PROCESSING

I2S_SD
I2S_WS
I2S_CK

PLUG_DETECT
RESETB

SDA
SLC

INTn1
INTn2

AUDIO

I2S_SD
I2S_WS
I2S_CLK

PLUG_DETECT
RESETB

SDA
SCL

POWER

INTn1
INTn2

SCL
SDA

PERIPHERALS

RES
SCL
SDA
SWCLK
SWDIO

UPINPUT
LEFTINPUT
RIGHTINPUT
DOWNINPUT

POWERSWITCH

VOLUMEDOWN
VOLUMEUP

UPINPUT
LEFTINPUT
RIGHTINPUT
DOWNINPUT

File: Peripherals.kicad_sch

SCL
SDA

SWCLK
SWDIO

C21
1uF
+3.3VA

C20
100nF

GNDA

+3.3VD   +3.3VD

C19
100nF

C22   C23   C24   C25   C26
100nF 100nF 100nF 100nF 1uF

GNDD

GNDD

VBAT VDDA VDD_1 VDD_2 VDD_3 VDD_4
1   13   19   32   48   64

PA0_WKUP   14

PB11   30
PB12   33   I2S_WSD
PB13   34   I2S_CKD
PB14   35
PB15   36   I2S_SDD
PC0   8
PC1   9
PC2   10
PC3   11
PC4   24
PC5   25
PC6   37
PC7   38
PC8   39   DAT0
PC9   40   DAT1
PC10   51   DAT2
PC11   52   DAT3
PC12   53   SD_CLK
PC13   2
PC14   3
PC15   4
PD2   54   CMD
PH0   5
PH1   6
BOOT0   60
NRST   7

PA1   15   INTn1
PA2   16   INTn2
PA3   17   RESETB
PA4   20   PLUG_DETECT
PA5   21
PA6   22   UPINPUT
PA7   23   LEFTINPUT
PA8   41   RIGHTINPUT
PA9   42   DOWNINPUT
PA10   43
PA11   44
PA12   45
PA13   46   SWCLK
PA14   49   SWDIO
PA15   50
PB0   26
PB1   27
PB2   28
PB3   55
PB4   56
PB5   57
PB6   58   SLC
PB7   59   SDA
PB8   61
PB9   62
PB10   29

VSSA VSS_1 VSS_2 VCAP_1 VCAP_2
12   18   63   31   47

IC4
STM32F405RGT6TR

GNDA   GNDD

C1   C18
2.2uF 2.2uF

GNDD

+3.3VD

C28
100nF

+3.3VD

R16
10k

GNDD

GNDD

1 OE   VDD 4
2 GND OUT 3
LMK6CE
U2

GNDD

R14
10k

GNDD

SW1
SW_Push

+3.3VD

R13
10k

GNDD

C27
100nF

GNDD

R15
10k

GNDD

+3.3VD

R28   R39
4.7k   4.7k

SCL
SDA

SLC
SDA

+3.3VD

R17   R18   R19   R20   R21
10k   10k   10k   10k   10k

+3.3VD

J2
503398-1892

4   VDD   DAT0   7
9   DETECT_LEVER DAT1   8
10 DETECT_SWITCH DAT2   1
5   CLK   CD/DAT3 2
6   VSS   CMD   3

DETECT_SWITCH
SD_CLK

GNDD

DAT0
DAT1
DAT2
DAT3
CMD

REGULATORS

+5V ← +5V
−5V ← −5V
+3.3VA ← 3V3A
+3.3VD ← 3V3D

VSYS

File: Regulation.kicad_sch

CHARGING

BAT

SCL
SDA
INTn1
INTn2

VSYS

INTn2D
INTn1D
SDAD
SCLD

File: Charging.kicad_sch

BATTERY

PACK+

SCL
SDA

File: Battery.kicad_sch

Check BQ28Z620 refrence design BOM and schematic for component values

IC2
TPD4E1U06DBVR

DATA_P	1	D1+	NC	5
DATA_N	6	D1−		
CC1	3	D2+	GND	2
CC2	4	D2−		

GND

1uF
C47
GND

+3.3V

IC7
TUSB320LAIRWBR

12	VDD	ID	9
		CC2	2	CC2
		CC1	1	CC1
3	PORT	VBUS_DET	4
SDAD	7	SDA/AOUT1	EN	11
SCLD	8	SCL/OUT2	GND	10
INTn2D	6	INT_N/OUT3	ADDR	5

