QWIIC AND I2C

J6
GND 1 GND
3V3 2 +3V3
SDA 3 SDA
SCL 4 SCL
MP 5
QWIIC 3V3

J7
GND 1 GND
3V3 2 +3V3
SDA 3 SDA
SCL 4 SCL
ALT I2C HEADER

I OUT A (J1)

J1
+3V3 1 +3V3
+5V 2 +5V
P3_GPIO 3
P4_UN 4
P5_UN 5
P6_GPIO 6
P7_UN 7
P8_SDA 8 SDA
P9_SCL 9 SCL
GND 10 GND
I OUT A

C1 100nF 16V X7R +3V3 GND

I OUT B (J2)

C16 10uF 16V X7R +5V GND
C18 2.2uF 16V X7R +3V3 GND

J2
+3V3 1 +3V3
+5V 2 +5V
P3_GPIO 3
P4_UN 4
P5_UN 5
P6_GPIO 6
P7_UN 7
SDA 8 P8_SDA
SCL 9 P9_SCL
GND 10 GND
I OUT B

OVERVOLTAGE CUTOFF

QF3
OV_GATE 1 G
OV_SAFE 4 S
D 2 12V_IN_RAW
BSS84-7-F

RF17 100k 1% OV_GATE GND
DF11 BZT52C12S-7-F OV_GATE OV_GATE

3V3 REGULATOR

U5
+3V3 2 VOUT
GND 3 GND
VIN 1 5V_BUCK
EN 4 5V_BUCK
NC 5
AP2112K-3.3

I2C DIFFERENTIAL BUFFER

U1
+3V3 1 VDDA
SDA 2 SDA
SCL 3 SCL
GND 4 VSS
EN 8 EN
DSCLM 7 SCL_N
DSCLP 6 SCL_P
DSDAP 5 SDA_P
DSDAM 4 SDA_N
VDDB 10 5V_BUCK
PCA9615DP

C2 100nF 16V X7R 5V_BUCK GND
C3 10uF 16V X7R 5V_BUCK GND
C13 22uF 10V X7R 5V_BUCK GND
C14 22uF 10V X7R 5V_BUCK GND
C15 100nF 16V X7R 5V_BUCK GND
C17 2.2uF 16V X7R 5V_BUCK GND

R11 10k +3V3 EN
F1 MF-NSMF012-2 5V_BUCK 5V_SW
L1 4.7uH 2A BUCK_SW 5V_BUCK

CABLE LINES

J8 CABLE OUT
SCL+ 1 SCL_P
SCL- 2 SCL_N
SDA+ 3 SDA_P
TERM5V 4 TERM_5V
GND 5 GND
SDA- 6 SDA_N
NC 7
NC 8
SHIELD 9 SHIELD

U2
NC 1
GND 2 GND
D1+ 3 SCL_P
D2+ 4 SDA_P
D2- 5 SDA_N
D1- 6 SCL_N
TPD4E1U06DBVR

U6
NC 1
GND 2 GND
D1+ 3 SCL_P
D2+ 4 SDA_P
D2- 5 SDA_N
D1- 6 SCL_N
TPD4E1U06DBVR

C4 1nF 2kV X7R SHIELD GND

J5 CABLE IN
SCL+ 1 SCL_P
SCL- 2 SCL_N
SDA+ 3 SDA_P
NC 4
SDA- 5 SDA_N
NC 6
NC 7
SHIELD 8 SHIELD

R9 1M SHIELD GND
SJ1 SHIELD BOND SHIELD GND

OVERVOLTAGE LAMP

UF2
OV_K 1 K
OV_REF 2 REF
A 3 GND
TL431BIDBZR

RF6 10k 1% WARN LL_R
RF7 45.3k 0.1% OV_SAFE OV_REF
RF8 10k 0.1% OV_REF GND
RF9 8.2k 0.25W WARN OV_K
DF3 BAT54WS-7-F OV_REF GND

