RaspberryPI B+/2B connector

P2 — RaspberryPI 2B

Pin	Signal		Signal	Pin
1	3.3V		5V	2
3	GPIO02/SDA1	SDA1	5V	4
5	GPIO03/SCL1	SCL1	GND	6
7	GPIO04	sw_4	TDX0	8 TX0
9	GND		RXD0	10 RX0
11	GPIO17	sw_3	GPIO18	12 SFP1_LOS
13	GPIO27	sw_2	GND	14
15	GPIO22	sw_1	GPIO23	16 TX1
17	3.3V		GPIO24	18 RX1
19	GPIO10/MOSI	MOSI	GND	20
21	GPIO01/MISO	MISO	GPIO25	22 SFP2_LOS
23	GPIO11/SCLK	SCLK	GPIO08/CS0	24 CS0
25	GND		GPIO07/CS1	26 CS1
27	ID_SDA	SDA0	ID_SCL	28 SCL0
29	GPIO05	SDA2	GND	30
31	GPIO06	SCL2	GPIO12	32 sw_7
33	GPIO13	sw_6	GND	34
35	GPIO19	sw_5	GPIO16	36 gpio16
37	GPIO26	1wire	GPIO20	38 gpio20
39	GND		GPIO21	40 gpio21

M1 M2 M3 M4 — 41 42 43 44

RPi-3.3V

GND

LEDs

5V

D1 LED   D2 LED   D3 LED

R15 100   R16 100   R17 100

n_out_5   n_out_6   n_out_7

D1 - blinking for system operation
D2 - on when IR link established on primary SFP
D3 - on when motors moving

Primary SFP module, on hardware I2C

VccT and VccR are connected, same as in SFP
add filtering prior to SFP cage

SFP1_LOS — R1 10k
SFP1_3V3
GND — J2

P1 IDC10

Pin	Signal		Signal	Pin
1	SFP1_VccT		SFP1_TX_fault	2
3	SFP1_VccR		SFP1_Tx_disable	4
5			SDA1	6
7	SFP1_LOS		SCL1	8
9	SFP1_Rate_sel		SFP1_present	10

R2 0
GND

VCC   GND

PoExtension1

Pin		Signal
1	-> TXD/PWM	RX0
2	<-RXD	TX0
3	SCL	SCL1
4	SDA	SDA1
5	MISO	MISO
6	MOSI	MOSI
7	SCK	SCLK
8	SSEL	CS0
9		
10		

SFP1_VccT
J1 — SFP1_Rate_sel
J3
GND

I2C secondary channel selector

Close J7 and J9 to use software I2C
Close J8 and J10 to use hardware I2C

SDA2 — J7 — SDA0
SFP2_SDA — J8
SCL2 — J9 — SCL0
J10 — SFP2_SCL

1 wire interface

RPi-3.3V

R3 4k7

P3 Header 3
1 2 3

P4 Header 3
1 2 3

1wire

GND

3.3V GPIO out via mosfet

RPi-3.3V **P5** Header 2
1 2

gpio16

R6

GND

Secondary SFP module, I2C routing via selector jumpers

VccT and VccR are connected, same as in SFP
add filtering prior to SFP cage

SFP2_LOS — R5 10k
SFP2_3V3
GND — J5

P6 IDC10

Pin	Signal		Signal	Pin
1	SFP2_VccT		SFP2_TX_fault	2
3	SFP2_VccR		SFP2_Tx_disable	4
5			SFP2_SDA	6
7	SFP2_LOS		SFP2_SCL	8
9	SFP2_Rate_sel		SFP2_present	10

