Voltage Regulator

U1 LD1117S33TR

GND — 1 GND VOUT 2 — VCC
+5V — 3 VIN VOUT 4 ✕
C2 22uF
C1 22uF
GND

Power LED

R1 1K
+5V
LED1 PWR
GND

USB to Serial

VBUS

USB microUSB
V+ 1
D- 2
D+ 3
ID 4 ✕
V- 5
GND

D1 MBR120VLSFT1G
VBUS1

D-D+
D+D-
GND

C5 4.7uF
C6 0.1uF
VCC
GND

D2 LESD5D5.0CT1G
GND

D3 LESD5D5.0CT1G
GND

D4 LESD5D5.0CT1G
GND

VBUS1
R9 22.1K
R12 47.5K
GND

R5 10K
GND

R10 2K
VCC
GND

** C7 0.1uF

U3 CP2102N-A01-GQFN28
1 DCD
2 RI/CLK
3 GND
4 D+
5 D-
6 VDD
7 VREGIN
8 VBUS
9 RSTb
10 NC
11 SUSPENDb
12 SUSPEND
13 CHREN
14 CHR1

28 DTR — DTR
27 DSR
26 TXD — TXD
25 RXD — RXD
24 RTS — RTS
23 CTS
22 GPIO.4
21 GPIO.5
20 GPIO.6
19 GPIO.0/TXT
18 GPIO.1/RXT
17 GPIO.2/RS485
16 GPIO.3/WAKEUP
15 CHR0
29 EXP — GND

EN
R6 10K
Q1 SS8050_C2150
DTR

R11 10K
Q2 SS8050_C2150
IO0
RTS

BME680

U4 BME680
VCC
GND
VCC
8 VDD
7 GND
6 VDDIO
5 SDO

1 GND — GND
2 CSB
3 SDI — SDA
4 SCK — SCL

C10 100nF
C11 100nF
GND

R14 4.7K
R15 4.7K
VCC

SDS021

H1 SDS
4 SDS_RX
3 SDS_TX
2 GND
1 +5V

MCU ESP32

U2 ESP-WROOM-32
VCC
GND
C4 22uF
C3 0.1uF
GND

EP 39

1 GND
2 3V3
3 EN — EN
4 SENSOR_VP
5 SENSOR_VN
6 IO34
7 IO35
8 IO32
9 IO33
10 IO25 — A9_IO25 uEN
11 IO26 — uPWR_KEY
12 IO27 — PWR_KEY
13 IO14 — AT_RX
14 IO12 — AT_TX GPS_RX

38 GND — GND
37 IO23 — IO23
36 IO22 — IO22
35 TXD0 — RXD
34 RXD0 — TXD IO21
33 IO21
32 NC ✕
31 IO19 VCC
30 IO18 — SDA
29 IO5 — SCL
28 IO17 — IO5
27 IO16 — LED_B
26 IO4 — LED_G
25 IO0 — LED_R IO0

