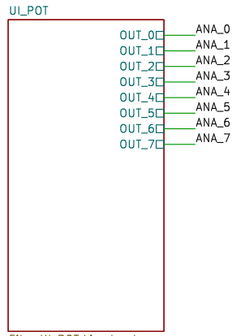
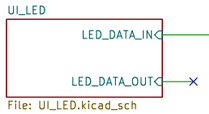
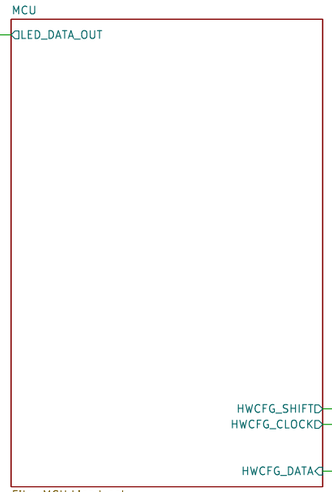
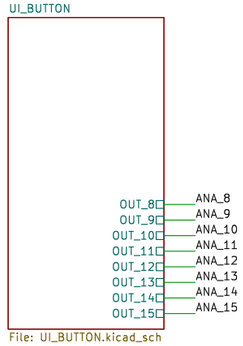


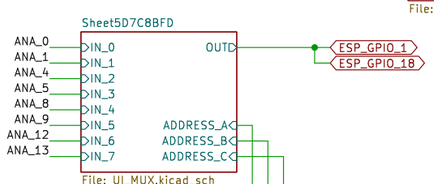



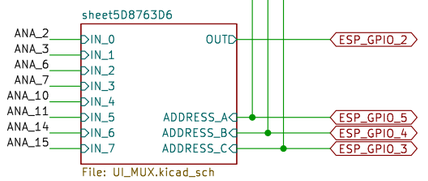










**Common Sheets:**
**500 GRID**
**600 USB_POWER**
**700 MCU**

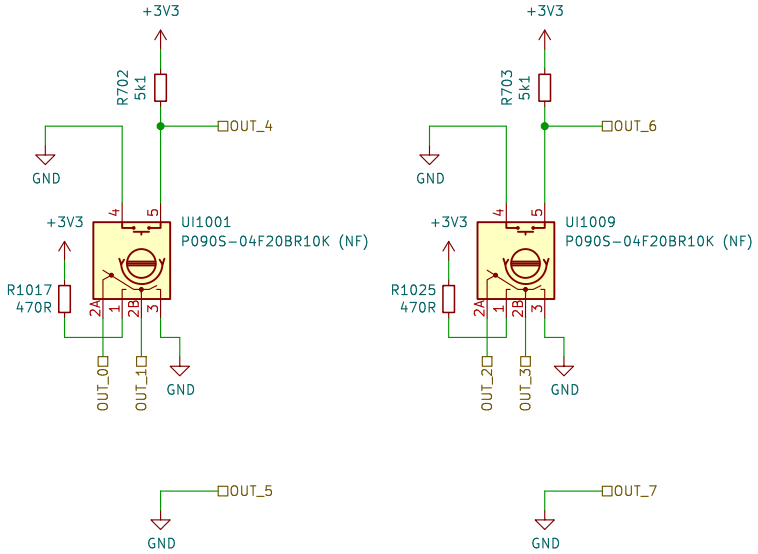
**Module Specific:**
**800 HWCFG**
**900 LED**
**1000 UI**