R44
10k

R43
10k

GND

R42
909k

GND

J4
632723300011

3	3	VBUS_1	A4
4	4	VBUS_2	A9
5	5	VBUS_3	B4
6	6	VBUS_4	B9
7	7		
8	8	DP1	A6	DATA_P
A2	SSTXP1	DN1	A7	DATA_N
A3	SSTXN1	DP2	B6	DATA_P
B11	SSRXP1	DN2	B7	DATA_N
B10	SSRXN1	CC1	A5	CC1
B3	SSTXN2	CC2	B5	CC2
B2	SSTXP2	SBU2	B8
A11	SSRXP2	SBU1	A8
A10	SSRXN2		

GND_1 GND_2 GND_3 GND_4 GND_5 GND_6
1 2 A1 A12 B1 B12

GND

C45
0.01uF
GND

C46
10uF
GND

C44
0.01uF
GND

C43
10uF
GND

L1
1uH

C42
0.047uF

C41
4.7uF
GND

DATA_P
DATA_N

SDAD
SCLD
INTn1D

GND

R62
10k

+3.3V

+3.3V

NEED TO CALC FOR LED
R36

D3
LED

392
R37
GND

IC6
BQ25883RGER

23	VBUS	STAT	2
21	PMID_1	ILIM	8
22	PMID_2		
17	SW_1	SYS_1	15
18	SW_2	SYS_2	16
12	BTST	BAT_1	13
11	REGN	BAT_2	14
24	D+	PG	9
1	D−	NC	10
4	SDA	TS	7
5	SCL		
6	INT		
3	CE		

GND_1 GND_2 EP
19 20 25

GND

10k
R38
GND

RT1
103AT−2

GND

VSYS

C39
10uF
GND

C40
0.01uF
GND

D2
PTVS13VS1UR,115
GND

BAT

C37
10uF
GND

C38
0.01uF
GND

D1
PTVS13VS1UR,115
GND

−5VREG

VSYS ▷ VSYS   −5V ◁   −5V

File: InvertingRegulator.kicad_sch

+5VREG

VSYS ▷ VSYS   +5V ◁   +5V

File: 5VRegulator.kicad_sch

ANALOG3V3

VSYS ▷ VSYS   3V3A ◁   3V3A

File: ANALOG3V3.kicad_sch

3V3Digital

VSYS ▷ VSYS   3V3D ◁   3V3D

File: 3V3Digital.kicad_sch

VOUT =-1.22 V × (R1 + R2) / R2
R1/R2 = 3.098 => Vout = −5V

IC8
LM27761DSGT

VSYSD

1 VIN
6 EN

VOUT 4

−5V

C50
4.7uF

10k
R45

7 C1−
8 C1+

VFB 5

301k
R46

GND

C49
4.7uF

GND EP CPOUT 3

2   9

100k
R47

C48
4.7uF

GND

GND GND

VSYSD

IC?
LT3045EMSE#PBF

Pin	Label
1	IN_1
2	IN_2
3	IN_3
4	EN/UV
5	PG
6	ILIM
12	OUT_2
11	OUT_1
10	OUTS
7	PGFB
8	SET
9	GND_1
13	GND_2

+5V

10uF C51 — GND
1uF C52 — GND
1uF C54 — GND
1uF C53 — GND
200k R51
249 R52 — GND
GND (pin 9/13)

C57 4.7uF — GND
20k R49
52.3k R48
C56 22uF
49.9k R50
C58 4.7uF
GND

V_PGFB = VOUT × RPG1 / (RPG1 + RPG2)

When V_PGFB < 0.3V FAST STARTUP ENGAGES
When V_PGFB > 0.3V FAST STARTUP DISENGAGES
VOUT(threshold) = 0.3V × (RPG1 + RPG2) / RPG1
VOUT(threshold) = 0.3V × (1 + RPG2/RPG1)

5V = 0.8V × (1 + R_SET/10kΩ)
5/0.8 = 1 + R_SET/10kΩ
6.25 = 1 + R_SET/10kΩ
R_SET = 52.5kΩ

During power-up, VOUT gradually ramps from 0V to 5V over 10-50ms,
not instantly. The LT3045 uses the PGFB pin to detect whether it's
starting up or already running. When VOUT is low (making PGFB < 300mV),
the IC recognizes it's in start-up mode and pumps 2mA into the SET pin
to quickly charge the large 22µF capacitor. Once VOUT rises above ~0.42V
(PGFB > 300mV), the IC knows the output is stabilizing and switches to
normal operation with only 80µA SET current for ultra-low noise
performance. This automatic switching reduces start-up time from 275ms
down to ~11ms while still maintaining excellent low-frequency noise
performance during normal operation.

