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

Sheet: 3.3V and 1.8V Power Supply
File: Page2.sch

Sheet: SODIMM Connections Part 1
File: Page3.sch

Sheet: SODIMM Connections Part 2
File: Page4.sch

Sheet: SODIMM Connections Part 3
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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
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Sheet: UART to USB Bridge
File: Page9.sch

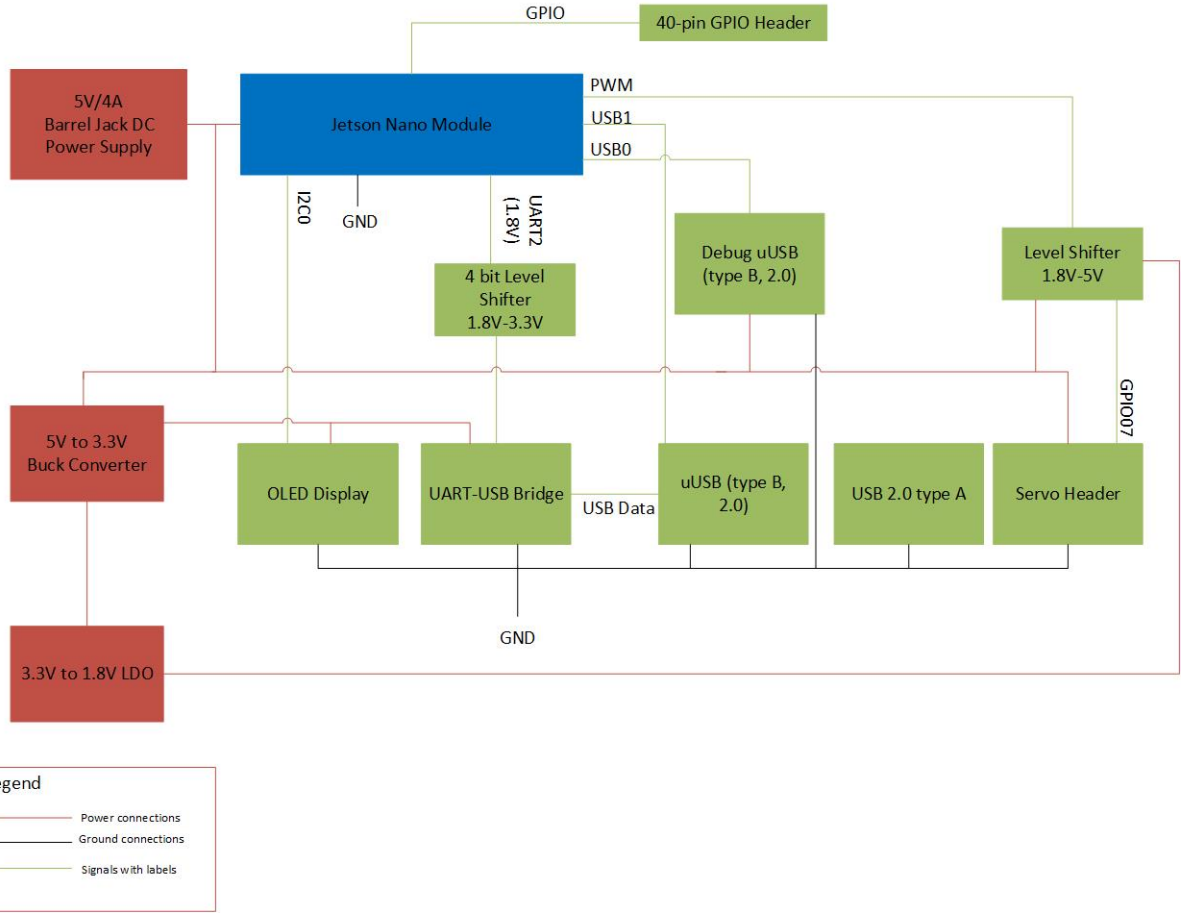
Sheet: USB2.0 Type A Hub
File: Page10.sch