Sheet: /
File: PCBA-TEK2.kicad_sch

**Title:**

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

# 1000

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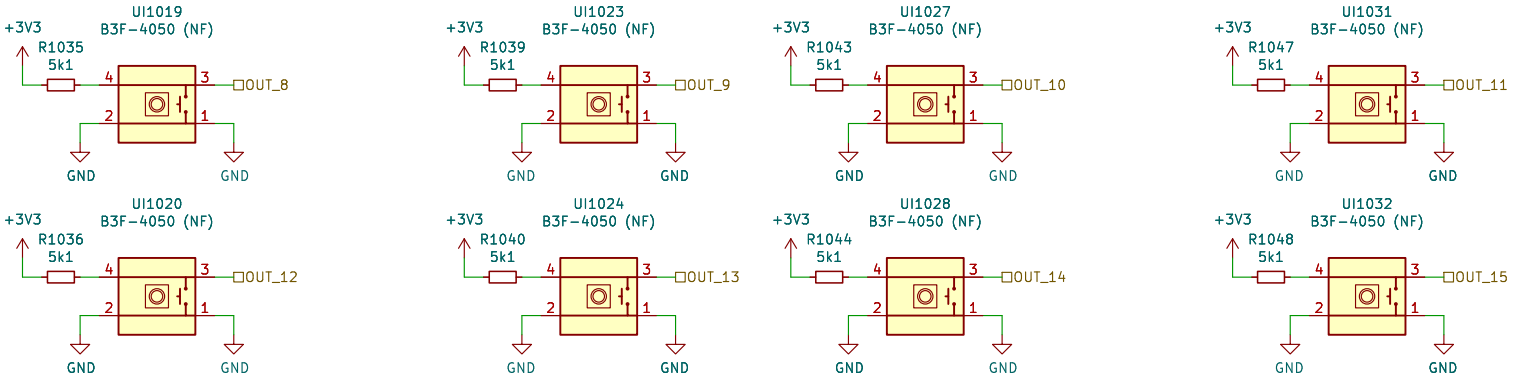
| Sheet: /UI_POT/ | | |
| File: UI_POT.kicad_sch | | |
| **Title:** | | |
| Size: A4 | Date: | **Rev:** |
| KiCad E.D.A. 9.0.6 | | Id: 2/10 |

# 1000

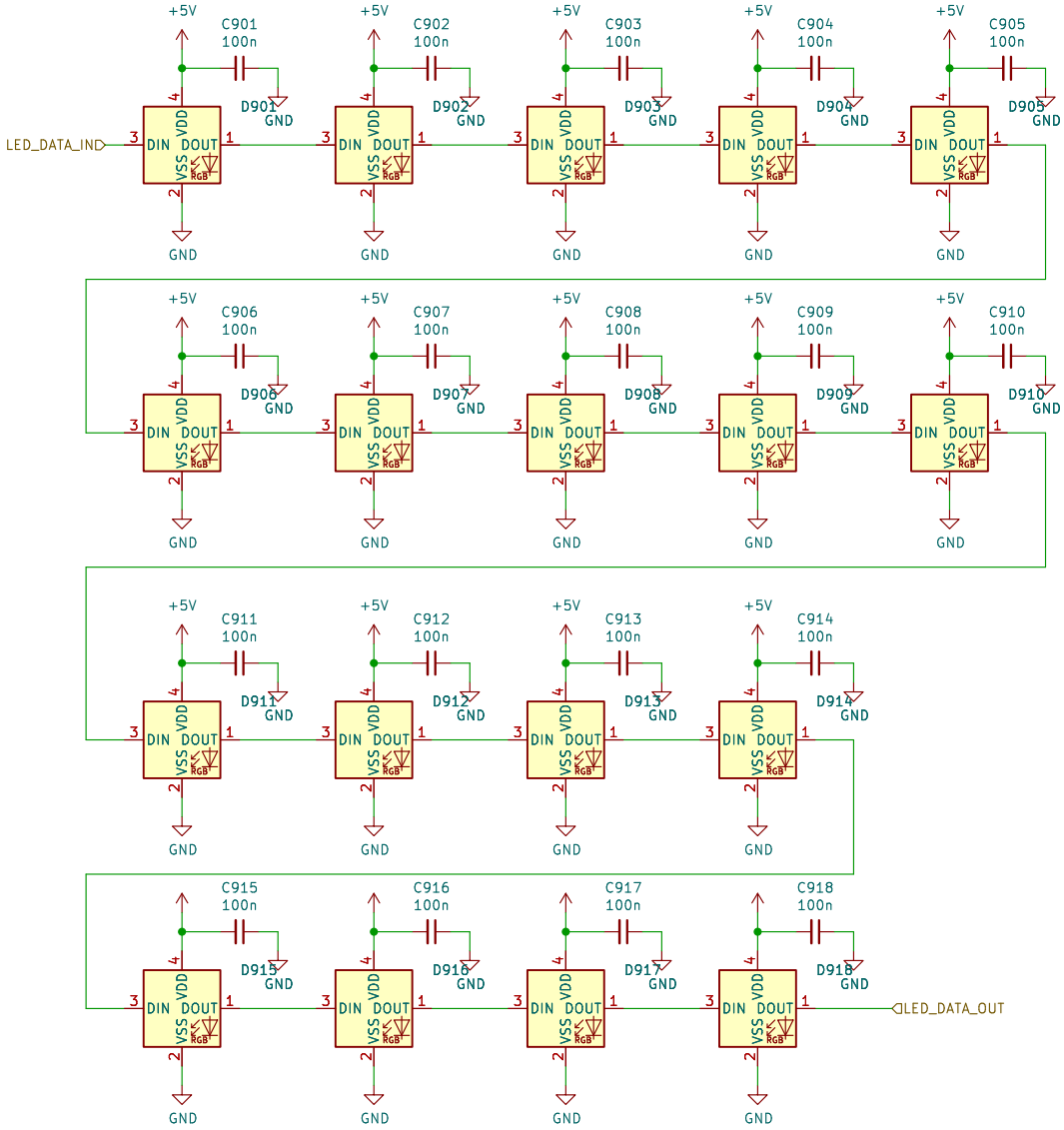
Simulation:

http://tinyurl.com/y229mty4



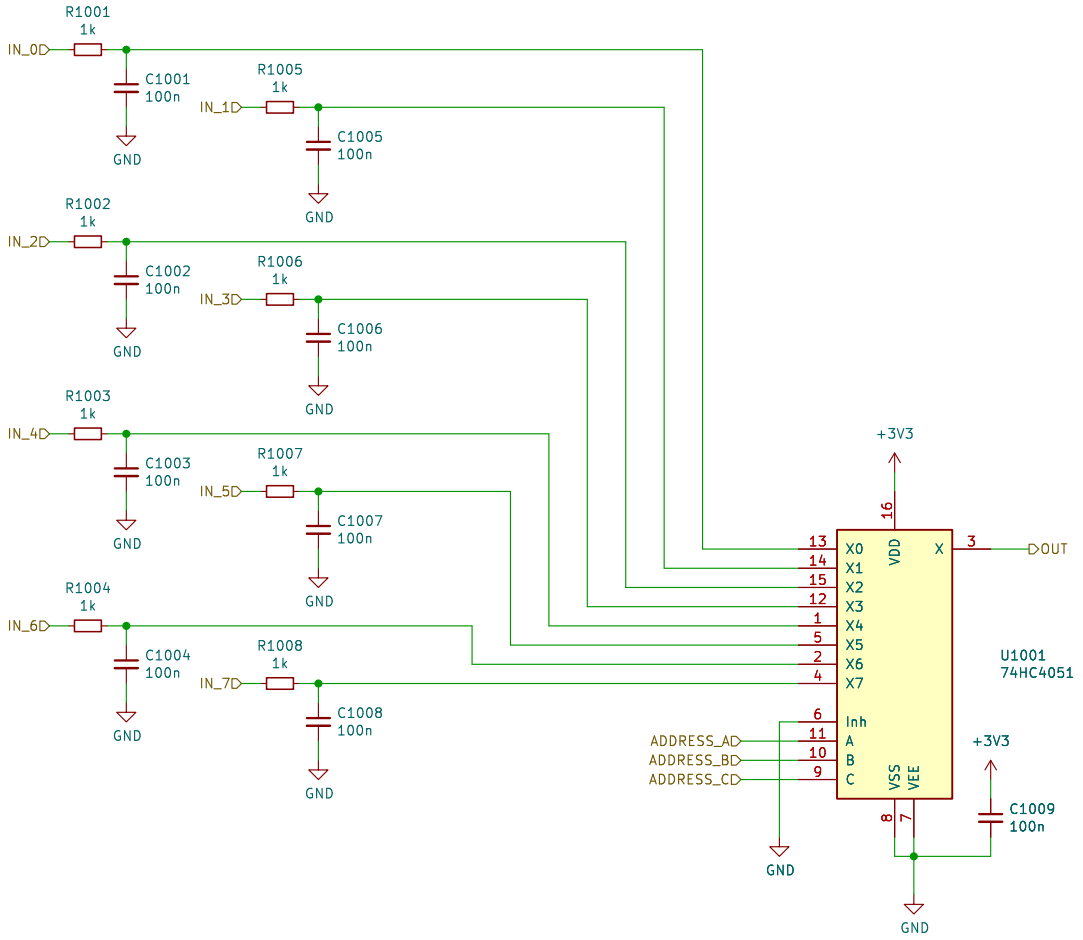

| | | |
|---|---|---|
| Sheet: /UI_BUTTON/ | | |
| File: UI_BUTTON.kicad_sch | | |
| **Title:** | | |
| Size: A4 | Date: | **Rev:** |
| KiCad E.D.A. 9.0.6 | | Id: 3/10 |

