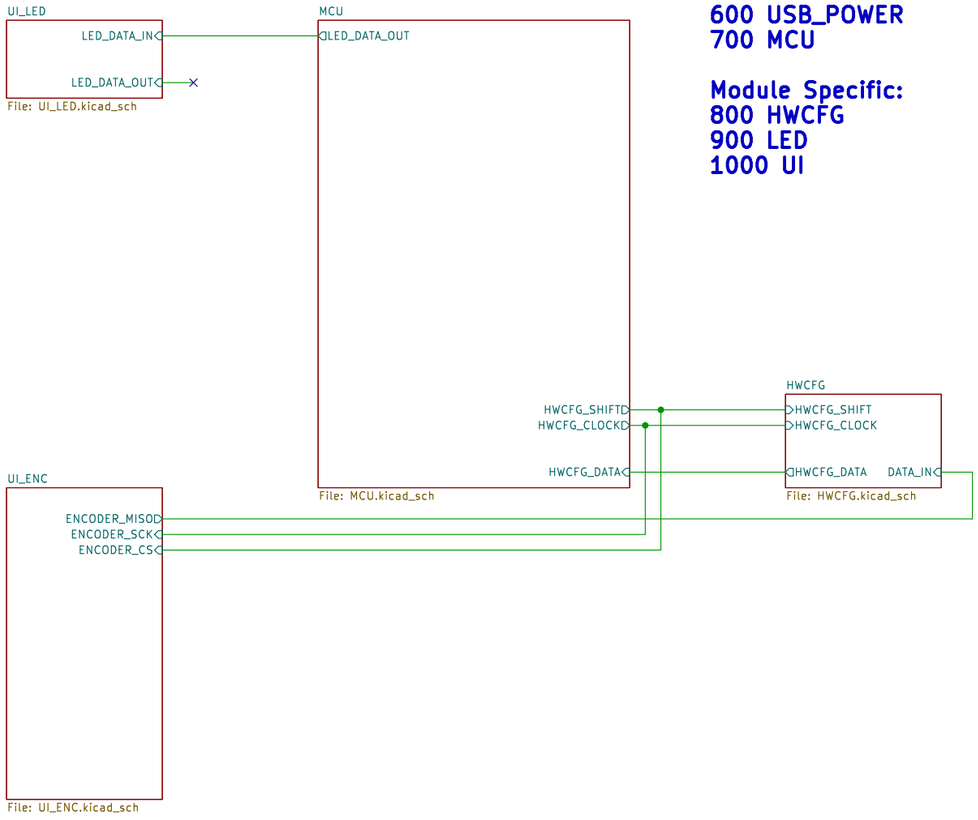
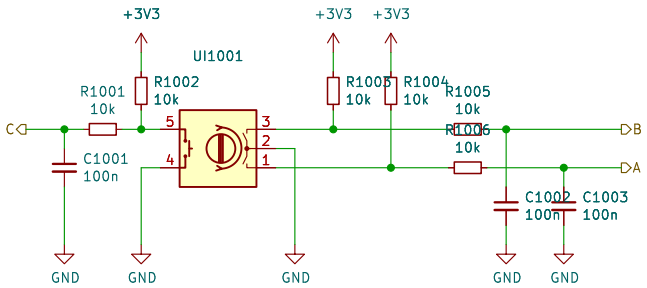


Common Sheets:
500 GRID
600 USB_POWER
700 MCU

Module Specific:
800 HWCFG
900 LED
1000 UI

Sheet: /		
File: PCBA-EN16.kicad_sch		
Title:		
Size: A3	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 1/23



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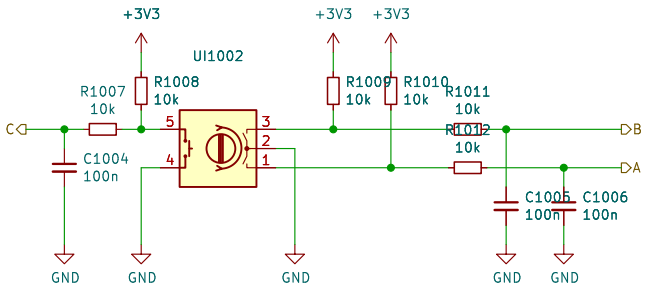
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 2/23



