Sheet: Power Regulation and Fan Tach
File: Page1.sch

Sheet: 3.3V and 1.8V Power Supply
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Sheet: SODIMM Connections Part 1
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Sheet: SODIMM Connections Part 2
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Sheet: SODIMM Connections Part 3
File: Page4b.sch

Sheet: Power ON/OFF Logic
File: Page5.sch

Sheet: Level Shifters and GPIO Header
File: Page6.sch

Sheet: uUSB Connections
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Sheet: OLED Display
File: Page8.sch

Sheet: UART to USB Bridge
File: Page9.sch

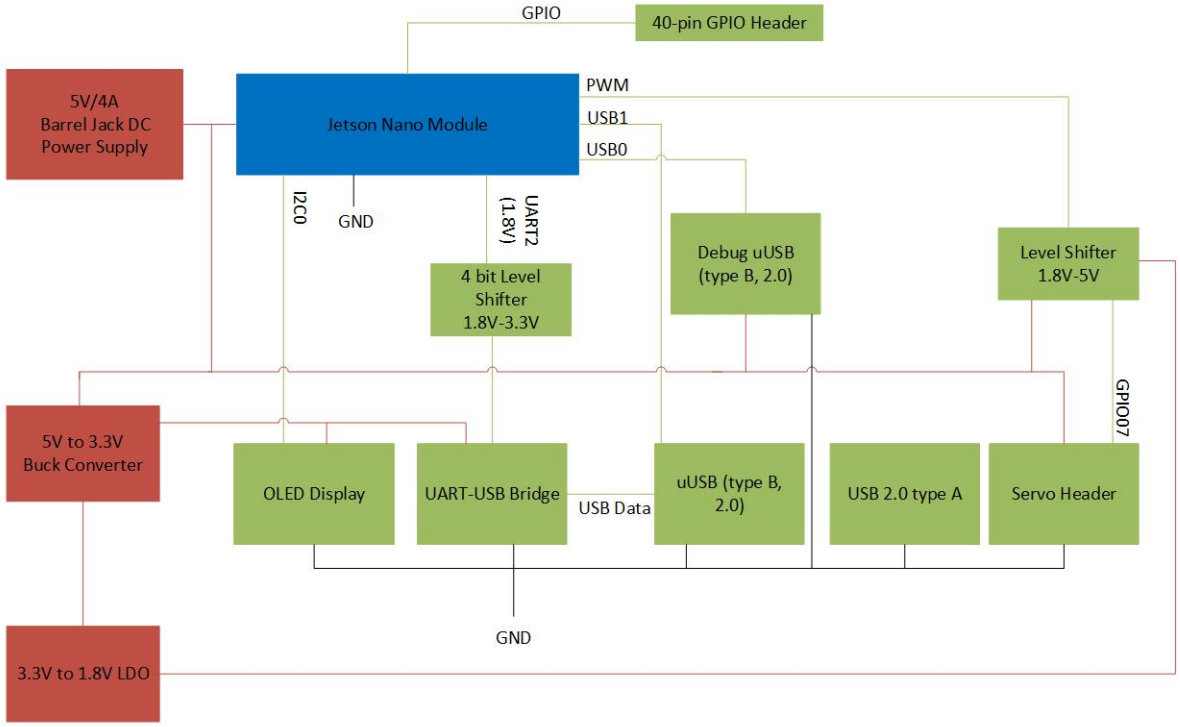
Sheet: USB2.0 Type A Hub
File: Page10.sch