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

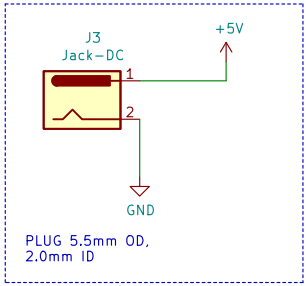
Sheet: /
File: os_baseboard.sch

Title: Open Source Educational Baseboard

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

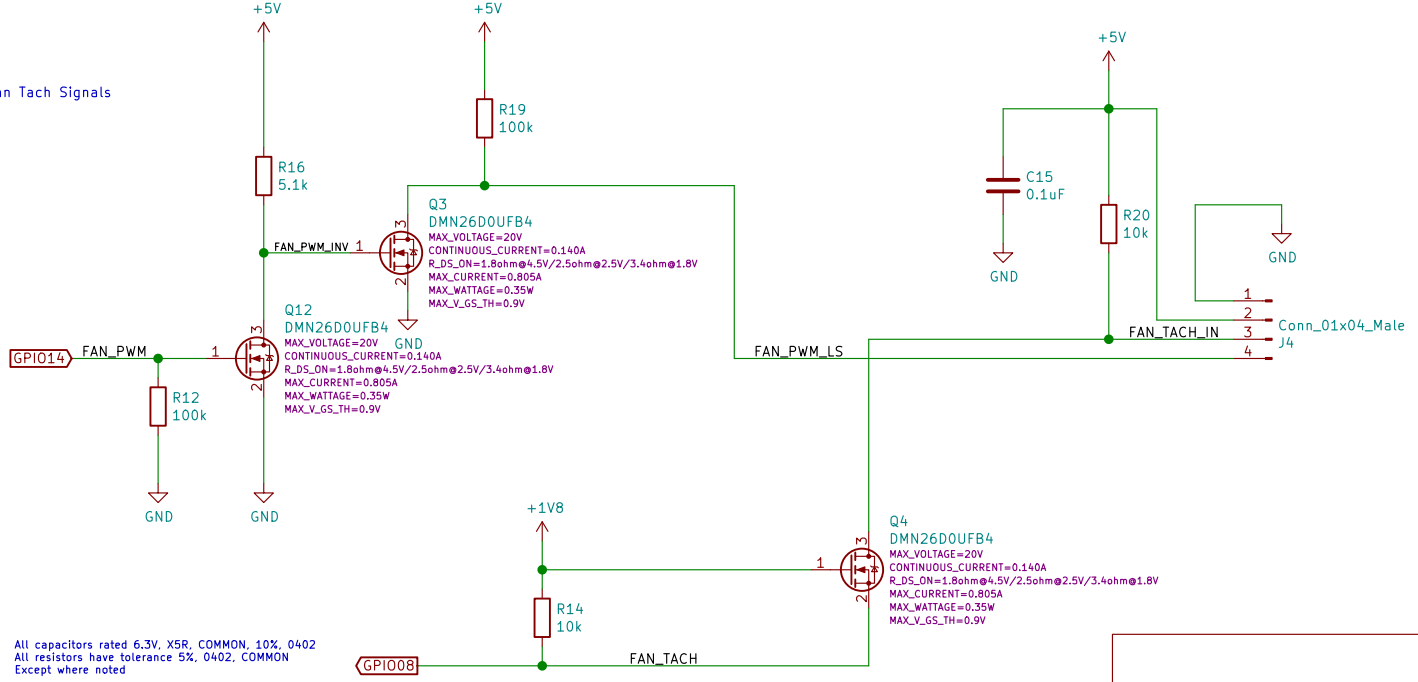
POWER AND FAN TACH

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

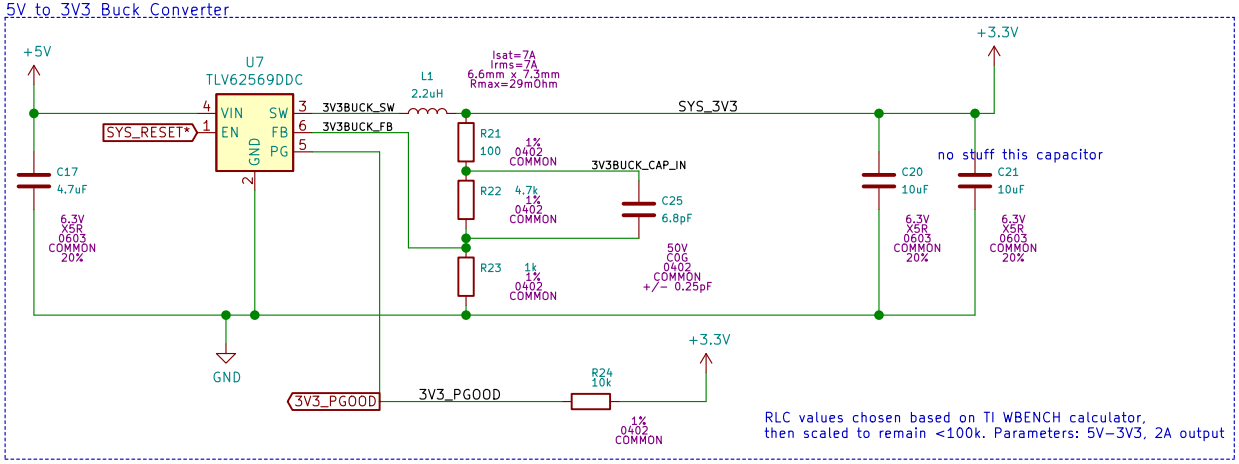
Sheet: /Power Regulation and Fan Tach/
File: Page1.sch

Title: Open Source Educational Baseboard

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

3V3 AND 1V8 POWER SUPPLY

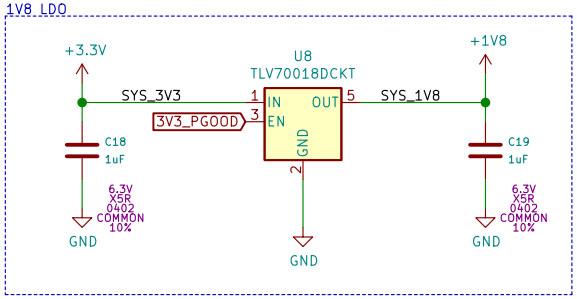
5V to 3V3 Buck Converter



Output Voltage with Tolerance

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

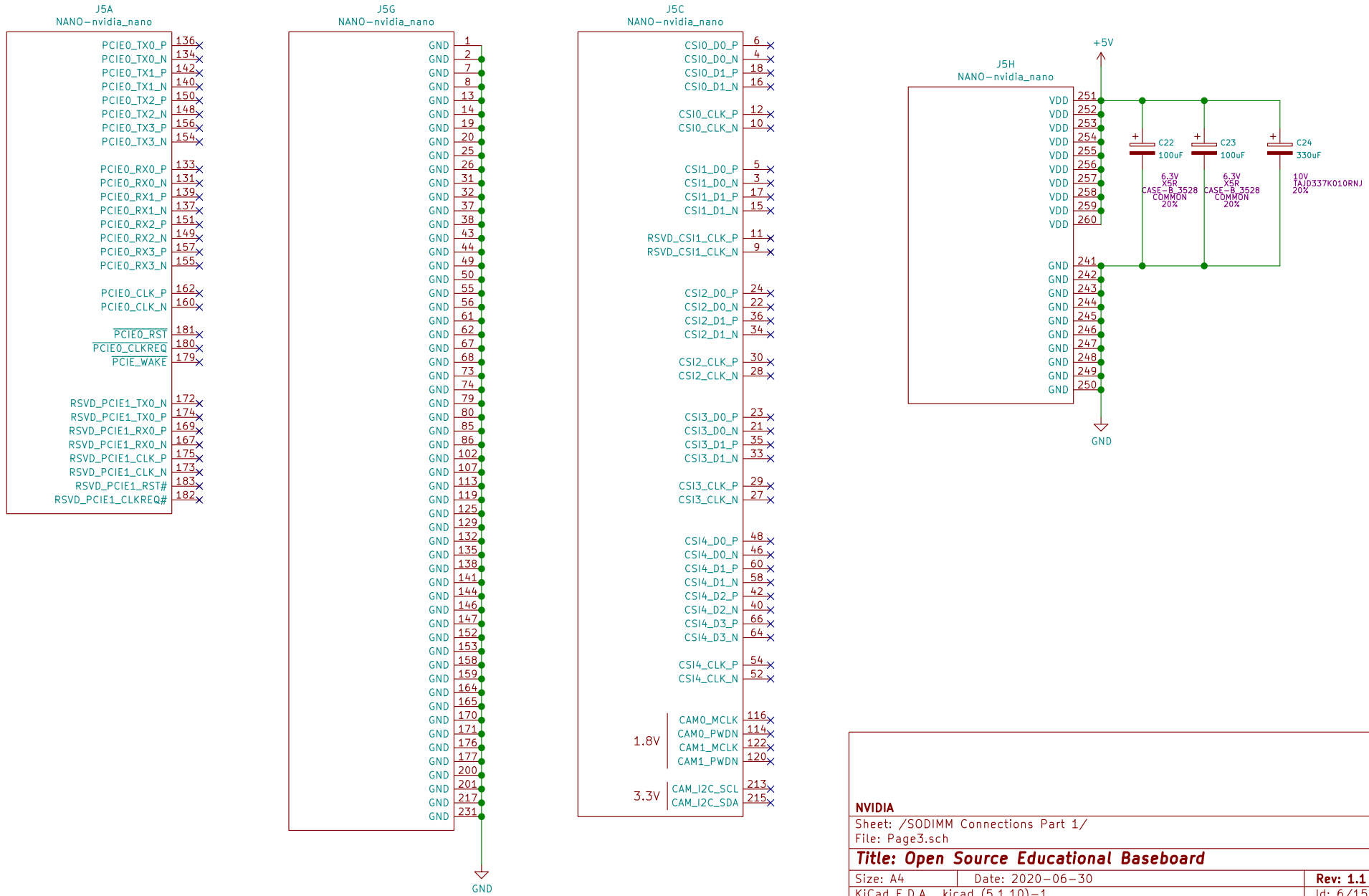
1V8 LDO



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. kicad (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. kicad (5.1.10)-1		Id: 6/15

