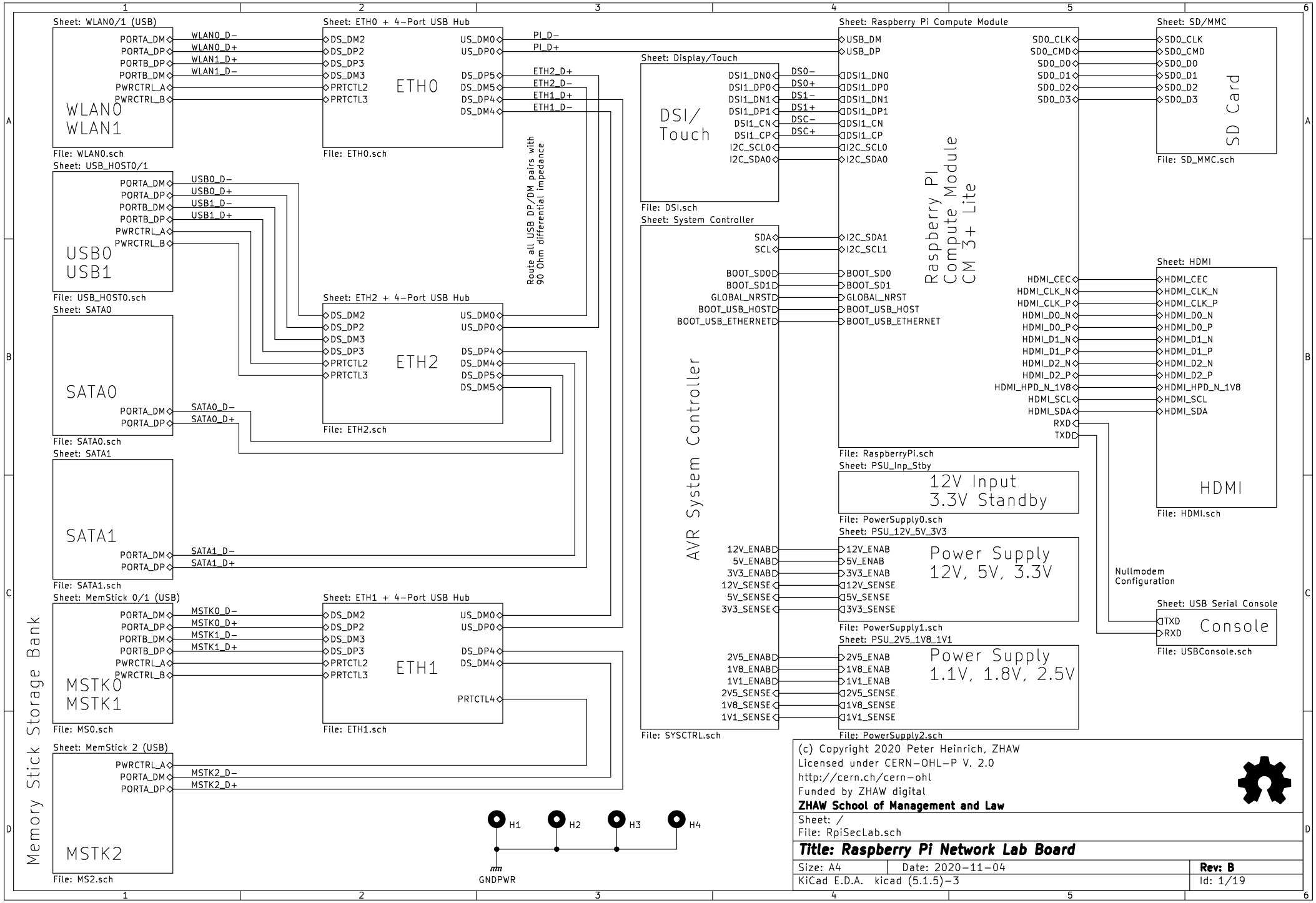
Sheet: WLAN0/1 (USB)
PORTA_DM
PORTA_DP
PORTB_DP
PORTB_DM
PWRCTRL_A
PWRCTRL_B
WLAN0
WLAN1
WLAN0_D−
WLAN0_D+
WLAN1_D+
WLAN1_D−
File: WLAN0.sch
Sheet: ETH0 + 4−Port USB Hub
DS_DM2
DS_DP2
DS_DP3
DS_DM3
PRTCTL2
PRTCTL3
ETH0
US_DM0
US_DP0
DS_DP5
DS_DM5
DS_DP4
DS_DM4
PI_D−
PI_D+
ETH2_D+
ETH2_D−
ETH1_D+
ETH1_D−
File: ETH0.sch
Sheet: USB_HOST0/1
USB0
USB1
USB0_D−
USB0_D+
USB1_D−
USB1_D+
File: USB_HOST0.sch
Route all USB DP/DM pairs with 90 Ohm differential impedance
Sheet: ETH2 + 4−Port USB Hub
ETH2
File: ETH2.sch
Sheet: SATA0
SATA0
SATA0_D−
SATA0_D+
File: SATA0.sch
Sheet: SATA1
SATA1
SATA1_D−
SATA1_D+
File: SATA1.sch
Sheet: MemStick 0/1 (USB)
MSTK0
MSTK1
MSTK0_D−
MSTK0_D+
MSTK1_D−
MSTK1_D+
File: MS0.sch
Sheet: ETH1 + 4−Port USB Hub
ETH1
File: ETH1.sch
Sheet: MemStick 2 (USB)
MSTK2
MSTK2_D−
MSTK2_D+
File: MS2.sch
Memory Stick Storage Bank
H1
H2
H3
H4
GNDPWR
Sheet: Display/Touch
DSI/
Touch
DSI1_DN0
DSI1_DP0
DSI1_DN1
DSI1_DP1
DSI1_CN
DSI1_CP
I2C_SCL0
I2C_SDA0
DS0−
DS0+
DS1−
DS1+
DSC−
DSC+
File: DSI.sch
Sheet: System Controller
AVR System Controller
SDA
SCL
BOOT_SD0
BOOT_SD1
GLOBAL_NRST
BOOT_USB_HOST
BOOT_USB_ETHERNET
I2C_SDA1
I2C_SCL1
12V_ENAB
5V_ENAB
3V3_ENAB
12V_SENSE
5V_SENSE
3V3_SENSE
2V5_ENAB
1V8_ENAB
1V1_ENAB
2V5_SENSE
1V8_SENSE
1V1_SENSE
File: SYSCTRL.sch
Sheet: Raspberry Pi Compute Module
Raspberry PI
Compute Module
CM 3+ Lite
USB_DM
USB_DP
SD0_CLK
SD0_CMD
SD0_D0
SD0_D1
SD0_D2
SD0_D3
HDMI_CEC
HDMI_CLK_N
HDMI_CLK_P
HDMI_D0_N
HDMI_D0_P
HDMI_D1_N
HDMI_D1_P
HDMI_D2_N
HDMI_D2_P
HDMI_HPD_N_1V8
HDMI_SCL
HDMI_SDA
RXD
TXD
File: RaspberryPi.sch
Sheet: SD/MMC
SD Card
File: SD_MMC.sch
Sheet: HDMI
HDMI
File: HDMI.sch
Sheet: PSU_Inp_Stby
12V Input
3.3V Standby
File: PowerSupply0.sch
Sheet: PSU_12V_5V_3V3
Power Supply
12V, 5V, 3.3V
File: PowerSupply1.sch
Sheet: PSU_2V5_1V8_1V1
Power Supply
1.1V, 1.8V, 2.5V
File: PowerSupply2.sch
Nullmodem
Configuration
Sheet: USB Serial Console
TXD
RXD
Console
File: USBConsole.sch
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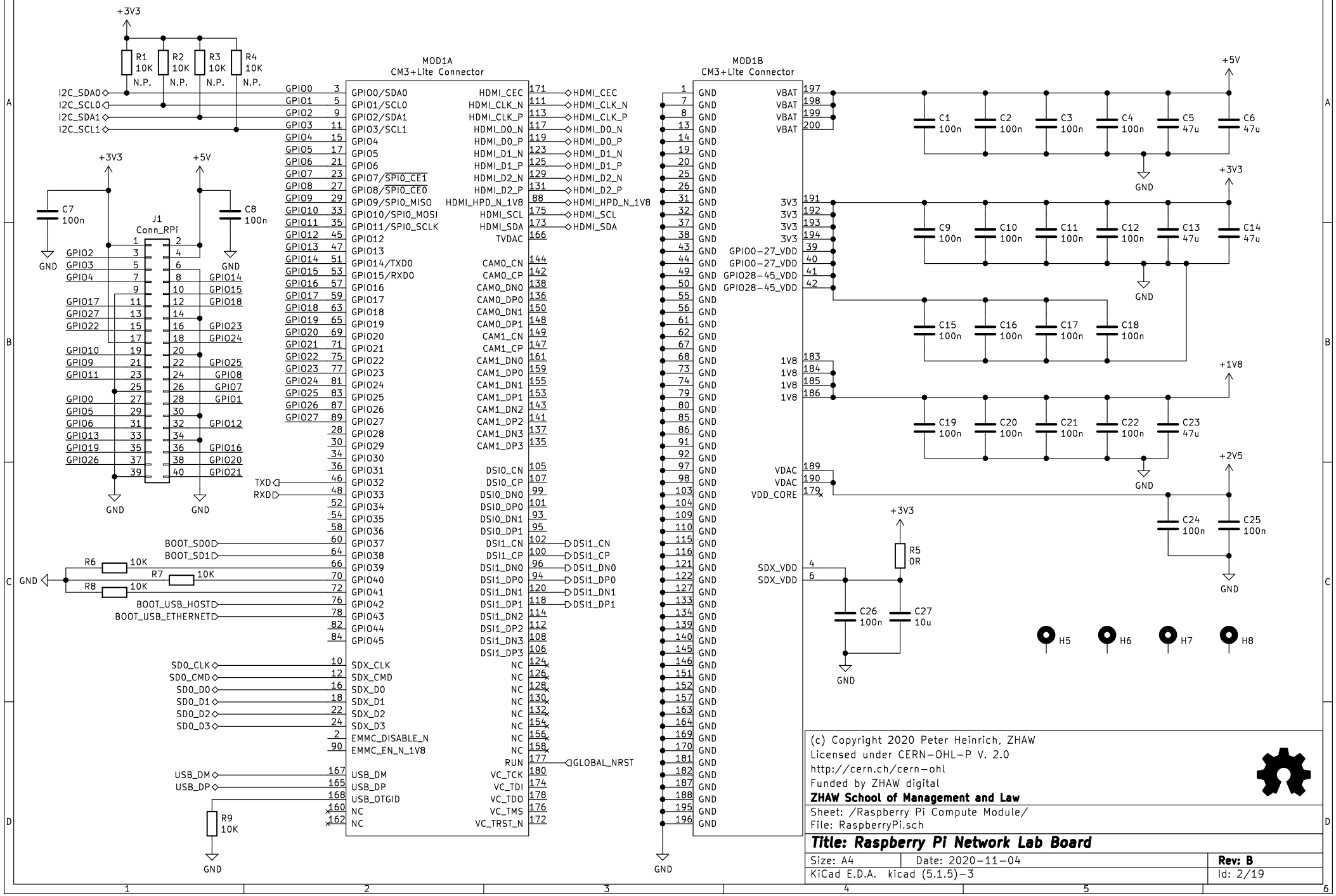
Sheet: /
File: RpiSecLab.sch
Title: Raspberry Pi Network Lab Board
Size: A4
Date: 2020−11−04
Rev: B
KiCad E.D.A. kicad (5.1.5)−3
Id: 1/19


