Common Sheets:
500 GRID
600 USB_POWER
700 MCU

Module Specific:
800 HWCFG
900 LED
1000 UI

UI_POT_BTN

ENDLESS_0_A — ANA_0
ENDLESS_0_B — ANA_1
ENDLESS_0_S — ANA_4
ENDLESS_1_A — ANA_2
ENDLESS_1_B — ANA_3
ENDLESS_1_S — ANA_6

File: UI_POT_BTN.kicad_sch

UI_LED

LED_DATA_IN
LED_DATA_OUT

File: UI_LED.kicad_sch

MCU

LED_DATA_OUT
HWCFG_SHIFT
HWCFG_CLOCK
HWCFG_DATA

File: MCU.kicad_sch

UI_DISPLAY

BACKLIGHT — RP_GPIO_10
CS1 — ESP_GPIO_16
CS0 — ESP_GPIO_18
D/C — ESP_GPIO_34
SDIO — ESP_GPIO_48
SCLK — ESP_GPIO_47
RESET — RP_GPIO_11

File: UI_DISPLAY.kicad_sch

HWCFG

HWCFG_SHIFT
HWCFG_CLOCK
HWCFG_DATA
DATA_IN

File: HWCFG.kicad_sch

LCDBUTTON

LCDBUTTON_SHIFT
LCDBUTTON_CLOCK
LCDBUTTON_DATA

File: LCDBUTTON.kicad_sch

UI_BUTTON

OUT_8 — IN_0
OUT_9 — IN_1
OUT_10 — IN_2
OUT_11 — IN_3
OUT_12 — IN_4
OUT_13 — IN_5
OUT_14 — IN_6
OUT_15 — IN_7

File: UI_BUTTON.kicad_sch

UI_HALL_PREAMP

OUT_0 — ANA_8
OUT_1 — ANA_9
OUT_2 — ANA_10
OUT_3 — ANA_11
OUT_4 — ANA_12
OUT_5 — ANA_13
OUT_6 — ANA_14
OUT_7 — ANA_15

File: UI_HALL_PREAMP.kicad_sch

Sheet5D7C8BFD

ANA_0 — IN_0
ANA_1 — IN_1
ANA_4 — IN_2
ANA_8 — IN_3
ANA_9 — IN_4
ANA_12 — IN_5
ANA_6 — IN_6
ANA_13 — IN_7
OUT — ESP_GPIO_1
ADDRESS_A
ADDRESS_B
ADDRESS_C

File: UI_MUX.kicad_sch

sheet5D8763D6

ANA_2 — IN_0
ANA_3 — IN_1
ANA_6 — IN_2
ANA_10 — IN_3
ANA_11 — IN_4
ANA_14 — IN_5
ANA_15 — IN_6
IN_7
OUT — ESP_GPIO_2
ADDRESS_A — ESP_GPIO_5
ADDRESS_B — ESP_GPIO_4
ADDRESS_C — ESP_GPIO_3

File: UI_MUX.kicad_sch

ESP_GPIO_37 — TP906 TestPoint
ESP_GPIO_36 — TP904 TestPoint
ESP_GPIO_35 — TP905 TestPoint

J904 SMTSO1625MTJ — GND
J906 SMTSO1625MTJ — GND
J910 SMTSO1625MTJ — GND
J912 SMTSO1625MTJ — GND

AUDIO

ESP_GPIO_42 — SDATA
ESP_GPIO_41 — BCLK
ESP_GPIO_40 — LRCLK
ESP_GPIO_39

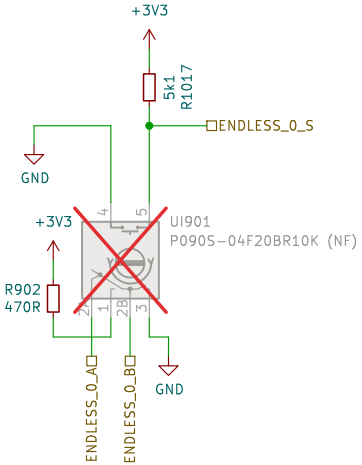
File: AUDIO.kicad_sch

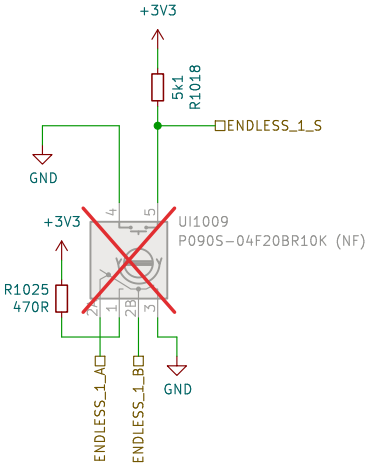
Sheet: /
File: PCBA-VSNX.kicad_sch

Title:

Size: A3 | Date: | **Rev:**
KiCad E.D.A. 9.0.6 | Id: 1/22

1000





Sheet: /UI_POT_BTN/
File: UI_POT_BTN.kicad_sch

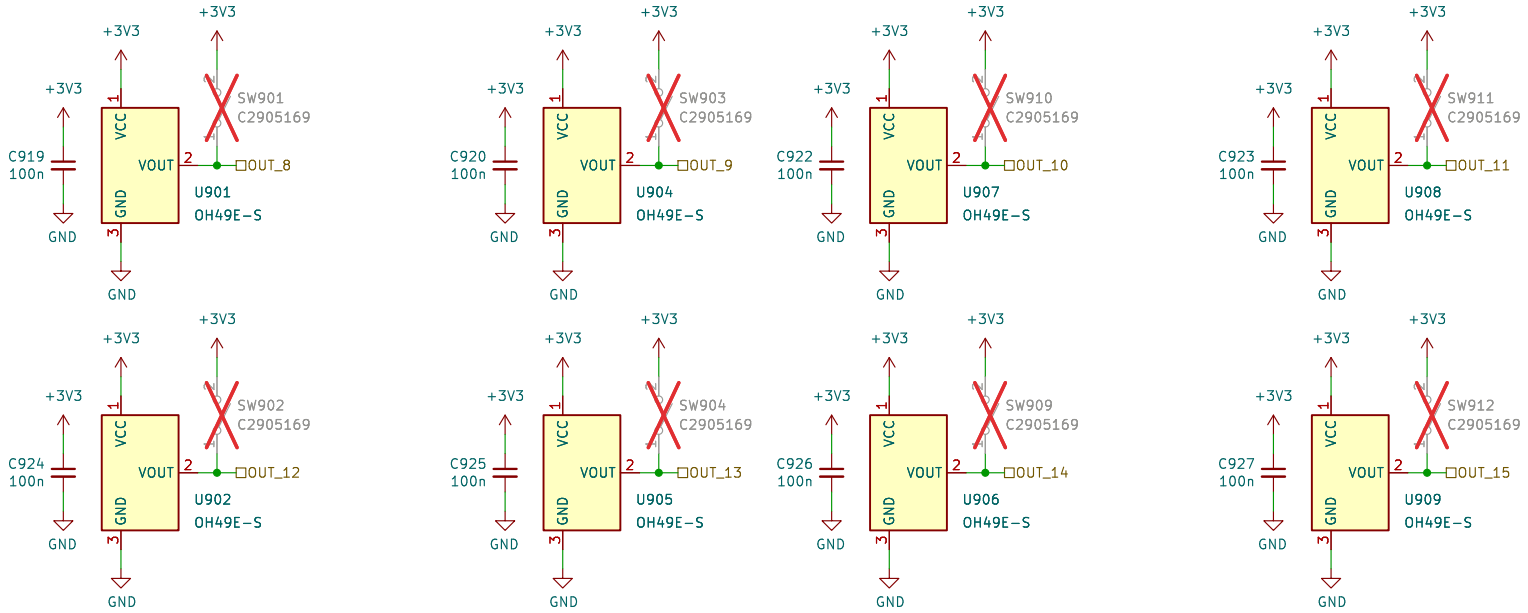
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 2/22

1000

Simulation:

http://tinyurl.com/y229mty4



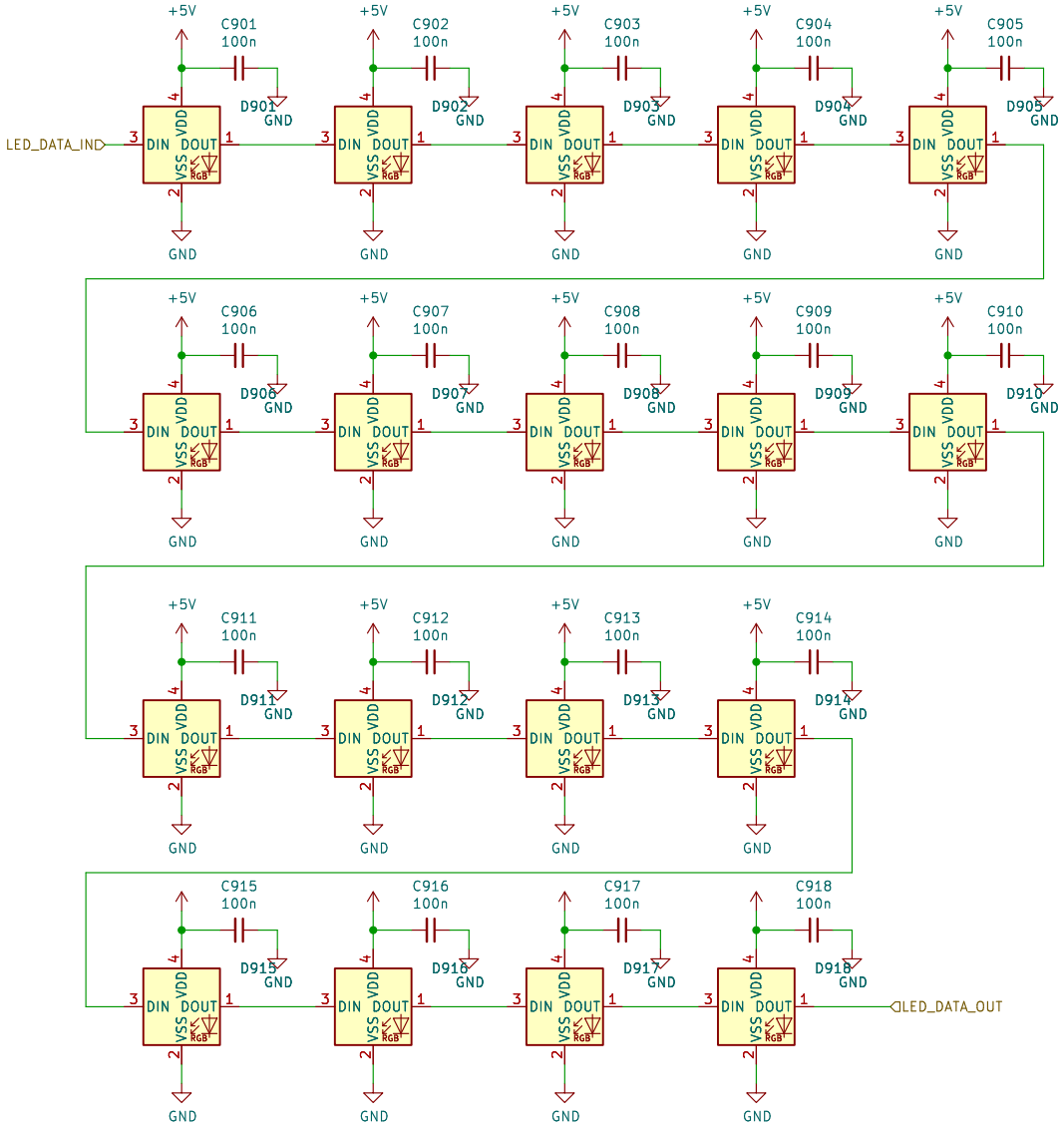
Sheet: /UI_BUTTON/
File: UI_BUTTON.kicad_sch

Title:

Size: A4 | Date: | **Rev:**

KiCad E.D.A. 9.0.6 | Id: 3/22

900



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Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 4/22