SODIMM CONNECTIONS PART 2

J5D
NANO-nvidia_nano

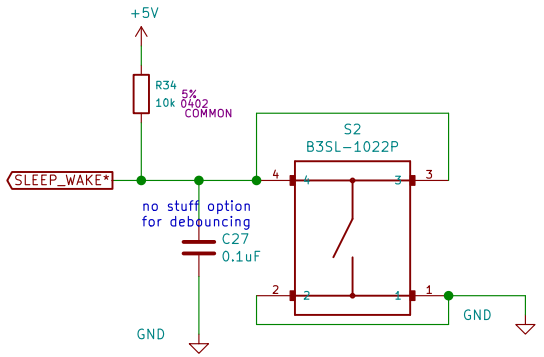
GBE_MDI0_P	186
GBE_MDI0_N	184
GBE_MDI1_P	192
GBE_MDI1_N	190
GBE_MDI2_P	198
GBE_MDI2_N	196
GBE_MDI3_P	204
GBE_MDI3_N	202
GBE_LED_LINK	188
GBE_LED_ACT	194
SDMMC_DAT0	219
SDMMC_DAT1	221
SDMMC_DAT2	223
SDMMC_DAT3	225
SDMMC_CMD	227
SDMMC_CLK	229
USB0_D_P	111
USB0_D_N	109
USB1_D_P	117
USB1_D_N	115
USB2_D_P	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