DF4 BZT52C12S-7-F OV_K GND
DF9 BAT54WS-7-F OV_K GND

RF10 10k 0.25W WARN OV_R
SJF2 CUT OV LED OV_R OV_A
DF5 RED OVERVOLTAGE OV_A OV_K

12V EFUSE

J3 12V DC IN
+12V 1 12V_IN_RAW
GND 2 GND

UF1
NC 1
ON 2 ON
SHDN 3 SHDN
NC 4
GND 5 GND
IN 10 12V_IN_RAW
IN 9 12V_IN_RAW
UVLO 8 UV
OVP 7 OV
MODE 6 RTN
RTN 11 RTN
ILIM 12 ILIM
dVdT 13 SLEW
FLT 14 FLT
OUT 15 12V_FUSED
OUT 16 12V_FUSED
EP 17 RTN
TPS26600PWPR

CF1 100nF 25V X7R SLEW RTN
CF2 100nF 50V X7R 12V_IN_RAW GND
CF3 1uF 50V X7R 12V_FUSED GND

RF1 72.0k 0.1% 12V_IN_RAW UV
RF2 10k 0.1% UV RTN
RF3 110k 0.1% 12V_IN_RAW OV
RF4 10k 0.1% OV RTN
RF5 24.0k 1% ILIM RTN
DF1 1N4148WS-7-F WARN 12V_IN_RAW

DF10 BAT54WS-7-F FLT_A FLT
DF2 RED FAULT FLT FLT_A
SJF1 CUT FAULT LED FLT_R FLT_A
D1 B340A 12V_FUSED 12V_PROT

REVERSE POLARITY LAMP

QF1 MMBT3904-7-F
B1 1 B
12V_IN_RAW 2 E
C1 3 C

QF2 MMBT3904-7-F
B2 1 B
12V_IN_RAW 2 E
C2 3 C

CF4 10uF 16V X7R C1 B1
CF5 10uF 16V X7R C2 B2

RF12 47k 1% 5V_VCC B1
RF13 47k 1% 5V_VCC B2
RF14 10k 1% 5V_VCC C1
RF15 10k 1% 5V_VCC C2
DF7 BZT52C3V9S-7-F 5V_VCC 12V_IN_RAW

RF11 4.7k 0.25W 5V_VCC REV_FEED
DF6 1N4148WS-7-F REV_FEED GND
RF16 2.2k 1% 5V_VCC REV_R
SJF3 CUT REVERSE LED REV_R REV_A
DF8 RED REVERSE REV_A C1

5V BUCK

U3
BUCK_BST 1 BST
GND 5 GND
FB 4 5V_BUCK
EN 3 12V_PROT
IN 2 12V_PROT
SW 6 BUCK_SW
AP63205WU-7

C10 10uF 50V X7R 12V_PROT GND
C11 100nF 50V X7R 12V_PROT GND
C12 100nF 50V X7R BUCK_SW BUCK_BST

D2 SMBJ15A 12V_PROT GND

5V OUTPUT SWITCH

U4
+5V 6 OUT
GND 7 GND
IN 1 5V_BUCK
EN 2 5V_BUCK
ILIM 3 SW_ILIM
FAULT 4
TPS25530BVR

R12 150k 1% SW_ILIM GND

SUPPORT CIRCUITRY

JP1 PULLUP SDA +3V3 PU_SDA
R1 3k3 1% PU_SDA SDA
JP2 PULLUP SCL +3V3 PU_SCL
R2 3k3 1% PU_SCL SCL

D3 GREEN 3V3 +3V3 PWR_K
JP10 CUT 3V3 LED PWR_R
R10 470R PWR_R GND

D4 RED 5V +5V LS_K
JP12 CUT 5V LED LS_R
R15 1k LS_R GND

TEST PADS

TP1 GND GND
TP2 +3V3 +3V3
TP3 +5V +5V
TP4 12V_PROT 12V_PROT
TP5 SDA SDA
TP6 SCL SCL

SUPPLY RAILS

PWR_FLAG +3V3
PWR_FLAG +5V
PWR_FLAG GND

CAD-checked prototype, not physically qualified
License: CERN-OHL-S-2.0
Smoothieware extension boards

Sheet: /
File: die-remote.kicad_sch

Title: Differential I2C Extender, remote

Size: A1 | Date: 2026-11-26	Rev: v02
KiCad E.D.A. 9.0.8	Id: 1/1