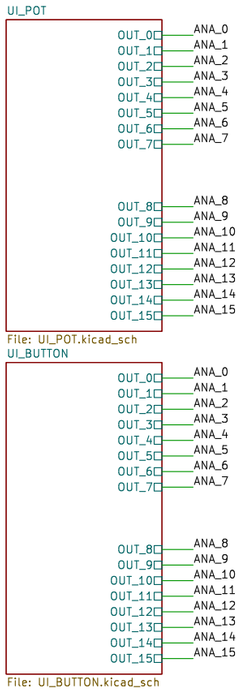
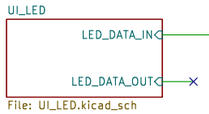
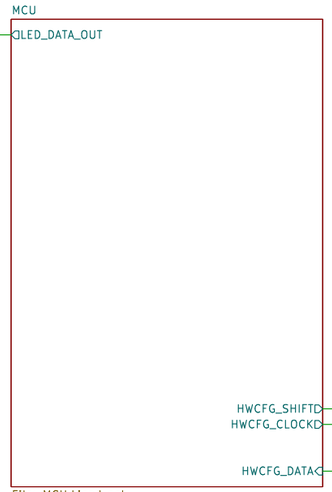
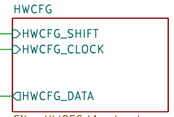
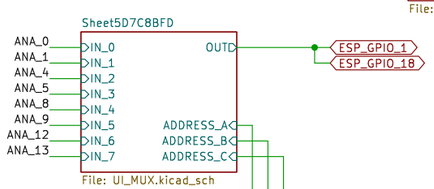
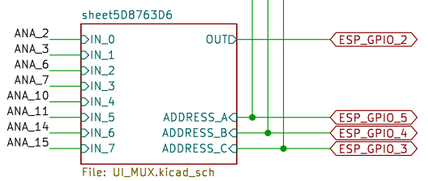












Common Sheets:
500 GRID
600 USB_POWER
700 MCU

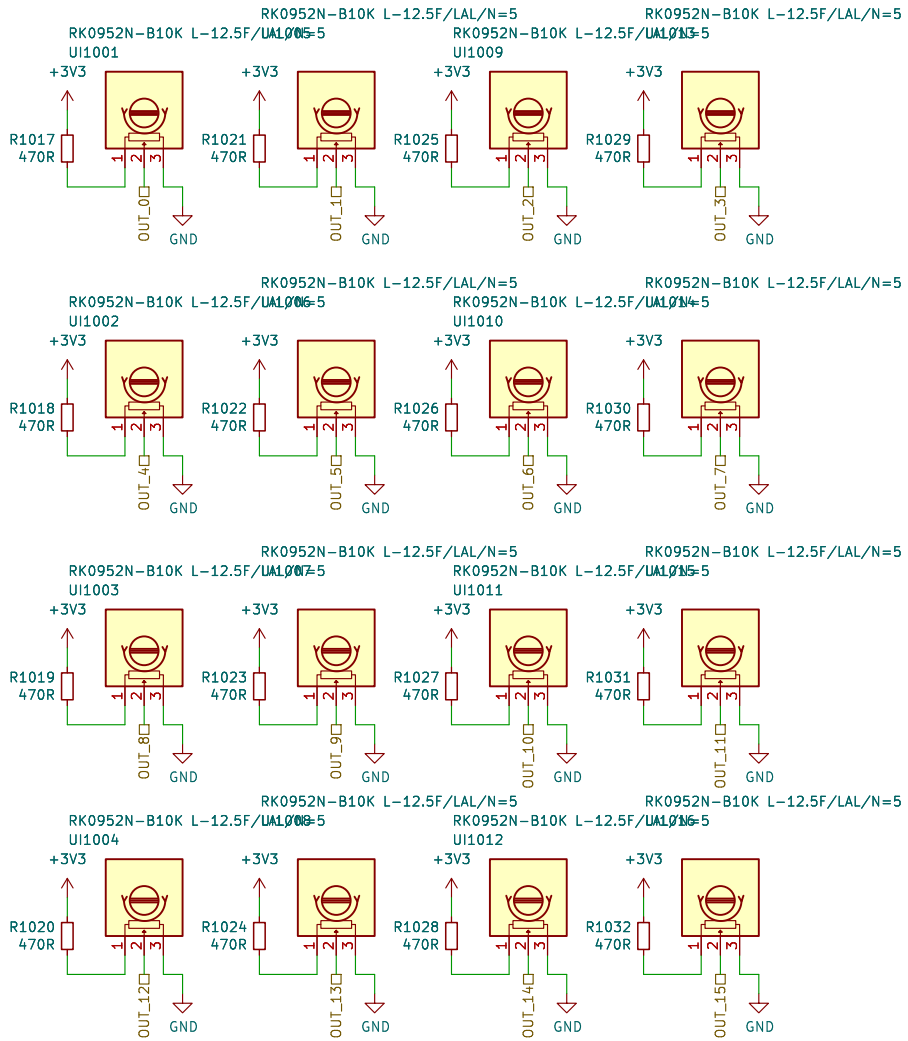
Module Specific:
800 HWCFG
900 LED
1000 UI

