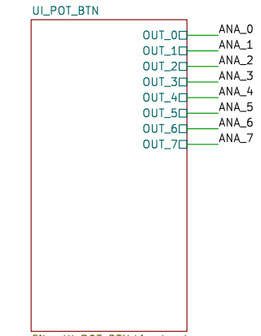

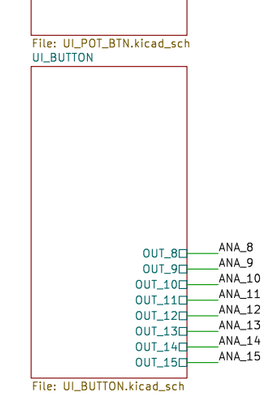

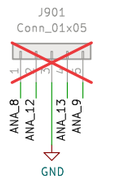

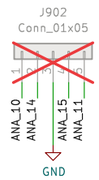

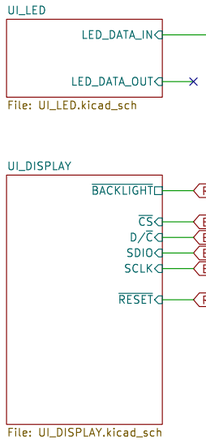

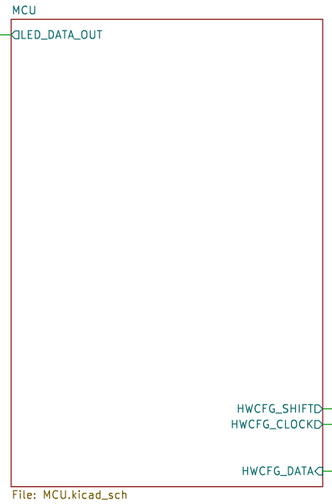

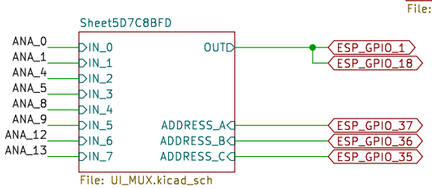

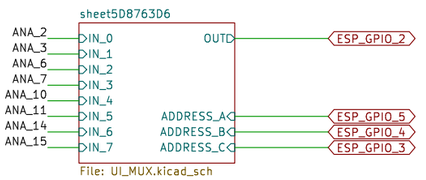

Common Sheets:
500 GRID
600 USB_POWER
700 MCU

Module Specific:
800 HWCFG
900 LED
1000 UI

Sheet: /
File: PCBA-TEK1.kicad_sch

Title:

Size: A3	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 1/11

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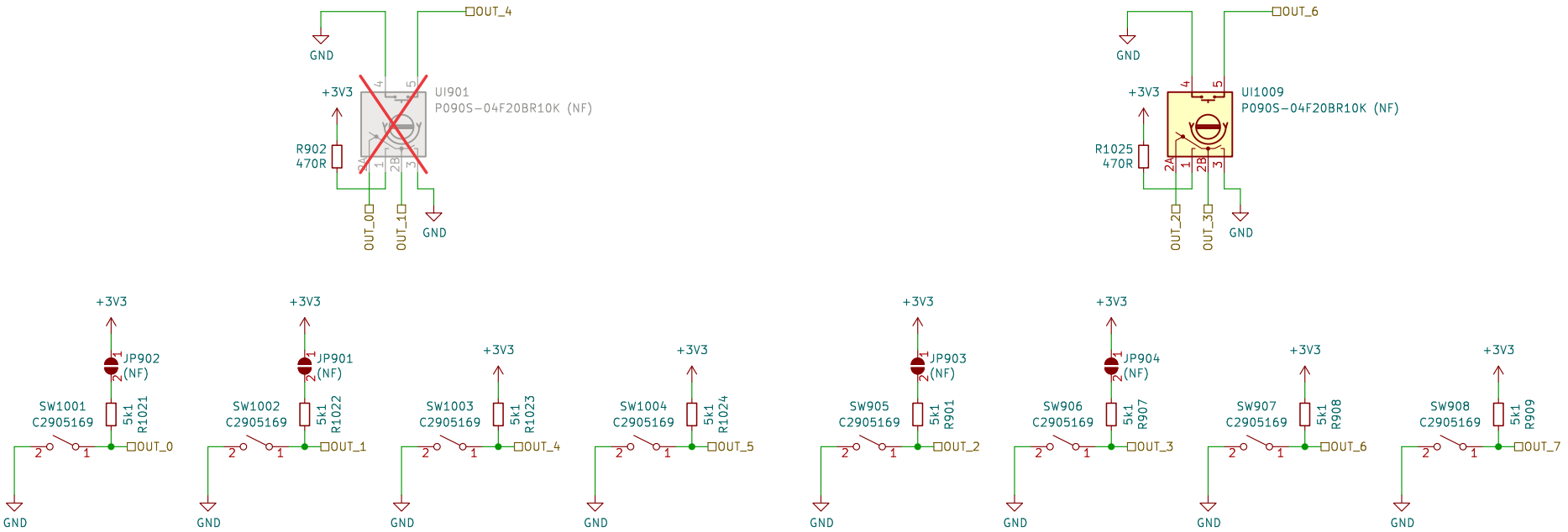