MOD1A
CM3+Lite Connector
MOD1B
CM3+Lite Connector
J1
Conn_RPi
+3V3
+5V
+1V8
+2V5
GND
R1 10K N.P.
R2 10K N.P.
R3 10K N.P.
R4 10K N.P.
R5 0R
R6 10K
R7 10K
R8 10K
R9 10K
C1 100n
C2 100n
C3 100n
C4 100n
C5 47u
C6 47u
C7 100n
C8 100n
C9 100n
C10 100n
C11 100n
C12 100n
C13 47u
C14 47u
C15 100n
C16 100n
C17 100n
C18 100n
C19 100n
C20 100n
C21 100n
C22 100n
C23 47u
C24 100n
C25 100n
C26 100n
C27 10u
H5
H6
H7
H8
I2C_SDA0
I2C_SCL0
I2C_SDA1
I2C_SCL1
TXD
RXD
BOOT_SD0
BOOT_SD1
BOOT_USB_HOST
BOOT_USB_ETHERNET
SD0_CLK
SD0_CMD
SD0_D0
SD0_D1
SD0_D2
SD0_D3
USB_DM
USB_DP
HDMI_CEC
HDMI_CLK_N
HDMI_CLK_P
HDMI_D0_N
HDMI_D0_P
HDMI_D1_N
HDMI_D1_P
HDMI_D2_N
HDMI_D2_P
HDMI_HPD_N_1V8
HDMI_SCL
HDMI_SDA
DSI1_CN
DSI1_CP
DSI1_DN0
DSI1_DP0
DSI1_DN1
DSI1_DP1
GLOBAL_NRST
GPIO00 3
GPIO01 5
GPIO02 9
GPIO03 11
GPIO04 15
GPIO05 17
GPIO06 21
GPIO07 23
GPIO08 27
GPIO09 29
GPIO010 33
GPIO011 35
GPIO012 45
GPIO013 47
GPIO014 51
GPIO015 53
GPIO016 57
GPIO017 59
GPIO018 63
GPIO019 65
GPIO020 69
GPIO021 71
GPIO022 75
GPIO023 77
GPIO024 81
GPIO025 83
GPIO026 87
GPIO027 89
GPIO00_27_VDD
GPIO28_45_VDD
3V3
VBAT
VDAC
VDD_CORE
SDX_VDD
1V8
SDX_CLK
SDX_CMD
SDX_D0
SDX_D1
SDX_D2
SDX_D3
EMMC_DISABLE_N
EMMC_EN_N_1V8
USB_DM
USB_DP
USB_OTGID
NC
VC_TCK
VC_TDI
VC_TDO
VC_TMS
VC_TRST_N
RUN
CAM0_CN
CAM0_CP
CAM0_DN0
CAM0_DP0
CAM0_DN1
CAM0_DP1
CAM1_CN
CAM1_CP
CAM1_DN0
CAM1_DP0
CAM1_DN1
CAM1_DP1
CAM1_DN2
CAM1_DP2
CAM1_DN3
CAM1_DP3
DSI0_CN
DSI0_CP
DSI0_DN0
DSI0_DP0
DSI0_DN1
DSI0_DP1
DSI1_DN2
DSI1_DP2
DSI1_DN3
DSI1_DP3
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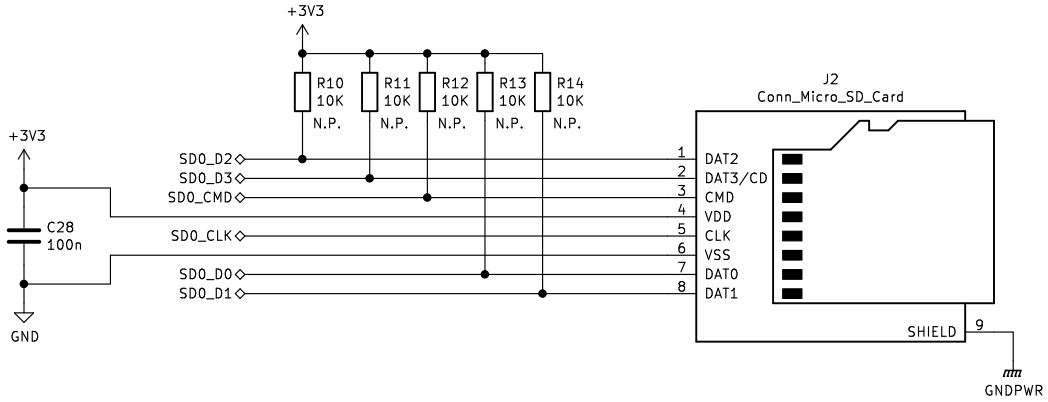
Sheet: /Raspberry Pi Compute Module/
File: RaspberryPi.sch
Title: Raspberry Pi Network Lab Board
Size: A4
Date: 2020-11-04
Rev: B
KiCad E.D.A. kicad (5.1.5)-3
Id: 2/19