Sheet: Servo Header and EEPROM
File: Page11.sch

Sheet: HDMI Connections Part 1
File: Page12.sch

Sheet: HDMI Connections Part 2
File: Page13.sch

BLOCK DIAGRAM



Legend

- Power connections
- Ground connections
- Signals with labels

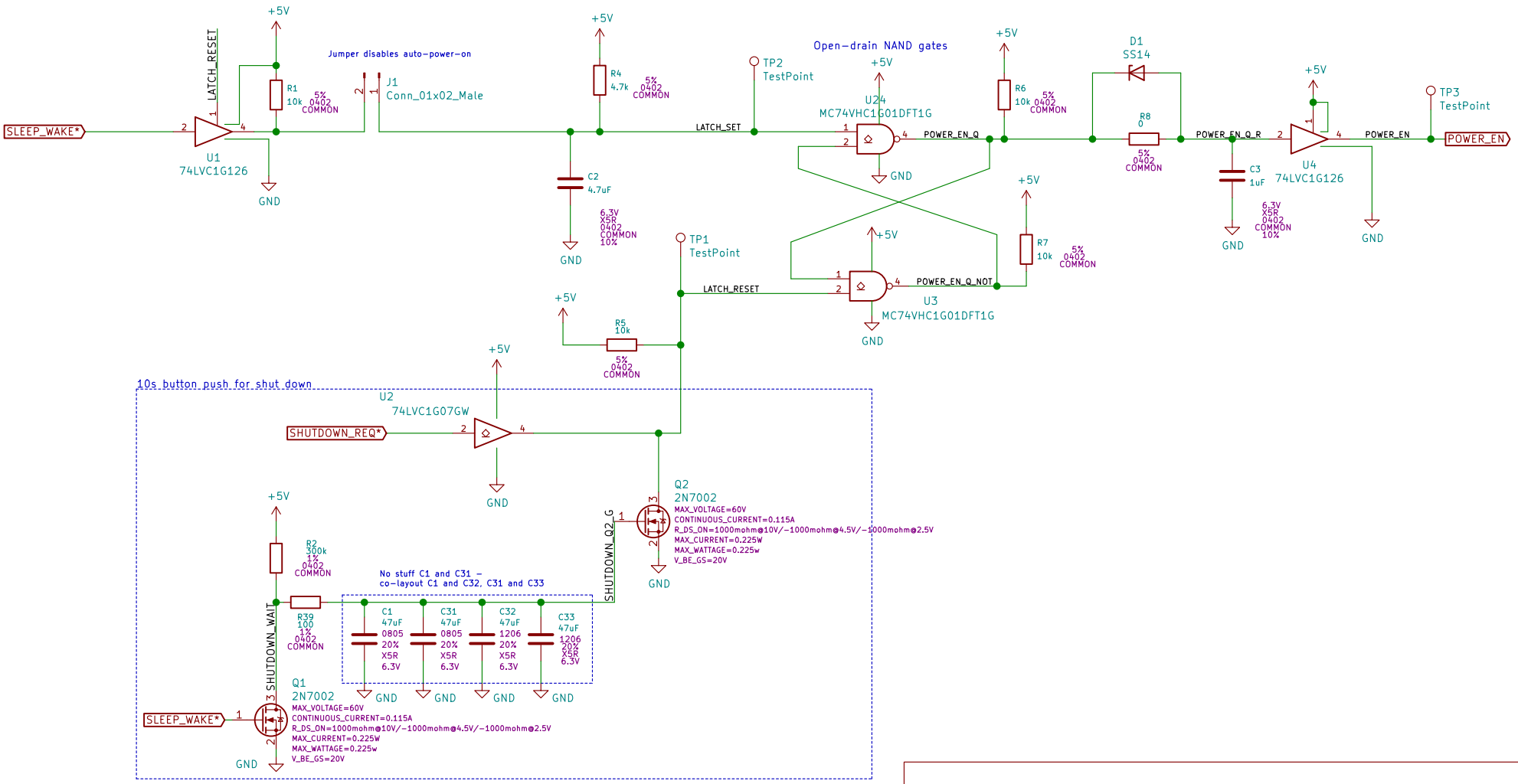
NVIDIA

Sheet: /
File: os_baseboard.sch

Title: Open Source Educational Baseboard

Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 1/15

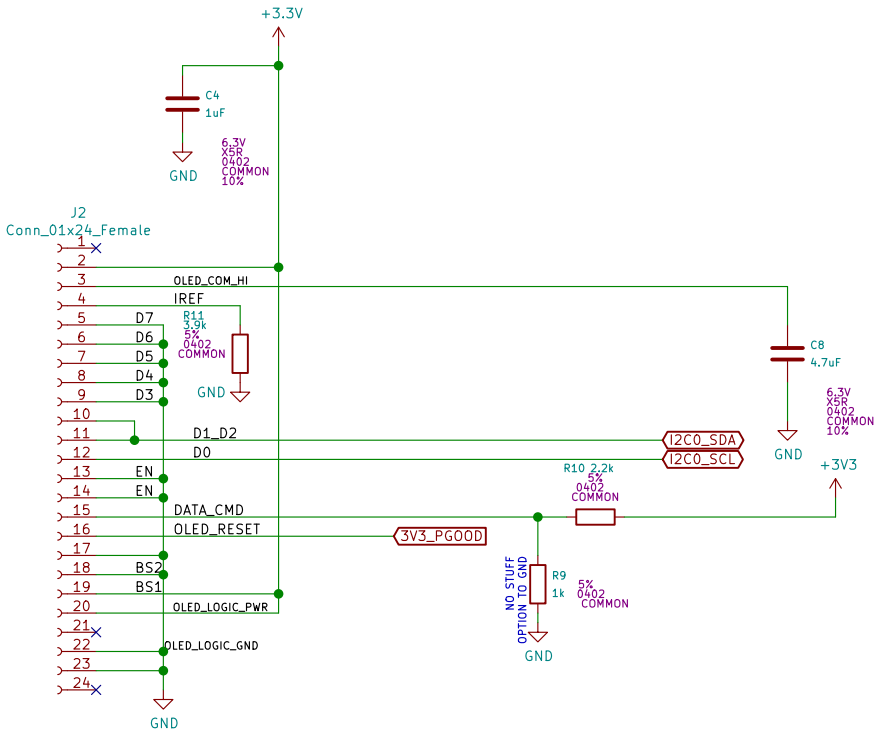
POWER ON/OFF LOGIC



In LTSpice, interval of button push
(+/- 10% RC value due to tolerance)
was measured to be approximately 9.8-12s.
The user also receives visual feedback from the power
LED on the state of the module.
Circuit was simulated in LTSpice.

NVIDIA		
Sheet: /Power ON/OFF Logic/		
File: Page5.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 2/15

OLED DISPLAY



INTERFACE SELECTION TRUTH TABLE

INTERFACE	BS0 (PIN 10)	BS1 (PIN 11)	BS2 (PIN 12)
I2C	0	1	0
4-WIRE SPI	0	0	0
8-BIT 68XX PARALLEL	0	0	1
8-BIT 80XX PARALLEL	0	1	1

This flex connector is mated to the UG-2864KLBMG01 OLED display from WiseChip.
I2C was chosen for this use because it uses fewer wires and
the signals come from the module (there is no microcontroller).

Note that pin numbers are flipped with regards to pin number for the display (i.e. 1 => 30 and vice versa)

NVIDIA

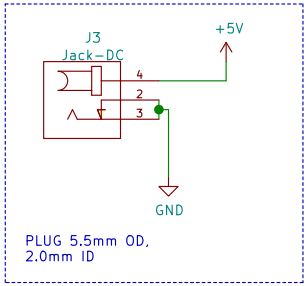
Sheet: /OLED Display/
File: Page8.sch

Title: Open Source Educational Baseboard

Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 3/15

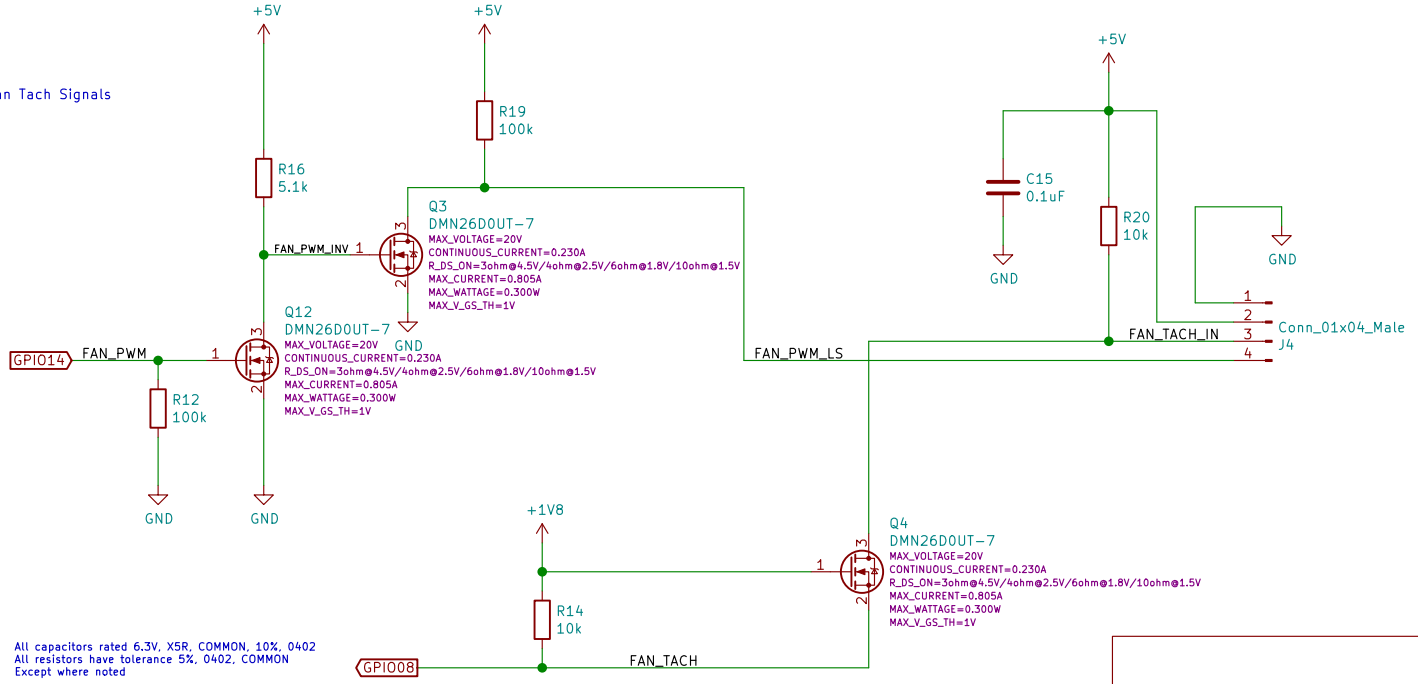
POWER AND FAN TACH

5V Power Protection



Note: for more robustness, additional power protection
(over/under voltage or current, slew rate, etc) can be added.
It is assumed that the hobbyist user will choose an appropriate
power supply for their board.