Sheet: /
File: PCBA-PO16.kicad_sch

Title:

Size: A3	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 1/10

1000



Sheet: /UI_POT/
File: UI_POT.kicad_sch

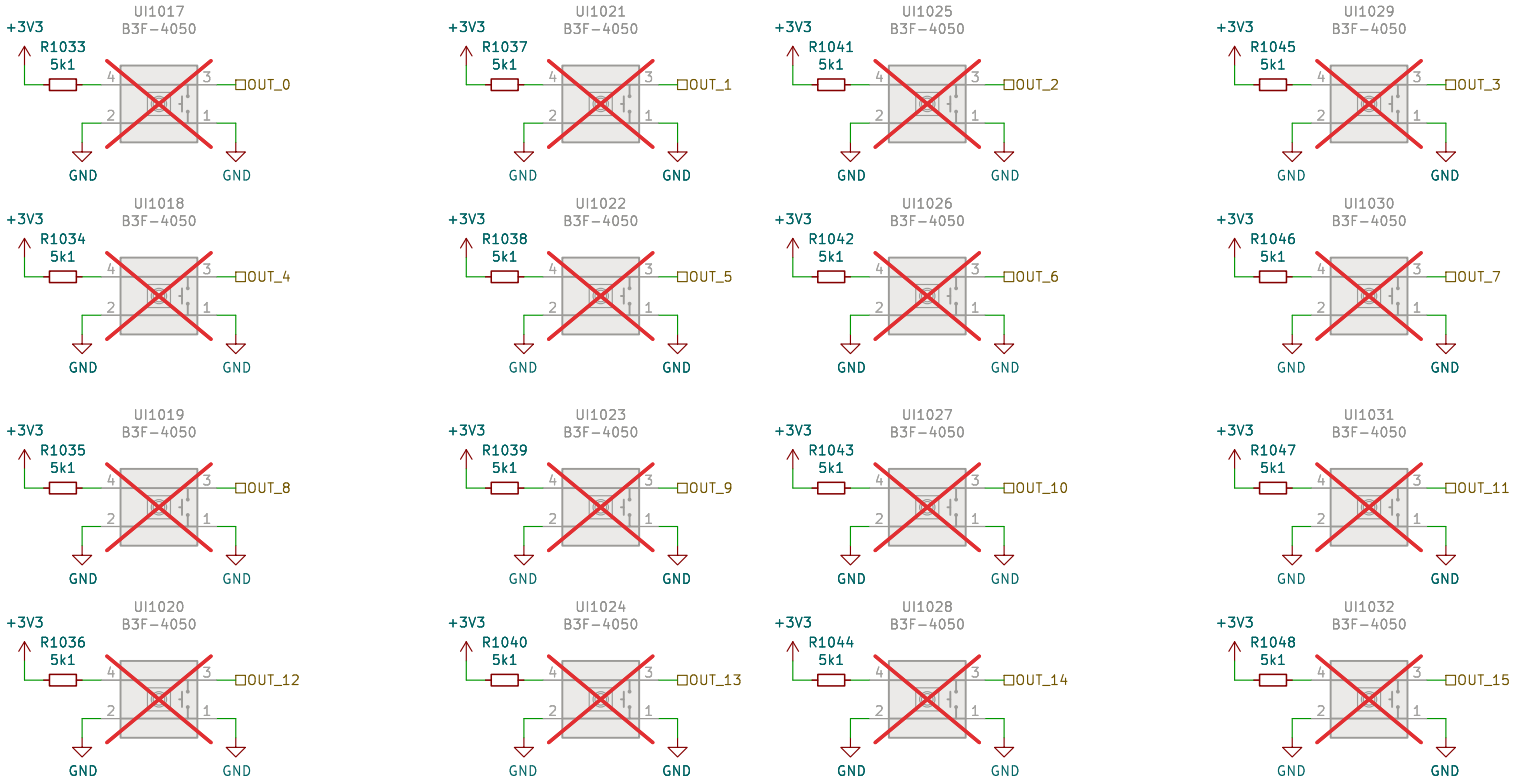
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 2/10