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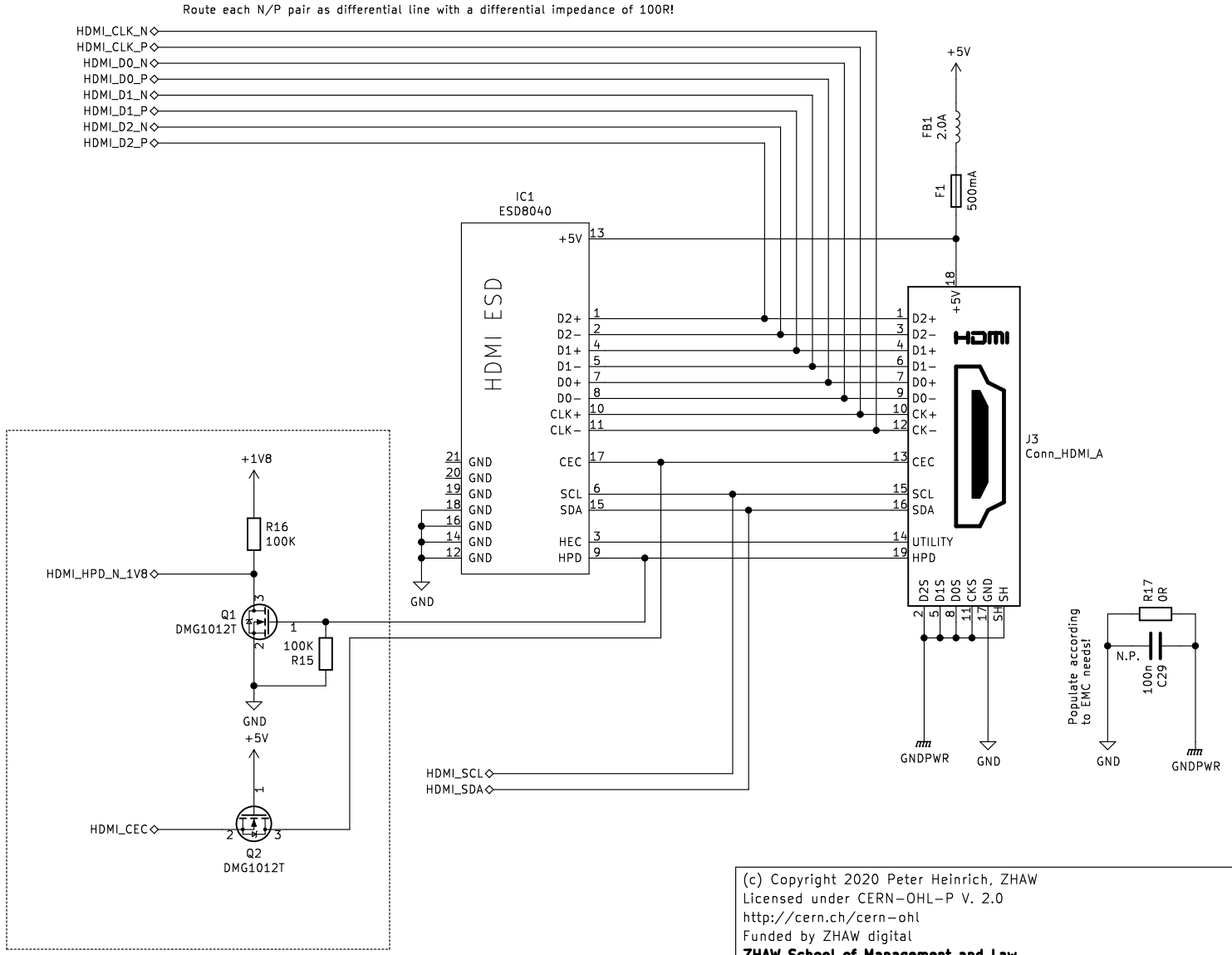
Sheet: /SD/MMC/
File: SD_MMC.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 3/19



Transistorized Level−Shifter as recommended in
https://www.raspberrypi.org/documentation/hardware/computemodule/schematics/rpi_SCH_CMIO_3p0.pdf

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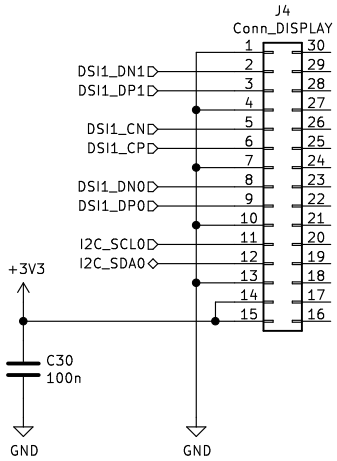
Sheet: /HDMI/
File: HDMI.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020−11−04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)−3		Id: 4/19



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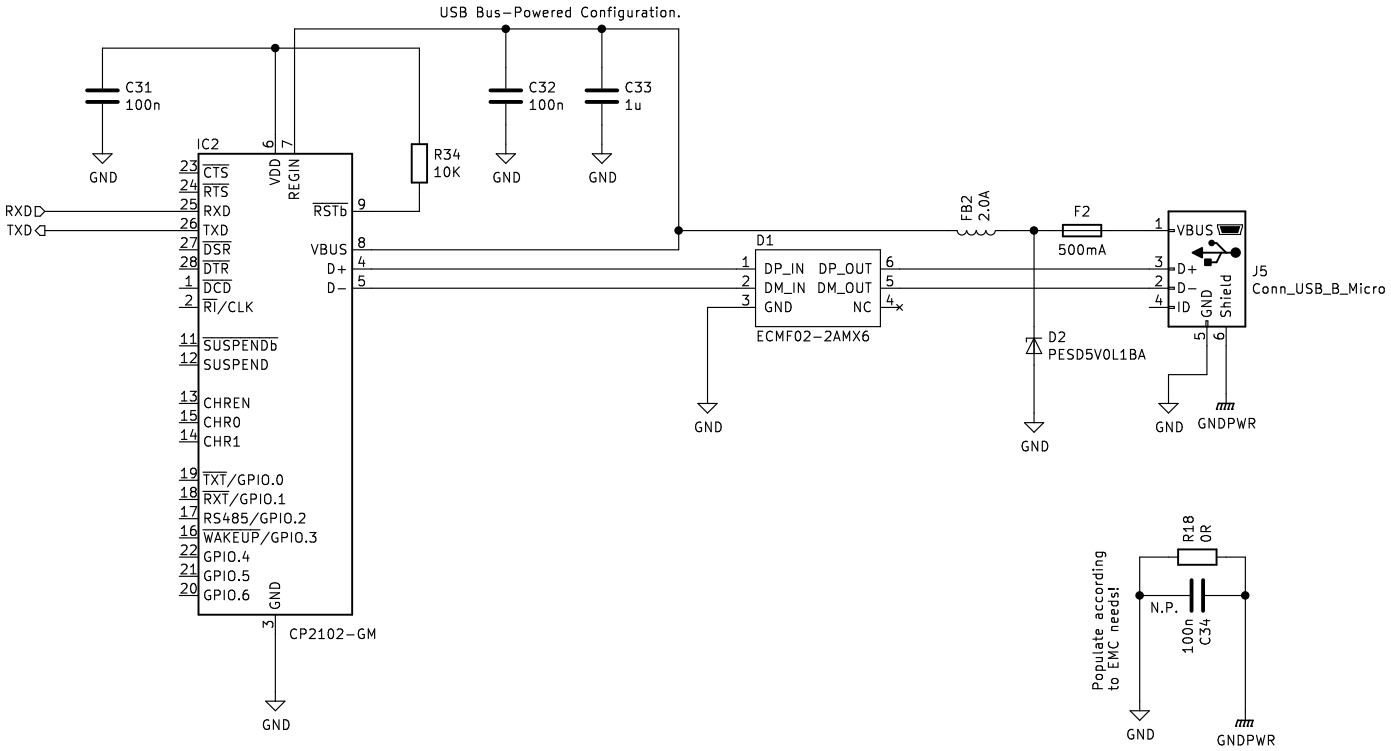
Sheet: /Display/Touch/
File: DSI.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 5/19



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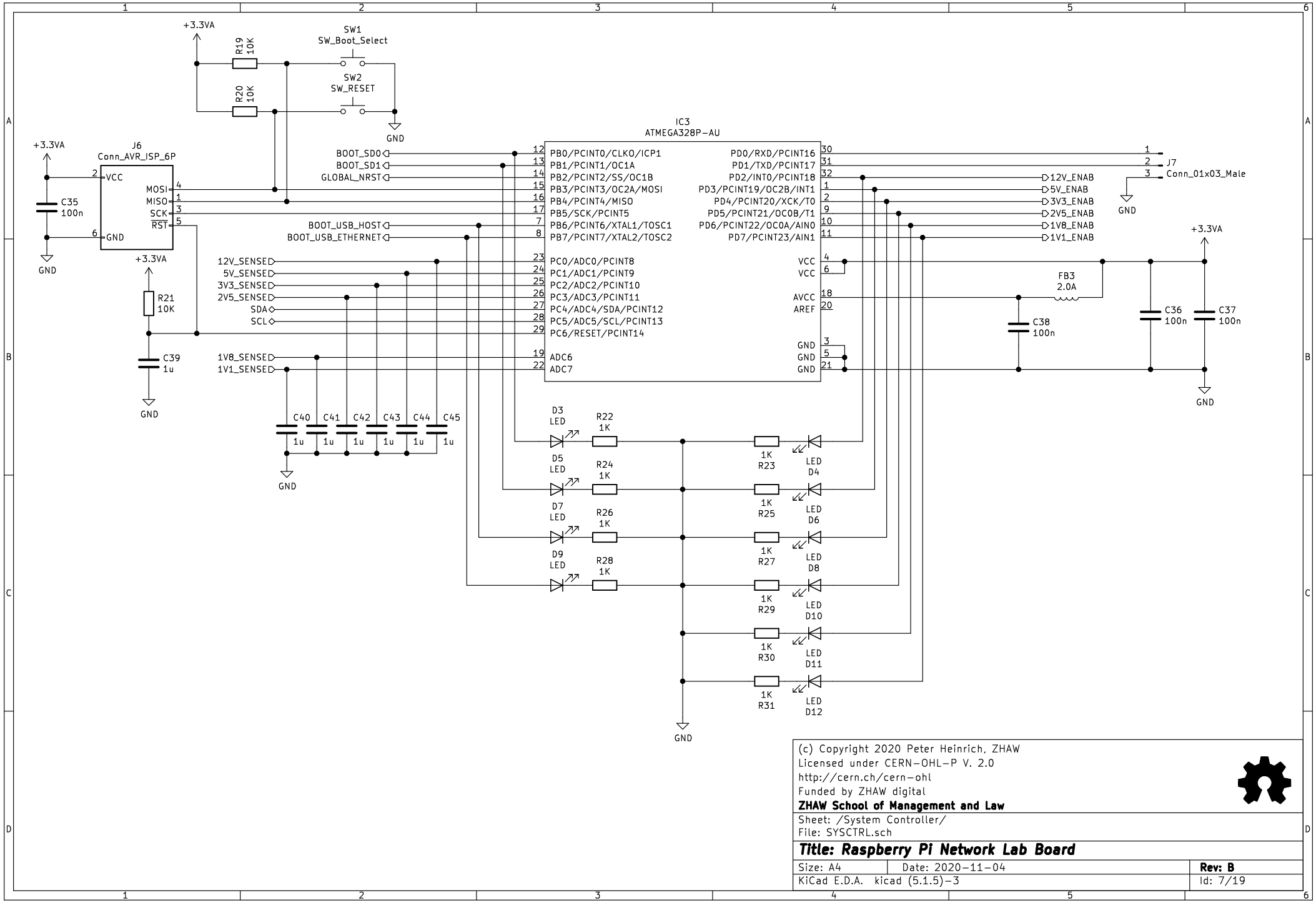
Sheet: /USB Serial Console/
File: USBConsole.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 6/19