15 GND
16 IO13
17 SD2
18 SD3
19 CMD
20 CLK
21 SD0
22 SD1
23 IO15
24 IO2
GND

GPS_TX
SDS_RX
SDS_TX

GPIO34, 35, 39, 37 only input
GPIO6-11 Recommended not to use

J1 GPIO
1 IO5
2 IO21
3 IO22
4 IO23
5 TX
6 RX

LED2 RGB1

R G B
R2 1K
R3 1K
R4 1K
VCC
LED_R LED_G LED_B

Buttons

**
R7 10K — VCC
SW2 BOOT
A B — IO0
C8 10uF
R13 2K
GND

**
R8 10K — VCC
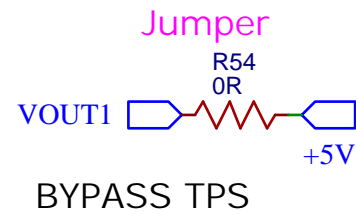SW3 RST
A B — EN
C9 100nF
GND
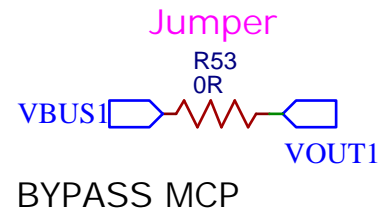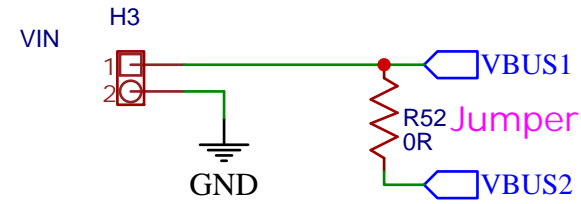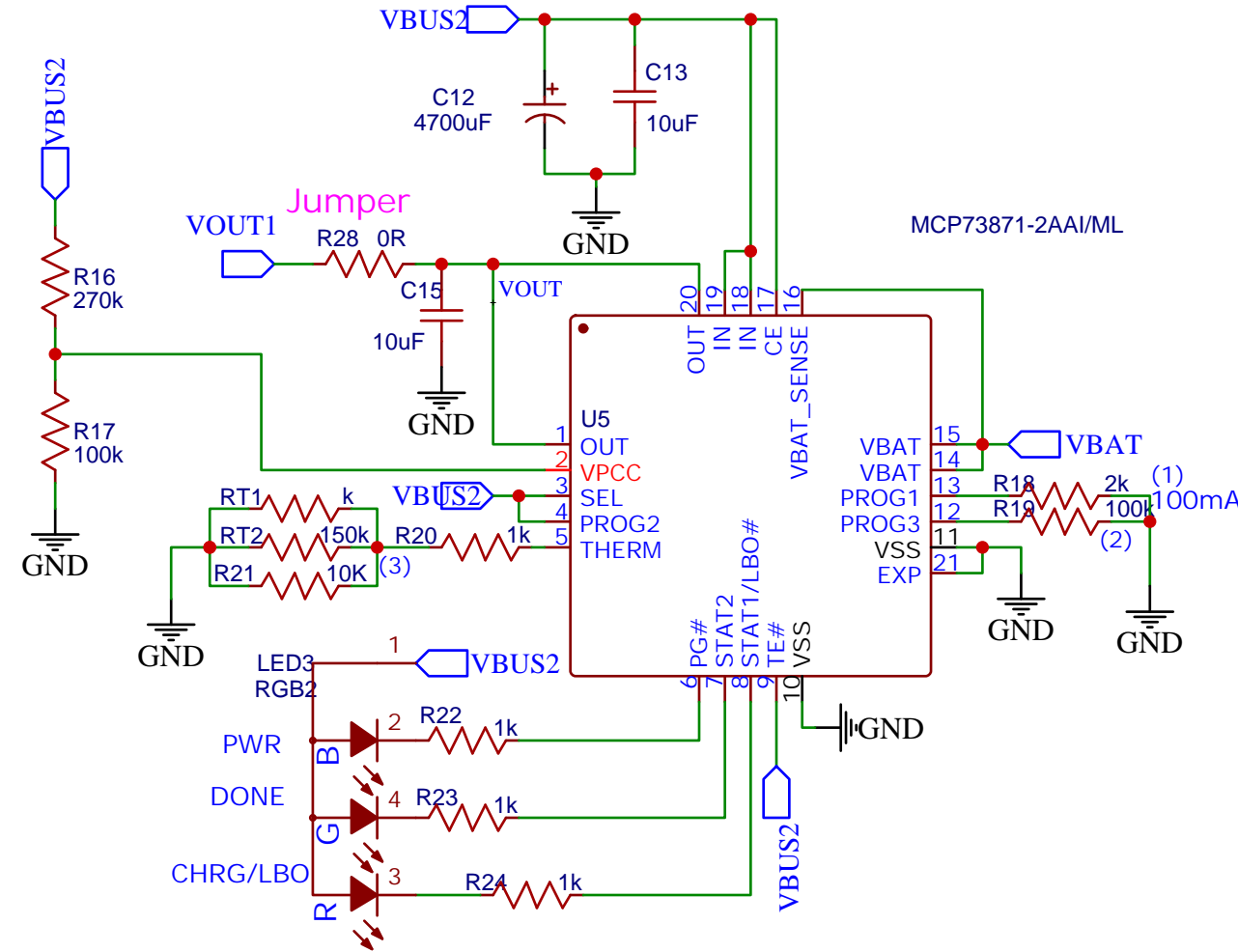
** Optional:
R15 R16
C15, C16
SW3

TITLE: Schematic ScooterAQNet Revision 4

REV: 4

Company: TECO

Date: 2021-08-13   Drawn By: SajjadHussain

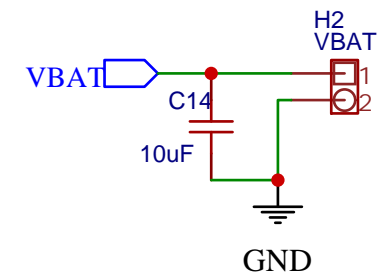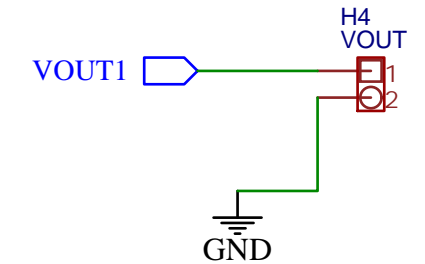Sheet: 1/4