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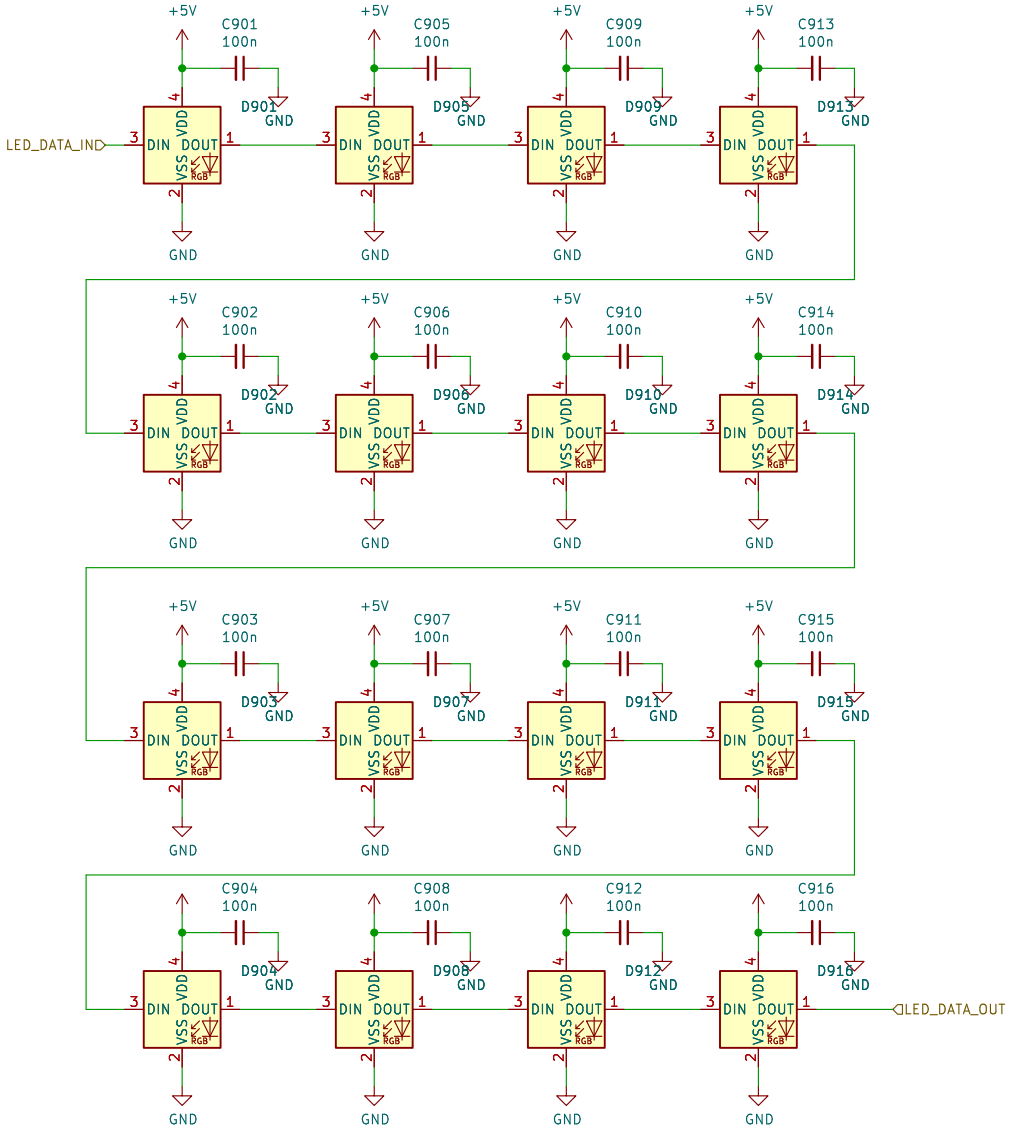
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 3/23

900



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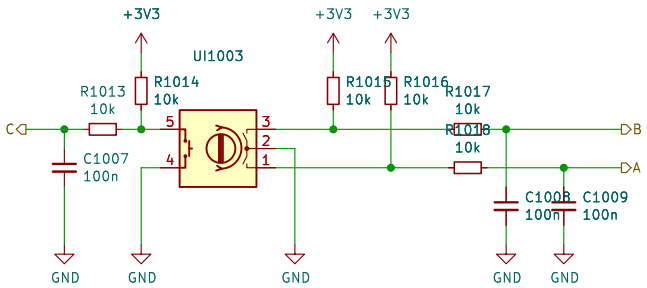
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 4/23