Fan Tach Signals



All capacitors rated 6.3V, X5R, COMMON, 10%, 0402
All resistors have tolerance 5%, 0402, COMMON
Except where noted

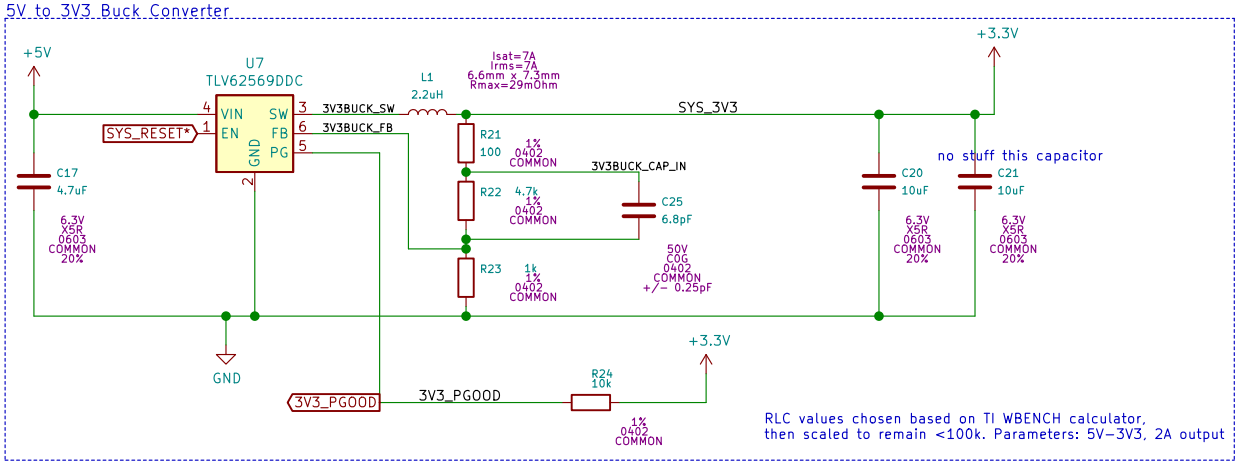
NVIDIA

Sheet: /Power Regulation and Fan Tach/
File: Page1.sch

Title: Open Source Educational Baseboard

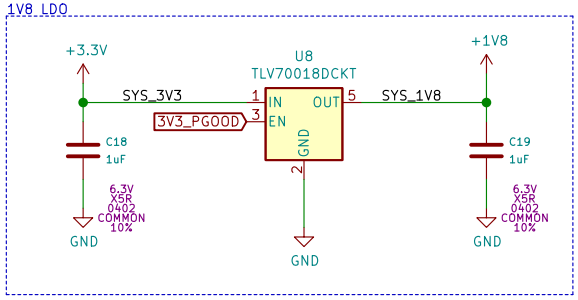
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 4/15

3V3 AND 1V8 POWER SUPPLY



Output Voltage with Tolerance

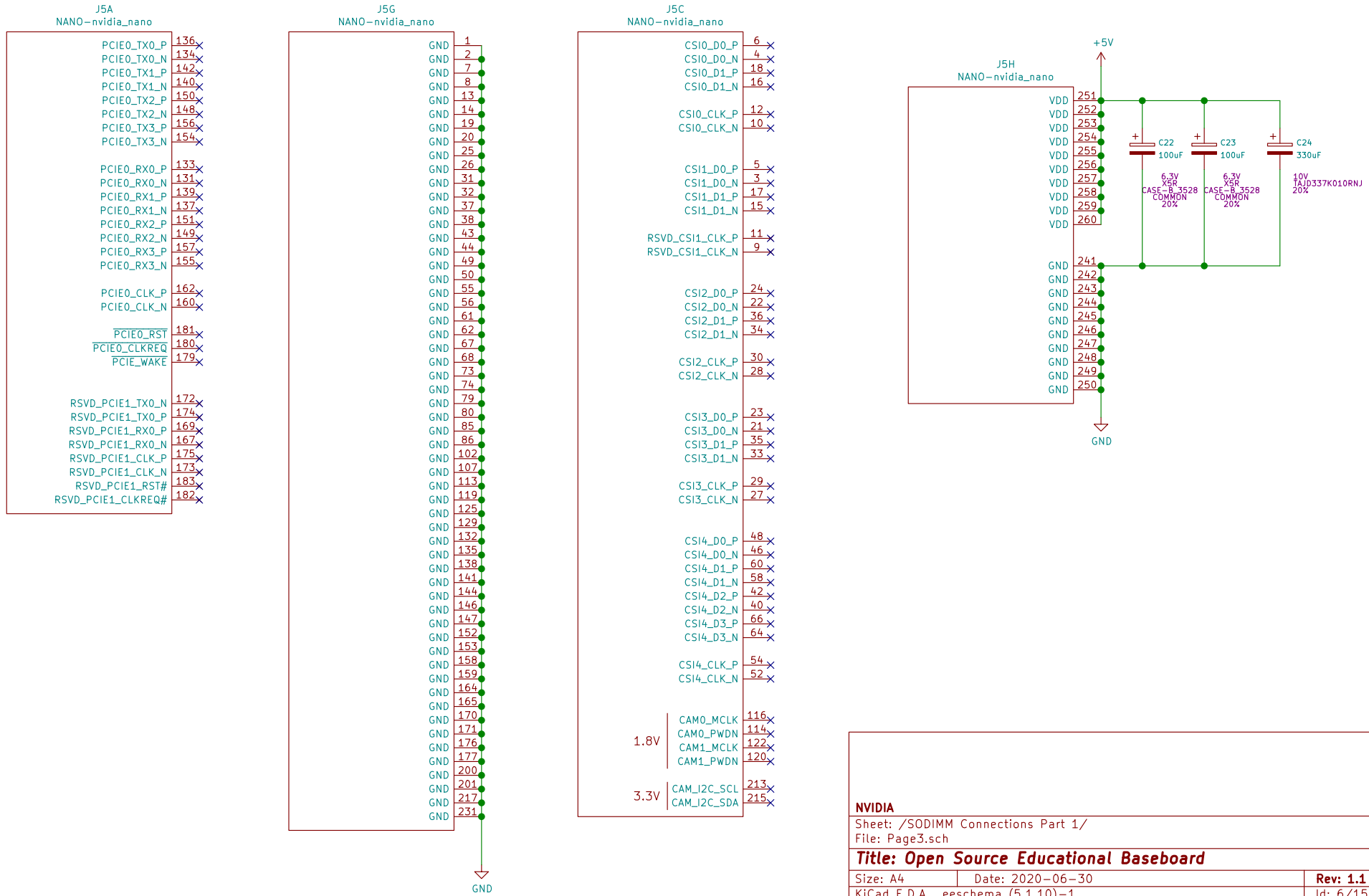
	Vfb	Vout
min	0.588V	3.3516V
nom	0.6V	3.42V
max	0.612V	3.4884V



NVIDIA	
Sheet: /3.3V and 1.8V Power Supply/	
File: Page2.sch	
Title: Open Source Educational Baseboard	
Size: A4	Date: 2020-06-30
KiCad E.D.A. eeschema (5.1.10)-1	Id: 5/15

Rev: 1.1

SODIMM CONNECTIONS PART 1



NVIDIA

Sheet: /SODIMM Connections Part 1/
File: Page3.sch

Title: Open Source Educational Baseboard

Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 6/15

SODIMM CONNECTIONS PART 2

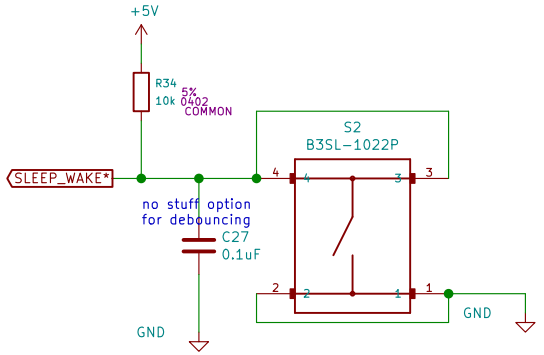
J5D
NANO-nvidia_nano

GBE_MDI0_P	186	
GBE_MDI0_N	184	
GBE_MDI1_P	192	
GBE_MDI1_N	190	
GBE_MDI2_P	198	
GBE_MDI2_N	196	
GBE_MDI3_P	204	
GBE_MDI3_N	202	
GBE_LED_LINK	188	
GBE_LED_ACT	194	
SDMMC_DAT0	219	
SDMMC_DAT1	221	
SDMMC_DAT2	223	
SDMMC_DAT3	225	
SDMMC_CMD	227	
SDMMC_CLK	229	
USB0_D_P	111	USB0_D_P
USB0_D_N	109	USB0_D_N
USB1_D_P	117	USB1_D_P
USB1_D_N	115	USB1_D_N
USB2_D_P	123	
USB2_D_N	121	
USBSS_TX_P	168	
USBSS_TX_N	166	
USBSS_RX_P	163	
USBSS_RX_N	161	
RSVD_CAN_TX	145	
RSVD_CAN_RX	143	