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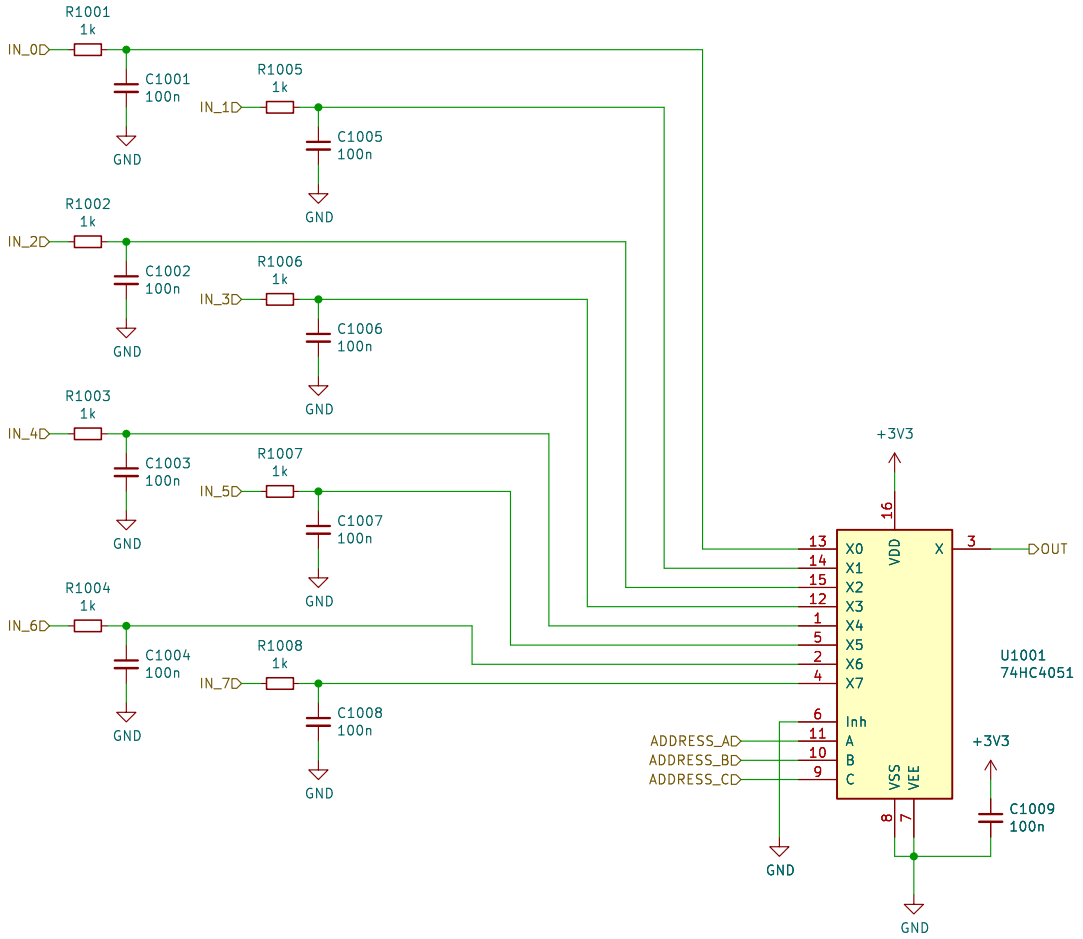

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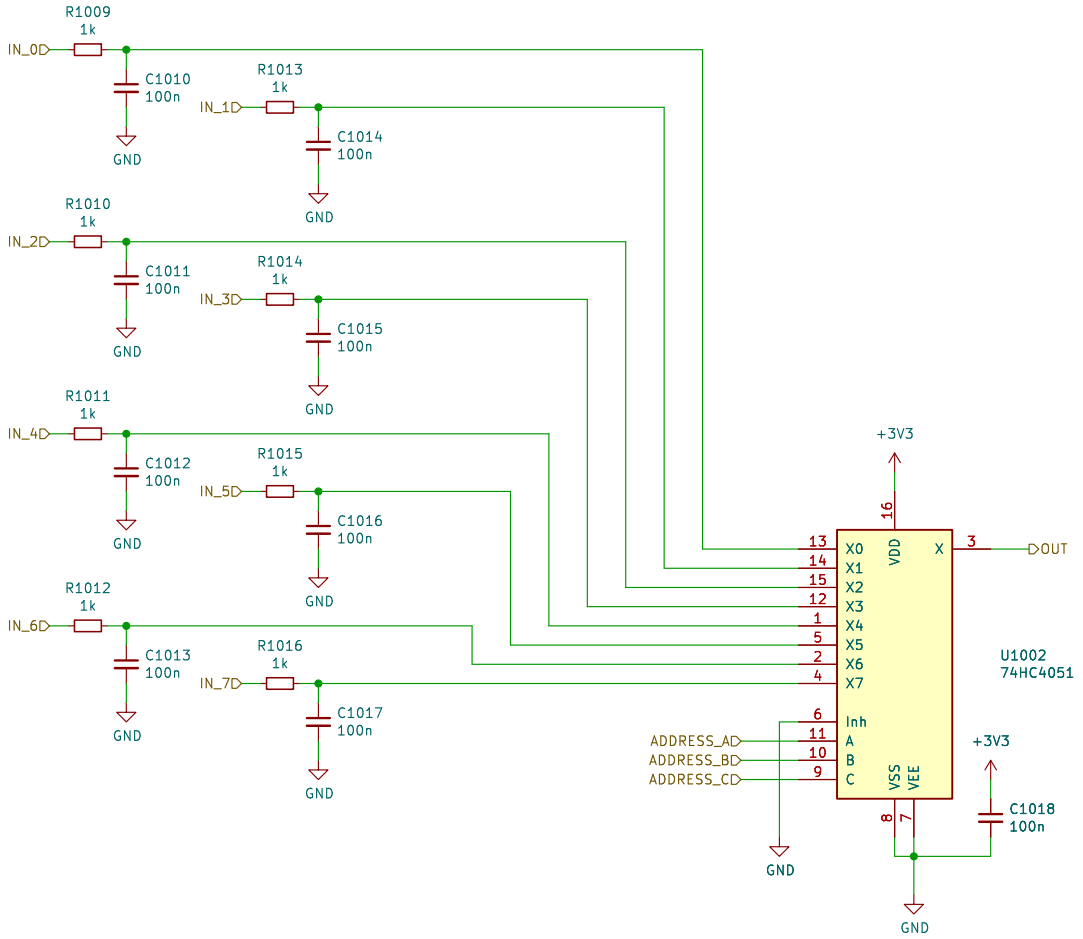
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 5/22

1000



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File: UI_MUX.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 6/22