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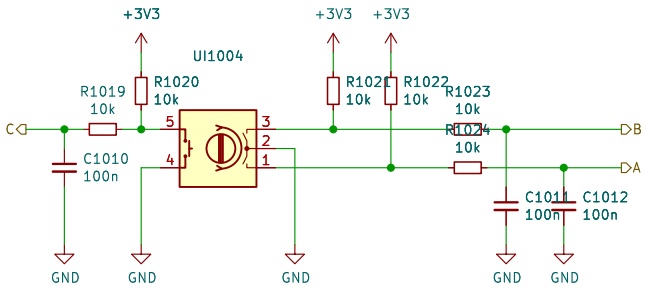
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 5/23



Sheet: /UI_ENC/ENCODER_12/
File: UI_ENC_FILTER.kicad_sch

Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 6/23

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
VDD_SPI
GND

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

1.8nH LQG15HS1N8S02D
3.9pF GJM1555C1H3R9WB01D
1.8pF GJM1555C1H1R8BB01D

ESP32-S3
CHIP_PU
LNA_IN
GPIO19 D-
GPIO20 D+
GPIO26 SPICS1
GPIO27 SPIHD
GPIO28 SPIWP
GPIO29 SPICS0
GPIO30 SPICLK
GPIO31 SPIQ
GPIO32 SPID
XTAL_P
XTAL_N
GPIO39 MTCK
GPIO40 MTDO
GPIO41 MTDI
GPIO42 MTMS
GPIO43 UOTXD
GPIO44 UORXD
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
U704
40MHz Y701
C748 10p
C750 10p

LCSC:
TXM40M0004322HBCEO00T
S3240000091040JY

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
UOTXD
UORXD
1k R733
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

R735 5k1
SW702 C2905169
ESP_RESET
C758 1u

SW703 C2905169
ESP_BOOT0

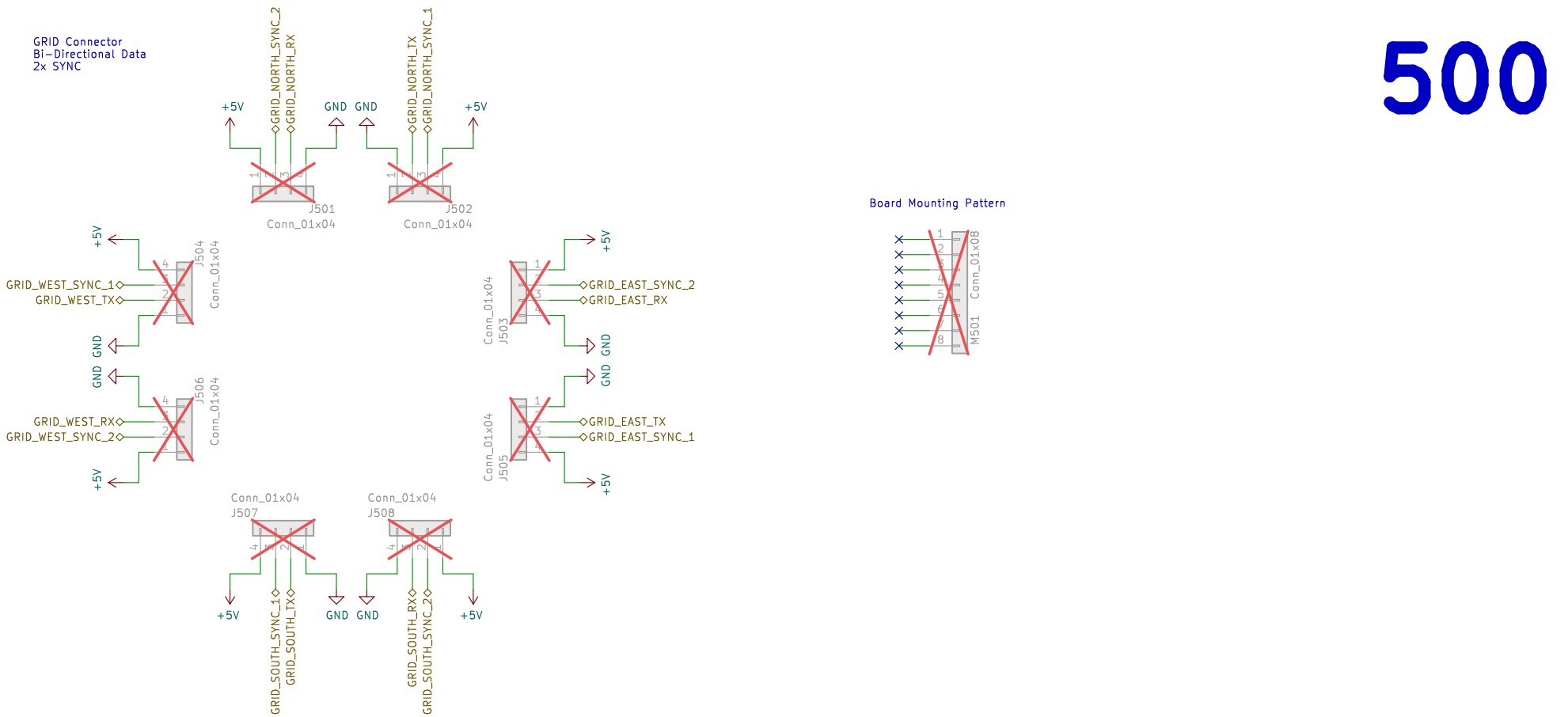
+1V1
C731 100n
C732 100n
C733 1u
C734 1u
C735 100n
C736 100n
C737 100n
C738 100n
C740 100n
C741 100n
C744 100n
C745 100n
R729 5k1
RP_RUN
RUN
VREG_VOUT
DVDD
IOVDD
USB_VDD
ADC_AVDD
VREG_IN
USB_DP
USB_DM
QSPI_SS
QSPI_SD0
QSPI_SD1
QSPI_SD2
QSPI_SD3
QSPI_SCLK
RP_CLK
XIN
XOUT
RP_SWCLK
RP_SWDIO
SWCLK
SWD
TESTEN
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
GPIO12 TP701 TestPoint
GPIO13 TP702 TestPoint
GPIO14 TP703 TestPoint
GPIO15 TP704 TestPoint
TP705 TestPoint
GPIO16 RP_SPIO_RX
GPIO17 RP_SPIO_CS
GPIO18 RP_SPIO_SCK
GPIO19 RP_SPIO_TX
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
U703
RP2040