R4 0
GND

GPIO pull resistors to set the default pin state on RPi boot

RPi-3.3V   RPi-3.3V   RPi-3.3V   RPi-3.3V

R7   R8 10k   R9   R10

sw_1   sw_2   sw_3   sw_4

R11   R12   R13   R14

GND   GND   GND   GND

Unused GPIO

VCC **P7** Header 5
gpio16 1
gpio20 2
gpio21 3
        4
        5

GND

PoExtension2

Pin		Signal
1	-> TXD/PWM	RX1
2	<-RXD	TX1
3	SCL	SCL2
4	SDA	SDA2
5	MISO	MISO
6	MOSI	MOSI
7	SCK	SCLK
8	SSEL	CS1
9		
10		

VCC   GND

SFP2_VccT
J4 — SFP2_Rate_sel
J6
GND

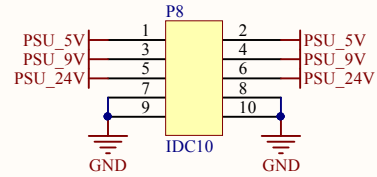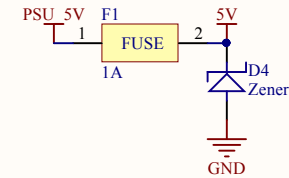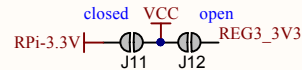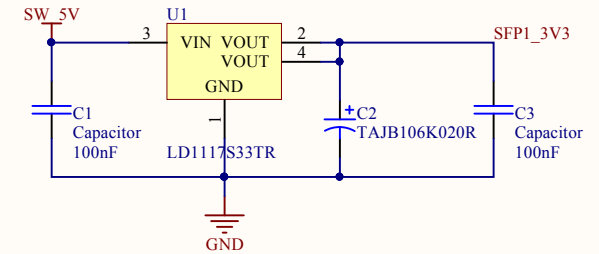|	
Title	
Size A4	Number
Date: 15.12.2015	Revision
File: D:\AltiumProjects\..\KORUZA_RPi_shield.SchDoc	Sheet of
	Drawn By:

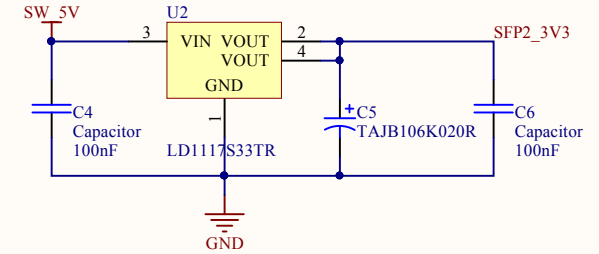Power input from KORUZA power supply board

PTC fuse and zener to protect RPi

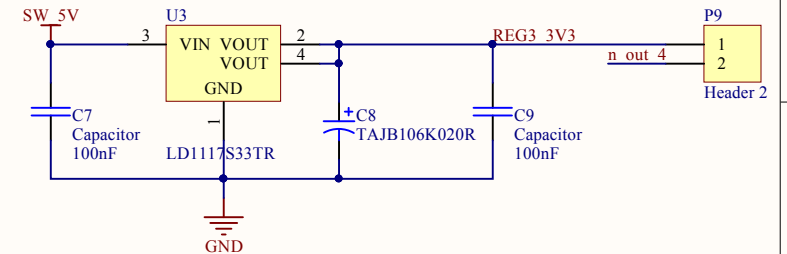Select VCC to be powered either from RPi or from standalone regulator

Primary SFP power supply
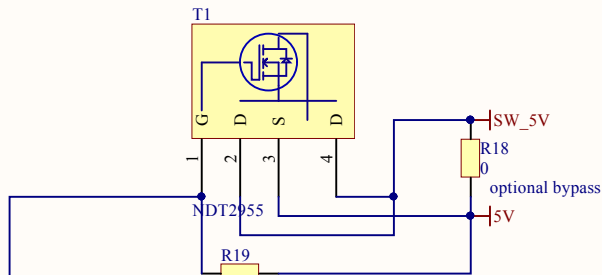Install only if Media converter is not used

P8
IDC10

PSU_5V   1   2   PSU_5V
PSU_9V   3   4   PSU_9V
PSU_24V   5   6   PSU_24V
          7   8
          9   10

GND   GND

PSU_5V   F1   5V
FUSE
1A
D4
Zener
GND

closed   VCC   open
RPi-3.3V   REG3_3V3
         J11   J12

SW_5V   U1
3   VIN VOUT   2
          VOUT   4
          GND
C1   C2   C3
Capacitor   TAJB106K020R Capacitor
100nF   100nF
         LD1117S33TR
GND

Secondary SFP power supply
Install only if Media converter is not used

T1
NDT2955
G D S D
1 2 3 4

SW_5V
R18
0
optional bypass
5V

R19
10k

5V for powering SFP modules

SW_5V   U2
3   VIN VOUT   2
          VOUT   4
          GND
C4   C5   C6
Capacitor   TAJB106K020R Capacitor
100nF   100nF
         LD1117S33TR
GND