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Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 2/11

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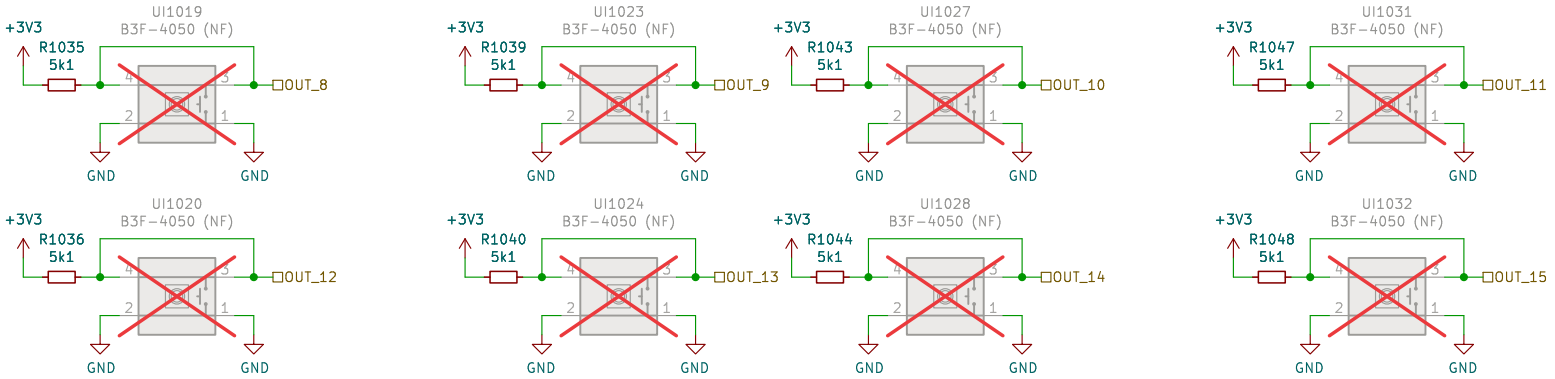
Simulation:

http://tinyurl.com/y229mty4



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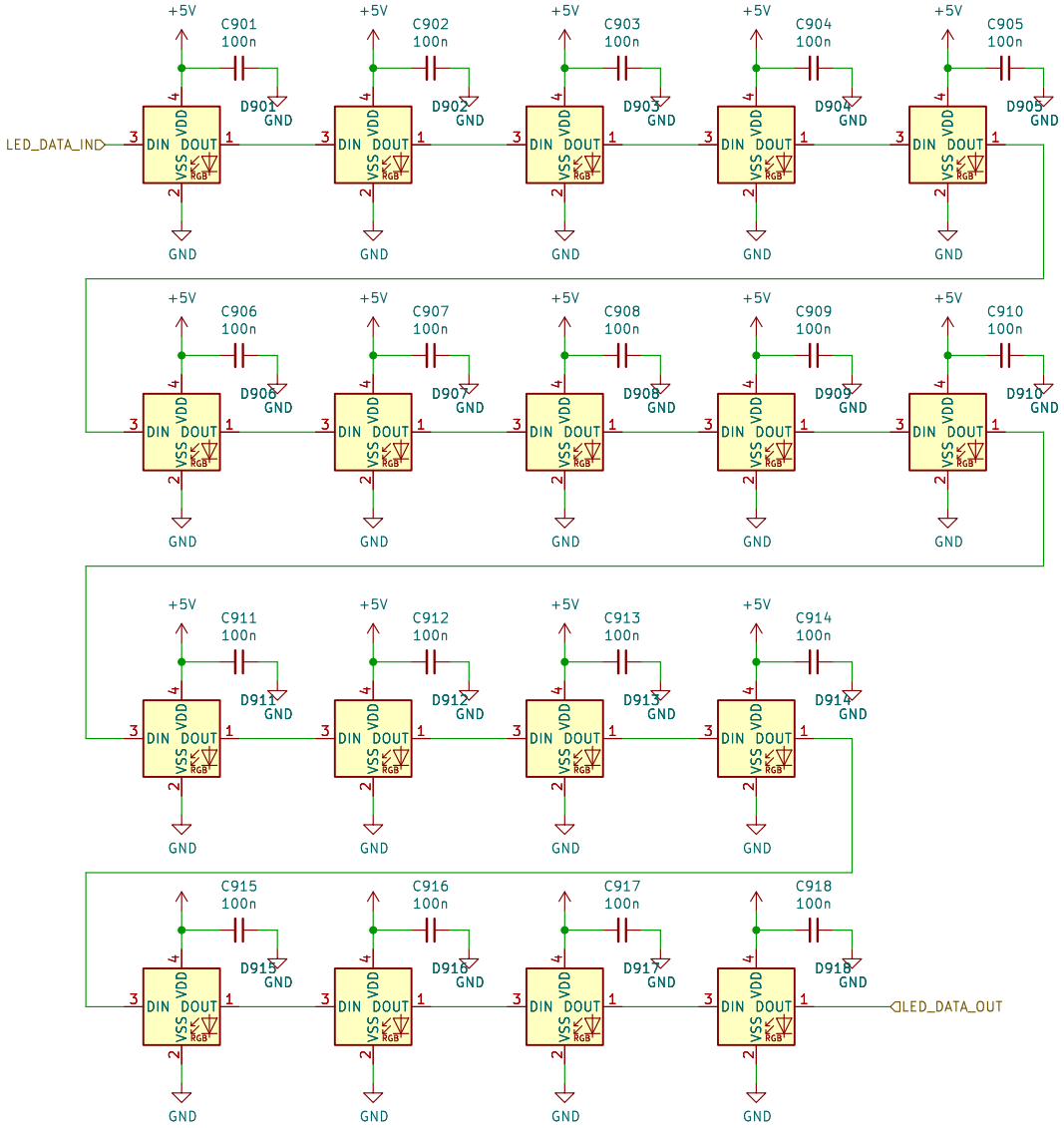
File: UI_BUTTON.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 3/11

900



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Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 4/11

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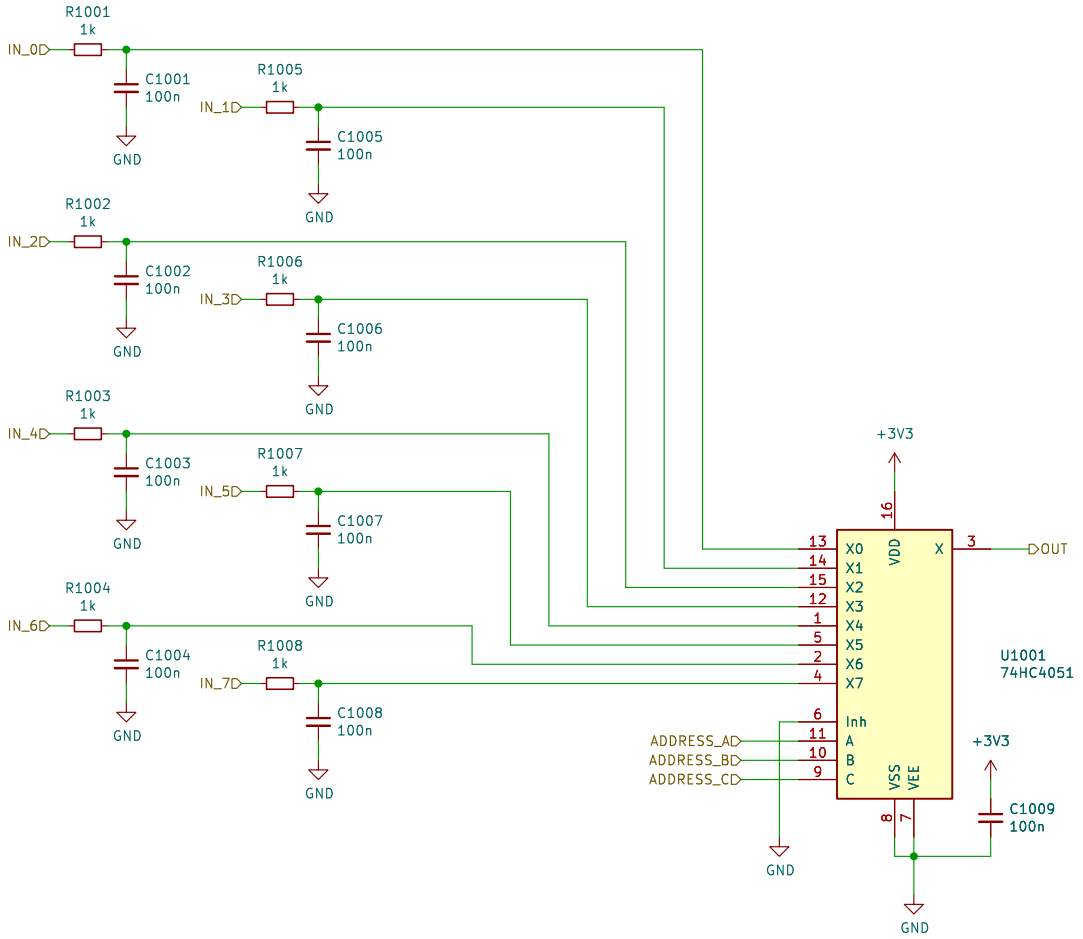