USB0_D_P → USB0_D_P
USB0_D_N → USB0_D_N
USB1_D_P → USB1_D_P
USB1_D_N → USB1_D_N

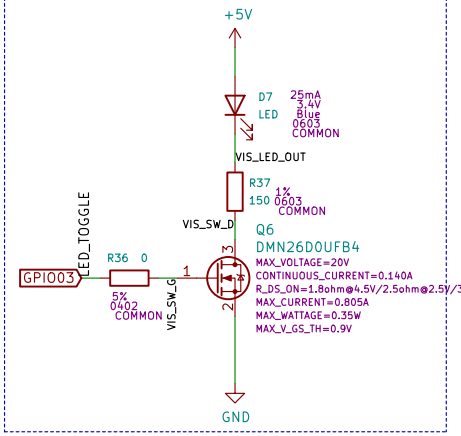
J5B
NANO-nvidia_nano

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

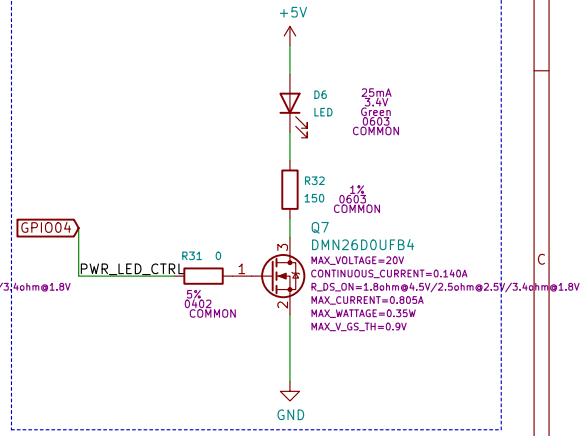
Power Button Pull Up



Visual Feedback LED



Power Indicator LED



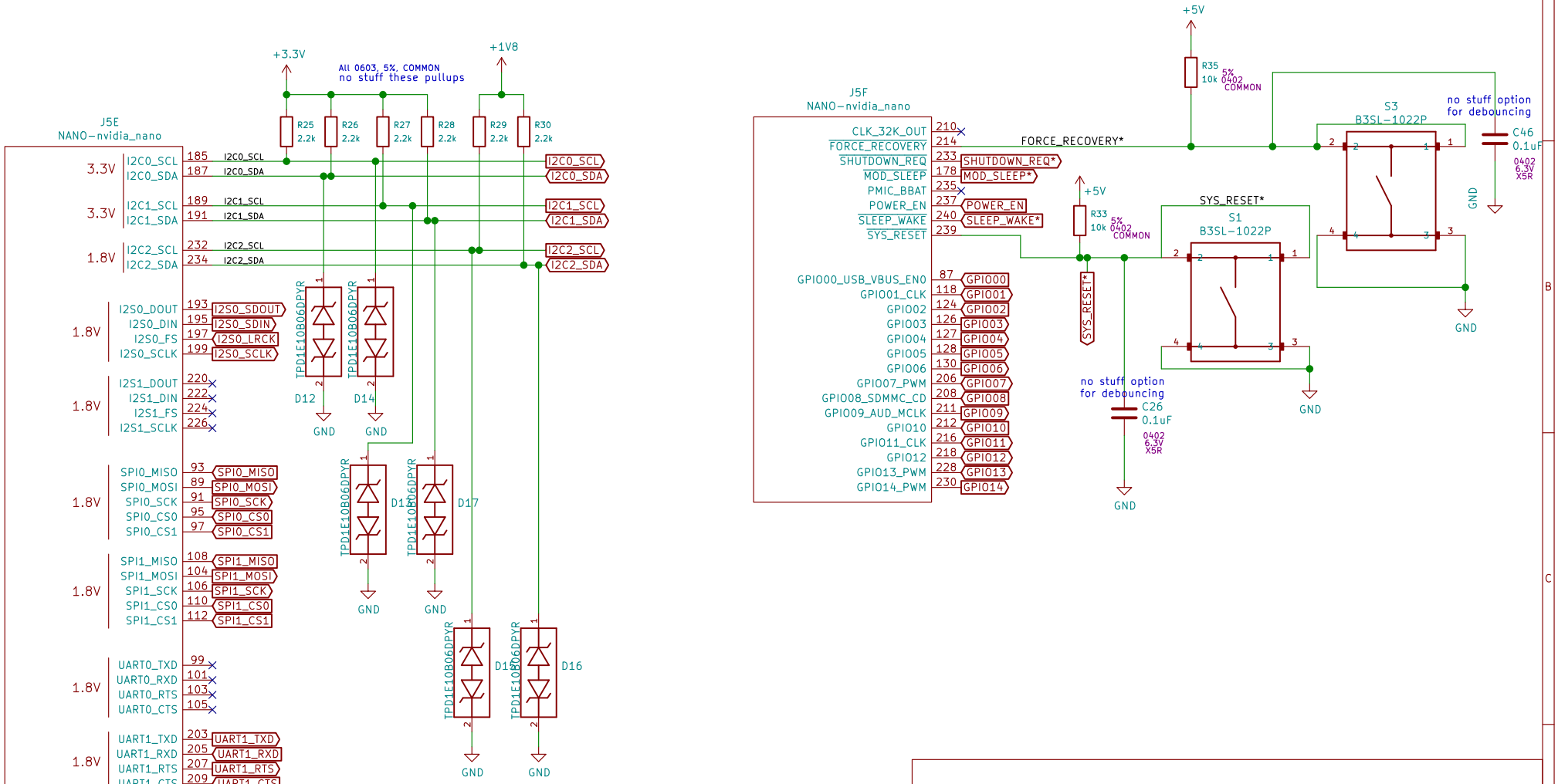
NVIDIA

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

Title: Open Source Educational Baseboard

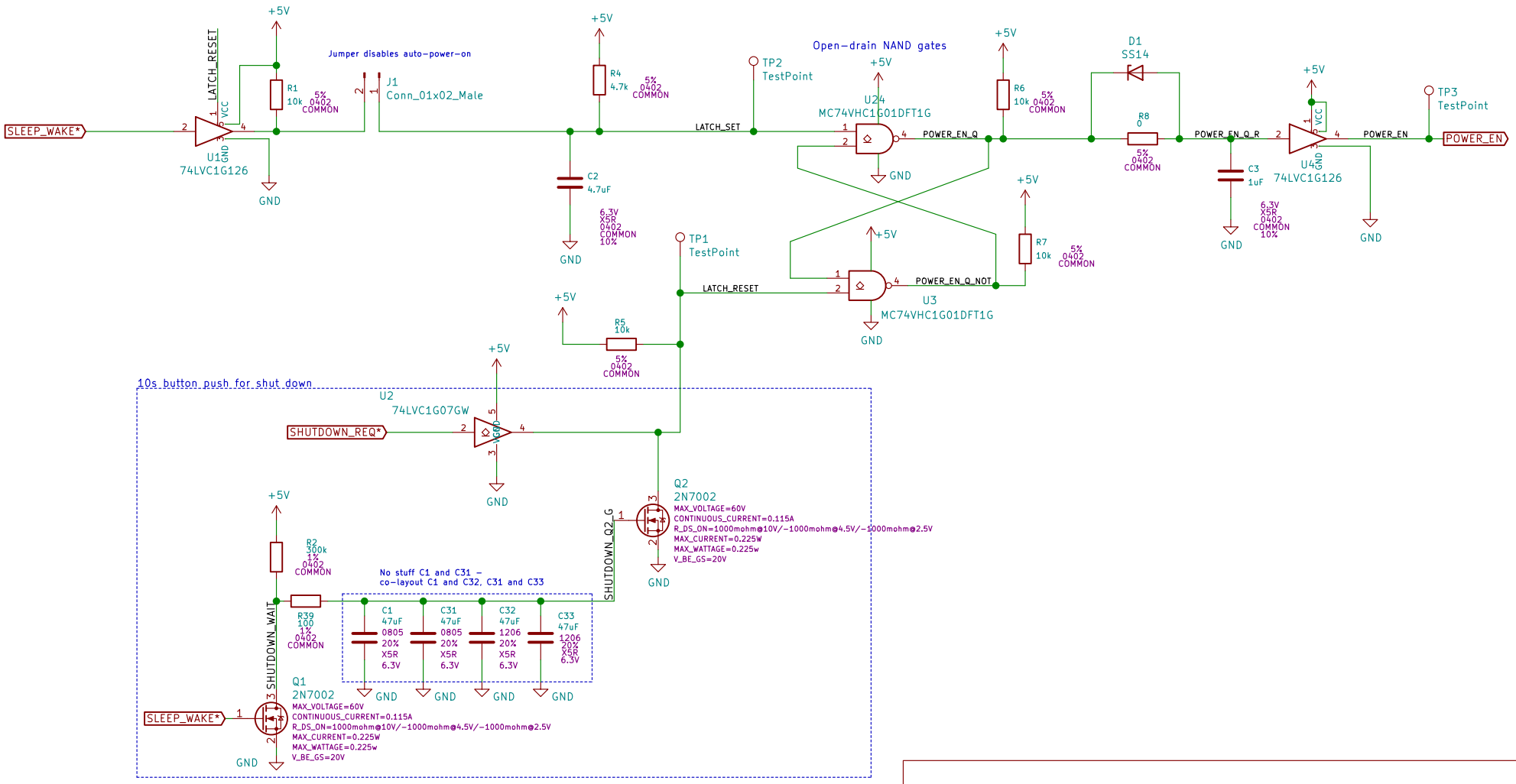
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 7/15

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. kicad (5.1.10)-1		Id: 13/15

POWER ON/OFF LOGIC

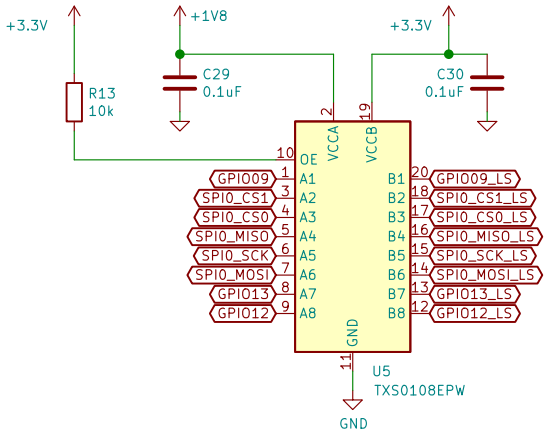


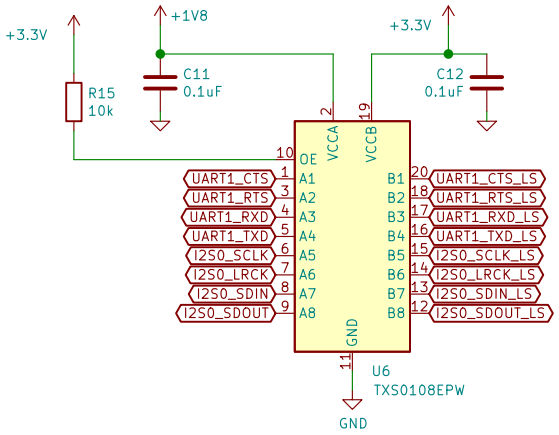
In LTSpice, interval of button push
(+/- 10% RC value due to tolerance)
was measured to be approximately 9.8-12s.
The user also receives visual feedback from the power
LED on the state of the module.
Circuit was simulated in LTSpice.

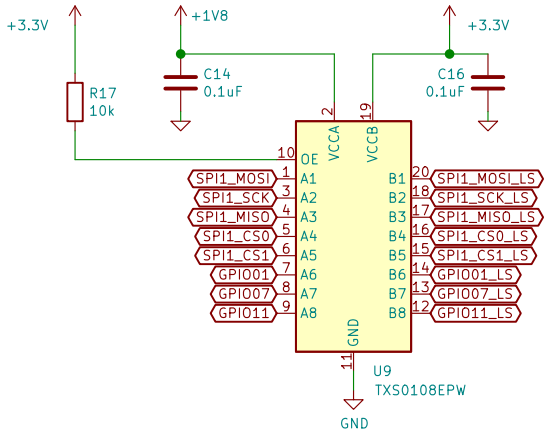
NVIDIA		
Sheet: /Power ON/OFF Logic/		
File: Page5.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 2/15