T2
NDT2955
G D S D
1 2 3 4

9V outputs

R20
0
optional bypass
PSU_9V

R22
10k

Conn1
2 1
GND
DC power input

Conn2
2 1
GND
DC power input

Optional power supply for VCC

U4
ULN2003

sw_1   1 IN_1   OUT_1 16
sw_2   2 IN_2   OUT_2 15
sw_3   3 IN_3   OUT_3 14
sw_4   4 IN_4   OUT_4 13 n_out_4
sw_5   5 IN_5   OUT_5 12 n_out_5
sw_6   6 IN_6   OUT_6 11 n_out_6
sw_7   7 IN_7   OUT_7 10 n_out_7
       8 GND   DIODE   9 PSU_24V

GND

R21
10k

R23
10k

T3
NDT2955
G D S D
1 2 3 4

R25
10k

24V output for heater or similar

R24
0
optional bypass
PSU_24V

Conn3
2 1
GND
DC power input

SW_5V   U3
3   VIN VOUT   2
          VOUT   4
          GND
C7   C8   C9
Capacitor   TAJB106K020R Capacitor
100nF   100nF
         LD1117S33TR
GND

REG3_3V3
n_out_4
P9
1
2
Header 2
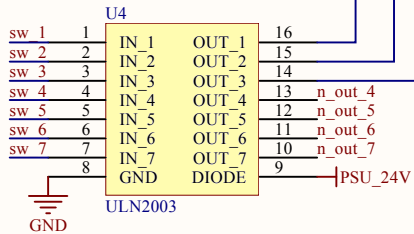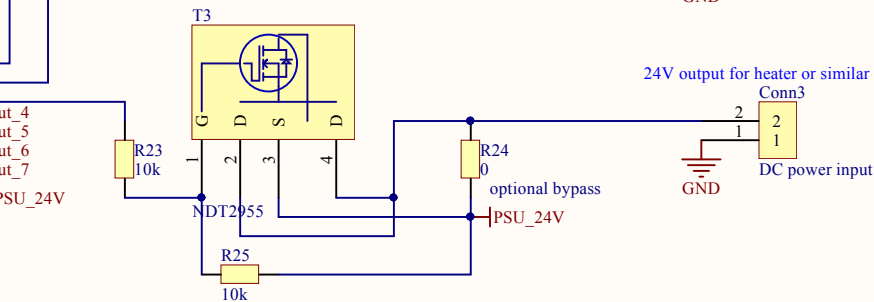
Title	Power supply circuitry		
Size	Number		Revision
A4			
Date:	15.12.2015		Sheet of
File:	D:\AltiumProjects\..\KORUZA_RPi_shield_power.SchDoc		Drawn By SchDoc
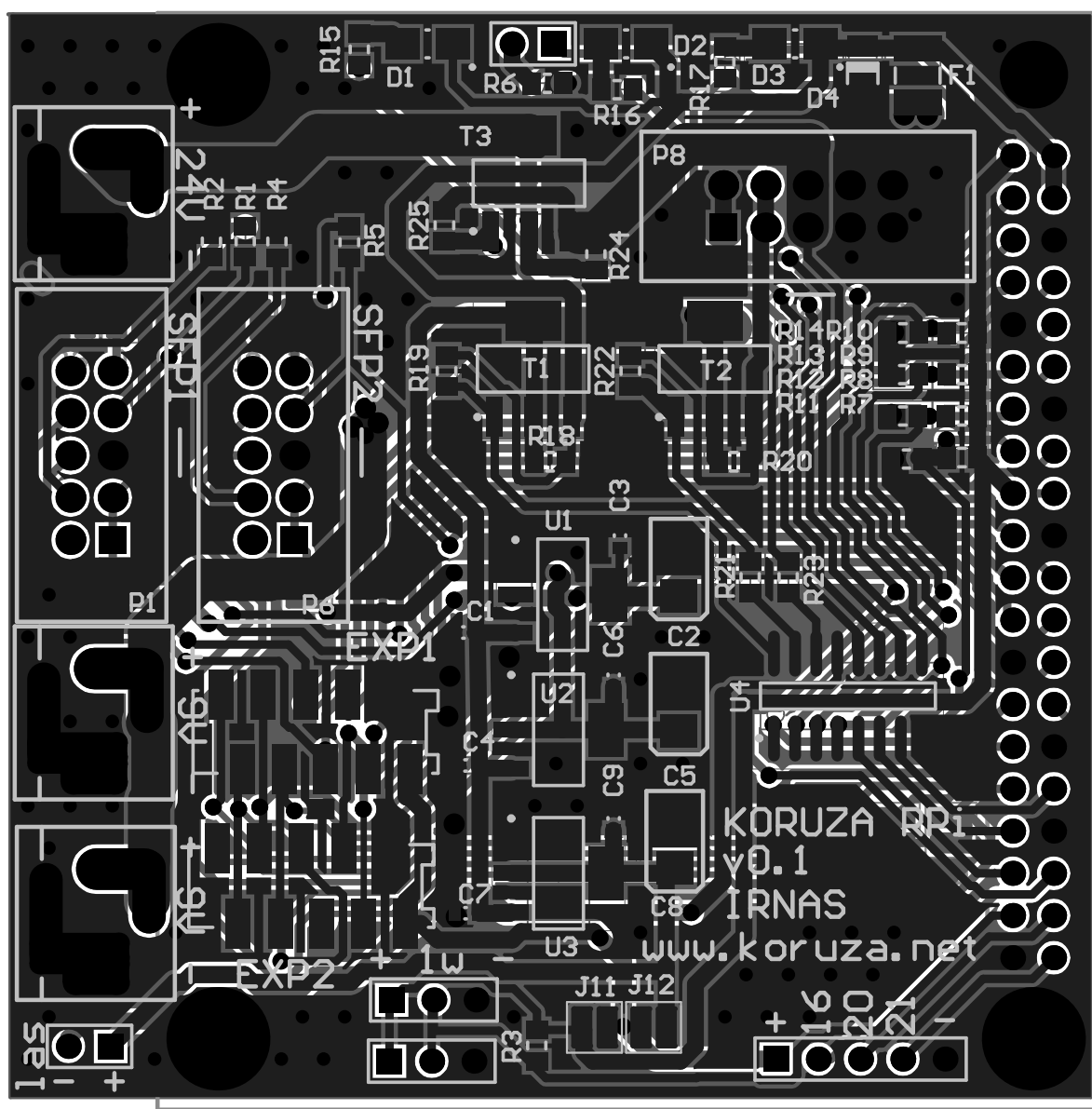
Comment	Description	Designator	Footprint	LibRef	Quantity
Capacitor	General capacitor	C1, C3, C4, C6, C7, C9	0603	Capacitor	6