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Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 5/11

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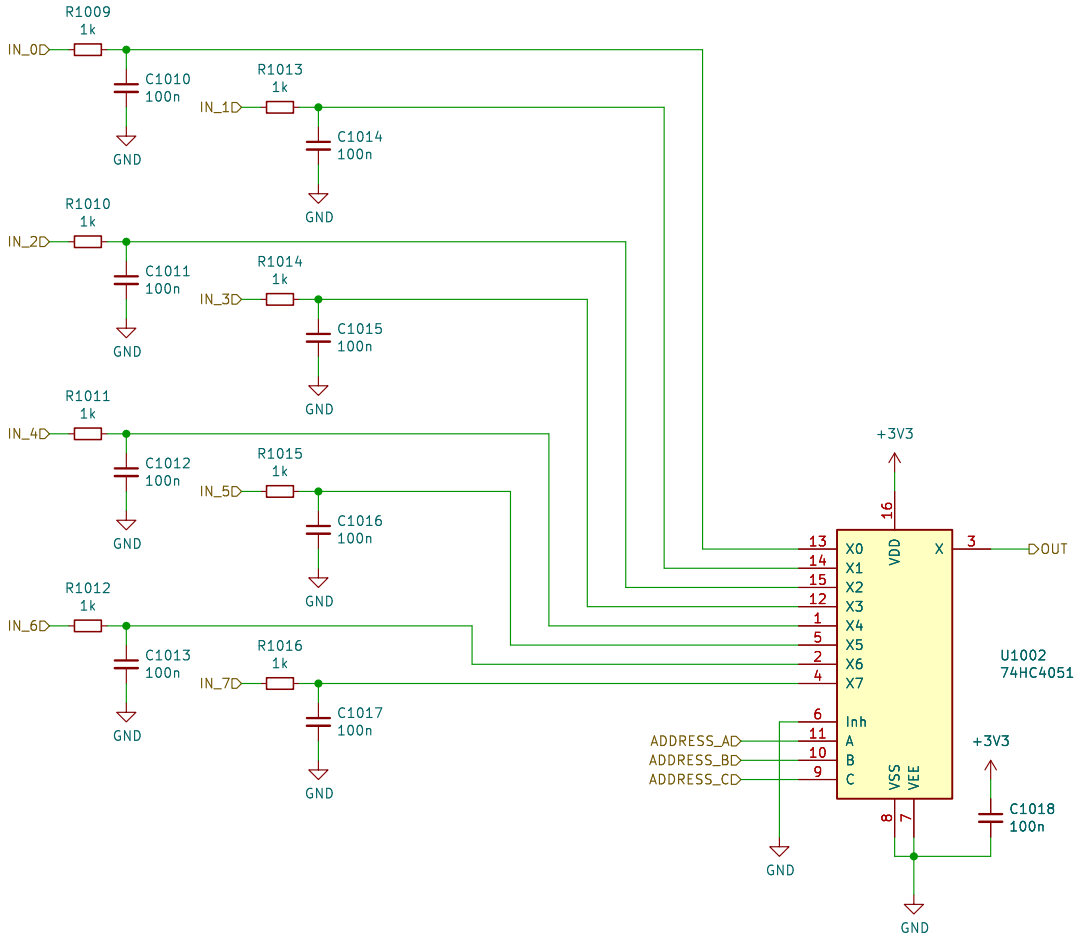