VSYSD

IC12
LT3045EMSE#PBF

Pin	
1	IN_1
2	IN_2
3	IN_3
4	EN/UV
5	PG
6	ILIM
12	OUT_2
11	OUT_1
10	OUTS
7	PGFB
8	SET
9	GND_1
13	GND_2

3V3A

C55 10uF
C59 1uF
C60 1uF
C61 1uF
GND GND GND GND

R53 200k

R54 249

GND

GND

C62 4.7uF
GND

R56 20k

R55 31.6k
C63 22uF
GND

R57 49.9k
C64 4.7uF
GND

$V\_PGFB = VOUT \times RPG1 / (RPG1 + RPG2)$

When $V\_PGFB < 0.3V$ FAST STARTUP ENGAGES
When $V\_PGFB > 0.3V$ FAST STARTUP DISENGAGES
$VOUT(threshold) = 0.3V \times (RPG1 + RPG2) / RPG1$
$VOUT(threshold) = 0.3V \times (1 + RPG2/RPG1)$

$5V = 0.8V \times (1 + R\_SET/10k\Omega)$
$5/0.8 = 1 + R\_SET/10k\Omega$
$6.25 = 1 + R\_SET/10k\Omega$
$R\_SET = 52.5k\Omega$

During power-up, VOUT gradually ramps from 0V to 5V over 10-50ms,
not instantly. The LT3045 uses the PGFB pin to detect whether it's
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normal operation with only 80µA SET current for ultra-low noise
performance. This automatic switching reduces start-up time from 275ms
down to ~11ms while still maintaining excellent low-frequency noise
performance during normal operation.

VSYS

IC9
ADPL42002ARDZ-3.3-R7

7	VIN_1	VOUT_1	1
8	VIN_2	VOUT_2	2
5	EN	SENSE	3

GND
EP
SS
4 9 6

2.2uF
C65

GND

1uF
C67

GND

2.2uF
C66

GND

3V3D

GND
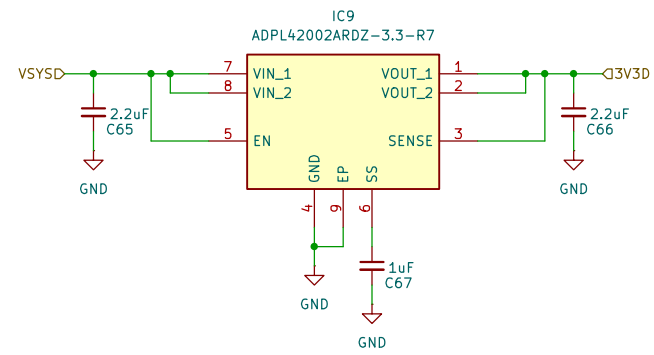
SWDIO HEADER OUPUT FOR PROGRAMMING AND DEBUGGING

SWCLK ▷ ──── 2 │ 2
SWDIO ▷ ──── 1 │ 1   J?
                     HTSW-102-09-G-S

+3.3VD
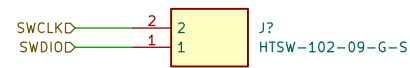
Pinout connector for 2.42inch OLED Module

MP2 │ MP2   7
MP1 │ MP1   6
            5 ──── 5 ▷ SDA
            4 ──── 4 ▷ SCL
            3 ──── 3
            2 ──── 2
            1 ──── 1 ▷ RES

GNDD   GNDD

J?
2-1445057-7

GNDD

PIN 2 = DC
Set Low, the 7-bit I2C address is 0x3C;
Set High, the I2C address is 0x3D.
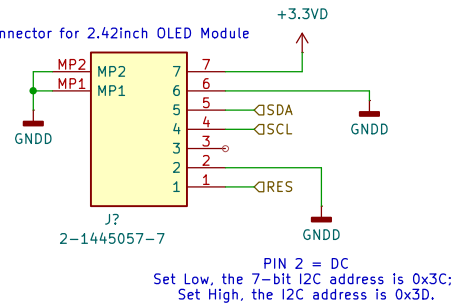
POWER SWITCH

▷ POWERSWITCH

VOLUME CONTROL

▷ VOLUMEUP

▷ VOLUMEDOWN

+3.3VD

R?
10k

SW?
SW_Push   Push butons for user control

            ▷ UPINPUT

GNDD

+3.3VD

R?
10k

SW?
SW_Push

            ▷ LEFTINPUT

GNDD

+3.3VD

R?
10k

SW?
SW_Push

            ▷ RIGHTINPUT

GNDD

+3.3VD

R?
10k

SW?
SW_Push

            ▷ DOWNINPUT

GNDD