# 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




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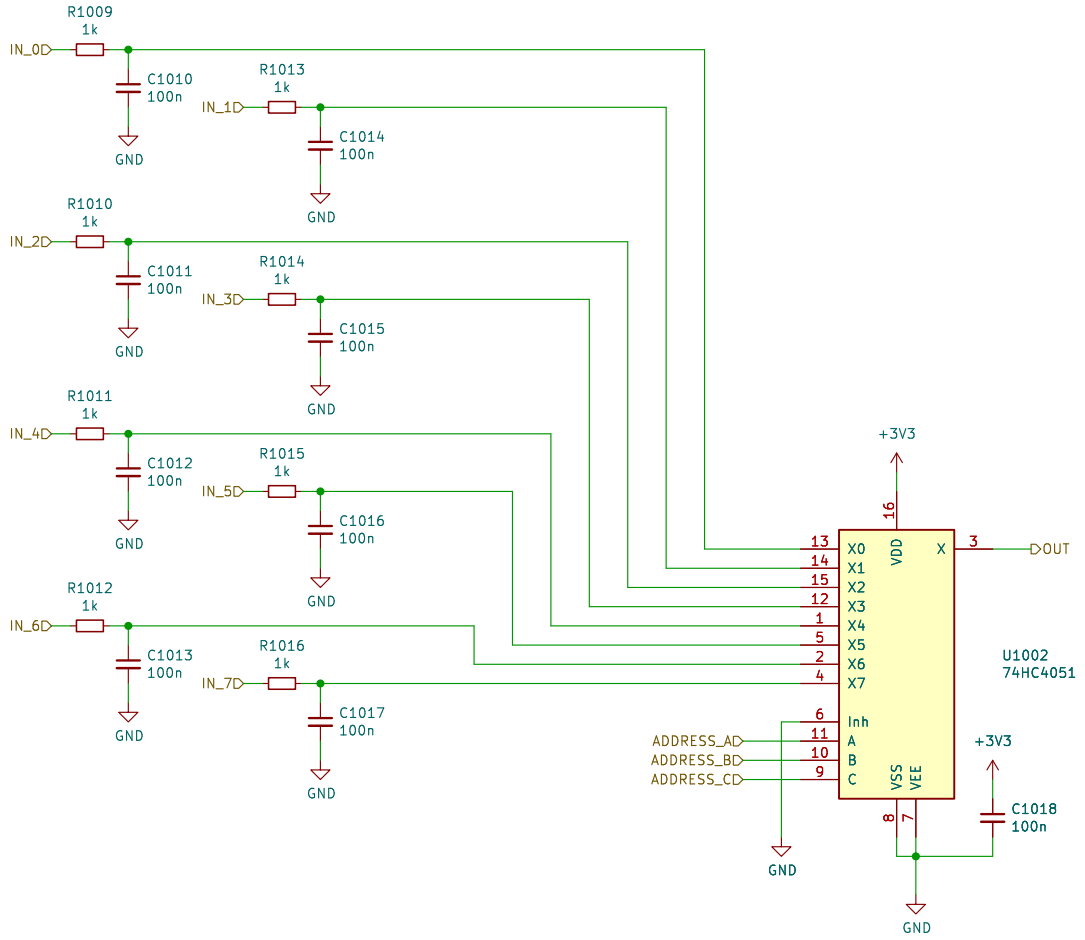
| Sheet: /Sheet5D7C8BFD/ | | |
| File: UI_MUX.kicad_sch | | |
| **Title:** | | |
| Size: A4 | Date: | **Rev:** |
| KiCad E.D.A. 9.0.6 | | Id: 5/10 |

# 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

## ESP32-S3FN8

+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
U.FL-R-SMT-1(80)
C739 3p9
C742 1p8
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+ |
| | 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 | |

R733 1k

U704

| | | | |
|---|---|---|---|
| | 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 |

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.

MAP_MODE
R701 5k1
C757 100n
R736 1k
SW701 C255807
Internal Pull-up

R735 5k1
ESP_RESET
SW702 C2905169
C758 1u

SW703 C2905169
ESP_BOOT0

## U703 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

| | | | |
|---|---|---|---|
| | 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 | |
| | 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 | |