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Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 6/11

700

Sheet60F06FE1

USB_DP
USB_DN
USB_DATA_P
USB_DATA_N

File: USB_POWER.kicad_sch

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

+3V3 VDD_SPI +3V3

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

1.8nH LQG15HS1N8S02D
3.9pF GJM1555C1H3R9WB01D
1.8pF GJM1555C1H1R8BB01D

ESP32-S3FN8
U704

ESP_RESET CHIP_PU
ESP_LNA LNA_IN
USB_DN GPIO19 D-
USB_DP GPIO20 D+
SPICS1 GPIO26 SPICS1
SPIHD GPIO27 SPIHD
SPIWP GPIO28 SPIWP
SPICS0 GPIO29 SPICS0
SPICLK GPIO30 SPICLK
SPIQ GPIO31 SPIQ
SPID GPIO32 SPID
TCK GPIO39 MTCK
TDO GPIO40 MTDO
TDI GPIO41 MTDI
TMS GPIO42 MTMS
U0TXD GPIO43 U0TXD
U0RXD GPIO44 U0RXD

VDD3P3 VDD3P3 VDD3P3_RTC VDD_SPI VDD3P3_CPU VDDA1 VDDA2
GND

* GPIO0 ESP_BOOT0
GPIO1 ESP_GPIO_1
GPIO2 ESP_GPIO_2
* GPIO3 ESP_GPIO_3
GPIO4 ESP_GPIO_4
GPIO5 ESP_GPIO_5
GPIO6 RP_SPIO_RX
GPIO7 RP_SPIO_CS
GPIO8 RP_SPIO_TX
GPIO9 RP_SPIO_SCK
GPIO10 HWCFG_SHIFT
GPIO11 HWCFG_CLOCK
GPIO12 HWCFG_DATA
GPIO13 RP_SWDIO
GPIO14 RP_SWCLK
GPIO15 RP_CLK
GPIO16 ESP_GPIO_16
GPIO17 RP_INTERRUPT
GPIO18 ESP_GPIO_18
GPIO21 LED_DATA_OUT
GPIO33 ESP_GPIO_33
GPIO34 ESP_GPIO_34
GPIO35 ESP_GPIO_35
GPIO36 ESP_GPIO_36
GPIO37 ESP_GPIO_37
GPIO38 MAP_MODE
* GPIO45 ESP_GPIO_45
* GPIO46 ESP_GPIO_46
GPIO47 ESP_GPIO_47
GPIO48 ESP_GPIO_48

40MHz Y701
XTAL_P XTAL_N
C748 10p
C750 10p

LCSC:
TXM40M0004322HBCEO00T
S3240000091040JY

Programming Interface

RP_UART0_TX TMS
RP_UART0_RX TCK
U0TXD 1k R733 TDO
U0RXD TDI
Conn_02x05_Odd_Even
J702

Mapmode switch

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

+3V3 +3V3
R701 5k1
100n C757
R736 1k
SW701 C255807
MAP_MODE
Internal Pull-up

+3V3
R735 5k1
SW702 C2905169
ESP_RESET
C758 1u

SW703 C2905169
ESP_BOOT0

+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
+3V3
R729 5k1
RP_RUN

RUN
USB_DP
USB_DM
QSPI_SS
QSPI_SD0
QSPI_SD1
QSPI_SD2
QSPI_SD3
QSPI_SCLK
RP_CLK XIN
XOUT
RP_SWCLK SWCLK
RP_SWDIO SWD
TESTEN
VREG_VOUT DVDD IOVDD USB_VDD ADC_AVDD VREG_IN
GND
U703 RP2040