700

USB_POWER

USB_DP
USB_DN
U0TXD
U0RXD
ESP_RESET
ESP_BOOT0

USB_DATA_P
USB_DATA_N
DEBUG_TX
DEBUG_RX
DEBUG_RESET
DEBUG_BOOT0

File: USB_POWER.kicad_sch

ESP32-S3

+3V3 GZ2012D601TF L702 PWR_FLAG

C743 10u · C746 1u · C747 100n · C749 100n · C751 100n · C752 100n · C753 10n · C754 1u

VDD_SPI

J701 C5137195 · L701 1n8 · C739 3p9 · C742 1p8

U.FL-R-SMT-1(80) ESP_LNA

1.8nH LQG15HS1N8S02D
3.9pF GJM1555C1H3R9WB01D
1.8pF GJM1555C1H1R8BB01D

40MHz Y701 · C748 10p · C750 10p

LCSC: TXM40M0004322HBCEO00T
S3240000091040JY

ESP_RESET	4	CHIP_PU	
ESP_LNA	1	LNA_IN	
USB_DN	25	GPIO19	D-
USB_DP	26	GPIO20	D+
SPICS1	28	GPIO26	SPICS1
SPIHD	30	GPIO27	SPIHD
SPIWP	31	GPIO28	SPIWP
SPICS0	32	GPIO29	SPICS0
SPICLK	33	GPIO30	SPICLK
SPIQ	34	GPIO31	SPIQ
SPID	35	GPIO32	SPID
	54	XTAL_P	
	53	XTAL_N	
TCK	44	GPIO39	MTCK
TDO	45	GPIO40	MTDO
TDI	47	GPIO41	MTDI
TMS	48	GPIO42	MTMS
U0TXD	49	GPIO43	U0TXD
U0RXD	50	GPIO44	U0RXD
	57	GND	
* GPIO0	5		ESP_BOOT0
GPIO1	6		ESP_GPIO_1
GPIO2	7		ESP_GPIO_2
* GPIO3	8		ESP_GPIO_3
GPIO4	9		ESP_GPIO_4
GPIO5	10		ESP_GPIO_5
GPIO6	11		RP_SPIO_RX
GPIO7	12		RP_SPIO_CS
GPIO8	13		RP_SPIO_TX
GPIO9	14		RP_SPIO_SCK
GPIO10	15		HWCFG_SHIFT
GPIO11	16		HWCFG_CLOCK
GPIO12	17		HWCFG_DATA
GPIO13	18		RP_SWDIO
GPIO14	19		RP_SWCLK
GPIO15	21		RP_CLK
GPIO16	22		ESP_GPIO_16
GPIO17	23		RP_INTERRUPT
GPIO18	24		ESP_GPIO_18
GPIO21	27		LED_DATA_OUT
GPIO33	38		ESP_GPIO_33
GPIO34	39		ESP_GPIO_34
GPIO35	40		ESP_GPIO_35
GPIO36	41		ESP_GPIO_36
GPIO37	42		ESP_GPIO_37
GPIO38	43		MAP_MODE
* GPIO45	51		ESP_GPIO_45
* GPIO46	52		ESP_GPIO_46
GPIO47	37		ESP_GPIO_47
GPIO48	36		ESP_GPIO_48

R733 1k

U704

Programming Interface

RP_UART0_TX · RP_UART0_RX · U0TXD · U0RXD · TMS · TCK · TDO · TDI

Conn_02x05_Odd_Even J702

Mapmode switch

This pusbutton is acessible through the housing, activates USB bootloader.

R701 5k1 · C757 100n · R736 1k · SW701 C255807 · MAP_MODE

Internal Pull-up

R735 5k1 · SW702 C2905169 · ESP_RESET · C758 1u

SW703 C2905169 · ESP_BOOT0

RP2040

+1V1 · +3V3

C731 100n · C732 100n · C733 1u · C734 1u · C735 100n · C736 100n · C737 100n · C738 100n · C740 100n · C741 100n · C744 100n · C745 100n

R729 5k1 · RP_RUN

RP_RUN	26	RUN	
	47	USB_DP	
	46	USB_DM	
	56	QSPI_SS	
	53	QSPI_SD0	
	55	QSPI_SD1	
	54	QSPI_SD2	
	51	QSPI_SD3	
	52	QSPI_SCLK	
RP_CLK	20	XIN	
	21	XOUT	
RP_SWCLK	24	SWCLK	
RP_SWDIO	25	SWD	
	19	TESTEN	
	57	GND	
	45	VREG_VOUT	
	23	DVDD	
	1	IOVDD	
	48	USB_VDD	
	43	ADC_AVDD	
	44	VREG_IN	
	2	GPIO0	RP_UART0_TX
	3	GPIO1	RP_UART0_RX
	4	GPIO2	GRID_SOUTH_TX
	5	GPIO3	GRID_WEST_RX
	6	GPIO4	GRID_SYNC_2
	7	GPIO5	GRID_WEST_TX
	8	GPIO6	GRID_NORTH_RX
	9	GPIO7	
	11	GPIO8	
	12	GPIO9	
	13	GPIO10	RP_GPIO_10
	14	GPIO11	RP_GPIO_11
	15	GPIO12	TP701 TestPoint
	16	GPIO13	TP702 TestPoint
	17	GPIO14	TP703 TestPoint
	18	GPIO15	TP704 TestPoint
	27	GPIO16	RP_SPIO_RX
	28	GPIO17	RP_SPIO_CS
	29	GPIO18	RP_SPIO_SCK
	30	GPIO19	RP_SPIO_TX
	31	GPIO20	
	32	GPIO21	
	34	GPIO22	RP_INTERRUPT
	35	GPIO23	GRID_NORTH_TX
	36	GPIO24	GRID_EAST_RX
	37	GPIO25	GRID_SYNC_1
	38	GPIO26_ADC0	GRID_EAST_TX
	39	GPIO27_ADC1	GRID_SOUTH_RX
	40	GPIO28_ADC2	
	41	GPIO29_ADC3	

U703 RP2040

GRID Connector

Connector arrays for the interface boards on all four sides of the module.

sheet5D85C9EA

GRID_SYNC_1	GRID_WEST_SYNC_1
GRID_WEST_TX	GRID_WEST_TX
GRID_WEST_RX	GRID_WEST_RX
GRID_SYNC_2	GRID_WEST_SYNC_2
GRID_SYNC_1	GRID_SOUTH_SYNC_1
GRID_SOUTH_TX	GRID_SOUTH_TX
GRID_SOUTH_RX	GRID_SOUTH_RX
GRID_SYNC_2	GRID_SOUTH_SYNC_2
GRID_SYNC_1	GRID_EAST_SYNC_1
GRID_EAST_TX	GRID_EAST_TX
GRID_EAST_RX	GRID_EAST_RX
GRID_SYNC_2	GRID_EAST_SYNC_2
GRID_SYNC_1	GRID_NORTH_SYNC_1
GRID_NORTH_TX	GRID_NORTH_TX
GRID_NORTH_RX	GRID_NORTH_RX
GRID_SYNC_2	GRID_NORTH_SYNC_2

File: GRID.kicad_sch

QSPI Flash memory

This memory can be accessed throgh the QSPI interface of the MCU. Can be used for configuration, static data or program execution.