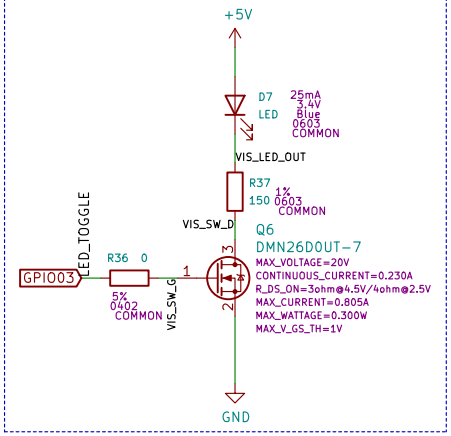
J5B
NANO-nvidia_nano

DP0_TXD0_P	41	
DP0_TXD0_N	39	
DP0_TXD1_P	47	
DP0_TXD1_N	45	
DP0_TXD2_P	53	
DP0_TXD2_N	51	
DP0_TXD3_P	59	
DP0_TXD3_N	57	
DP0_AUX_P	92	
DP0_AUX_N	90	
DP0_HPD	88	
HDMI_CEC	94	HDMI_CEC
DP1_TXD0_P	65	HDMI_TXD2_P
DP1_TXD0_N	63	HDMI_TXD2_N
DP1_TXD1_P	71	HDMI_TXD1_P
DP1_TXD1_N	69	HDMI_TXD1_N
DP1_TXD2_P	77	HDMI_TXD0_P
DP1_TXD2_N	75	HDMI_TXD0_N
DP1_TXD3_P	83	HDMI_TXC_P
DP1_TXD3_N	81	HDMI_TXC_N
DP1_AUX_P	100	HDMI_DDC_SCL_POL
DP1_AUX_N	98	HDMI_DDC_SDA_POL
DP1_HPD	96	HDMI_HPD
DSI_D0_P	72	
DSI_D0_N	70	
DSI_D1_P	84	
DSI_D1_N	82	
DSI_CLK_P	78	
DSI_CLK_N	76	

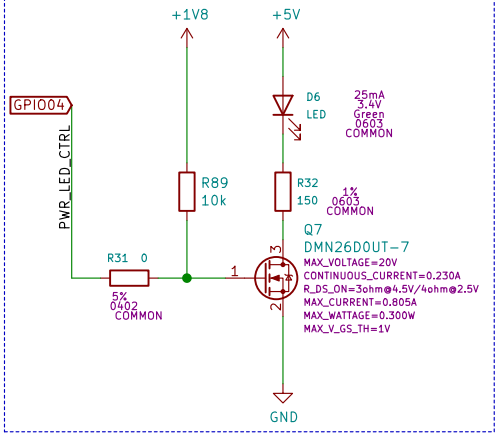
Power Button Pull Up



Visual Feedback LED



Power Indicator LED



NVIDIA

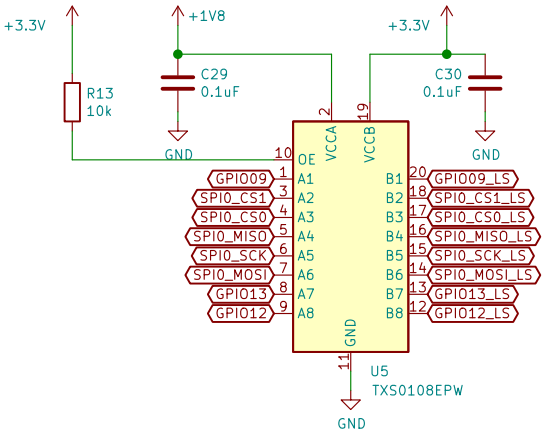
Sheet: /SODIMM Connections Part 2/
File: Page4.sch

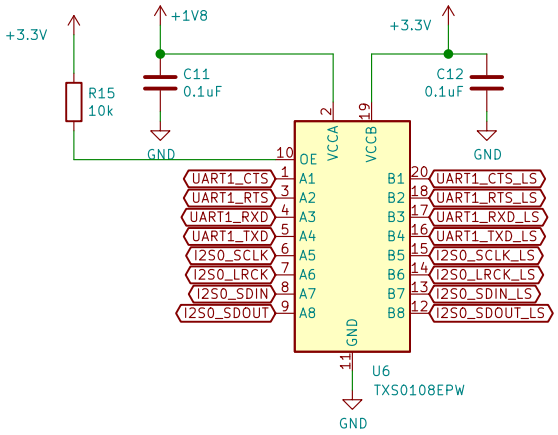
Title: Open Source Educational Baseboard

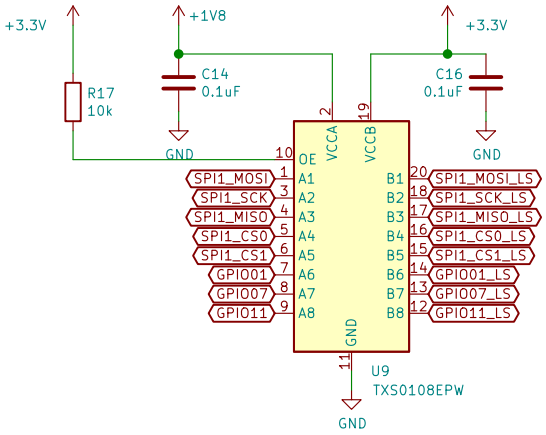
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 7/15

All capacitors rated 6.3V, X5R, COMMON, 10%, 0402
All resistors have tolerance 5%, 0402, COMMON