GPIO0 RP_UART0_TX
GPIO1 RP_UART0_RX
GPIO2 GRID_SOUTH_TX
GPIO3 GRID_WEST_RX
GPIO4 GRID_SYNC_2
GPIO5 GRID_WEST_TX
GPIO6 GRID_NORTH_RX
GPIO7
GPIO8
GPIO9
GPIO10 RP_GPIO_10
GPIO11 RP_GPIO_11
GPIO12 TP701 TestPoint
GPIO13 TP702 TestPoint
GPIO14 TP703 TestPoint
GPIO15 TP704 TestPoint
GPIO16 RP_SPIO_RX
GPIO17 RP_SPIO_CS
GPIO18 RP_SPIO_SCK
GPIO19 RP_SPIO_TX
GPIO20
GPIO21
GPIO22 RP_INTERRUPT
GPIO23 GRID_NORTH_TX
GPIO24 GRID_EAST_RX
GPIO25 GRID_SYNC_1
GPIO26_ADC0 GRID_EAST_TX
GPIO27_ADC1 GRID_SOUTH_RX
GPIO28_ADC2
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

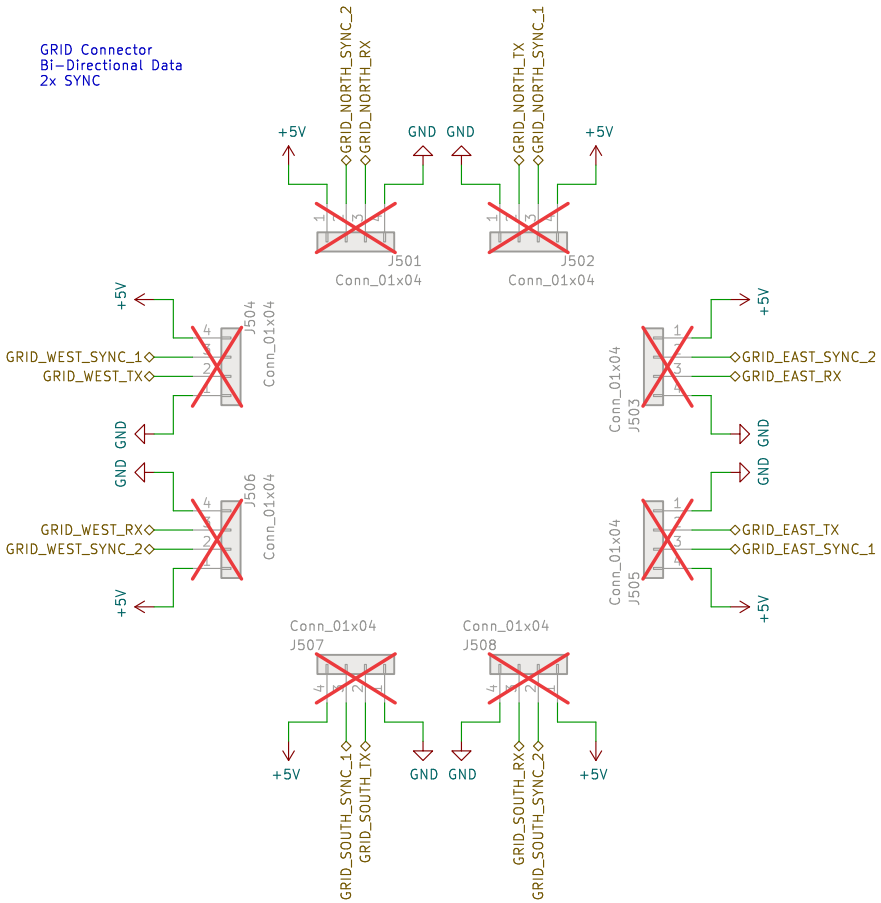
VDD_SPI
R904 5k1
SPICS1
U903 ESP-PSRAM32
CE SCLK SIO3 SIO2 SI/SIO SO/SIO VCC VSS
SPICLK SPIHD SPIWP SPID SPIQ
C921 100n
J799 Conn_01x02

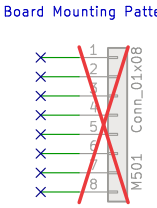
QSPI Flash memory

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

VDD_SPI VDD_SPI
U705 W25Q64JVSSIQ
R734 5k1
SPICS0 CS
SPICLK CLK
DI(IO0) DO(IO1) IO2 IO3 VCC GND
SPID SPIQ SPIWP SPIHD
C755 1u
C756 100n