R734 5k1 · C755 1u · C756 100n

U705 W25Q64JVSSIQ

SPICS0	1	CS	
SPICLK	6	CLK	
SPID	5	DI(IO0)	
SPIQ	2	DO(IO1)	
SPIWP	3	IO2	
SPIHD	7	IO3	
	8	VCC	
	4	GND	

R904 5k1 · C921 100n

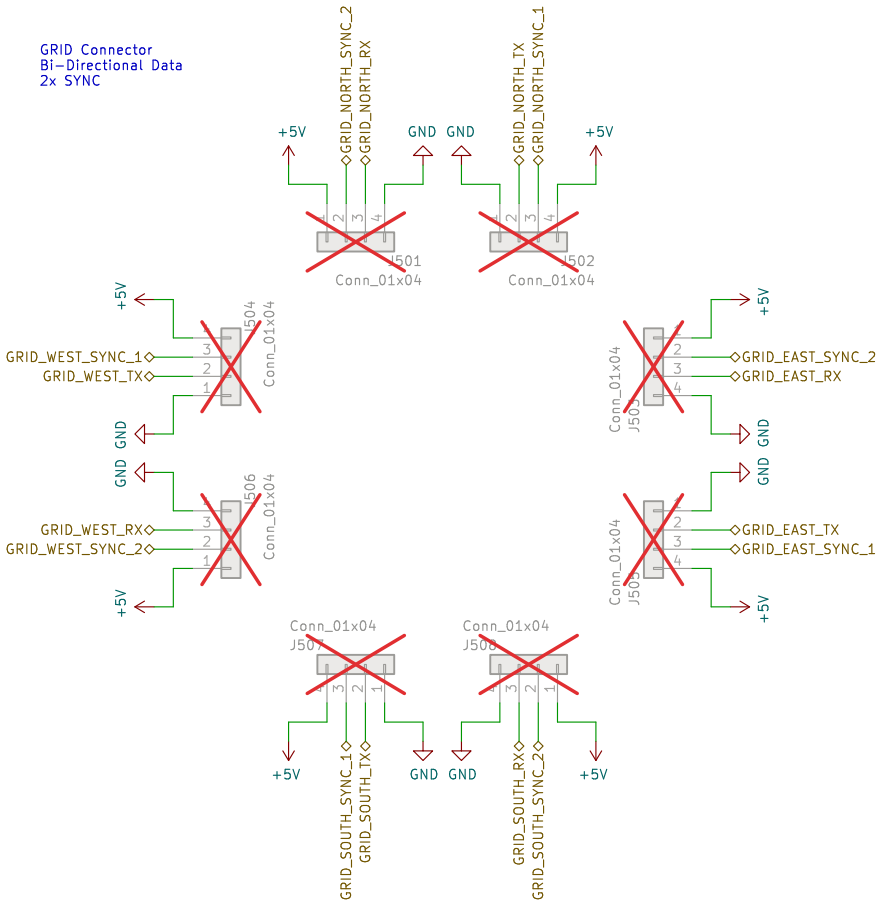
U903 APS1604M-3SQR-SN

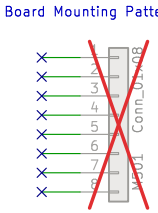
U610 APS1604M-3SQR-ZR

SPICS1	1	CE	
SPICLK	6	SCLK	
SPIHD	7	SIO3	
SPIWP	3	SIO2	
SPID	5	SI/SIO	
SPIQ	2	SO/SIO	
	8	VCC	
	4	VSS	

J799 Conn_01x02

Sheet: /MCU/		
File: MCU.kicad_sch		
Title:		
Size: A3	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 7/22





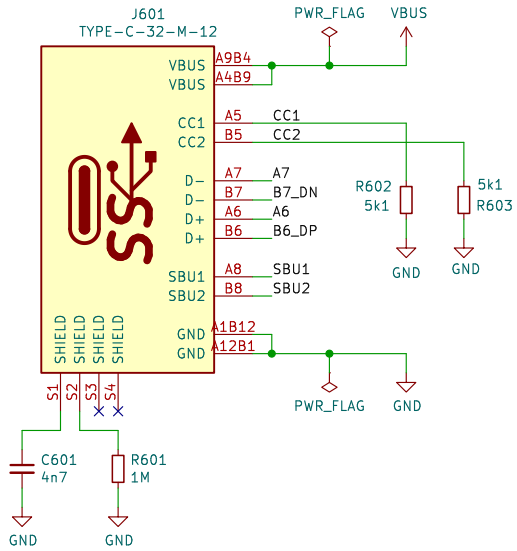
500

Sheet: /MCU/sheet5D85C9EA/		
File: GRID.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 8/22

600

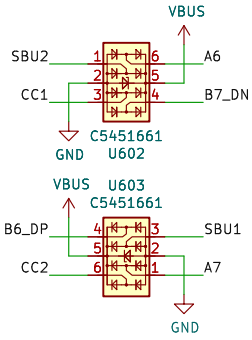
USB Port

USB C upstream facing port configured for 5V 3A power consumption.