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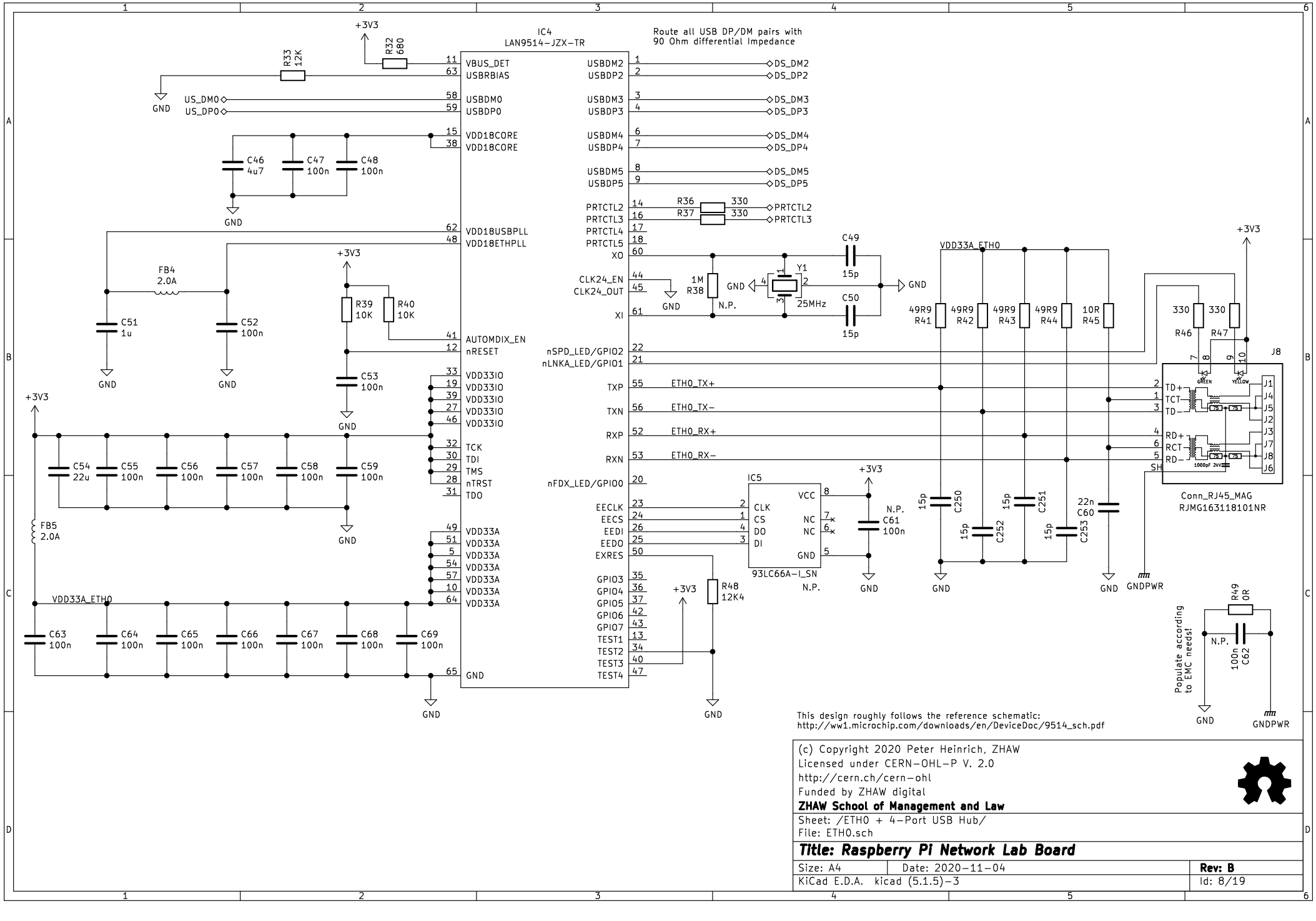
Sheet: /System Controller/
File: SYSCTRL.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 7/19



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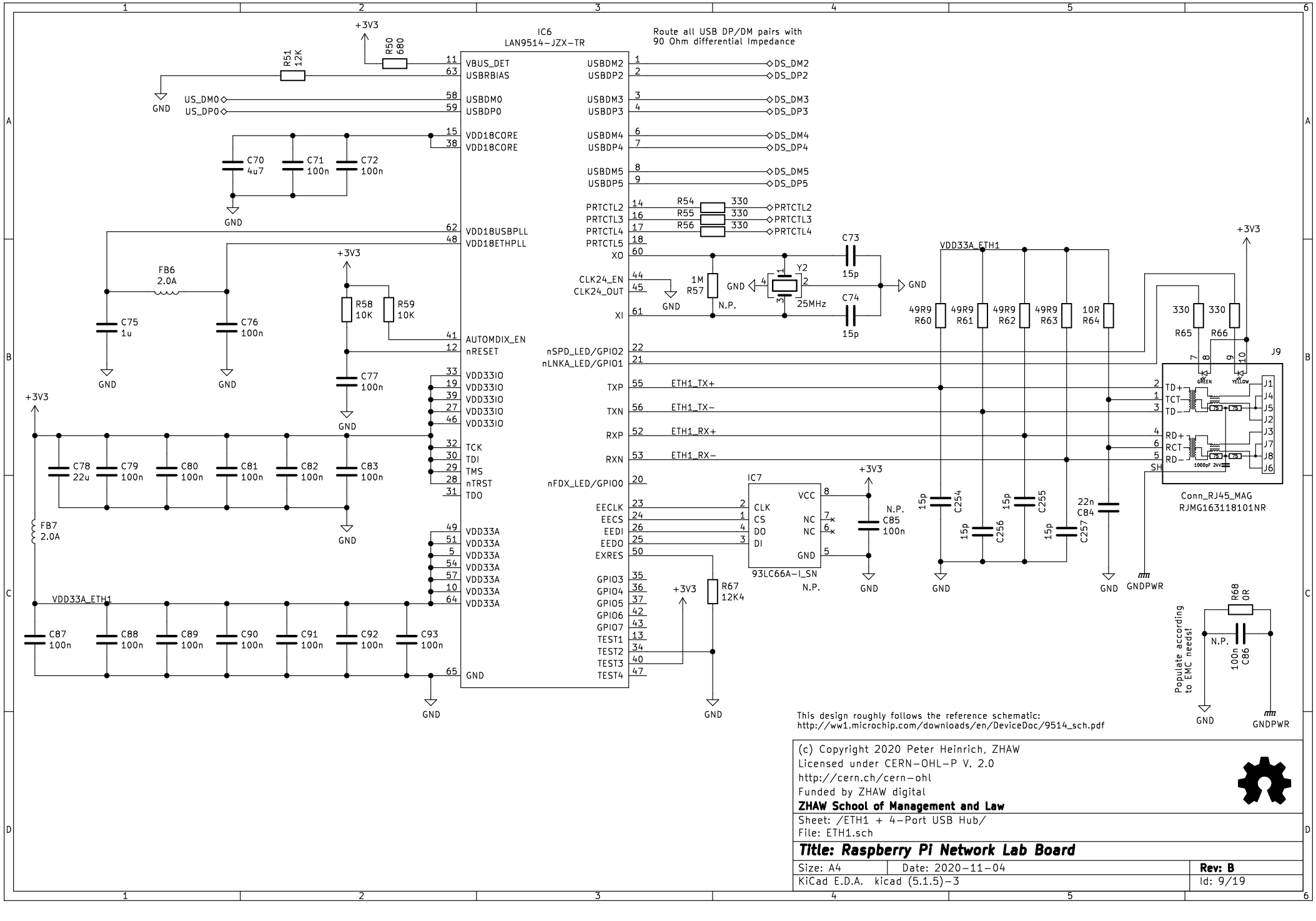
Sheet: /ETH0 + 4-Port USB Hub/
File: ETH0.sch