GRID Connector
Connector arrays for the interface boards on all four sides of the module.
sheet5D85C9EA
GRID_SYNC_1
GRID_WEST_TX
GRID_WEST_RX
GRID_SYNC_2
GRID_WEST_SYNC_1
GRID_WEST_TX
GRID_WEST_RX
GRID_WEST_SYNC_2
GRID_SYNC_1
GRID_SOUTH_TX
GRID_SOUTH_RX
GRID_SYNC_2
GRID_SOUTH_SYNC_1
GRID_SOUTH_TX
GRID_SOUTH_RX
GRID_SOUTH_SYNC_2
GRID_SYNC_1
GRID_EAST_TX
GRID_EAST_RX
GRID_SYNC_2
GRID_EAST_SYNC_1
GRID_EAST_TX
GRID_EAST_RX
GRID_EAST_SYNC_2
GRID_SYNC_1
GRID_NORTH_TX
GRID_NORTH_RX
GRID_SYNC_2
GRID_NORTH_SYNC_1
GRID_NORTH_TX
GRID_NORTH_RX
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
SPICLK
SPID
SPIQ
SPIWP
SPIHD
C755 1u
C756 100n

Sheet: /MCU/
File: MCU.kicad_sch
Title:
Size: A3
Date:
Rev:
KiCad E.D.A. 8.0.5
Id: 7/23



500

Sheet: /MCU/sheet5D85C9EA/
File: GRID.kicad_sch

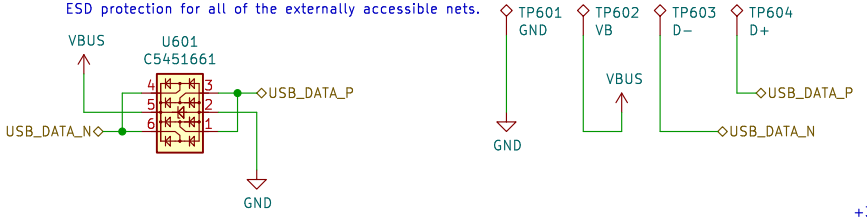
Title:

Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 8/23

600

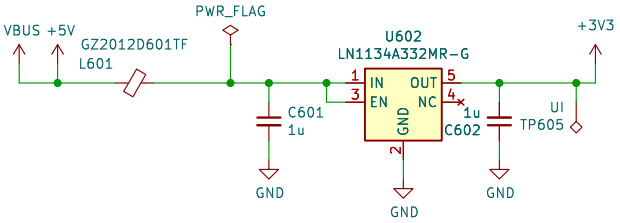
ESD Diodes

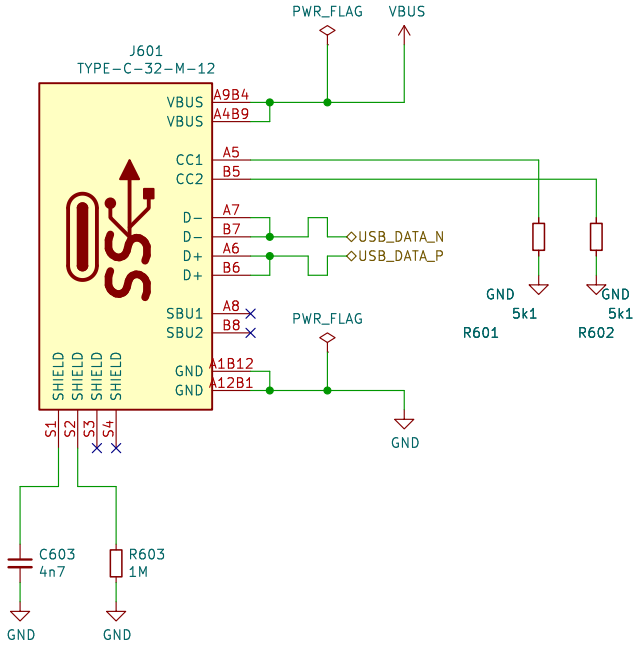
ESD protection for all of the externally accessible nets.



+3V3 LDO Regulators

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





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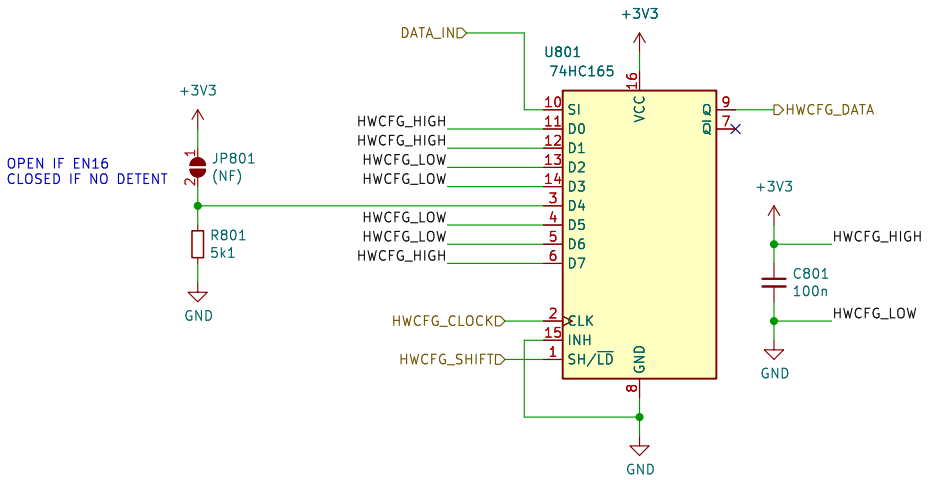
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 9/23

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)

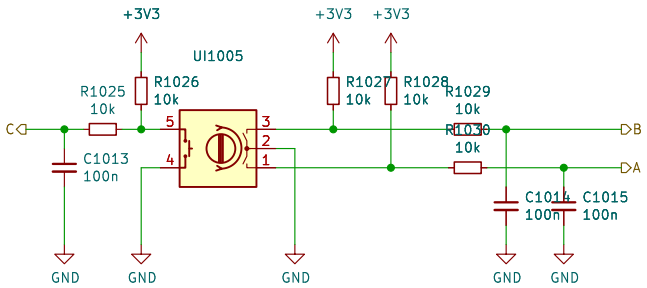
Model Codes (D3–D0):