TP705 TestPoint

## 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

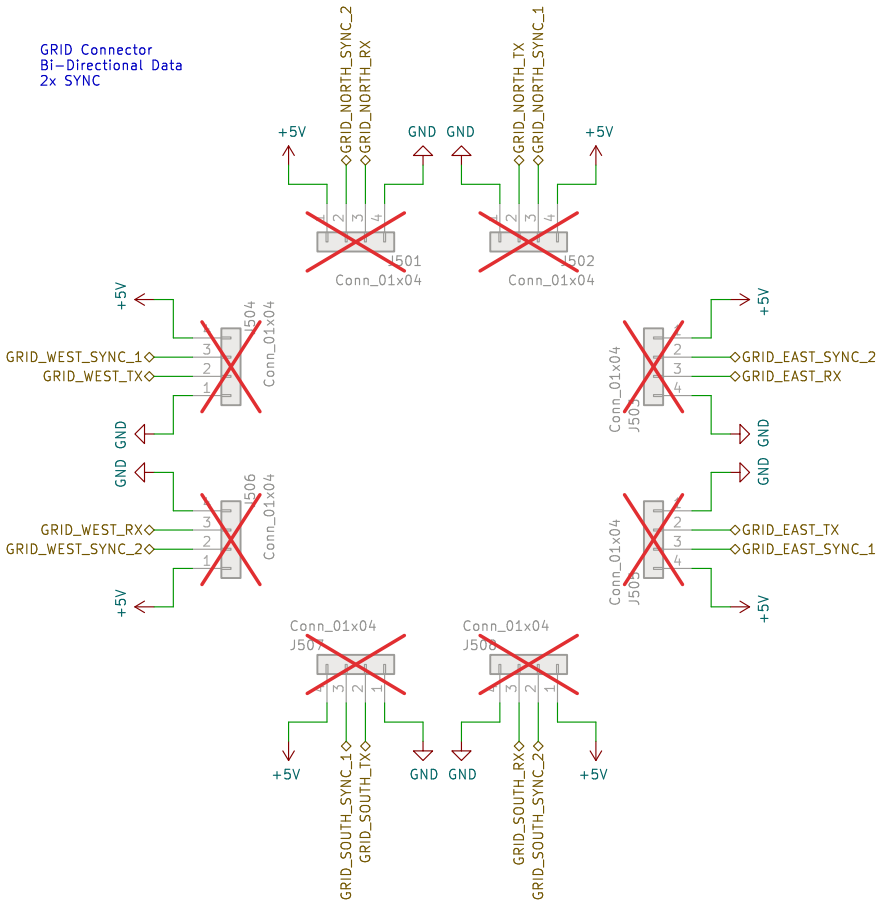
| | | | |
|---|---|---|---|
| SPICS0 | 1 | CS | |
| SPICLK | 6 | CLK | |
| | 8 | VCC | |
| | 4 | GND | |
| SPID | 5 | DI(IO0) | |
| SPIQ | 2 | DO(IO1) | |
| SPIWP | 3 | IO2 | |
| SPIHD | 7 | IO3 | |

C755 1u
C756 100n

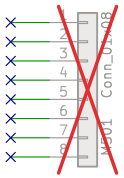
Sheet: /MCU/
File: MCU.kicad_sch
Title:
Size: A3 | Date: | Rev:
KiCad E.D.A. 9.0.6 | Id: 7/10

# 500

GRID Connector
Bi-Directional Data
2x SYNC




Board Mounting Pattern

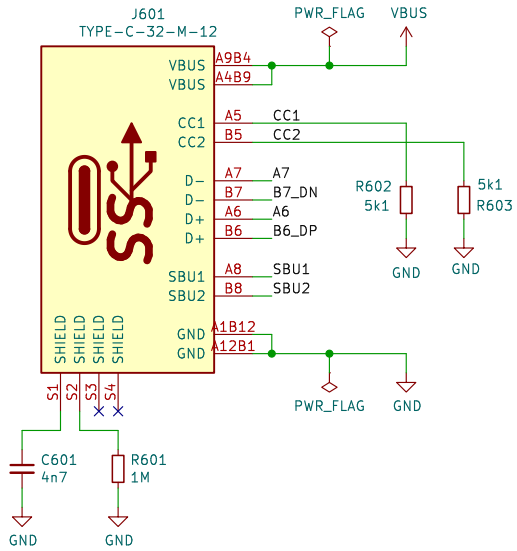



| | | |
|---|---|---|
| Sheet: /MCU/sheet5D85C9EA/<br>File: GRID.kicad_sch | | |
| **Title:** | | |
| Size: A4 | Date: | **Rev:** |
| KiCad E.D.A. 9.0.6 | | Id: 8/10 |