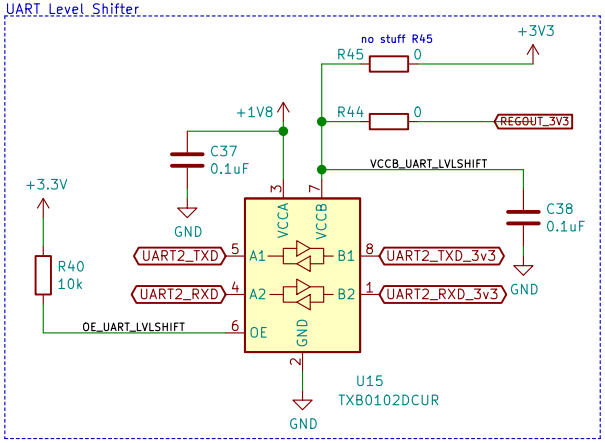
LEVEL SHIFTERS AND GPIO HEADER



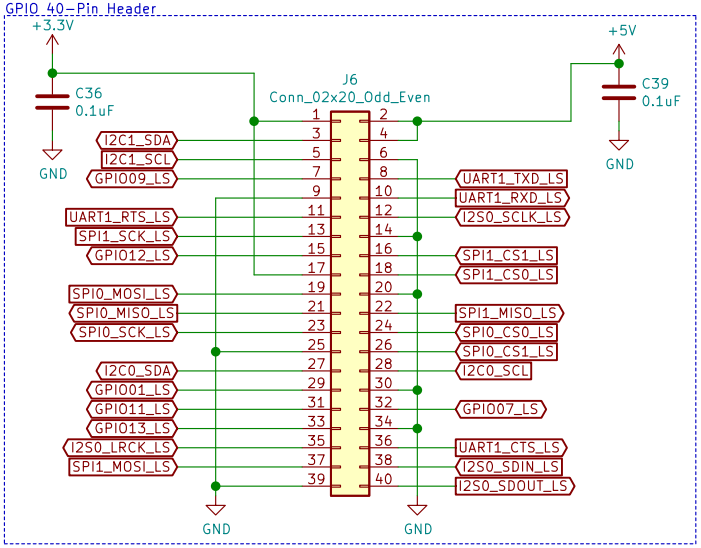




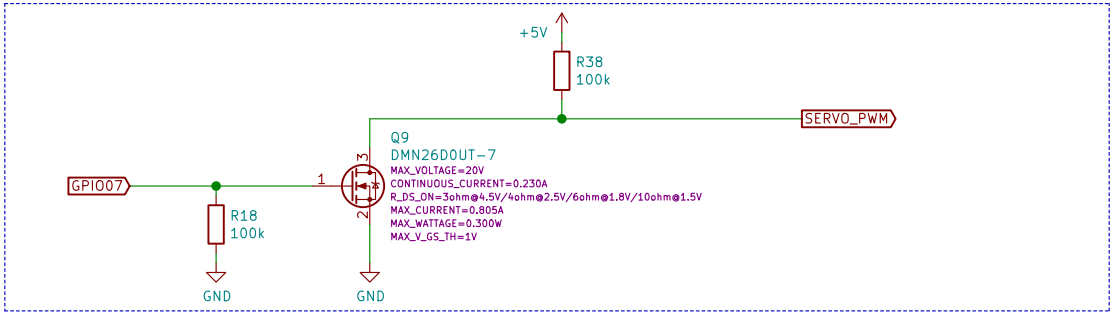
UART Level Shifter



GPIO 40-Pin Header



Level Shift for Servo PWM signal



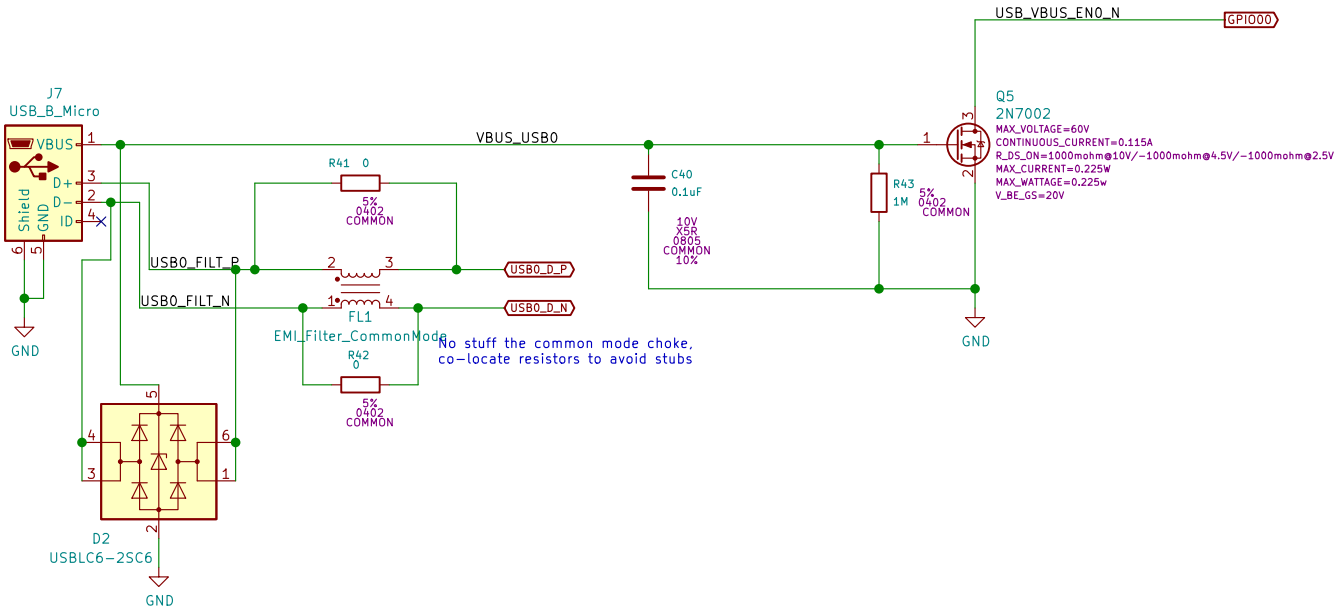
NVIDIA

Sheet: /Level Shifters and GPIO Header/
File: Page6.sch

Title: Open Source Educational Baseboard

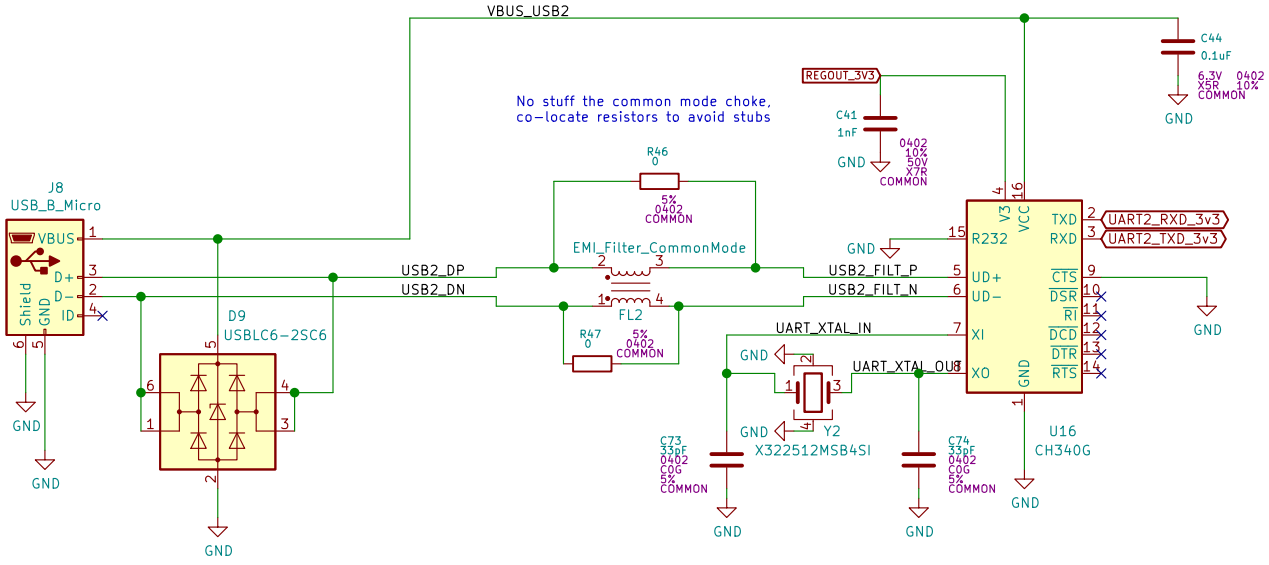
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 8/15