1000

Simulation:

http://tinyurl.com/y229mty4

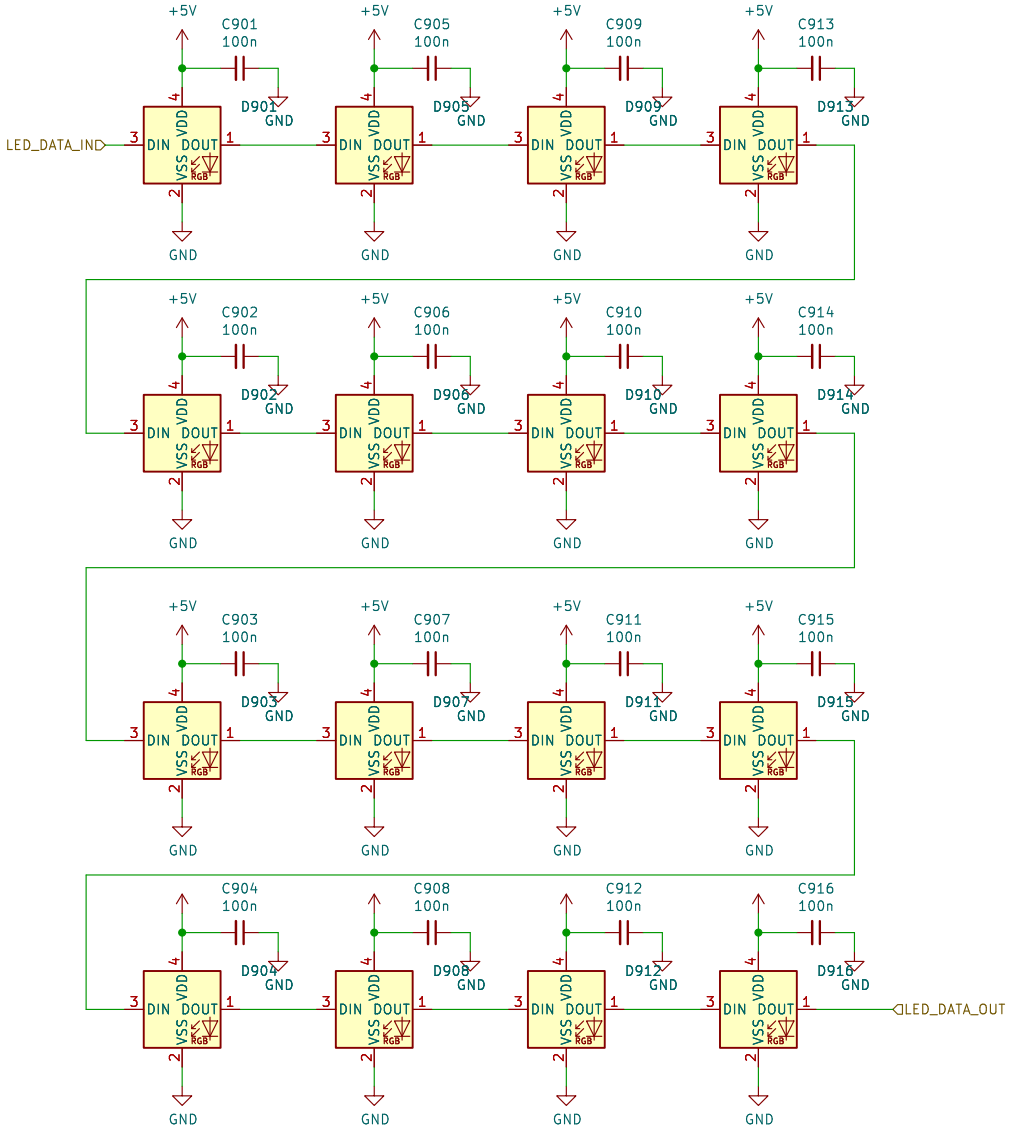


Sheet: /UI_BUTTON/
File: UI_BUTTON.kicad_sch

Title:

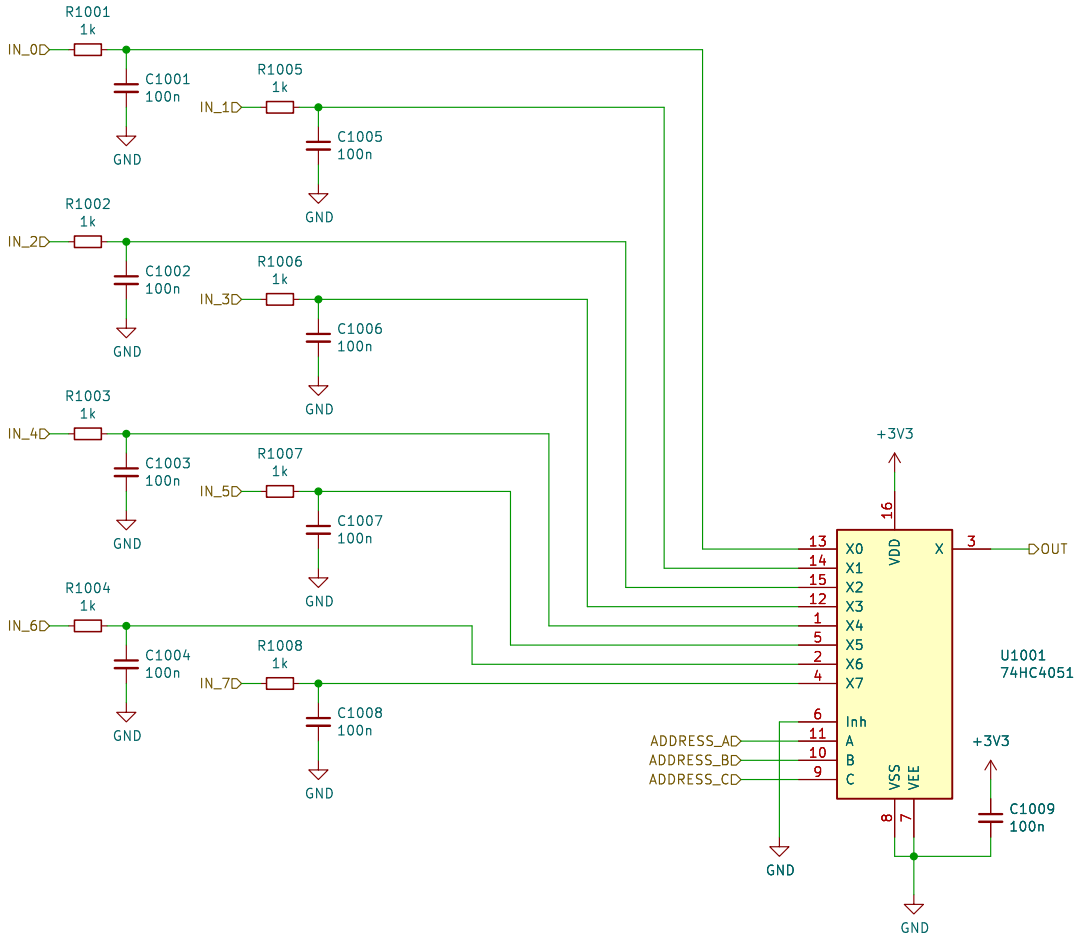
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 3/10