Title: Raspberry Pi Network Lab Board

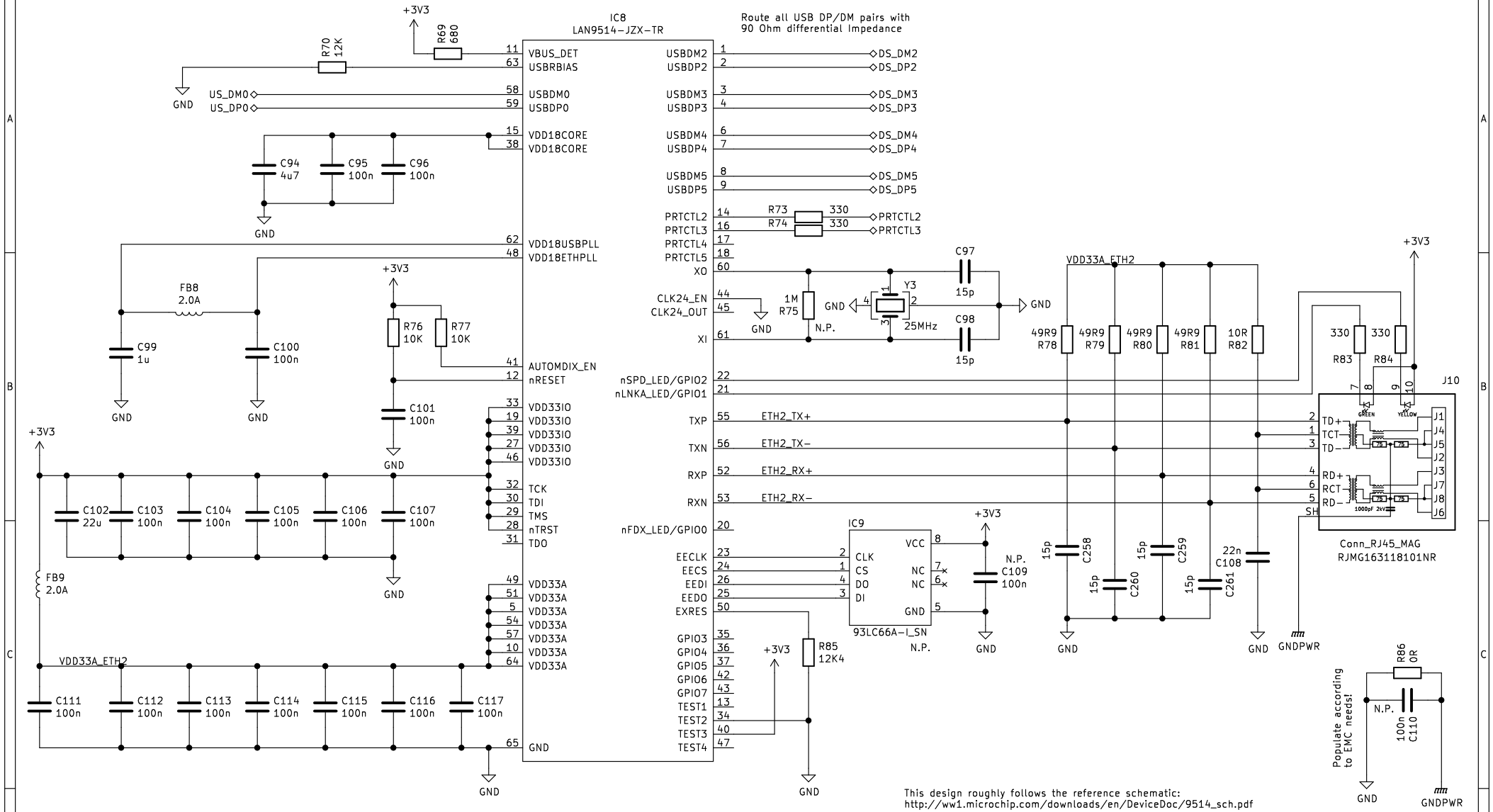
Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 8/19



Sheet: /ETH1 + 4-Port USB Hub/
File: ETH1.sch

Title: Raspberry Pi Network Lab Board

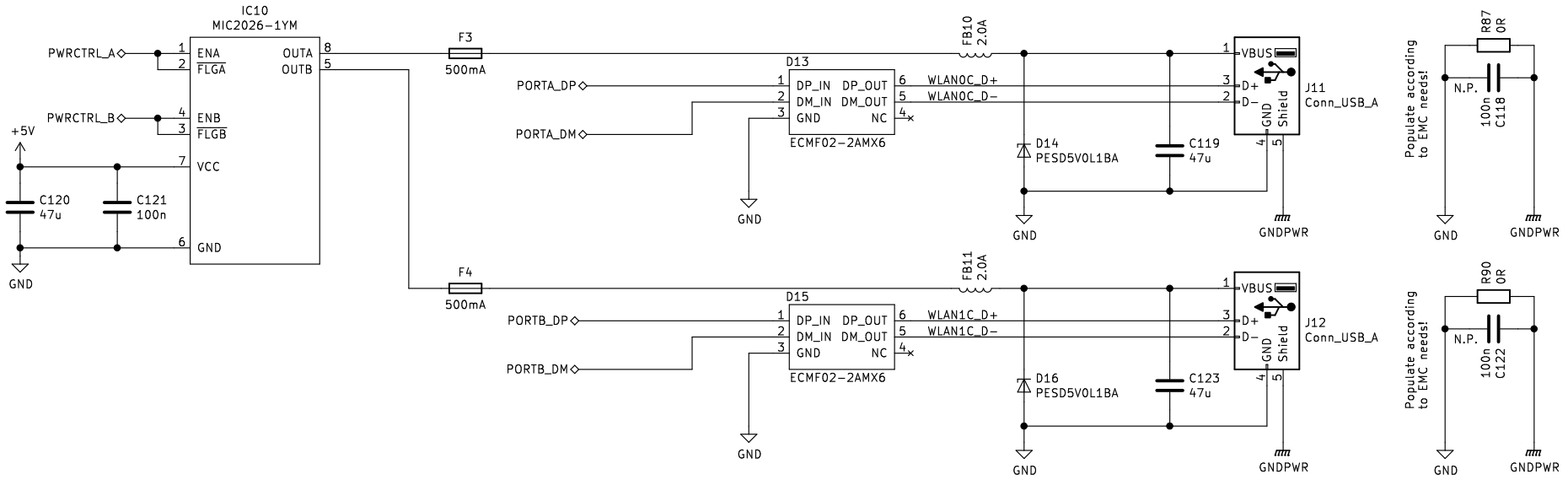
Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 9/19



Sheet: /ETH2 + 4-Port USB Hub/
File: ETH2.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 10/19



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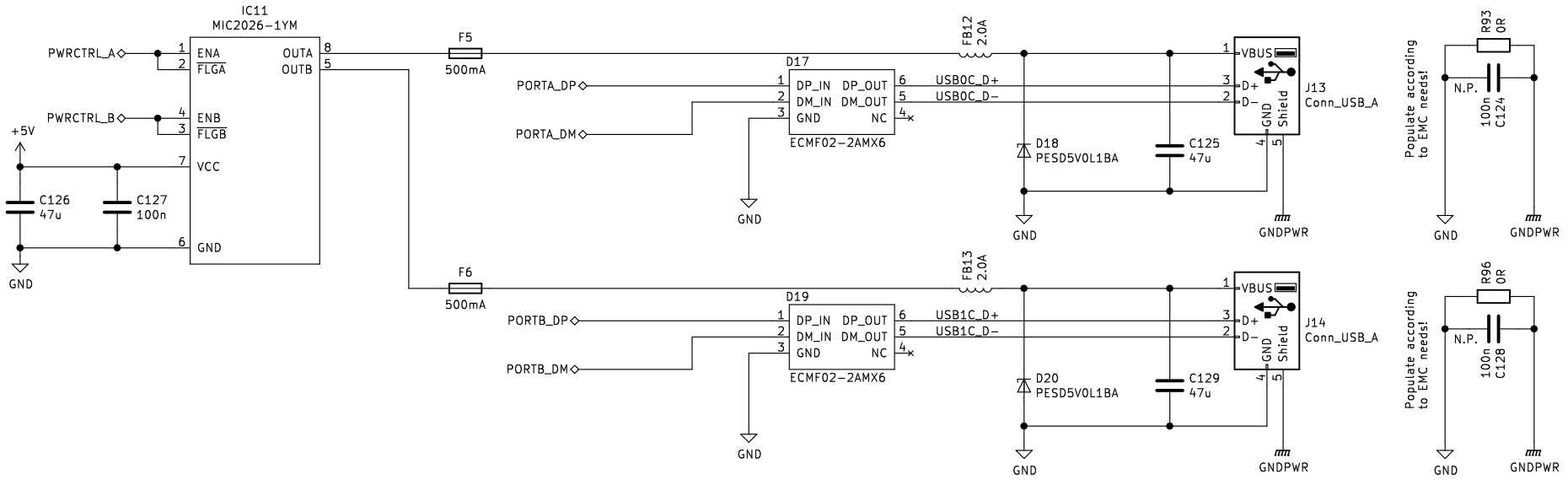
Sheet: /WLAN0/1 (USB)/
File: WLAN0.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 11/19