DEBUG MICRO USB CONNECTIONS



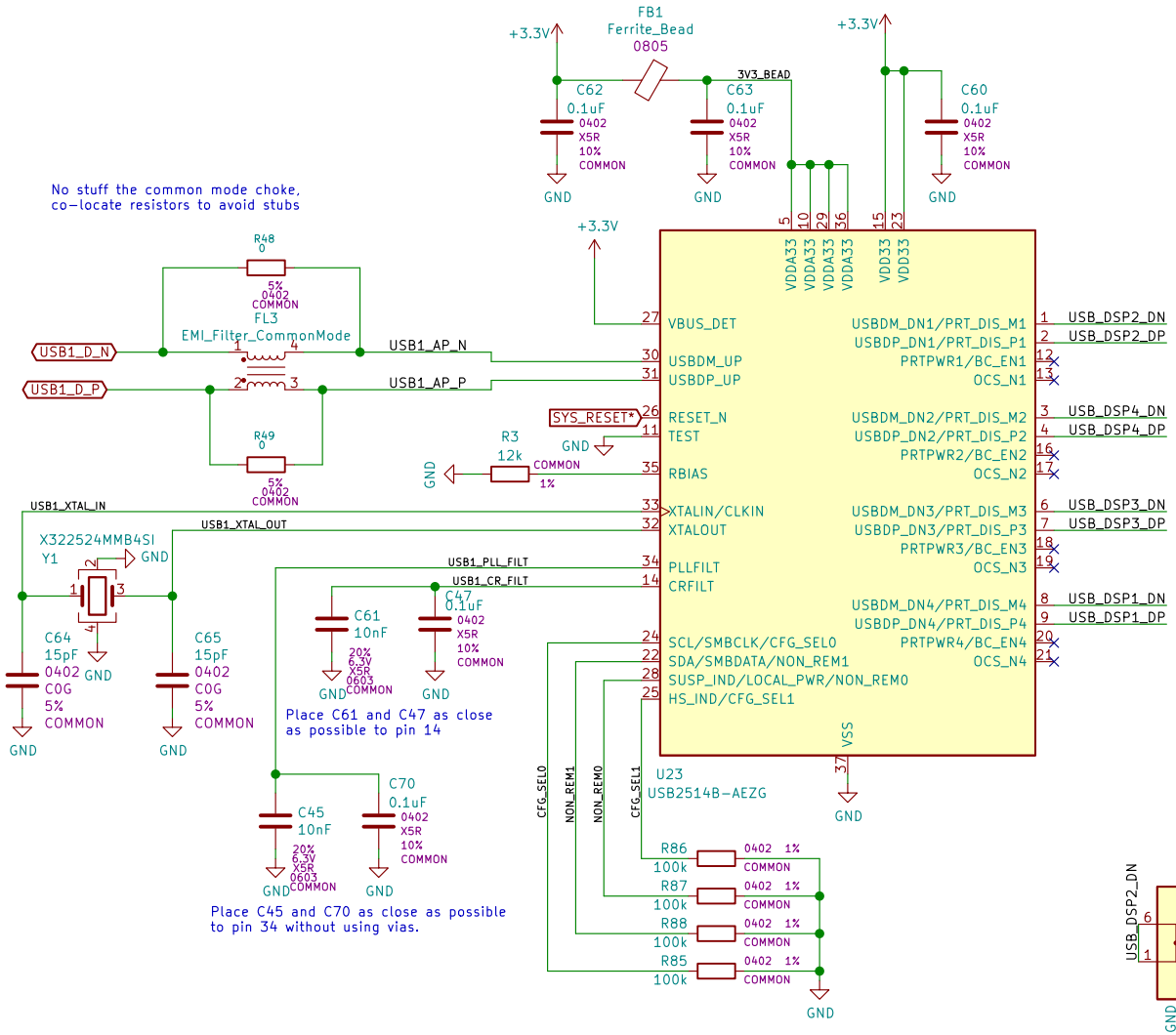
NVIDIA		
Sheet: /uUSB Connections/		
File: Page7.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 9/15

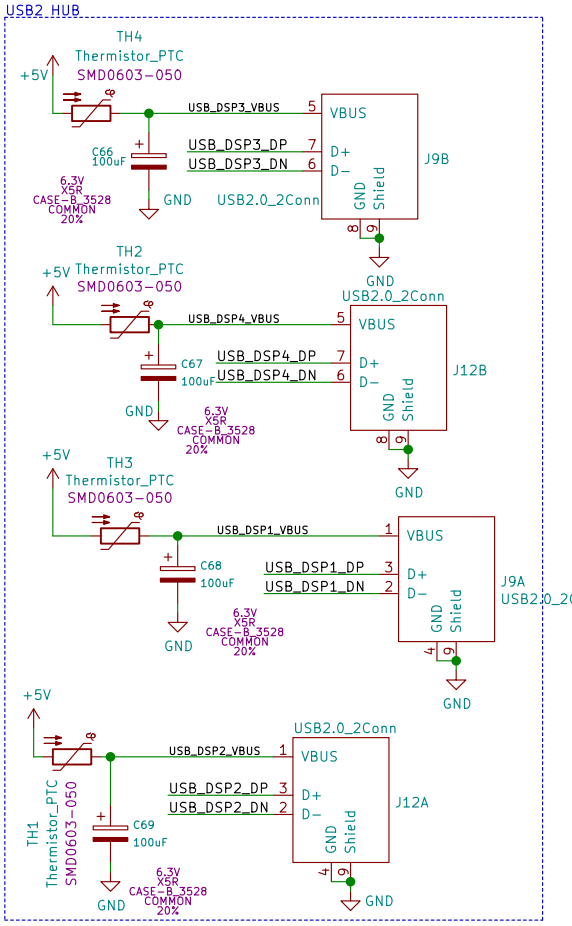
UART to USB Bridge

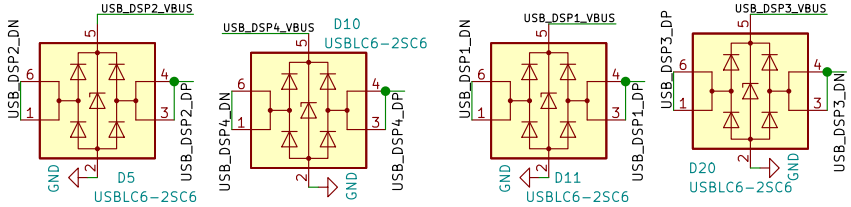


NVIDIA		
Sheet: /UART to USB Bridge/		
File: Page9.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 10/15

USB 2.0 TYPE A HUB







NONREMOVABLE DEVICES CONFIGURATION

DESCRIPTION	NON_REM1 (PIN 22)	NON_REM0 (PIN 28)
All downstream ports removable	0	0
Port 1 only is non-removable	0	1
Port 1 & 2 only are non-removable	1	0
Port 1, 2, & 3 are non-removable	1	1

All downstream ports were chosen to be removable to provide more options for the user.

MODE CONFIGURATION TRUTH TABLE

MODE	CFG_SEL1 (PIN 25)	CFG_SEL0 (PIN 24)
Configured externally over SMBus	0	1
Default config with bus-powered operation	1	0
Default config with self-powered operation	0	0
I2C EEPROM Configuration	1	1

Default configuration was used because it involved fewer outside devices.