900



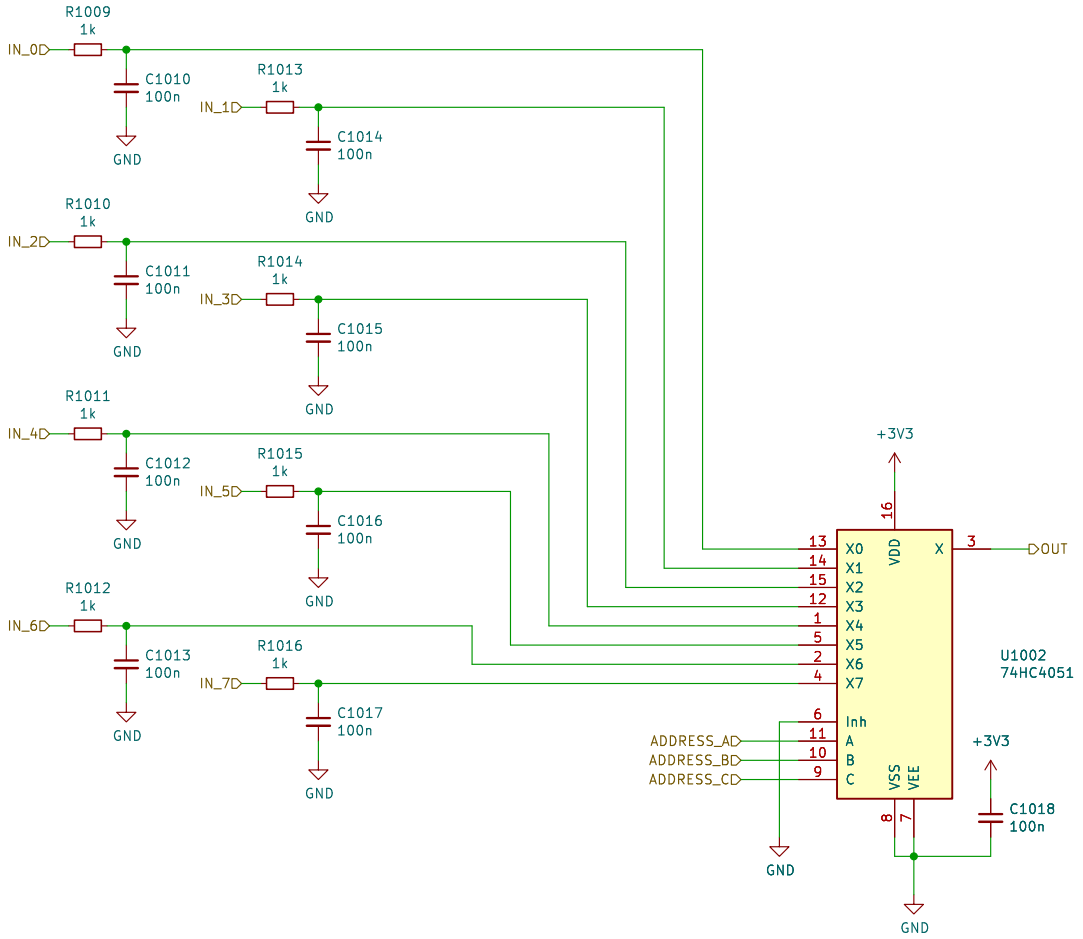
Sheet: /UI_LED/		
File: UI_LED.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 4/10

1000



Sheet: /Sheet5D7C8BFD/		
File: UI_MUX.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 5/10

1000



Sheet: /sheet5D8763D6/
File: UI_MUX.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 6/10

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

J701 / L701

J701 C5137195
U.FL-R-SMT-1(80)
L701 1n8
C739 3p9
C742 1p8
ESP_LNA
GND

1.8nH LQG15HS1N8S02D
3.9pF GJM1555C1H3R9WB01D
1.8pF GJM1555C1H1R8BB01D

Power rail

+3V3
GZ2012D601TF
L702
PWR_FLAG
C743 10u
C746 1u
C747 100n
C749 100n
C751 100n
C752 100n
C753 10n
C754 1u
VDD_SPI