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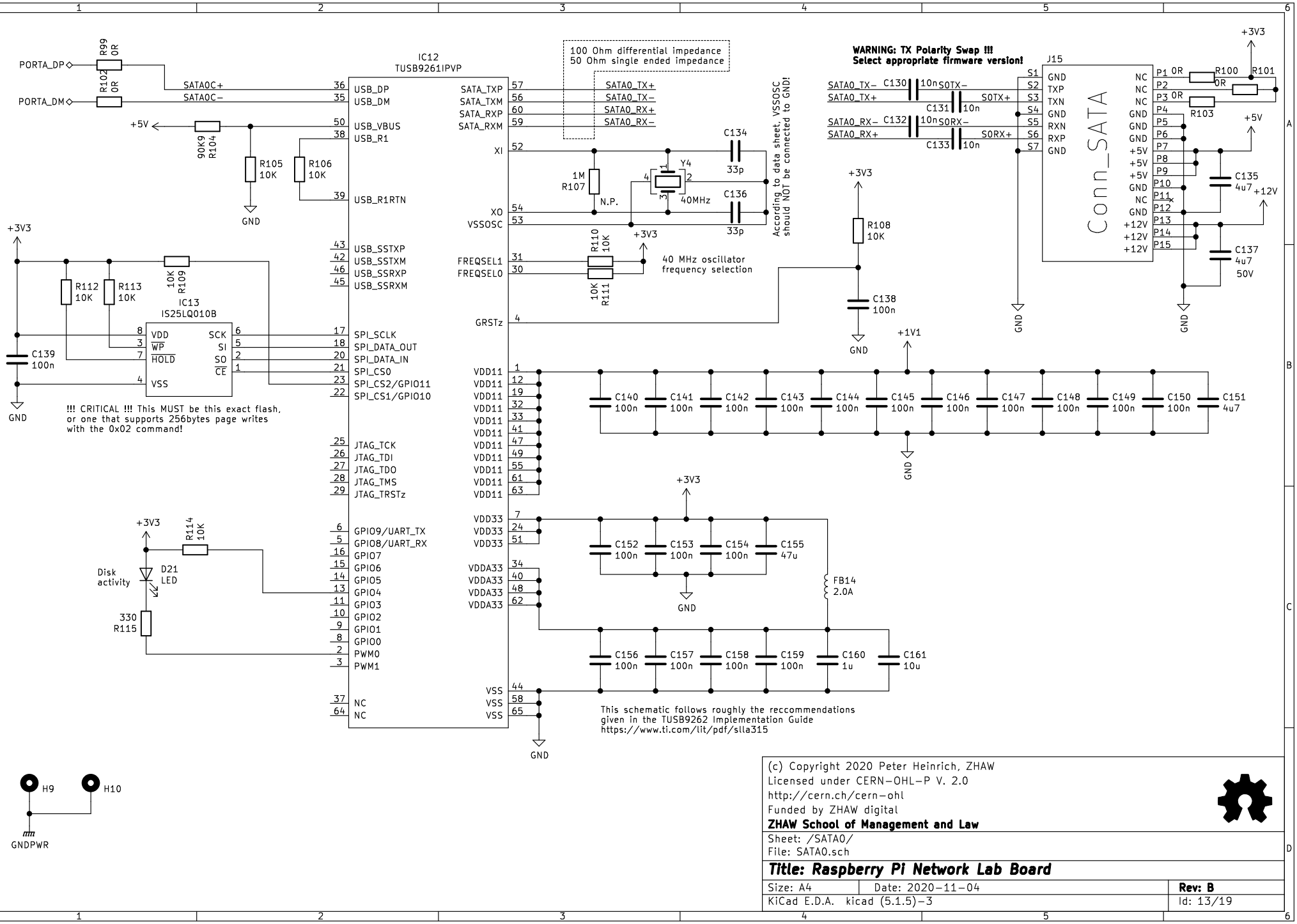
Sheet: /USB_HOST0/1/
File: USB_HOST0.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 12/19


IC12
TUSB9261IPVP
100 Ohm differential impedance
50 Ohm single ended impedance
WARNING: TX Polarity Swap !!!
Select appropriate firmware version!
J15
Conn_SATA
IC13
IS25LQ010B
!!! CRITICAL !!! This MUST be this exact flash,
or one that supports 256bytes page writes
with the 0x02 command!
40 MHz oscillator
frequency selection
According to data sheet, VSSOSC
should NOT be connected to GND!
Disk
activity
This schematic follows roughly the reccommendations
given in the TUSB9262 Implementation Guide
https://www.ti.com/lit/pdf/slla315
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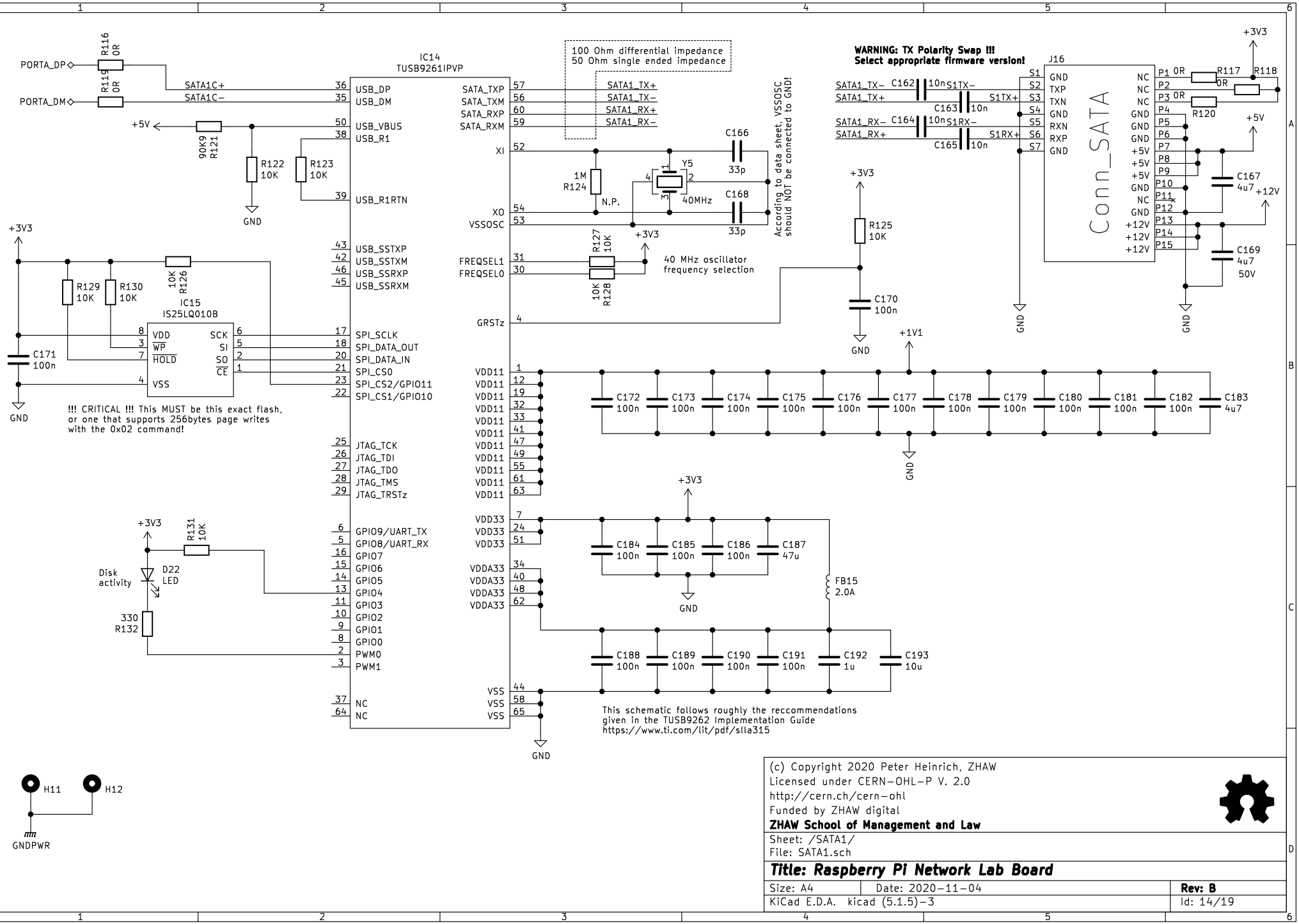
Sheet: /SATA0/
File: SATA0.sch
Title: Raspberry Pi Network Lab Board
Size: A4
Date: 2020-11-04
Rev: B
KiCad E.D.A. kicad (5.1.5)-3
Id: 13/19