RECHARGE CIRCUIT

DC CONNECTOR

VIN
H3
1
2
VBUS1
R52 0R *Jumper*
VBUS2
GND

BYPASS MCP

Jumper
R53 0R
VBUS1
VOUT1

BYPASS TPS

Jumper
R54 0R
VOUT1
+5V

VBUS2
R16 270k
R17 100k
GND

VBUS2
C12 4700uF
C13 10uF
GND

Jumper
VOUT1
R28 0R
C15 10uF
VOUT
GND

MCP73871-2AAI/ML

U5
OUT 1
VPCC 2
SEL 3
PROG2 4
THERM 5
PG# 6
STAT2 7
STAT1/LBO# 8
TE# 9
VSS 10

OUT 20
IN 19
IN 18
CE 17
VBAT_SENSE 16

VBAT 15
VBAT 14
PROG1 13
PROG3 12
VSS 11
EXP 21

RT1 k
RT2 150k
R21 10K (3)
R20 1k
VBUS2
GND

R18 2k (1)
R19 100k (2)
100mA
VBAT
GND
GND

LED3 RGB2
PWR   B 2   R22 1k
DONE G 4   R23 1k
CHRG/LBO R 3   R24 1k
VBUS2

BATTERY CONNECTORS

VBAT
H2 VBAT
1
2
C14 10uF
GND

BOOSTER INPUT CONNECTORS

VOUT1
H4 VOUT
1
2
GND

DC BOOSTER

TPS61032: Fixed 5V Output
TPS61030: Variable Output

U6
TPS6103xRSAR

VOUT1
R57 0R *Jumper*
VOUT1in
C19 10uF
R25 1.87M
LBI
R26 200k
L1 7uH
R29 340k
GND

VBAT 8
SYNC 10
SW/2 4
EP 17
LBI 9
EN 11
FB 14
SW 3
NC 2
PGND 7
PGND 5
PGND 6
GND 13

VOUT/2 1
VOUT/3 15
VOUT 16
LBO 12

LB
FB

GND

R55 1M
R56 0R *Jumper*
VOUT1
Q3 MMUN2133LT1G
R31 1k
LED5 LBO
GND

R27 1.87M
FB
R30 200k
GND

C16 2.2uF
C17 100uF
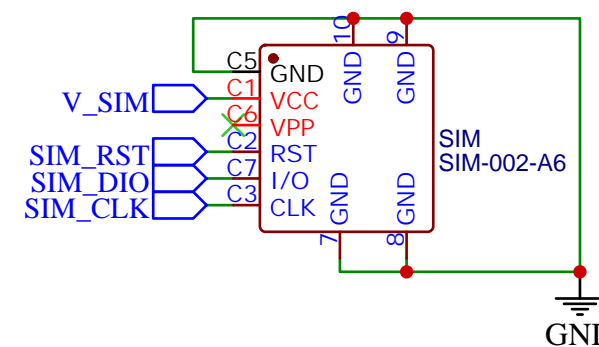C18 100uF
VOUT2
R49 0R *Jumper*
+5V
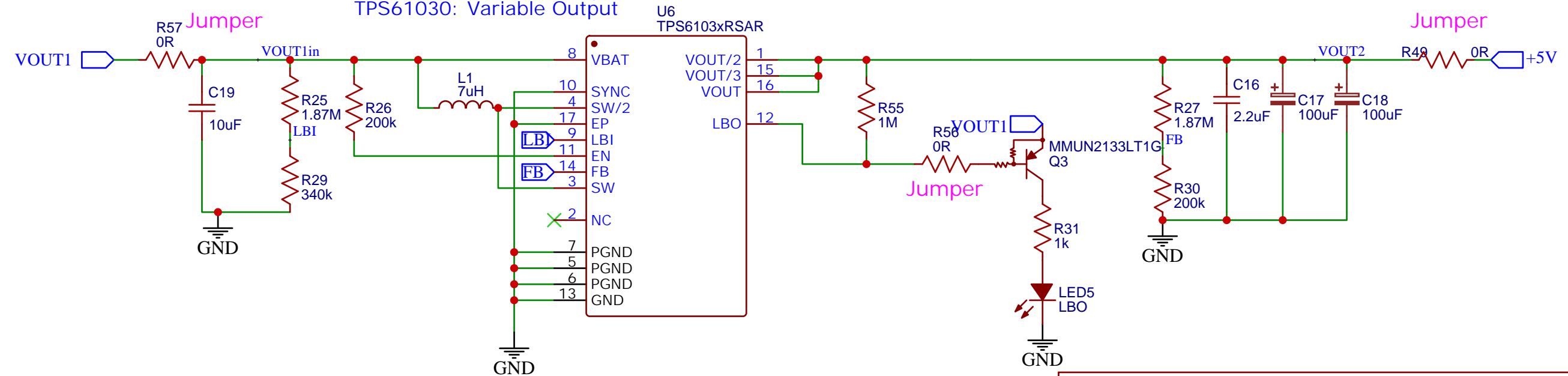
(1) Max recharge current Ireg = 1000V/Rprog1
(2) Stop recharge condition Ireg = 1000V/Rprog3
(3) Tolerance <10%
(4) RT2 is a placeholder for a real NTC. If thermistor is not needed, R11=short and R12=open