TAJB106K020R	Capacitor, Tantalum, 10uF 10% 20V MCCT-B (3528)	C2, C5, C8	AVX-CAPC3528_V	CMP-0279-00001-1	3
DC power input		Conn1, Conn2, Conn3	MKDSN 2,5/ 2-5,08 and powercon	PowerScrewTerminal	3
LED	LED diode	D1, D2, D3	1206/0805 diode	LED	3
Zener	Zener	D4	DIOMELF3517N	Zener	1
1A	1A fuse	F1	1210	Fuse	1
IDC10	IDC 10pin	P1, P6, P8	IDC10	IDC10	3
RaspberryPI 2B	RPi2	P2	RaspberryPI_B+	RaspberryPI 2B	1
Header 3	Header, 3-Pin	P3, P4	HDR1X3	Header 3	2
Header 2	Header, 2-Pin	P5, P9	HDR1X2	Header 2	2
Header 5	Header, 5-Pin	P7	HDR1X5	Header 5	1
	Micro-Match female PCB connector 10 Positions THT	PoExtension1, PoExtension2	8-188275-0	1-215079-0	2
10k	Resistor 0805 smd	R1, R5, R8, R19, R21, R22, R23, R25	RESC2012X06N	Resistor	8
0	Resistor 0805 smd	R2, R4, R18, R20, R24	RESC2012X06N	Resistor	5
4k7	Resistor 0805 smd	R3, R6	RESC2012X06N	Resistor	2
/	Resistor 0805 smd	R7, R9, R10, R11, R12, R13, R14	RESC2012X06N	Resistor	7
100	Resistor 0805 smd	R15, R16, R17	RESC2012X06N	Resistor	3
NDT2955	P MOSFET	T1, T2, T3	SOT230P700X180-4N	NDT2955	3
LD1117S33TR	Fixed Low Drop Positive Voltage Regulator, 3.3V, 4-Pin SOT-223, Tape and Reel	U1, U2, U3	SOT-223_L	CMP-0244-00310-1	3
ULN2003	Darlington array	U4	SO-16 narrow	ULN2003	1