U704 ESP32-S3

4	CHIP_PU		ESP_RESET
1	LNA_IN		ESP_LNA
25	GPIO19	D-	USB_DN
26	GPIO20	D+	USB_DP
28	GPIO26	SPICS1	
30	GPIO27	SPIHD	SPIHD
31	GPIO28	SPIWP	SPIWP
32	GPIO29	SPICS0	SPICS0
33	GPIO30	SPICLK	SPICLK
34	GPIO31	SPIQ	SPIQ
35	GPIO32	SPID	SPID
54	XTAL_P		
53	XTAL_N		
44	GPIO39	MTCK	TCK
45	GPIO40	MTDO	TDO
47	GPIO41	MTDI	TDI
48	GPIO42	MTMS	TMS
49	GPIO43	U0TXD	U0TXD
50	GPIO44	U0RXD	U0RXD
5	* GPIO0		ESP_BOOT0
6	GPIO1		ESP_GPIO_1
7	GPIO2		ESP_GPIO_2
8	* GPIO3		ESP_GPIO_3
9	GPIO4		ESP_GPIO_4
10	GPIO5		ESP_GPIO_5
11	GPIO6		RP_SPIO_RX
12	GPIO7		RP_SPIO_CS
13	GPIO8		RP_SPIO_TX
14	GPIO9		RP_SPIO_SCK
15	GPIO10		HWCFG_SHIFT
16	GPIO11		HWCFG_CLOCK
17	GPIO12		HWCFG_DATA
18	GPIO13		RP_SWDIO
19	GPIO14		RP_SWCLK
21	GPIO15		RP_CLK
22	GPIO16		ESP_GPIO_16
23	GPIO17		RP_INTERRUPT
24	GPIO18		ESP_GPIO_18
27	GPIO21		LED_DATA_OUT
38	GPIO33		ESP_GPIO_33
39	GPIO34		ESP_GPIO_34
40	GPIO35		ESP_GPIO_35
41	GPIO36		ESP_GPIO_36
42	GPIO37		ESP_GPIO_37
43	GPIO38		MAP_MODE
51	*GPIO45		ESP_GPIO_45
52	*GPIO46		ESP_GPIO_46
37	GPIO47		ESP_GPIO_47
36	GPIO48		ESP_GPIO_48
2	VDD3P3		
3	VDD3P3		
20	VDD3P3_RTC		
29	VDD_SPI		
46	VDD3P3_CPU		
55	VDDA1		
56	VDDA2		
57	GND		

40MHz Y701
C748 10p
C750 10p
R733 1k

LCSC:
TXM40M0004322HBCEO00T
S3240000091040JY

Test points

ESP_GPIO_47 TP706 TestPoint
ESP_GPIO_48 TP707 TestPoint
ESP_GPIO_34 TP708 TestPoint
ESP_GPIO_33 TP709 TestPoint
TP710 TestPoint

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
100n C757
R736 1k
SW701 C255807
MAP_MODE
Internal Pull-up

Reset

R735 5k1
SW702 C2905169
ESP_RESET
C758 1u

Boot

SW703 C2905169
ESP_BOOT0

U703 RP2040

26	RUN		RP_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		
20	XIN		RP_CLK
21	XOUT		
24	SWCLK		RP_SWCLK
25	SWD		RP_SWDIO
19	TESTEN		
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		
14	GPIO11		
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		
57	GND		

TP705 TestPoint

C731 100n
C732 100n
C733 1u
C734 1u
C735 100n
C736 100n
C737 100n
C738 100n
C740 100n
C741 100n
C744 100n
C745 100n
+1V1
+3V3
R729 5k1