NVIDIA

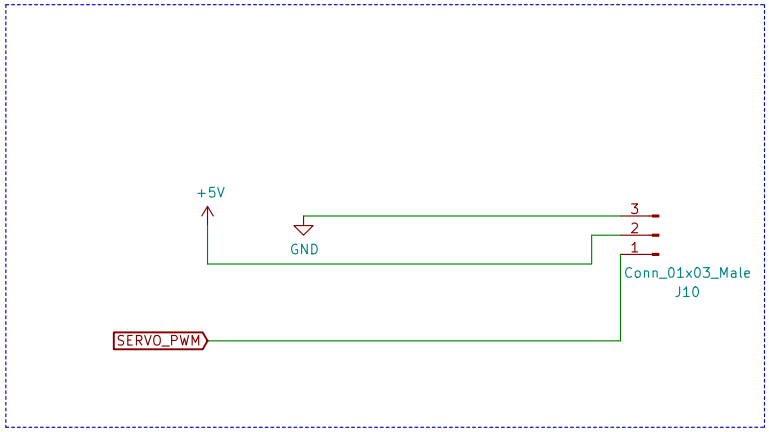
Sheet: /USB2.0 Type A Hub/

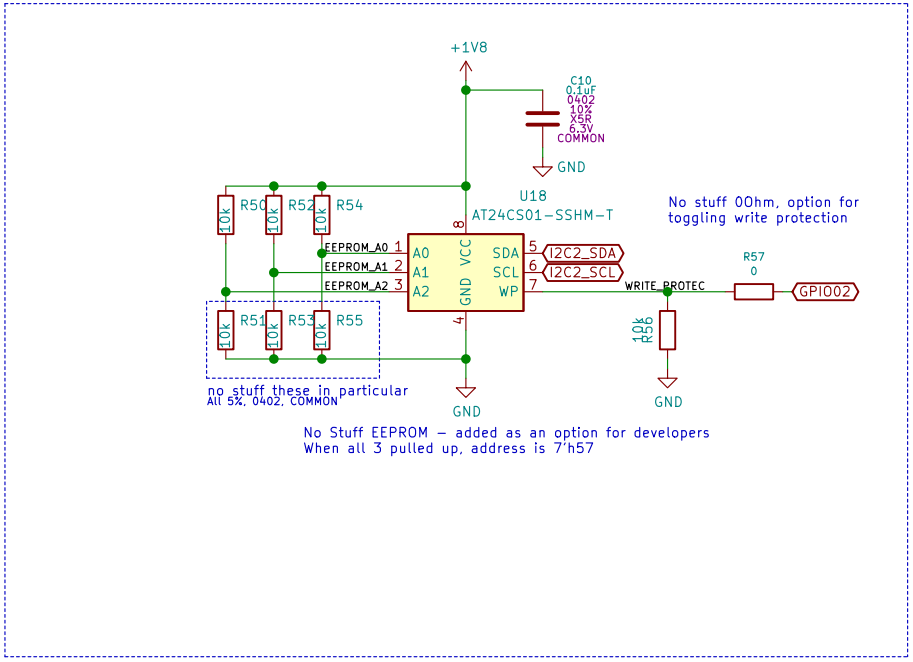
File: Page10.sch

Title: Open Source Educational Baseboard

Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 11/15

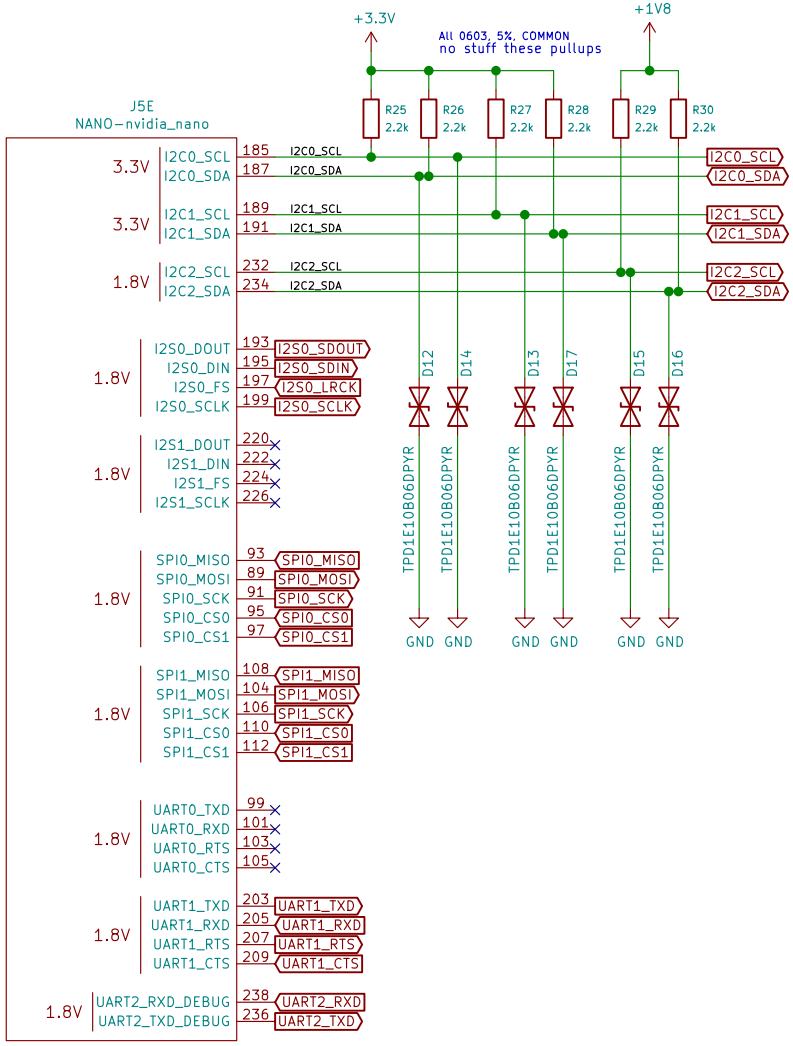
SERVO HEADER AND EEPROM

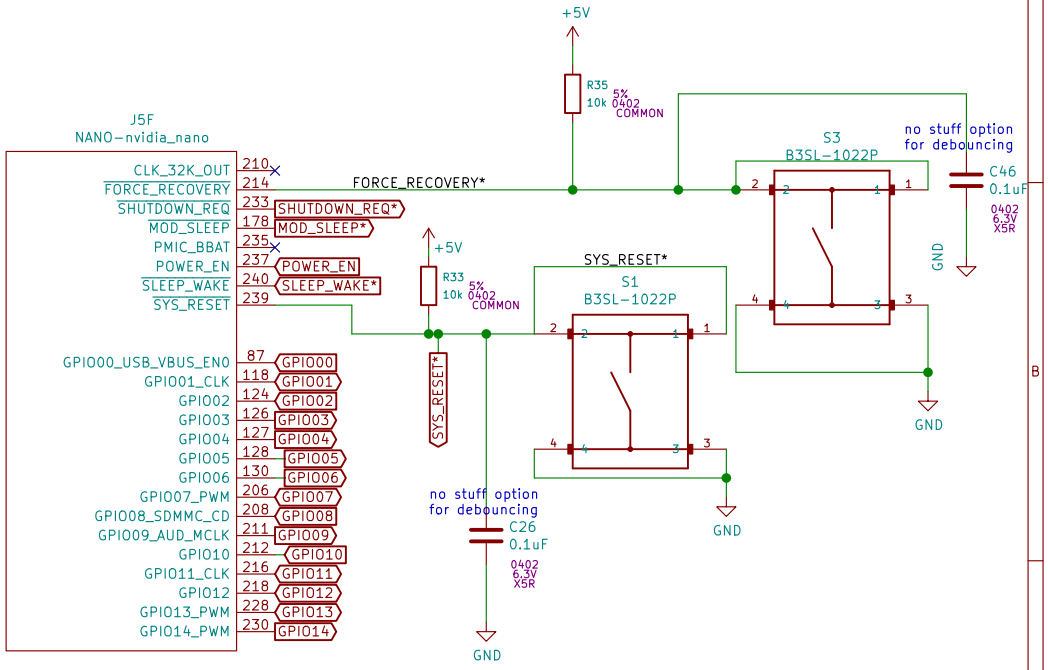




NVIDIA		
Sheet: /Servo Header and EEPROM/ File: Page11.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 12/15