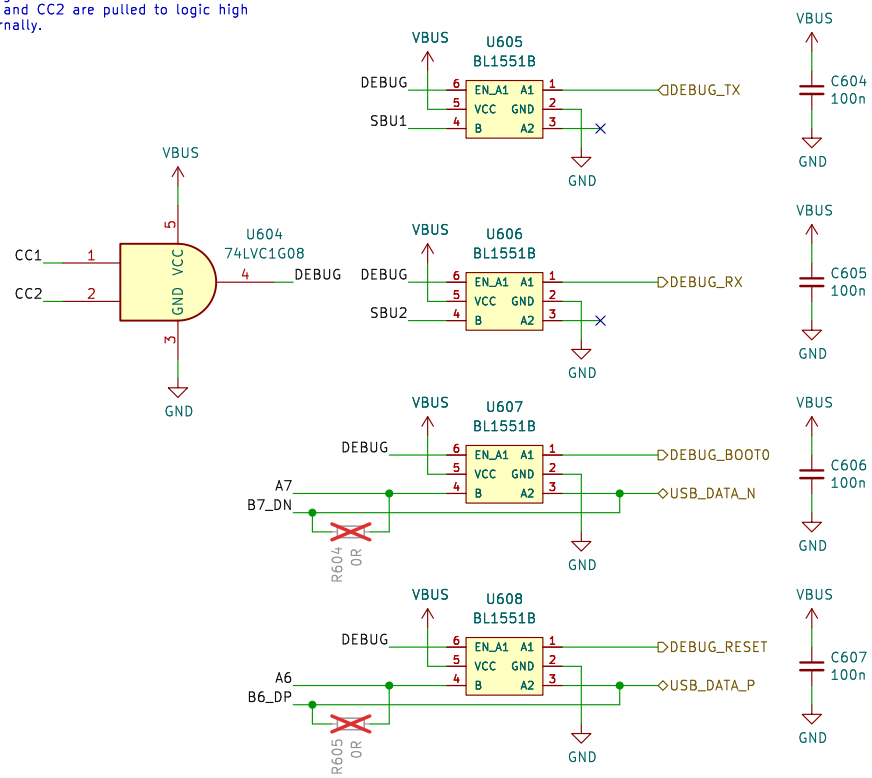
ESD Prot.

ESP protection for all 8 signals externally accessable via the USB C connector.



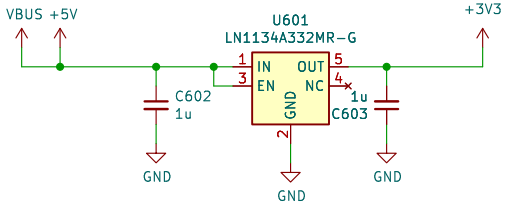
Debug-Mode Multiplexing

Debug.mode is activated when both CC1 and CC2 are pulled to logic high externally.

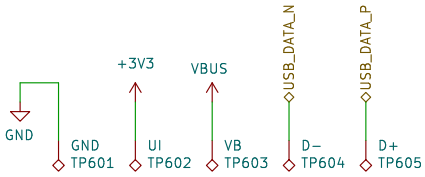


3V3 LDO

LDO regulator for generating the +3V3 power rail for the microcontroller and UI.

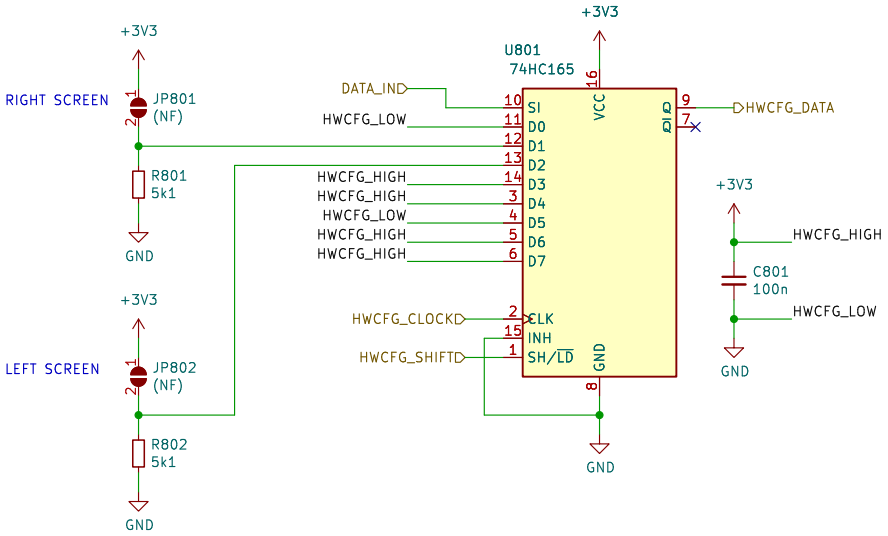


Testpoints



Sheet: /MCU/USB_POWER/		
File: USB_POWER.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 9/22

800



Board Identification

Grid firmware can identify the hardware and the board revision thorugh a 3 wire serial interface using one or more shift register as read only memory. The content of the memory is defined by pulling the inputs high or low through pcb traces or solderable configuration jumpers.

4b'Model + 4b'Revision + nb'Reserved (Multiple shift registers)

D0: MODEL (LSB)
D1: MODEL
D2: MODEL
D3: MODEL (MSB)
D4: REVISION (LSB)
D5: REVISION
D6: REVISION
D7: REVISION (MSB)

Model Codes (D3–D0):

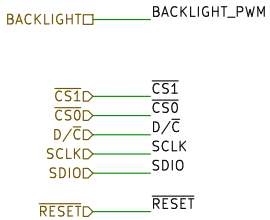
Po16 0000
Bo16 0001
PBF4 0010
EN16 0011
...

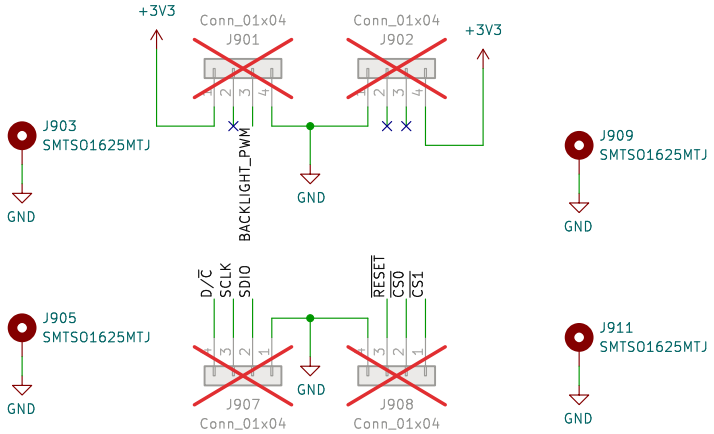
Revision Codes (D7–D4):

RevA 0000
RevB 0001
RevC 0010
RevD 0011
...