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

J799 Conn_01x02

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
U705 W25Q64JVSSIQ

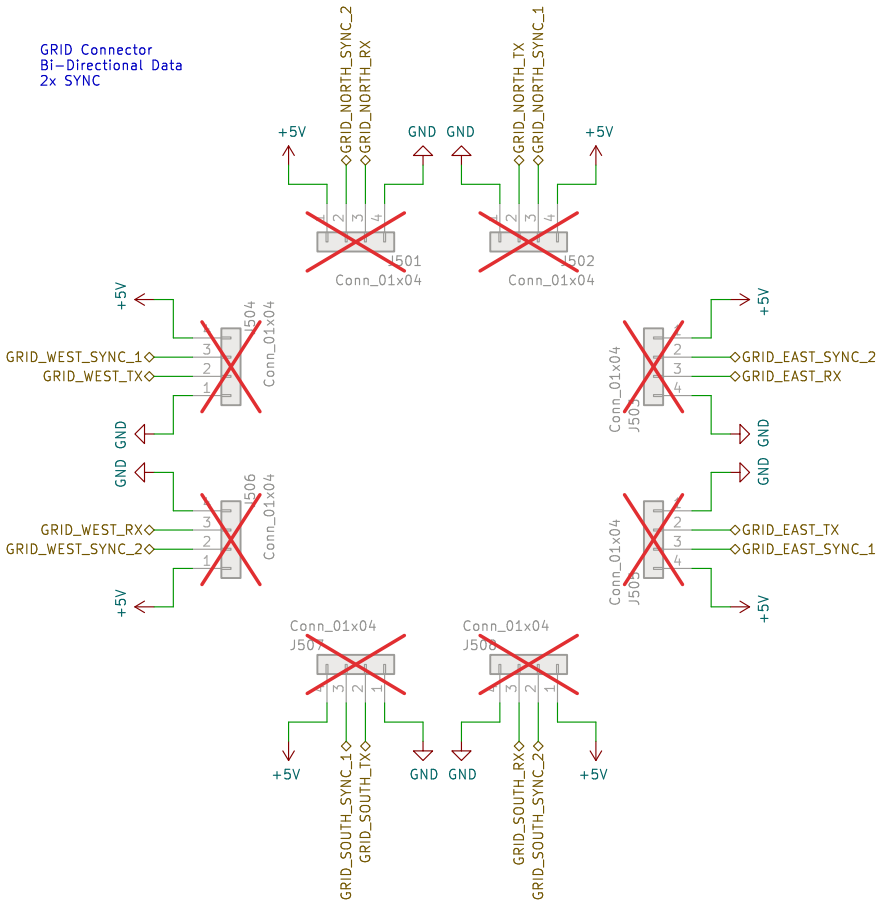
1	SPICS0	/CS
6	SPICLK	CLK
8	VCC	
4	GND	
5	SPID	DI(IO0)
2	SPIQ	DO(IO1)
3	SPIWP	IO2
7	SPIHD	IO3

C755 1u
C756 100n

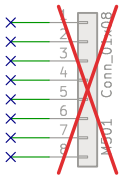
Sheet: /MCU/
File: MCU.kicad_sch
Title:
Size: A3 | Date: | Rev:
KiCad E.D.A. 9.0.6 | Id: 7/10

500

GRID Connector
Bi-Directional Data
2x SYNC



Board Mounting Pattern

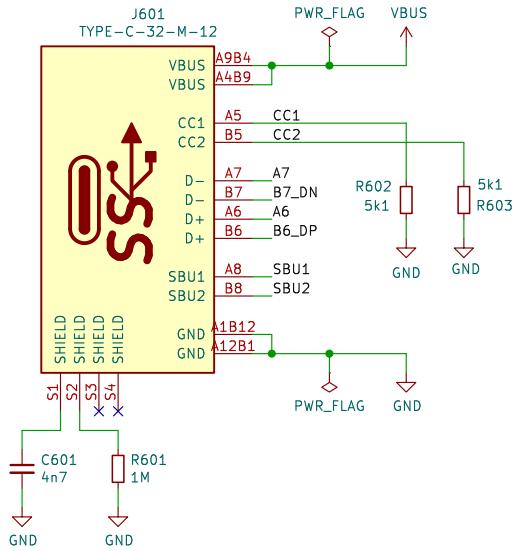


Sheet: /MCU/sheet5D85C9EA/		
File: GRID.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 8/10