IC14
TUSB9261IPVP
100 Ohm differential impedance
50 Ohm single ended impedance
WARNING: TX Polarity Swap !!!
Select appropriate firmware version!
J16
Conn_SATA
IC15
IS25LQ010B
!!! CRITICAL !!! This MUST be this exact flash,
or one that supports 256bytes page writes
with the 0x02 command!
40 MHz oscillator
frequency selection
According to data sheet, VSSOSC
should NOT be connected to GND!
Disk
activity
This schematic follows roughly the reccommendations
given in the TUSB9262 Implementation Guide
https://www.ti.com/lit/pdf/slla315
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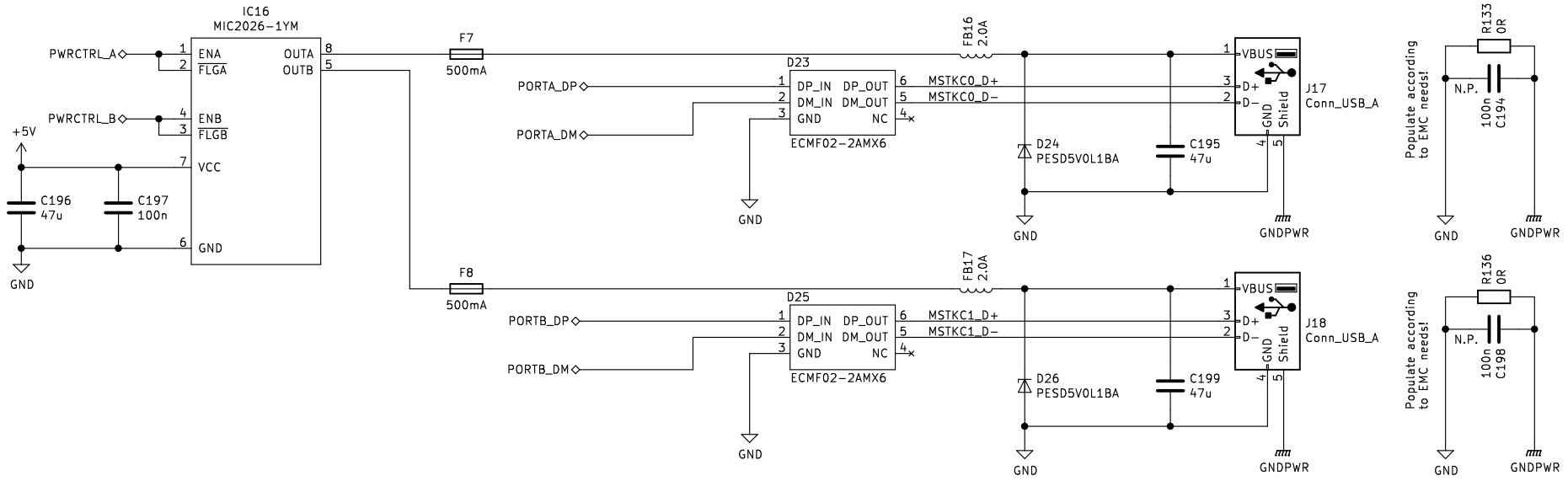
Sheet: /SATA1/
File: SATA1.sch
Title: Raspberry Pi Network Lab Board
Size: A4
Date: 2020-11-04
Rev: B
KiCad E.D.A. kicad (5.1.5)-3
Id: 14/19



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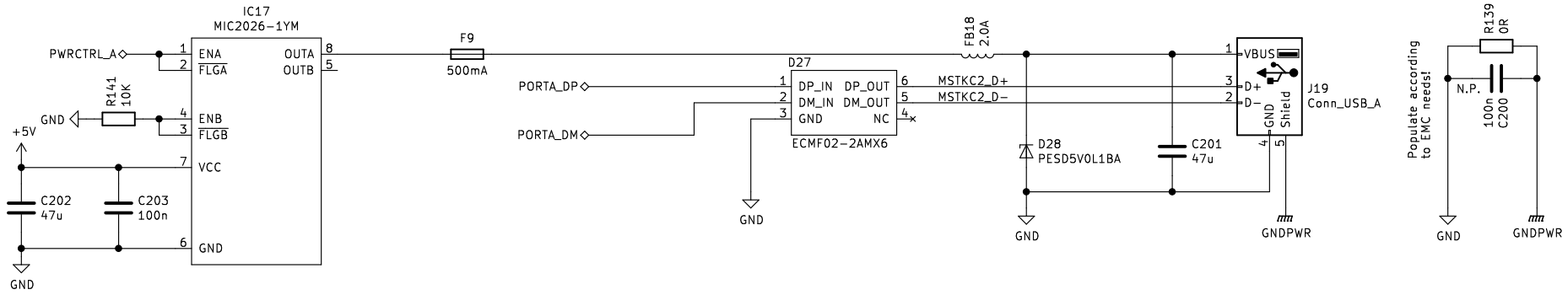
Sheet: /MemStick 0/1 (USB)/
File: MS0.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 15/19



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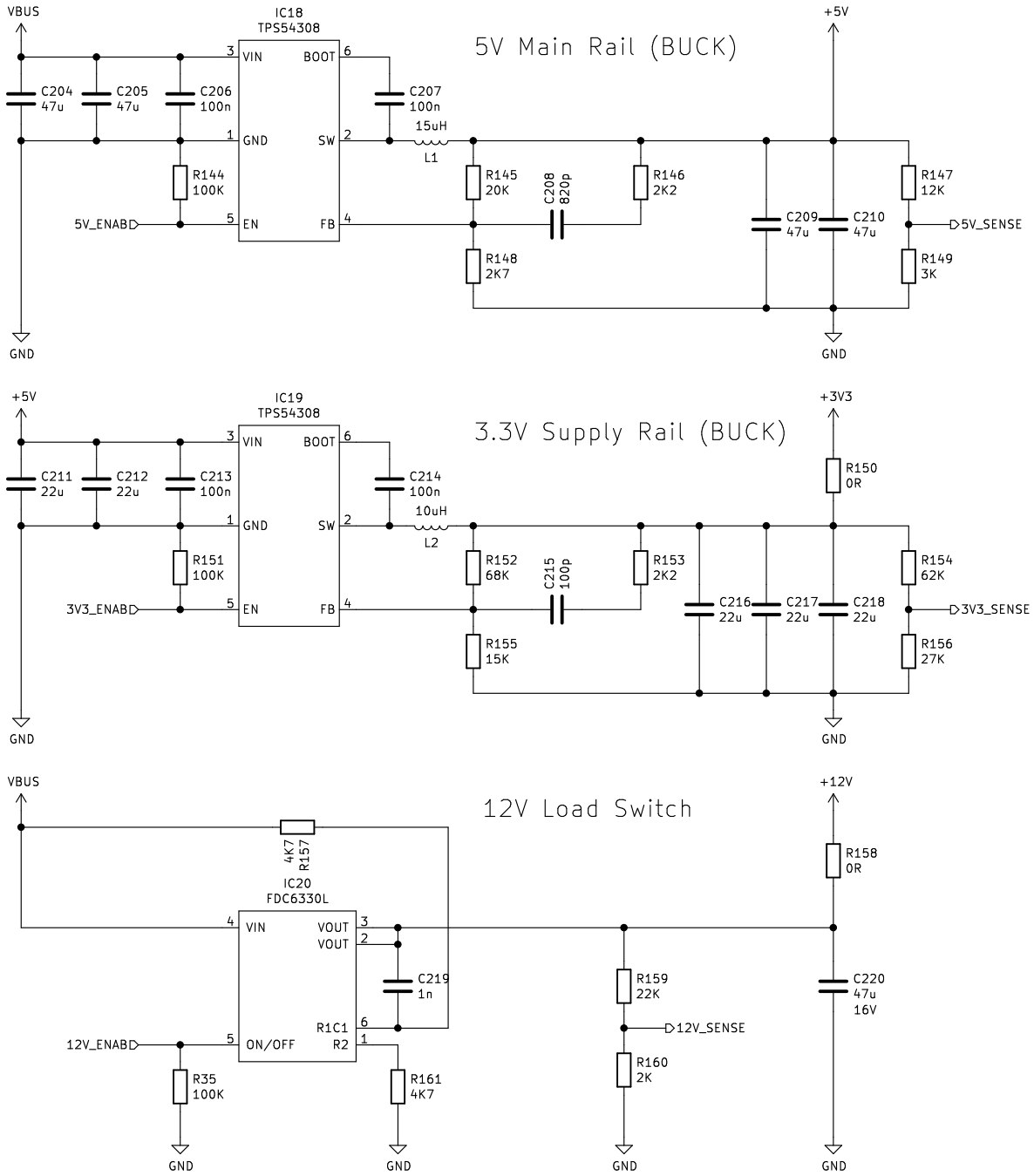
Sheet: /MemStick 2 (USB)/
File: MS2.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 16/19



TPS54308 Component Selection

All calculations according to data sheet!