Sheet: /HWCFG/		
File: HWCFG.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 10/22

1000





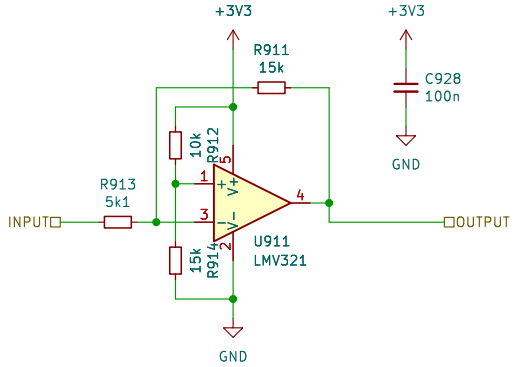
Sheet: /UI_DISPLAY/		
File: UI_DISPLAY.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 11/22

simulation

Sheet: /UI_HALL_PREAMP/
File: UI_HALL_PREAMP.kicad_sch

Title:

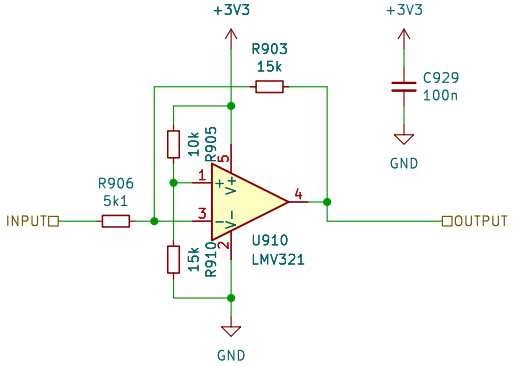
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 12/22



Sheet: /UI_HALL_PREAMP/INVERT_AND_OFFSET/
File: INVERT_AND_OFFSET.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 13/22



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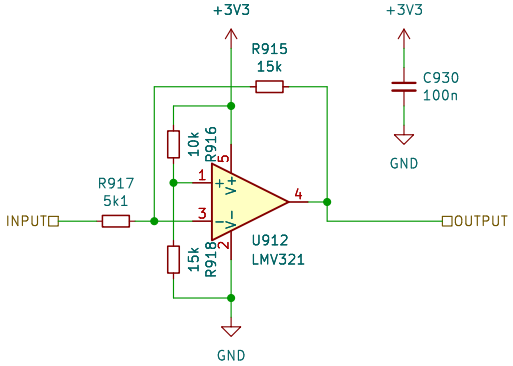
File: INVERT_AND_OFFSET.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 14/22



Sheet: /UI_HALL_PREAMP/INVERT_AND_OFFSET2/		
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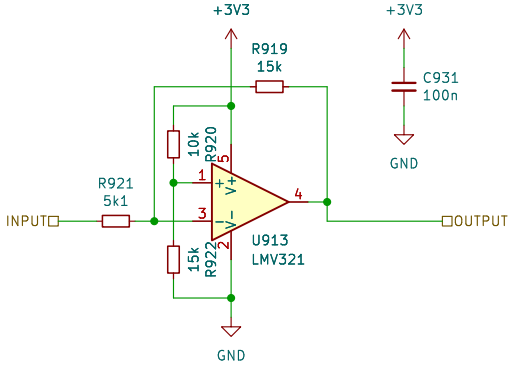
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 15/22



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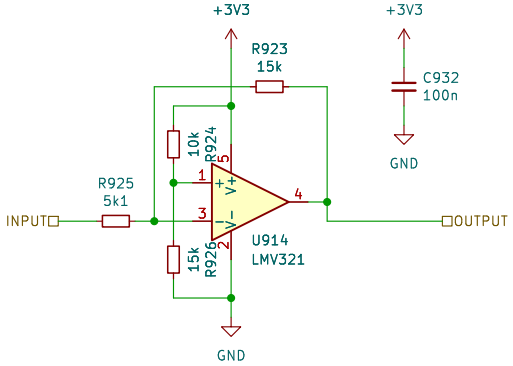
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 16/22



Sheet: /UI_HALL_PREAMP/INVERT_AND_OFFSET4/		
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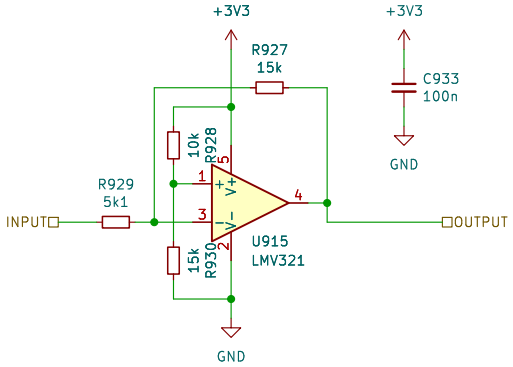
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 17/22



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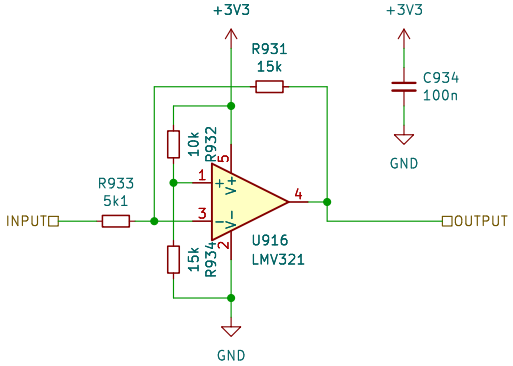
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 18/22



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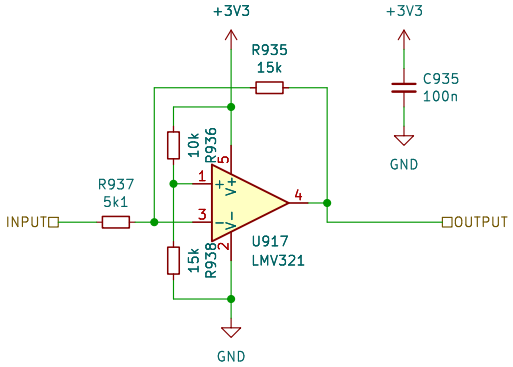
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 19/22