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

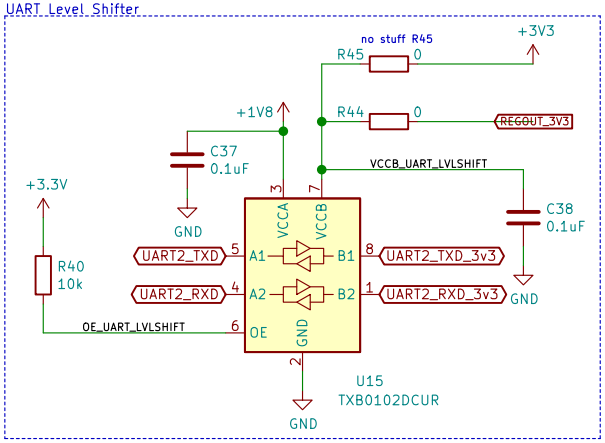
LEVEL SHIFTERS AND GPIO HEADER



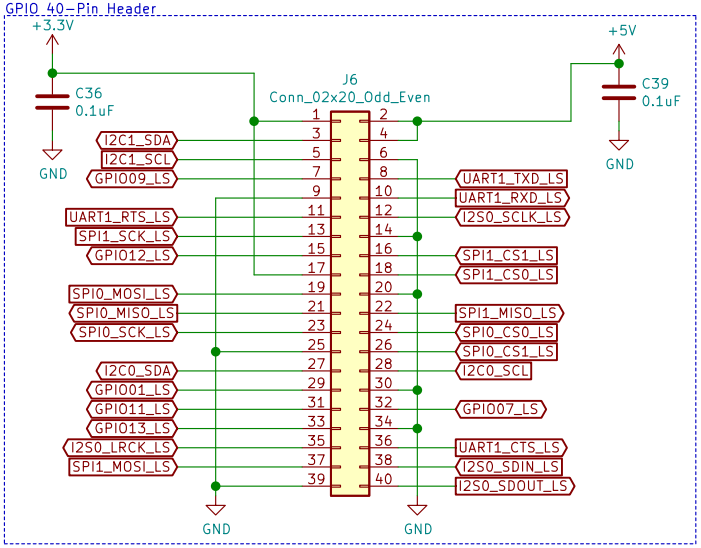




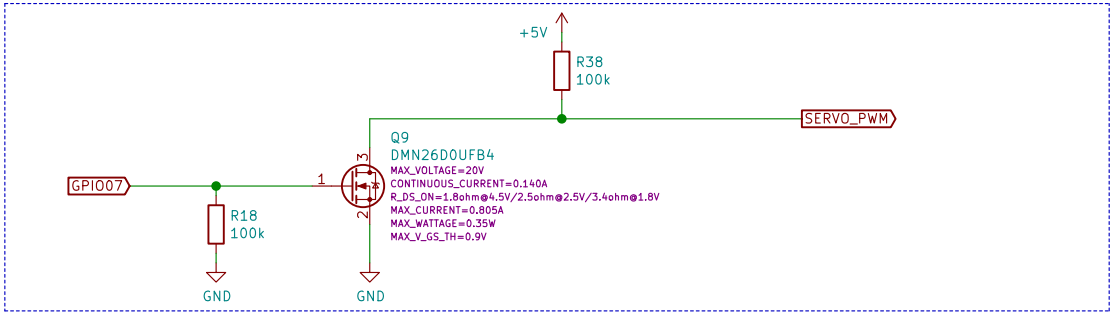
UART Level Shifter



GPIO 40-Pin Header



Level Shift for Servo PWM signal



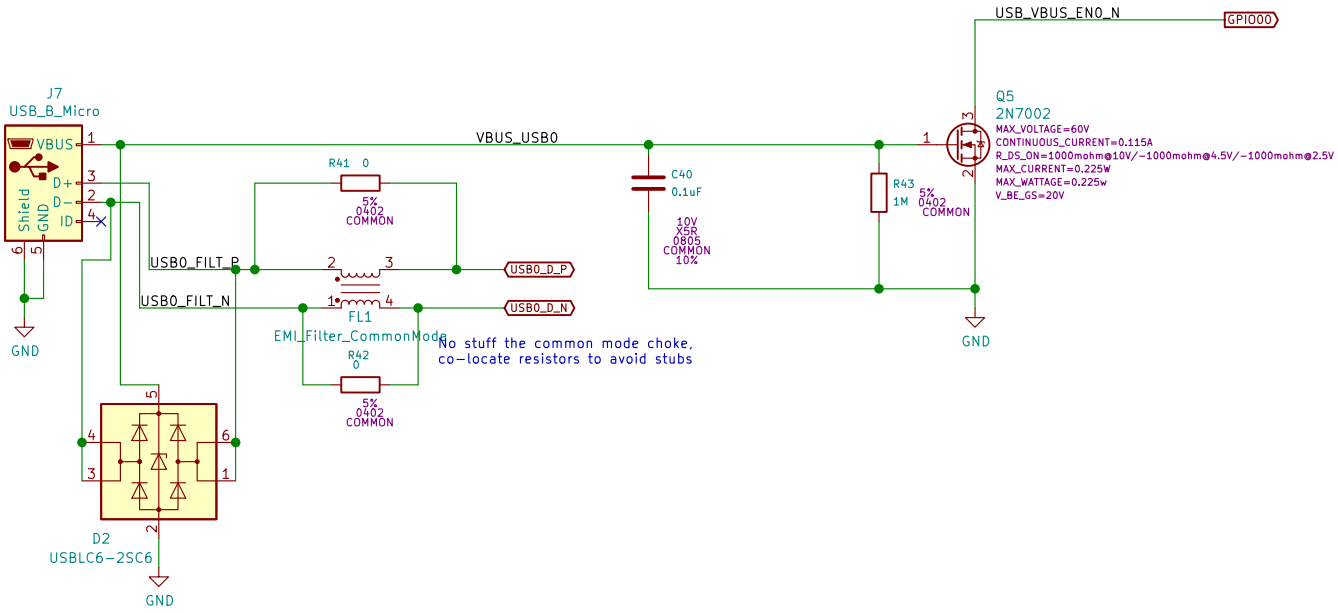
NVIDIA

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

Title: Open Source Educational Baseboard

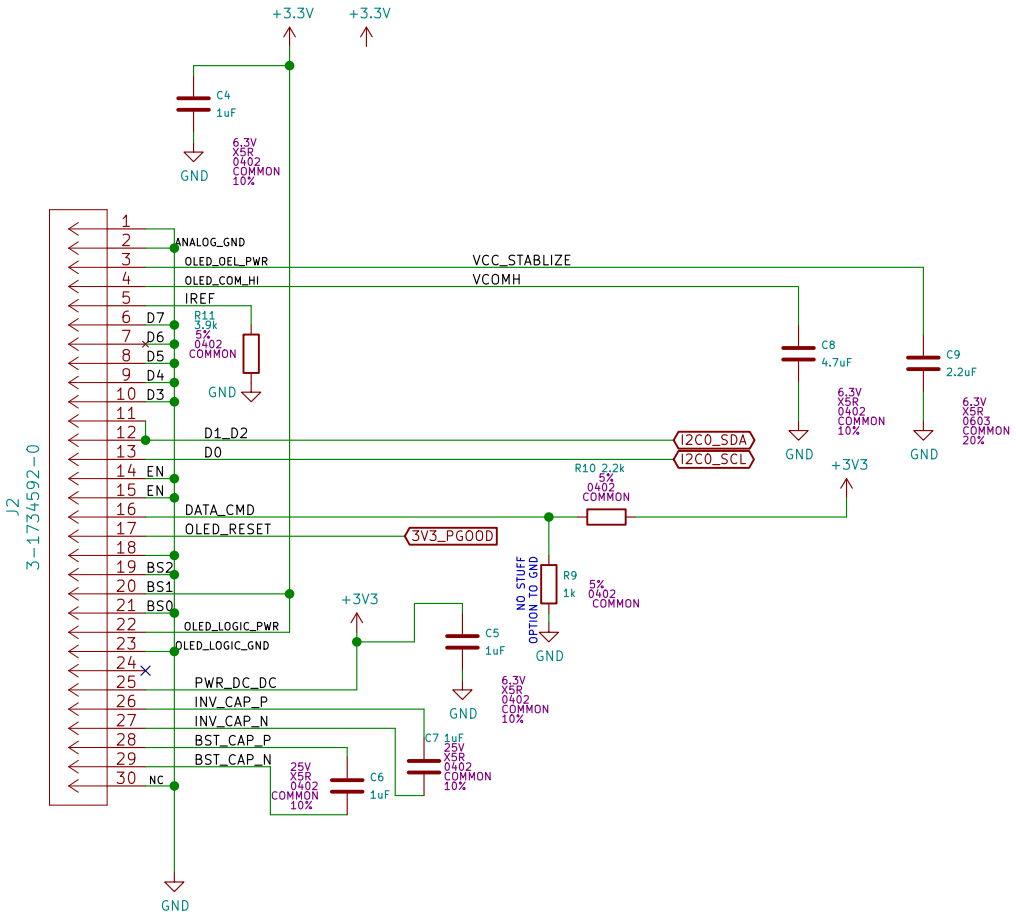
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 8/15

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. kicad (5.1.10)-1		Id: 9/15