# 600

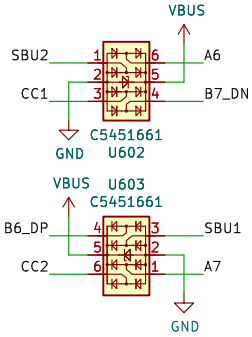
## USB Port

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



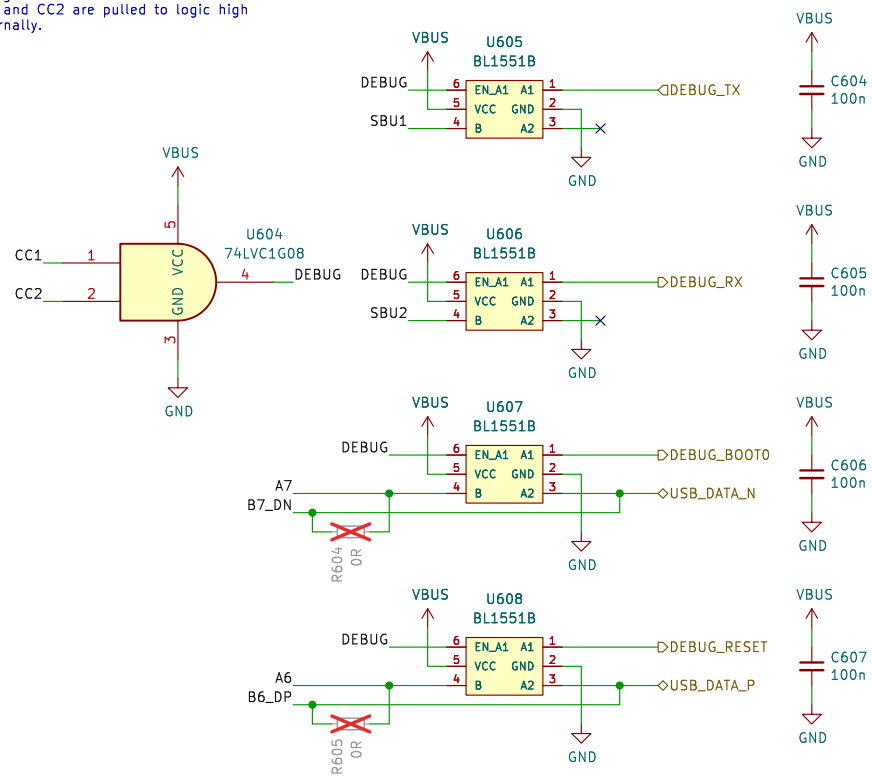

## ESD Prot.

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



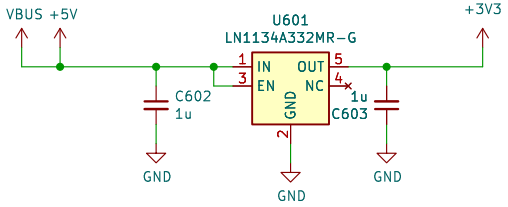

## Debug-Mode Multiplexing

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

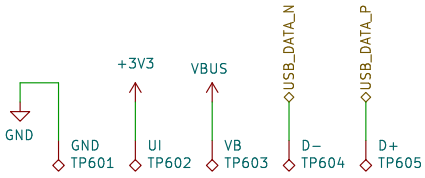



## 3V3 LDO

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




## Testpoints




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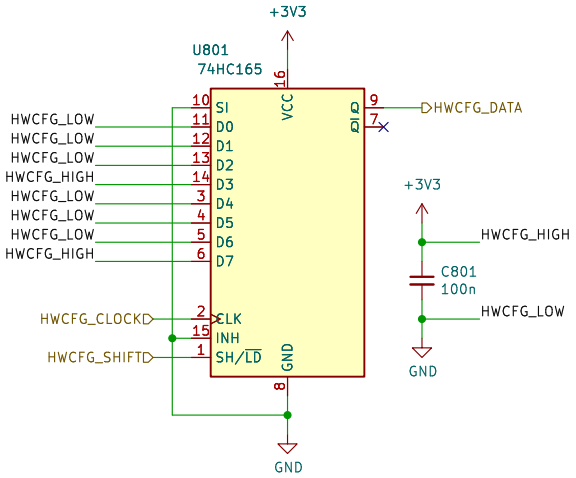
| Sheet: /MCU/USB_POWER/ | | |
| File: USB_POWER.kicad_sch | | |
| **Title:** | | |
| Size: A4 | Date: | **Rev:** |
| KiCad E.D.A. 9.0.6 | | Id: 9/10 |

# 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 |