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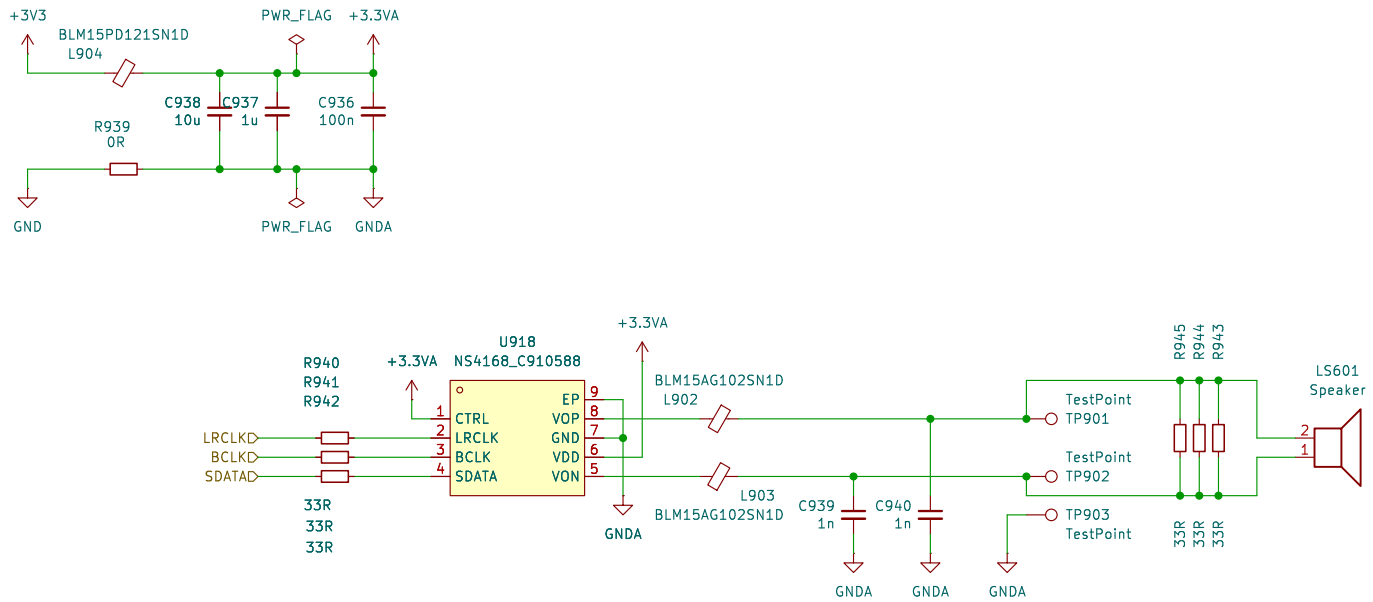
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 20/22



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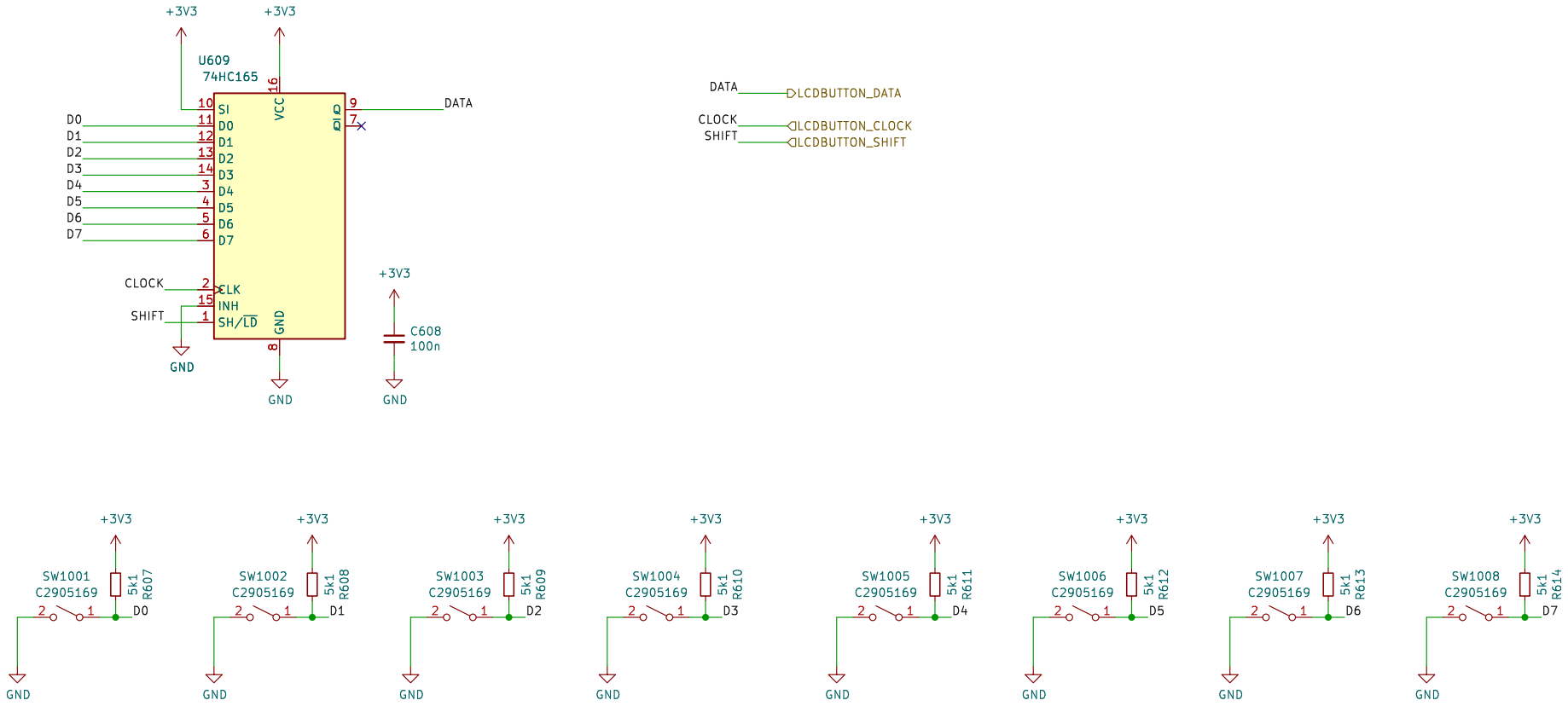
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 21/22



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KiCad E.D.A. 9.0.6		Id: 22/22