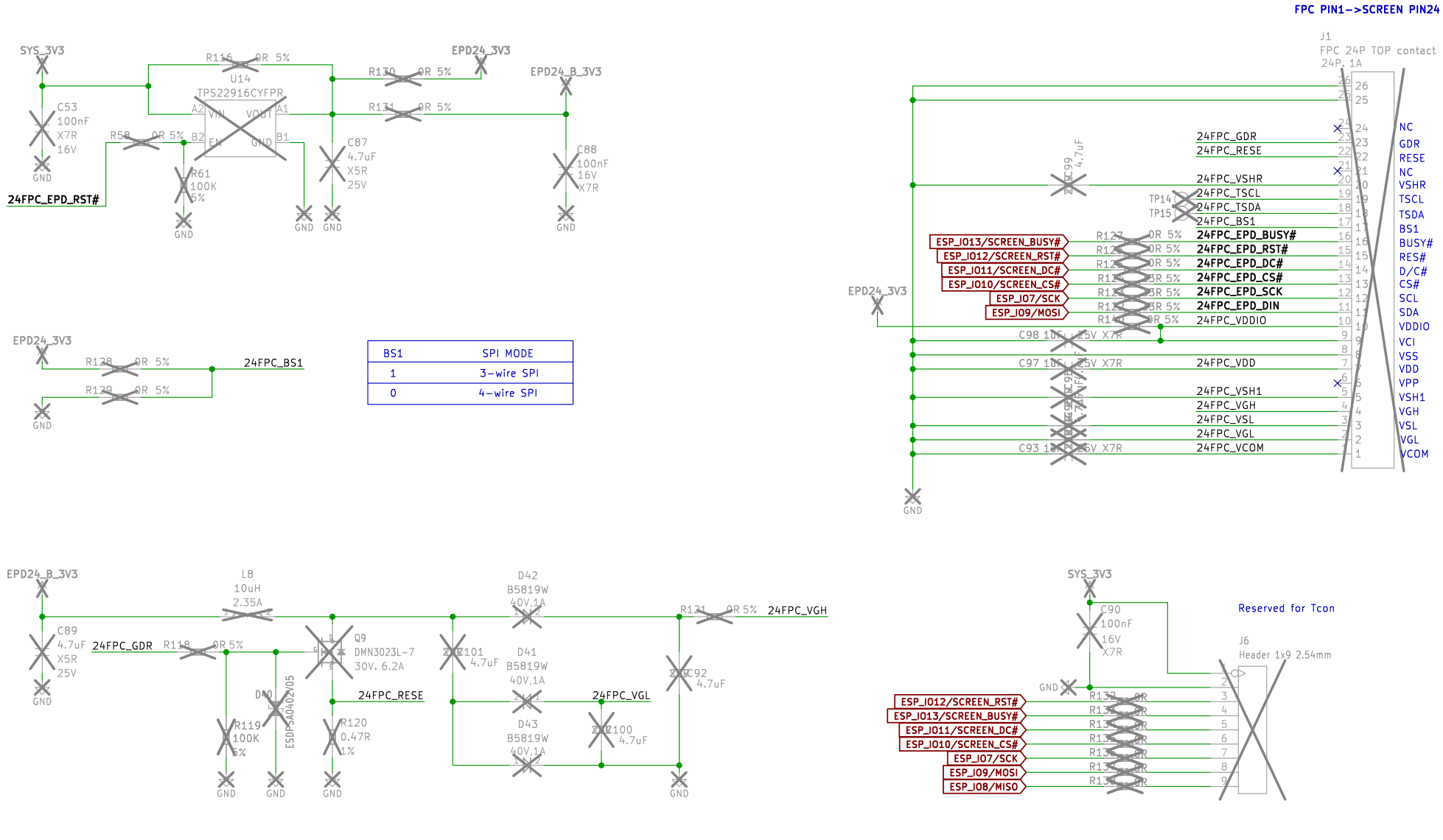
Sheet: /04 ESP32-S3/			
File: 04 ESP32-S3.kicad_sch			
Title: reTerminal E1002			CC BY-SA 4.0
Size: A4	Date: 2025-08-05	Design: Wenkang.Liu	Rev: v1.0
KiCad E.D.A. 9.0.3			Id: 5/9


FPC PIN1->SCREEN PIN24
SYS_3V3
EPD24_3V3
EPD24_B_3V3
U14
TPS22916CYFPR
R116 0R 5%
R130 0R 5%
R131 0R 5%
R58 0R 5%
C53 100nF X7R 16V
C87 4.7uF X5R 25V
C88 100nF 16V X7R
R61 100K 5%
24FPC_EPD_RST#
GND
J1
FPC 24P TOP contact
24P, 1A
24FPC_GDR
24FPC_RESE
24FPC_VSHR
24FPC_TSCL
24FPC_TSDA
24FPC_BS1
24FPC_EPD_BUSY#
24FPC_EPD_RST#
24FPC_EPD_DC#
24FPC_EPD_CS#
24FPC_EPD_SCK
24FPC_EPD_DIN
24FPC_VDDIO
24FPC_VDD
24FPC_VSH1
24FPC_VGH
24FPC_VSL
24FPC_VGL
24FPC_VCOM
ESP_IO13/SCREEN_BUSY#
ESP_IO12/SCREEN_RST#
ESP_IO11/SCREEN_DC#
ESP_IO10/SCREEN_CS#
ESP_IO7/SCK
ESP_IO9/MOSI
TP14
TP15
C99 4.7uF
C98 10uF 25V X7R
C97 10uF 25V X7R
C93 10uF 25V X7R
NC
GDR
RESE
NC
VSHR
TSCL
TSDA
BS1
BUSY#
RES#
D/C#
CS#
SCL
SDA
VDDIO
VCI
VSS
VDD
VPP
VSH1
VGH
VSL
VGL
VCOM
R128 0R 5%
R129 0R 5%
24FPC_BS1
BS1 | SPI MODE
1 | 3-wire SPI
0 | 4-wire SPI
L8 10uH 2.35A
C89 4.7uF X5R 25V
24FPC_GDR
R118 0R 5%
Q9 DMN3023L-7 30V, 6.2A
D40 ESDPSA0402V05
R119 100K 5%
R120 0.47R 1%
24FPC_RESE
D42 B5819W 40V,1A
D41 B5819W 40V,1A
D43 B5819W 40V,1A
R101 4.7uF
R100 4.7uF
C92 4.7uF
R121 0R 5%
24FPC_VGH
24FPC_VGL
C90 100nF 16V X7R
Reserved for Tcon
J6
Header 1x9 2.54mm
R132 0R
R133 0R
R134 0R
R135 0R
R136 0R
R137 0R
R138 0R
R139 0R
ESP_IO12/SCREEN_RST#
ESP_IO13/SCREEN_BUSY#
ESP_IO11/SCREEN_DC#
ESP_IO10/SCREEN_CS#
ESP_IO7/SCK
ESP_IO9/MOSI
ESP_IO8/MISO
seeed studio
Sheet: /08 24P FPC Connector/
File: 08 24P FPC Connector.kicad_sch
Title: reTerminal E1002
CC BY-SA 4.0
Size: A4
Date: 2025-08-05
Design: Wenkang.Liu
Rev: v1.0
KiCad E.D.A. 9.0.3
Id: 9/9