Sheet: /MCU/
File: MCU.kicad_sch
Title:
Size: A3 Date:
KiCad E.D.A. kicad-cli 7.0.11+1
Rev:
Id: 7/11





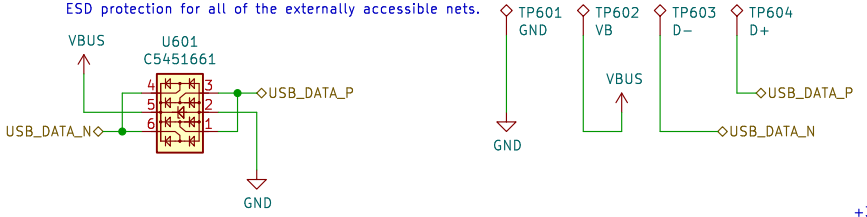
500

Sheet: /MCU/sheet5D85C9EA/ File: GRID.kicad_sch		
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 8/11

600

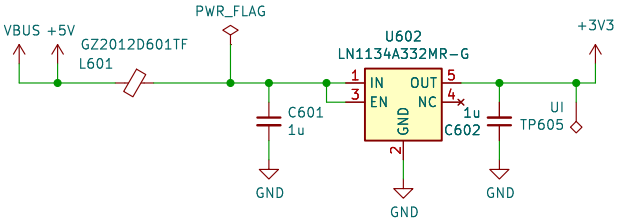
ESD Diodes

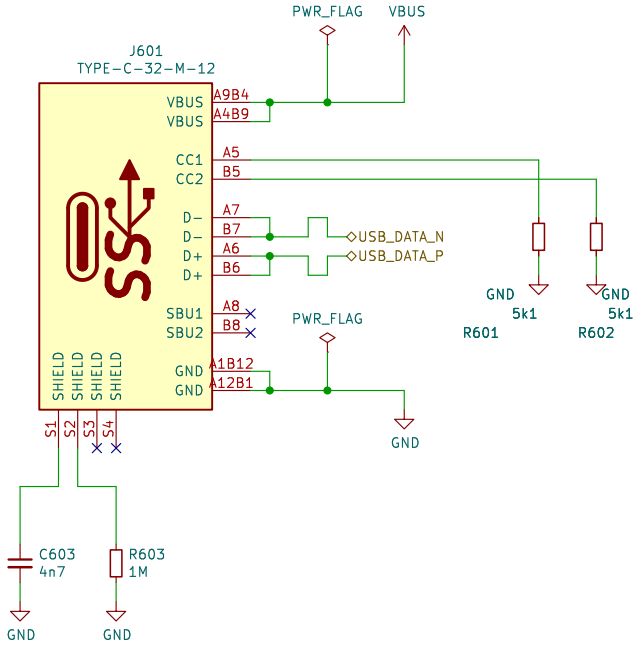
ESD protection for all of the externally accessible nets.



+3V3 LDO Regulators

Regulators for generating independent power rails for the microcontroller and the user interface.





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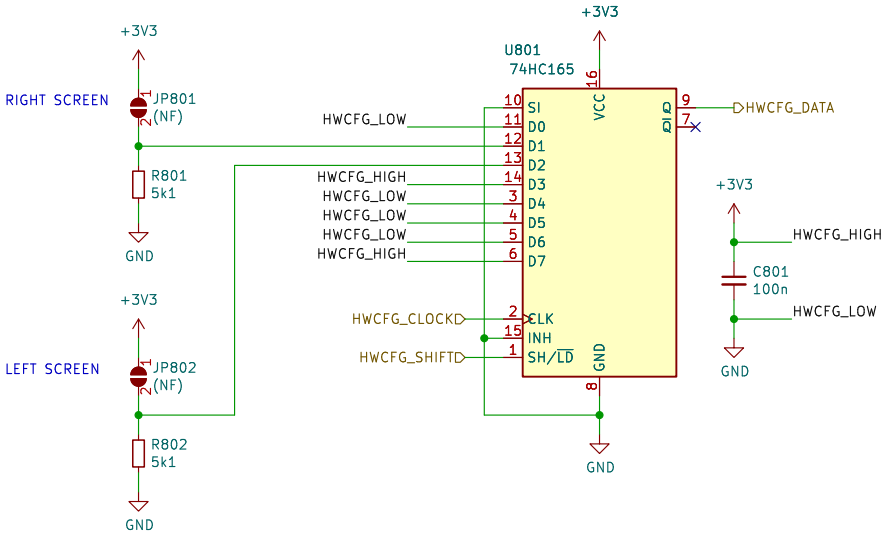
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 9/11