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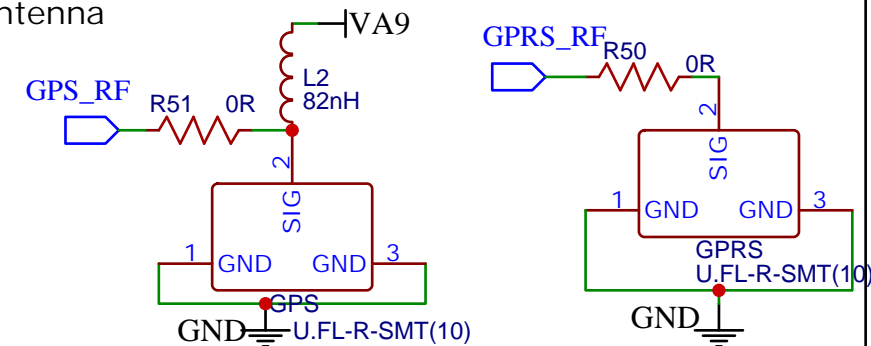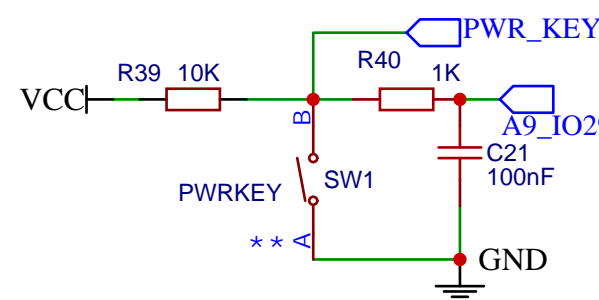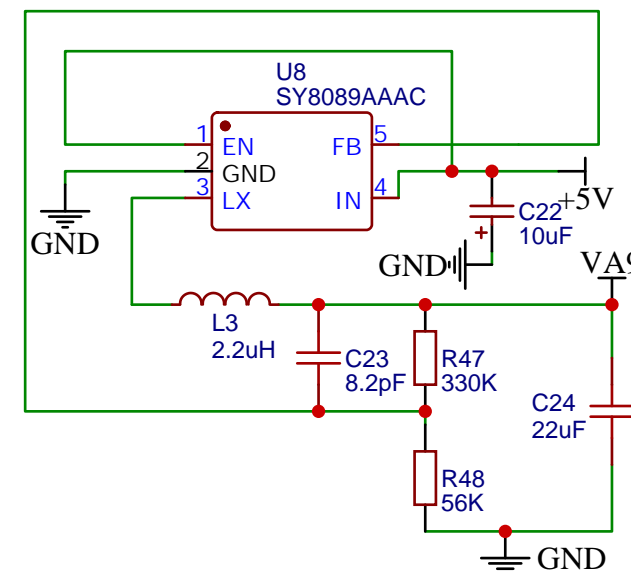Date: 2021-08-13
Drawn By: SajjadHussain