600

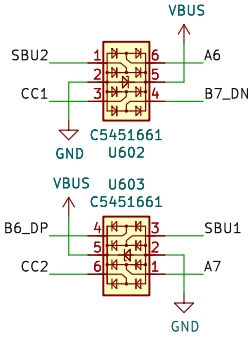
USB Port

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



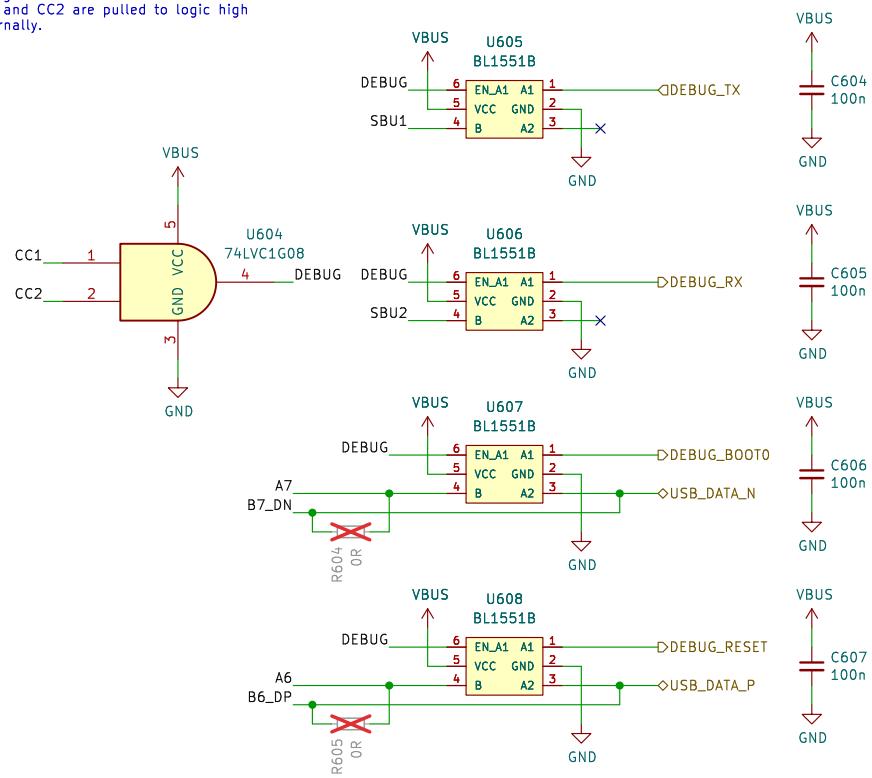
ESD Prot.

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



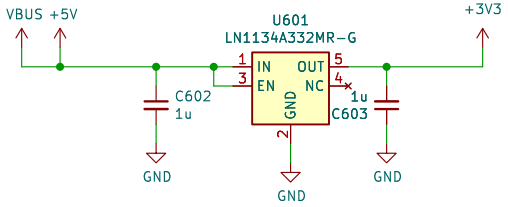
Debug-Mode Multiplexing

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

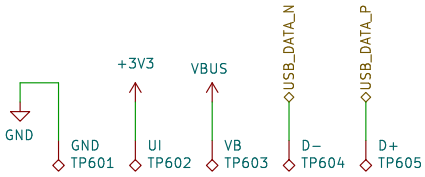


3V3 LDO

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

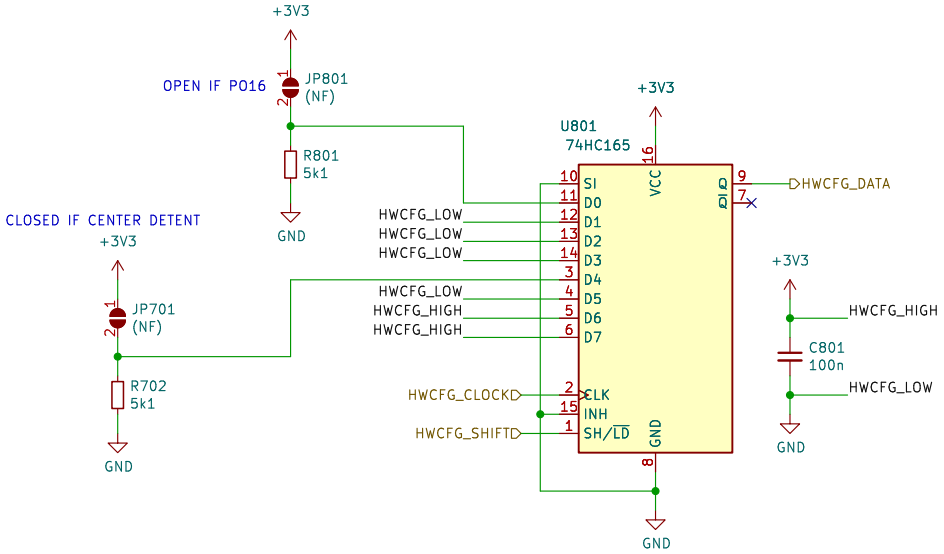


Testpoints



Sheet: /MCU/USB_POWER/		
File: USB_POWER.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 9.0.6		Id: 9/10

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: 10/10