OLED DISPLAY



INTERFACE SELECTION TRUTH TABLE

INTERFACE	BS0 (PIN 10)	BS1 (PIN 11)	BS2 (PIN 12)
I2C	0	1	0
3-WIRE SPI	1	0	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 VG-2864KSWEG01 OLED display from WiseChip.
The QG-2864KLBEG01 is also pin-compatible.

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)

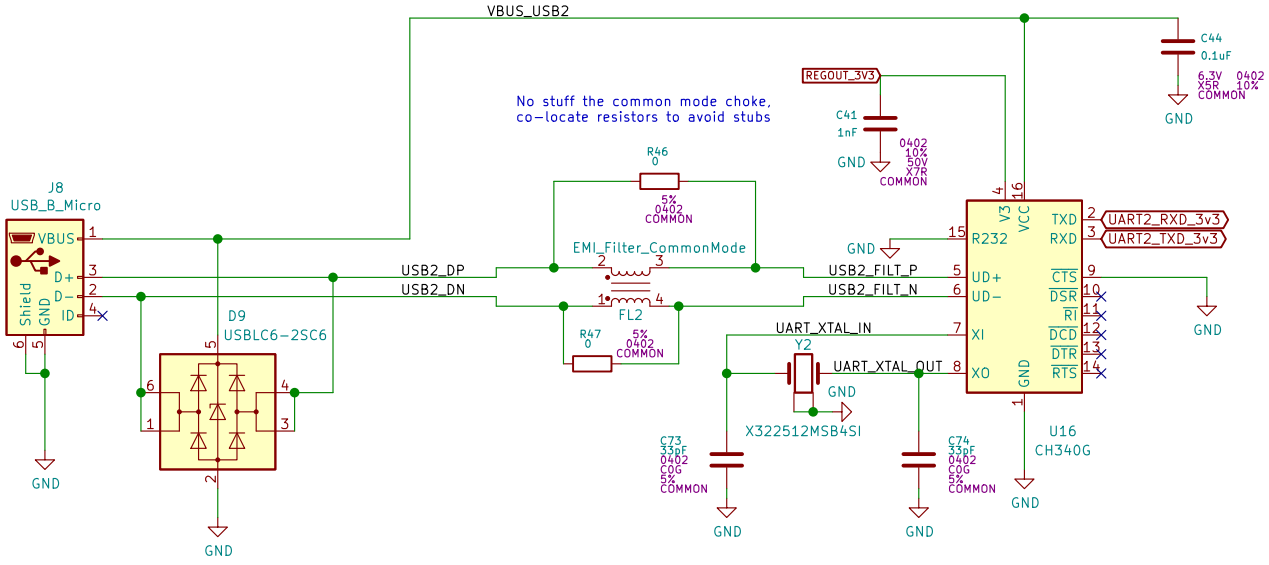
NVIDIA

Sheet: /OLED Display/
File: Page8.sch

Title: Open Source Educational Baseboard

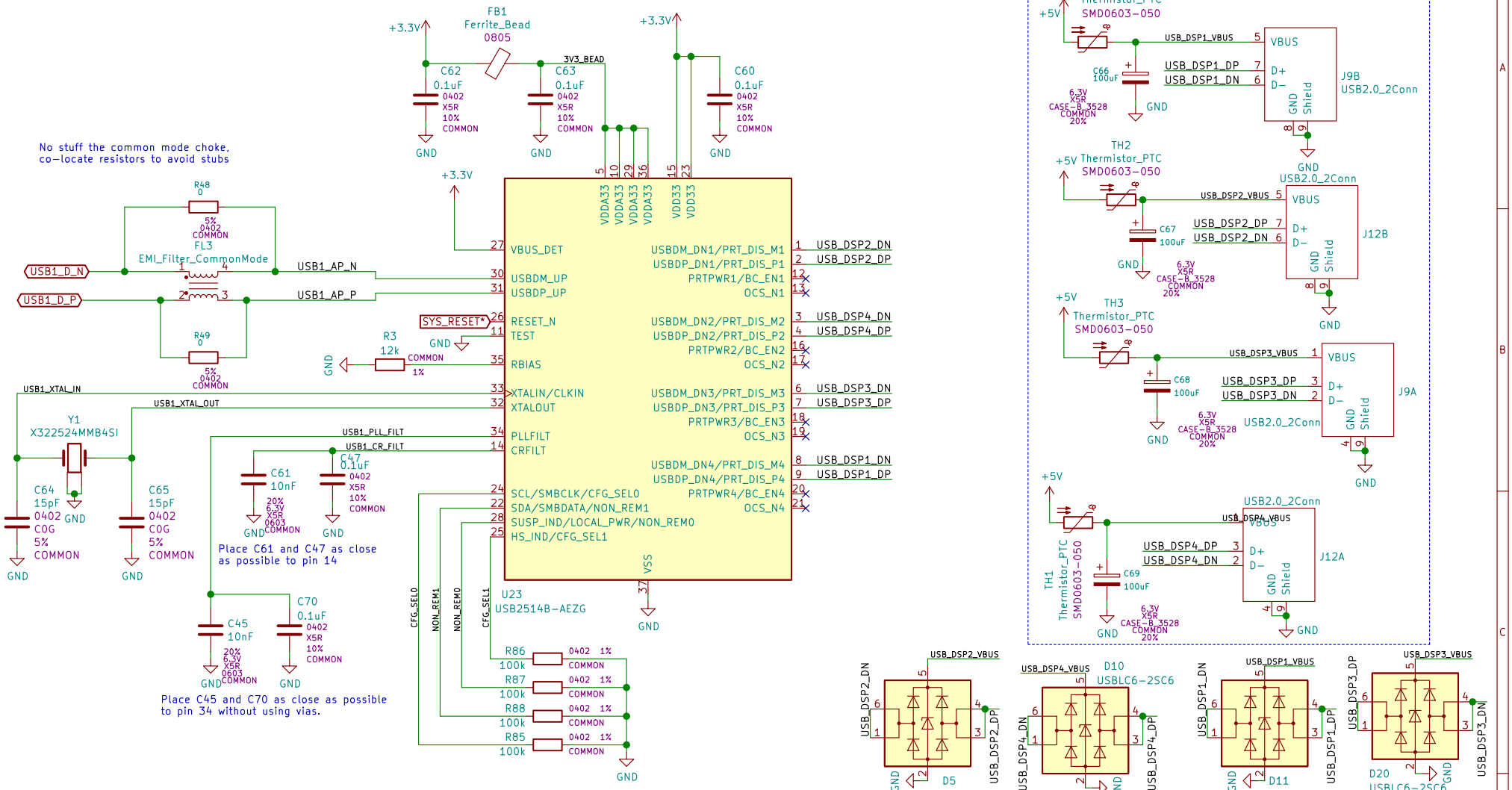
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 3/15