A9G

Jumper R32-R35

GPS_TX — R33 50R — R32 50R
GPS_RX — R34 50R
AT_TX — R35 50R
AT_RX

GND

GPRS_RF
SIM_RST

U7
A9G

54 53 52 51 50 49 48 47 46 45 44 43 42

UART1_TXD UART1_RXD UART1_CTS UART1_RTS UART2_TXD UART2_RXD UART2_CTS UART2_RTS GND GPRS_RF VIO SMO_RST

Jumper R36-R37

1 I2C2_SCL
2 I2C2_SDA
3 SD_D3
4 SD_D2
5 SD_D1
6 SD_D0
7 SD_CMD
8 SD_CLK
9 PWRKEY
10 GND
11 VBAT
12 VBAT
13 SPK_P
14 SPK_N

uPWR_KEY — R36 50R
PWR_KEY — R37 50R

GND

VA9

GND 55 GND

GND 56 GND

41 SMO_CLK — SIM_CLK
40 VSMO — V_SIM
39 SMO_DIO — SIM_DIO
38 HST_RXD — HST_RXD
37 HST_TXD — HST_TXD
36 USB_P
35 USB_N
34 MIC_P
33 MIC_N
32 IO25 — R38 50R — A9_IO25 *Jumper*
31 IO30
30 IO28 — A9_IO28
29 GND
28 GPS_RF — GPS_RF

J2
RS232
+5V
1
2
3
4
HST_RXD
HST_TXD

GND

ADC0 ADC1 VUSB RESET LCD_CS LCD_RST LCD_DIO LCD_SDC LCD_SCK IO29 IO26 IO27 GND

15 16 17 18 19 20 21 22 23 24 25 26 27

+5V

R43 50R
GND

Jumper R42-R44

EN — R44 50R — R42 50R
uEN

Q4
BSN20BKR
1 G
2 S
3 D

A9_IO26
A9_IO27

GND

VA9 — R41 1K — LED6 VA9

A9_IO27 — R45 1K — LED7 Network

A9_IO28 — R46 1K — LED8 GPS

GND

Micro Sim

C5 10
C1 GND — GND 9
V_SIM — VCC — GND
C6 VPP
SIM_RST — RST C2
SIM_DIO — I/O C7
SIM_CLK — CLK C3 GND

SIM
SIM-002-A6

7 GND 8 GND

GND

Antenna

GPS_RF — R51 0R — L2 82nH — VA9

SIG
2
1 GND GND 3
GND — GPS — U.FL-R-SMT(10)

GPRS_RF — R50 0R

SIG 2
1 GND GND 3
GPRS
U.FL-R-SMT(10)
GND

A9G Power Key

VCC — R39 10K — B — R40 1K — PWR_KEY
A9_IO29
C21 100nF

PWRKEY
SW1
* * A

GND

A9G Voltage Regulator

U8
SY8089AAAC
1 EN   FB 5
2 GND
3 LX   IN 4

GND

L3 2.2uH
C23 8.2pF
R47 330K
C24 22uF
C22 10uF
+5V
VA9

R48 56K
GND

TITLE: Schematic ScooterAQNet Revision 4
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Sheet: 3/4
Date: 2021-08-13   Drawn By: SajjadHussain

EasyEDA

Jumpers/0-Ohm

R50 Jumper for GPRS Antenna
R51 Jumper for GPS Antenna
R52 to control connection of MCP73871 input
R28 Jumper for MCP73871 VOUT Output
R49 Jumper for TPS61030RSAR VOUT Output
R53 to bypass MCP73871 while it is not inserted
R54 to bypass TPS61030RSAR while it is not inserted
R56 joins TPS LBO to LED circuit
R57 Joins output of MCP to input of TPS
R32-R38, R42-R44 connects different ESP32 pins to A9G pins

PCB Soldering TODOs

Not Used
D2, D3, D4 USB Protection
C12 Charge IC Ripple Protection
RT1 Charge IC Thermistor
R29, R27, R30, R31, R55 LED5, Q3, Required TPS61030 & LBO
R53 to bypass MCP73871 while it is not inserted
R54 to bypass TPS61030RSAR while it is not inserted
R36 connects A9G PWRKEY to ESP32 pin
R42 connects A9G RESET pin to power-up/button reset
VIN, J1, J2 Headers

Not Used at Start, but used after testing individual parts
R28 Joins VOUT (MCP) and VOUT1
R49 Joins VOUT2 (TPS) and +5V

Replaced
D1=>0R Protection Diode @ Input
R25=>0R No Threshold for TPS6103x
C14, C15, C13=> Same as C19 High Ratings
H2=>Battery Connector Battery Connection
H1=>SDS Connector SDS Connection

TITLE:	Schematic ScooterAQNet Revision 4	REV: 4.0
	Company: TECO	Sheet: 4/4
EasyEDA	Date: 2022-02-26 Drawn By: SajjadHussain	