SODIMM CONNECTIONS PART 3

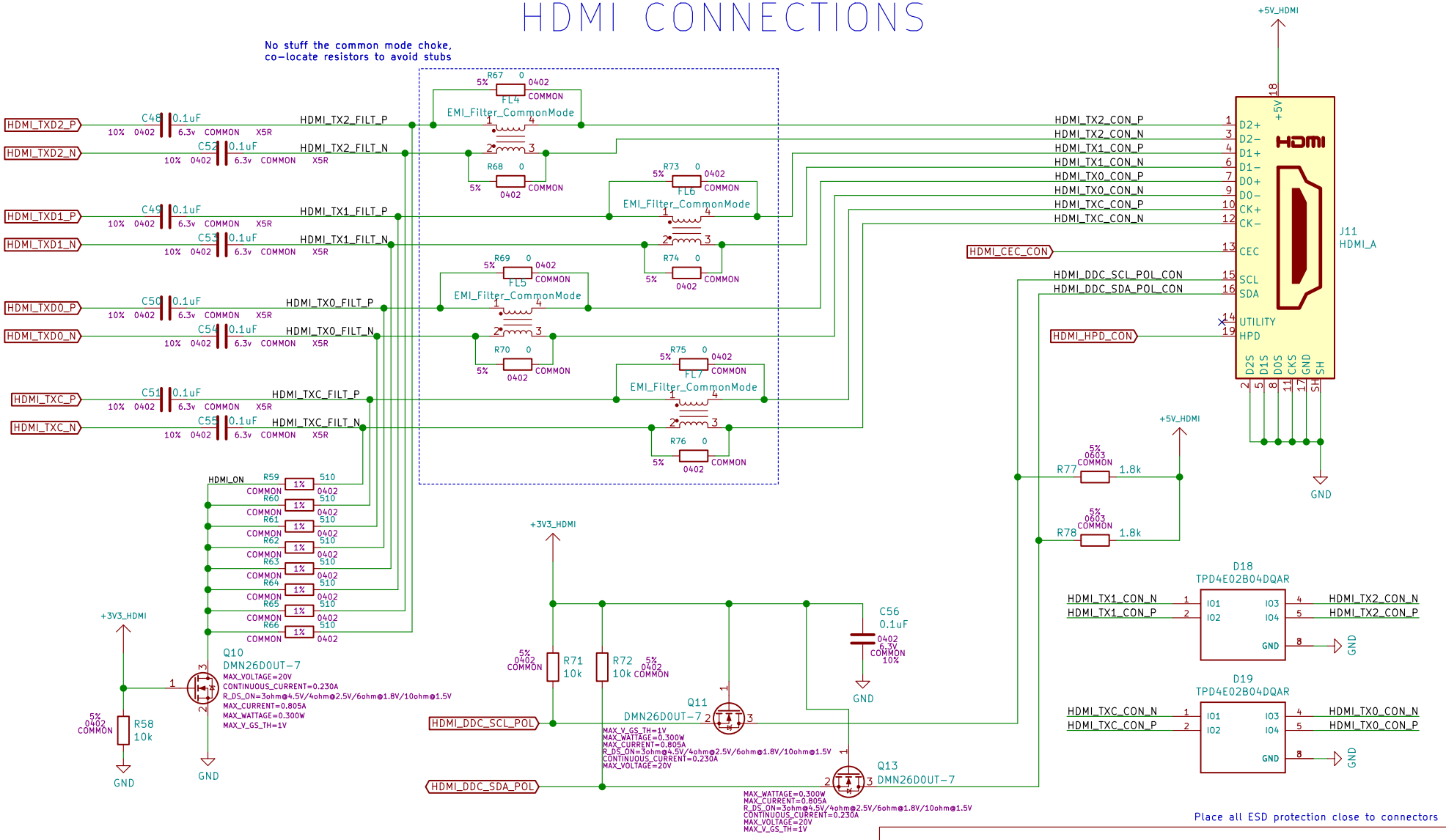




NVIDIA		
Sheet: /SODIMM Connections Part 3/		
File: Page4b.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 13/15

HDMI CONNECTIONS

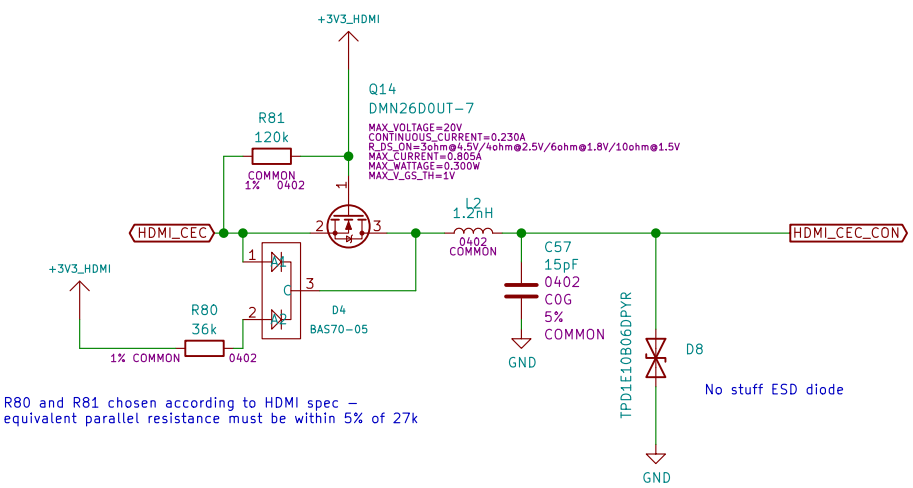
No stuff the common mode choke,
co-locate resistors to avoid stubs

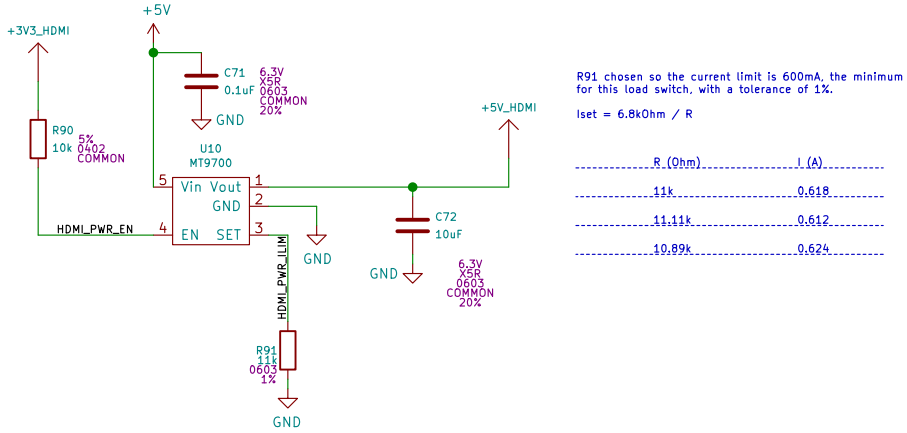


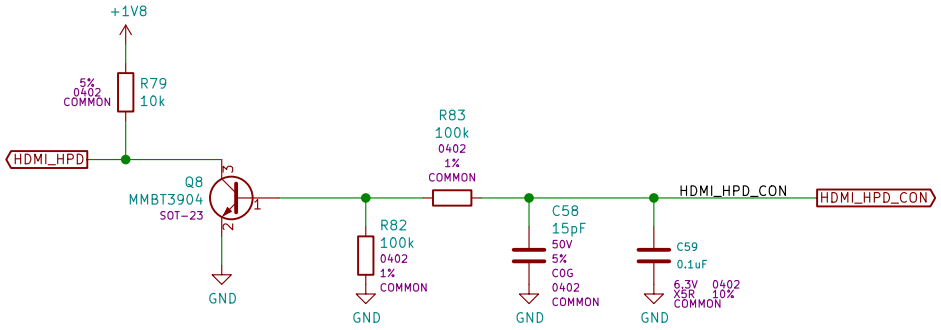
Place all ESD protection close to connectors

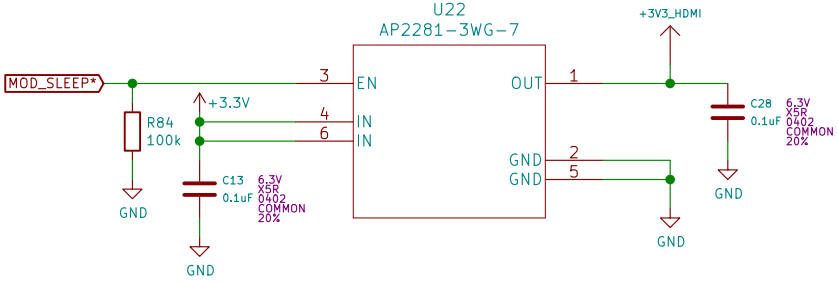
Sheet: /HDMI Connections Part 1/		
File: Page12.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 14/15

HDMI CONNECTIONS PART 2









Sheet: /HDMI Connections Part 2/		
File: Page13.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. eeschema (5.1.10)-1		Id: 15/15