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. kicad-cli 7.0.11+1		Id: 10/11

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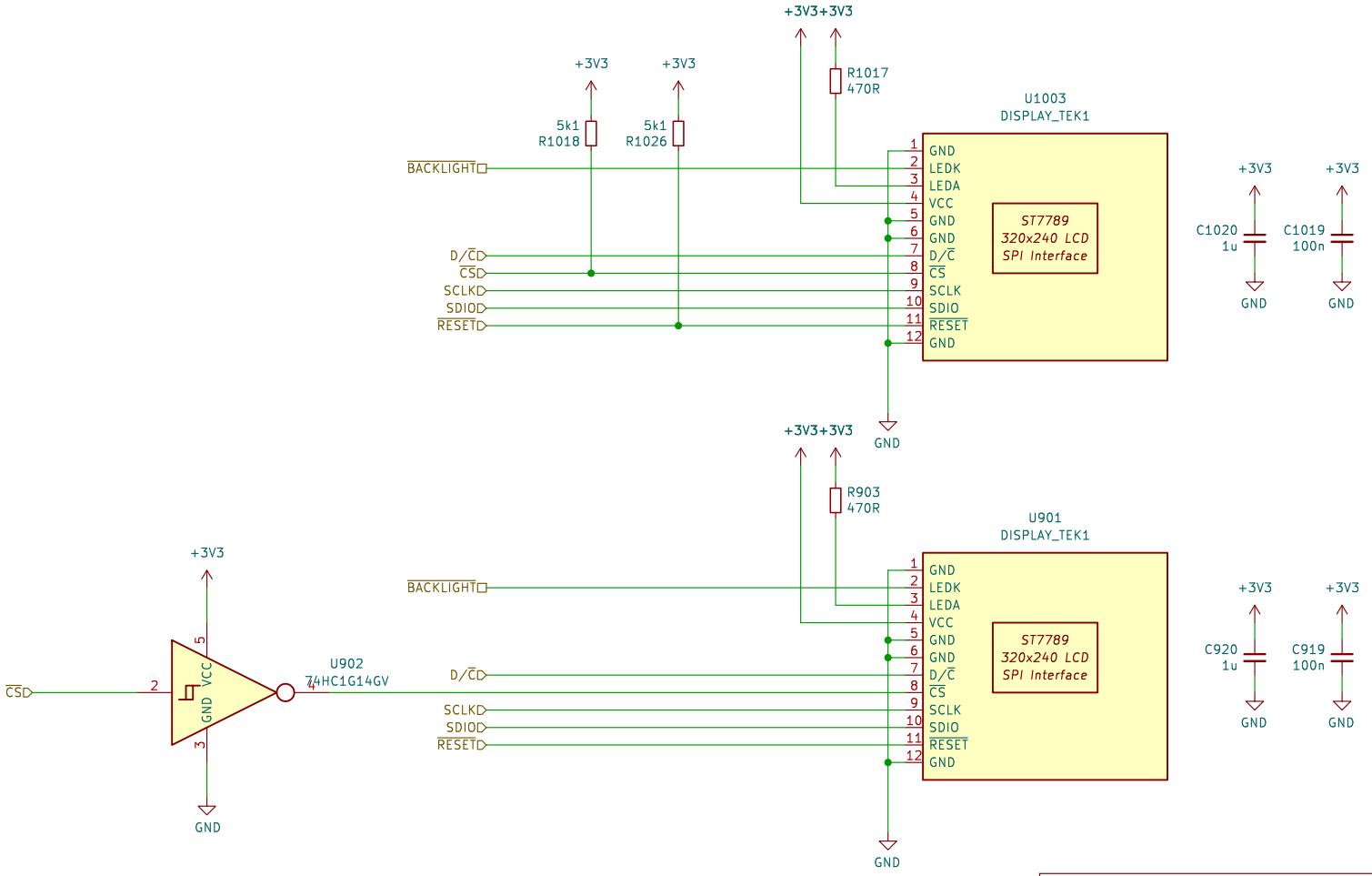

Sheet: /UI_DISPLAY/		
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Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. kicad-cli 7.0.11+1		Id: 11/11