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. kicad (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.

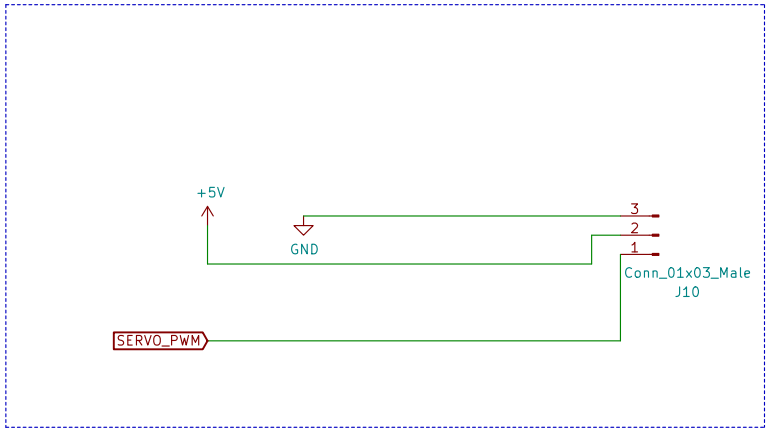
NVIDIA

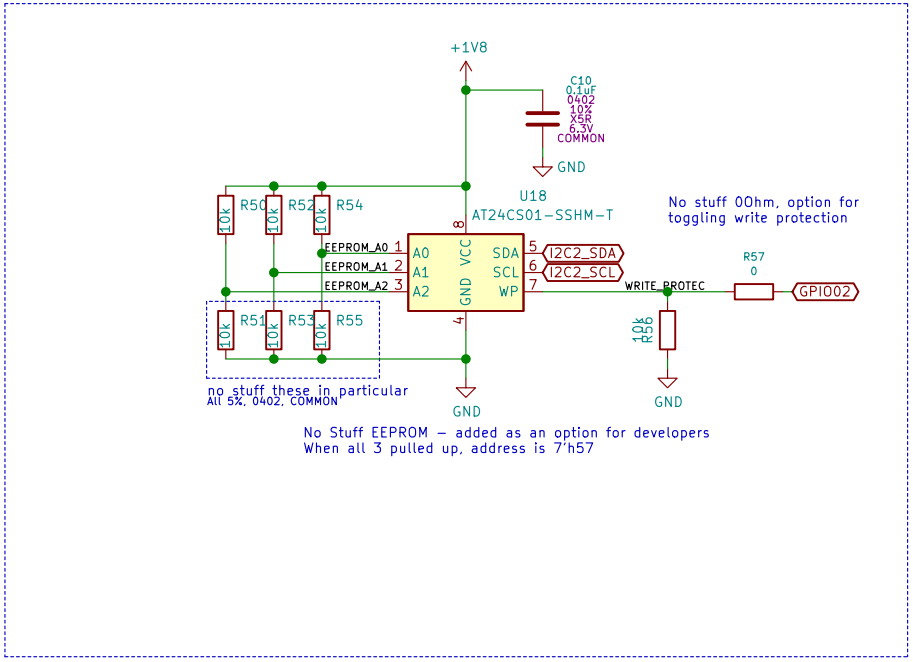
Sheet: /USB2.0 Type A Hub/
File: Page10.sch