Specification	5V	3.3V
V_out	5 V	3.3 V
V_in_max	12 V	5 V
I_out_max	3 A	3 A
Delta_I_out	1.5 A	1.5 A
Max_Delta_Vout_Load_Response	100 mV	165 mV
Max_Vout_Ripple	50 mV	30 mV
Resistor Divider		
R2	20 KOhm	68 KOhm
R3_calc	2.71 KOhm	14.99 KOhm
R3	2.7 KOhm	15 KOhm
Vout_calc	5.011 V	3.298 V
Input Capacitor Selection		
C_bulk	94 uF	44 uF
C_bulk_esr	0.01 Ohm	0.01 Ohm
Delta_V_IN	53 mV	79 mV
I_C_IN_RMS	1.5 A	1.5 A
Inductor Selection		
L_MIN	9 uH	4 uH
L	15 uH	10 uH
I_L_MAX	3.012 A	3.009 A
I_L_PK	3.347 A	3.2 A
Output Capacitor Selection		
C_O_MIN_Load_Response	86 uF	52 uF
C_O_MIN_Ripple	11 uF	18 uF
C_O	94 uF	66 uF
C_O_MAX_ESR	33 mOhm	20 mOhm
f_o	10.9 KHz	23.4 KHz
I_COUT_RMS	160 mA	93 mA
Feed-Forward Capacitor		
C_FFC_Calc	733 pF	100 pF

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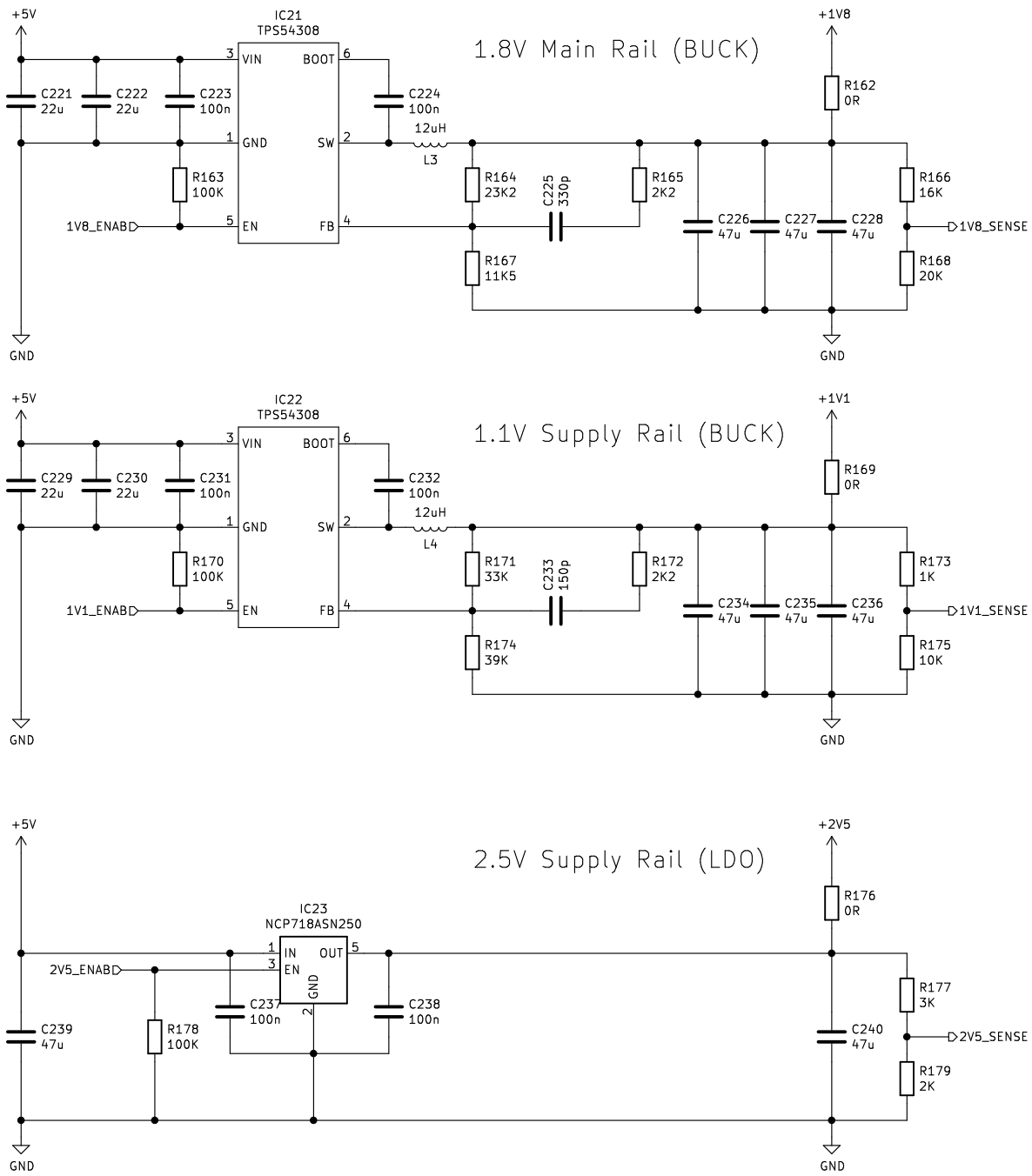
Sheet: /PSU_12V_5V_3V3/
File: PowerSupply1.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 17/19



	A	B	C	E	F
1	**TPS54308 Component Selection**				
2	All callculations according to data sheet!				
3					
4	**Specification**	**1V8**		**1V1**	
5	V_out	1.8	V	1.1	V
6	V_in_max	5	V	5	V
7	I_out_max	1	A	1	A
8	Delta_I_out	1	A	1	A
9	Max_Delta_Vout_Load_Response	50	mV	50	mV
10	Max_Vout_Ripple	50	mV	30	mV
11					
12					
13	**Resistor Divider**				
14	R2	23.2	KOhm	33	KOhm
15	R3_calc	11.48	KOhm	39.02	KOhm
16	R3	11.5	KOhm	39	KOhm
17	Vout_calc	1.798	V	1.1	V
18					
19					
20	**Input Capacitor Selection**				
21	C_bulk	44	uF	44	uF
22	C_bulk_esr	0.01	Ohm	0.01	Ohm
23	Delta_V_IN	26	mV	26	mV
24	I_C_IN_RMS	0.5	A	0.5	A
25					
26					
27	**Inductor Selection**				
28	L_MIN	11	uH	8	uH
29	L	12	uH	12	uH
30	I_L_MAX	1.024	A	1.021	A
31	I_L_PK	1.171	A	1.128	A
32					
33					
34	**Output Capacitor Selection**				
35	C_O_MIN_Load_Response	114	uF	114	uF
36	C_O_MIN_Ripple	7	uF	12	uF
37	C_O	141	uF	141	uF
38	C_O_MAX_ESR	50	mOhm	30	mOhm
39	f_o	20.1	KHz	32.9	KHz
40	I_COUT_RMS	79	mA	59	mA
41					
42					
43	**Feed-Forward Capacitor**				
44	C_FFC_Calc	341	pF	147	pF
45					

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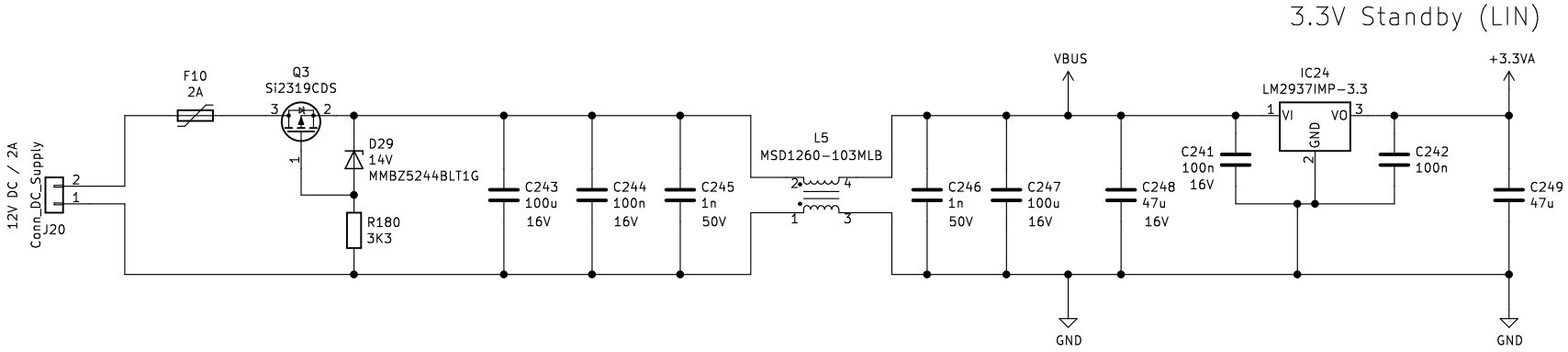
Sheet: /PSU_2V5_1V8_1V1/
File: PowerSupply2.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 18/19



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Sheet: /PSU_Inp_Stby/
File: PowerSupply0.sch

Title: Raspberry Pi Network Lab Board

Size: A4	Date: 2020-11-04	**Rev: B**
KiCad E.D.A. kicad (5.1.5)-3		Id: 19/19