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. 8.0.5		Id: 10/23



Sheet: /UI_ENC/ENCODER_0/		
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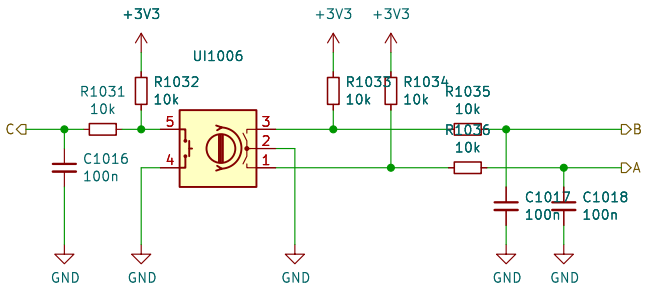
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 11/23



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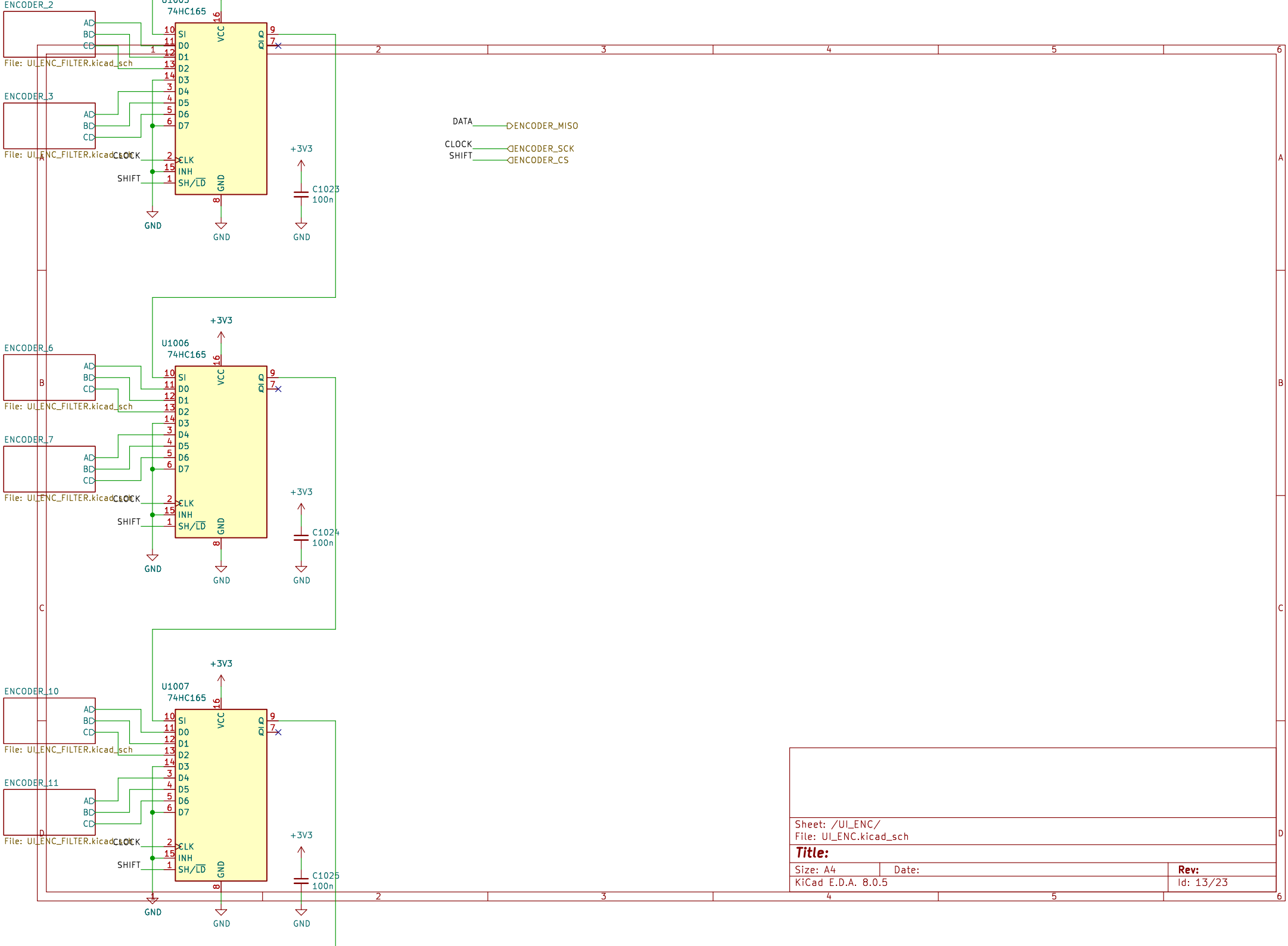
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 12/23