Title: Open Source Educational Baseboard

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

SERVO HEADER AND EEPROM

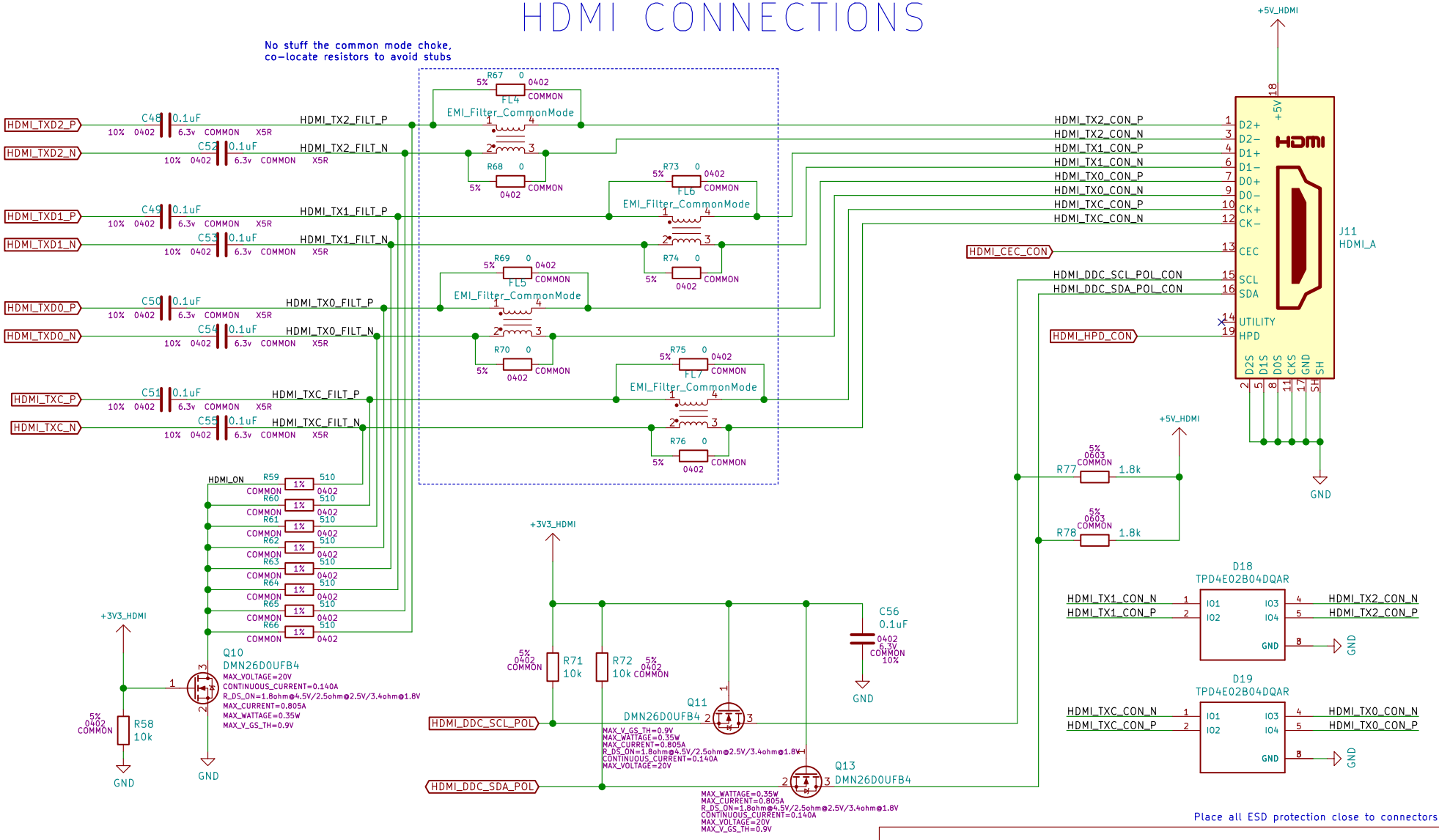




NVIDIA		
Sheet: /Servo Header and EEPROM/ File: Page11.sch		
Title: Open Source Educational Baseboard		
Size: A4	Date: 2020-06-30	**Rev: 1.1**
KiCad E.D.A. kicad (5.1.10)-1		Id: 12/15

HDMI CONNECTIONS

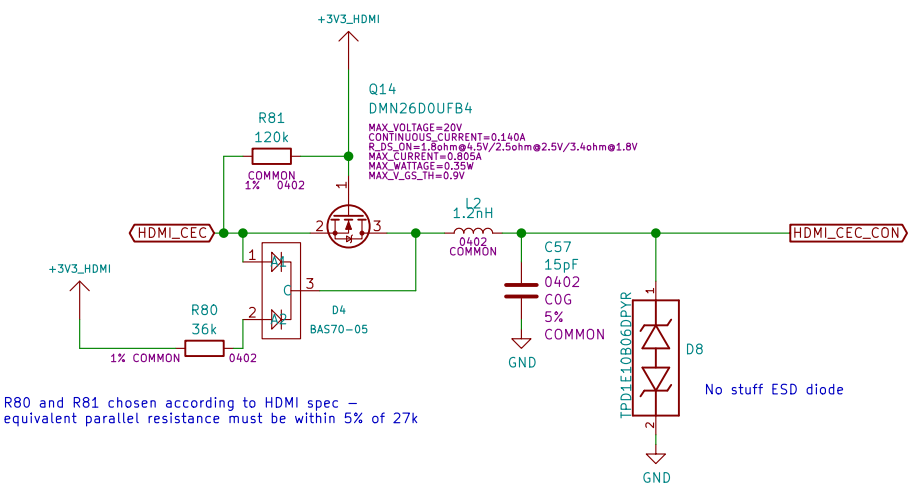
No stuff the common mode choke,
co-locate resistors to avoid stubs

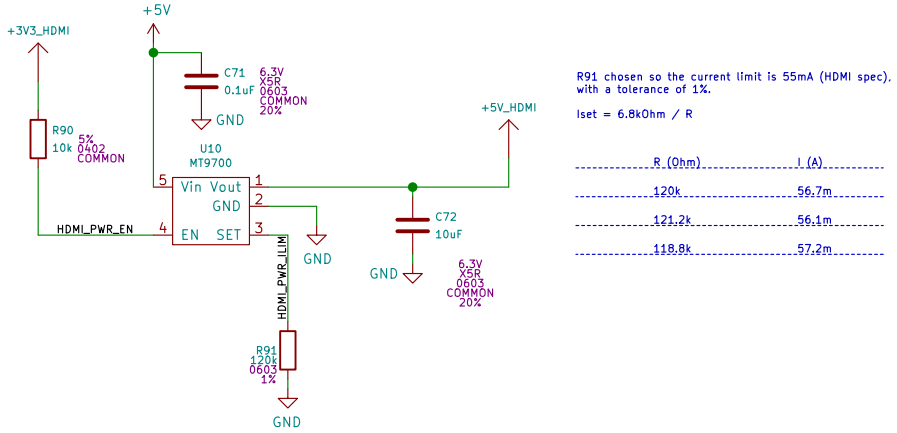


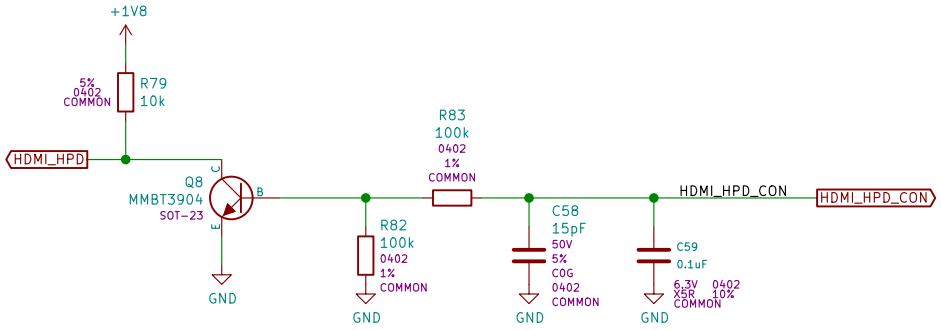
Place all ESD protection close to connectors

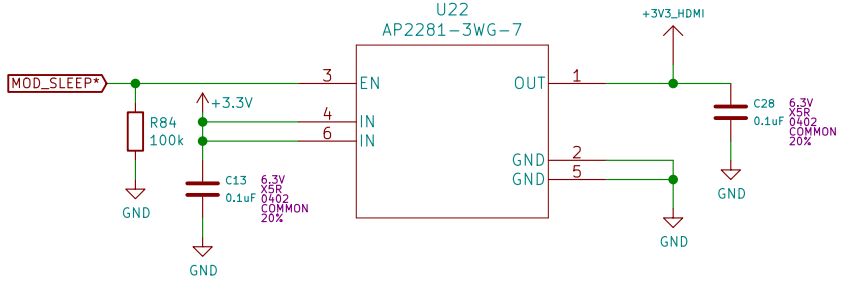
Sheet: /HDMI Connections Part 1/		
File: Page12.sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad (5.1.10)-1		Id: 14/15

HDMI CONNECTIONS PART 2









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