ENCODER_2
AD
BD
CD
File: UI_ENC_FILTER.kicad_sch
ENCODER_3
AD
BD
CD
File: UI_ENC_FILTER.kicad_sch
U1005
74HC165
SI
D0
D1
D2
D3
D4
D5
D6
D7
CLK
INH
SH/LD
VCC
GND
Q
Q
CLOCK
SHIFT
GND
GND
+3V3
C1023
100n
GND
DATA
ENCODER_MISO
CLOCK
ENCODER_SCK
SHIFT
ENCODER_CS
ENCODER_6
AD
BD
CD
File: UI_ENC_FILTER.kicad_sch
ENCODER_7
AD
BD
CD
File: UI_ENC_FILTER.kicad_sch
U1006
74HC165
+3V3
C1024
100n
ENCODER_10
AD
BD
CD
File: UI_ENC_FILTER.kicad_sch
ENCODER_11
AD
BD
CD
File: UI_ENC_FILTER.kicad_sch
U1007
74HC165
+3V3
C1025
100n
Sheet: /UI_ENC/
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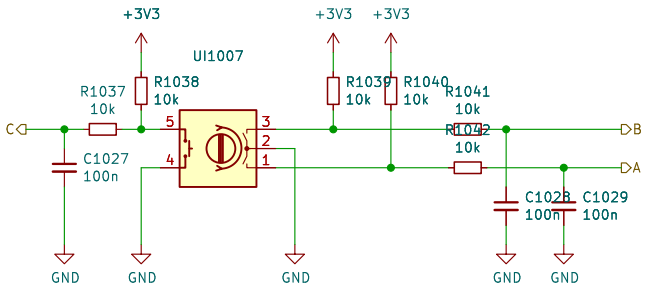
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. 8.0.5
Id: 13/23



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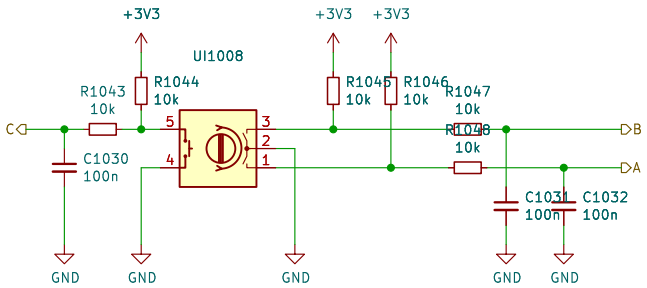
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 14/23



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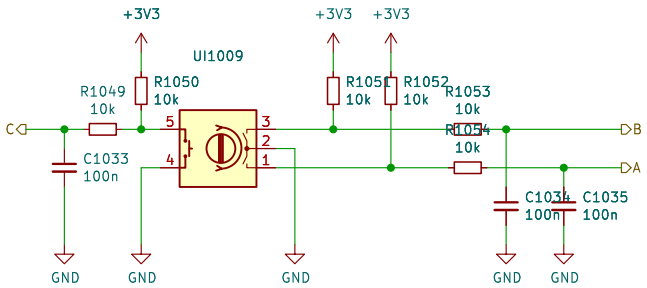
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 15/23



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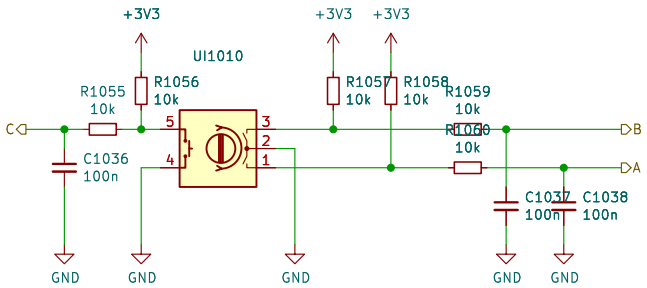
KiCad E.D.A. 8.0.5		Id: 16/23



Sheet: /UI_ENC/ENCODER_14/		
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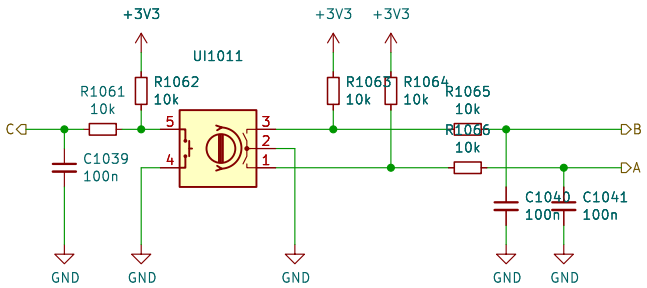
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 17/23



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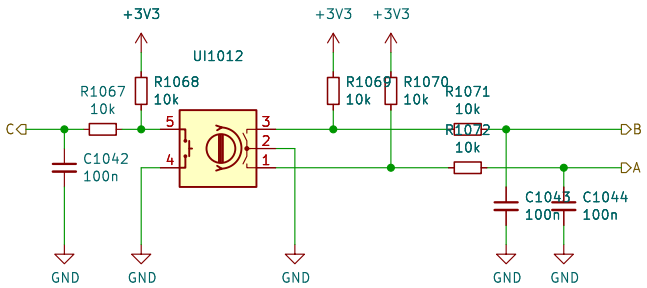
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 18/23



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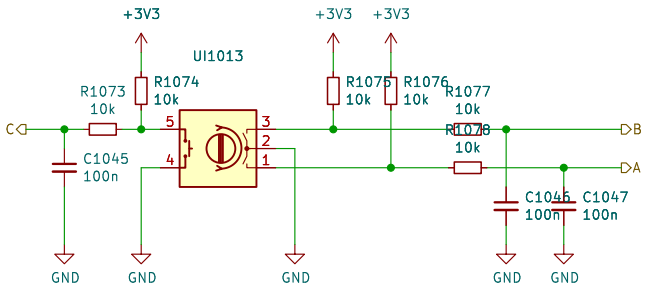
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 19/23



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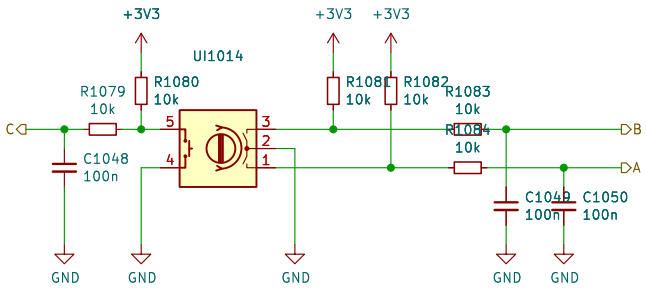
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 20/23



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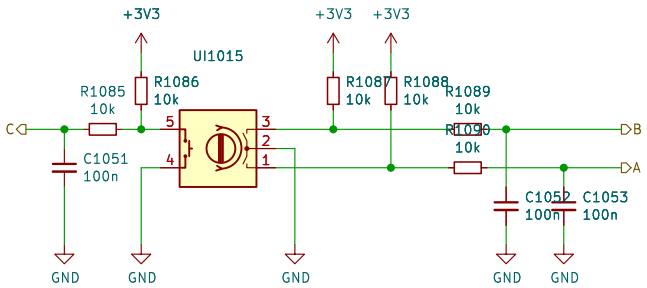
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 21/23



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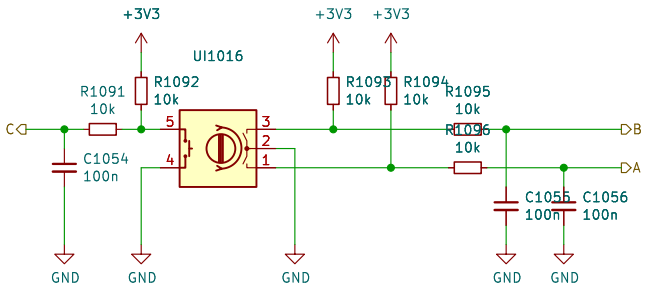
Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 22/23



Sheet: /UI_ENC/ENCODER_9/		
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Title:		
Size: A4	Date:	**Rev:**
KiCad E.D.A. 8.0.5		Id: 23/23