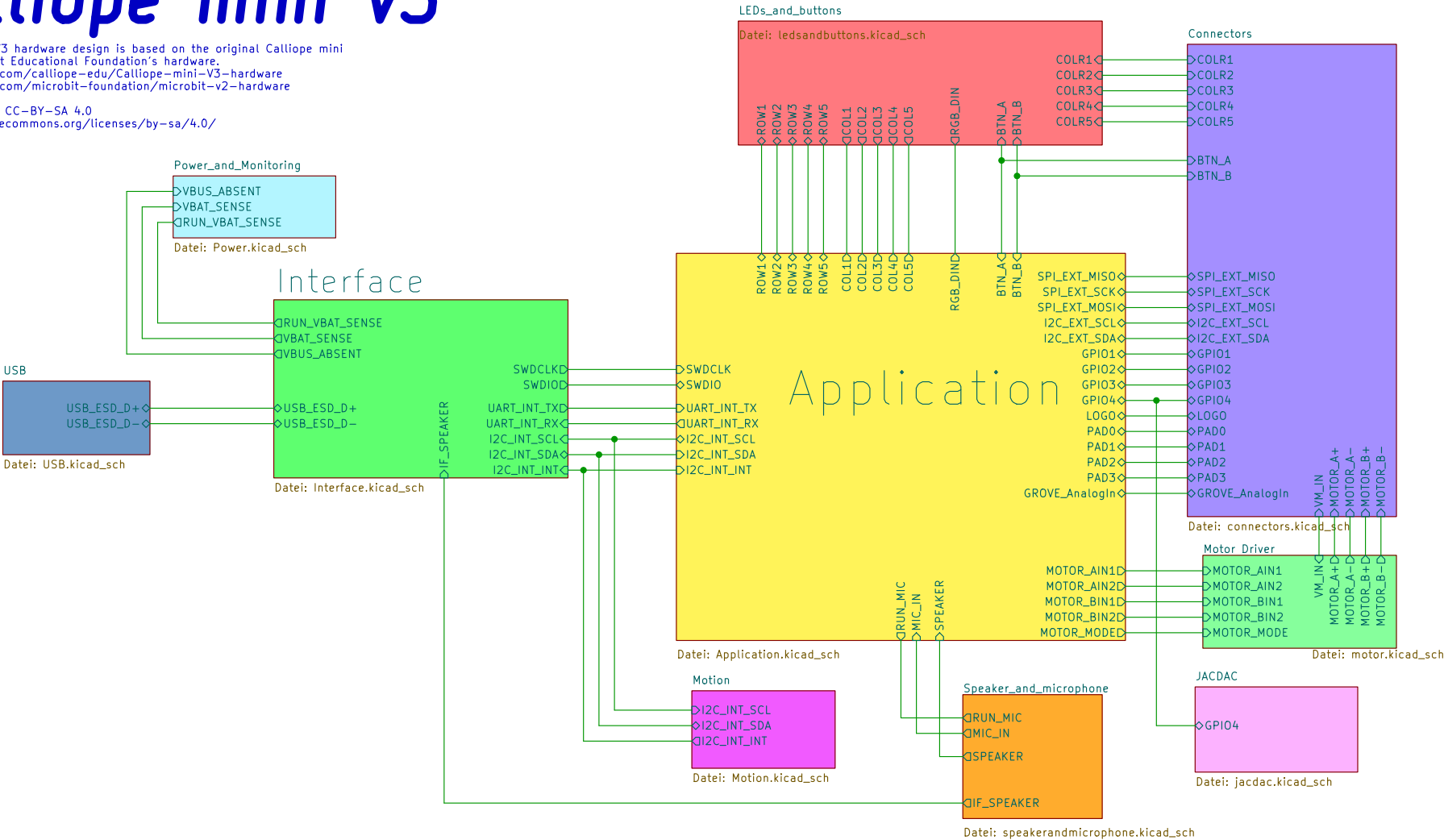


# Calliope mini V3

Calliope mini V3 hardware design is based on the original Calliope mini and of Micro:bit Educational Foundation's hardware.  
<https://github.com/calliope-edu/Calliope-mini-V3-hardware>  
<https://github.com/microbit-foundation/microbit-v2-hardware>

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<https://creativecommons.org/licenses/by-sa/4.0/>



Notes:  
- INT means internal, as EXT means external  
- IF is interface

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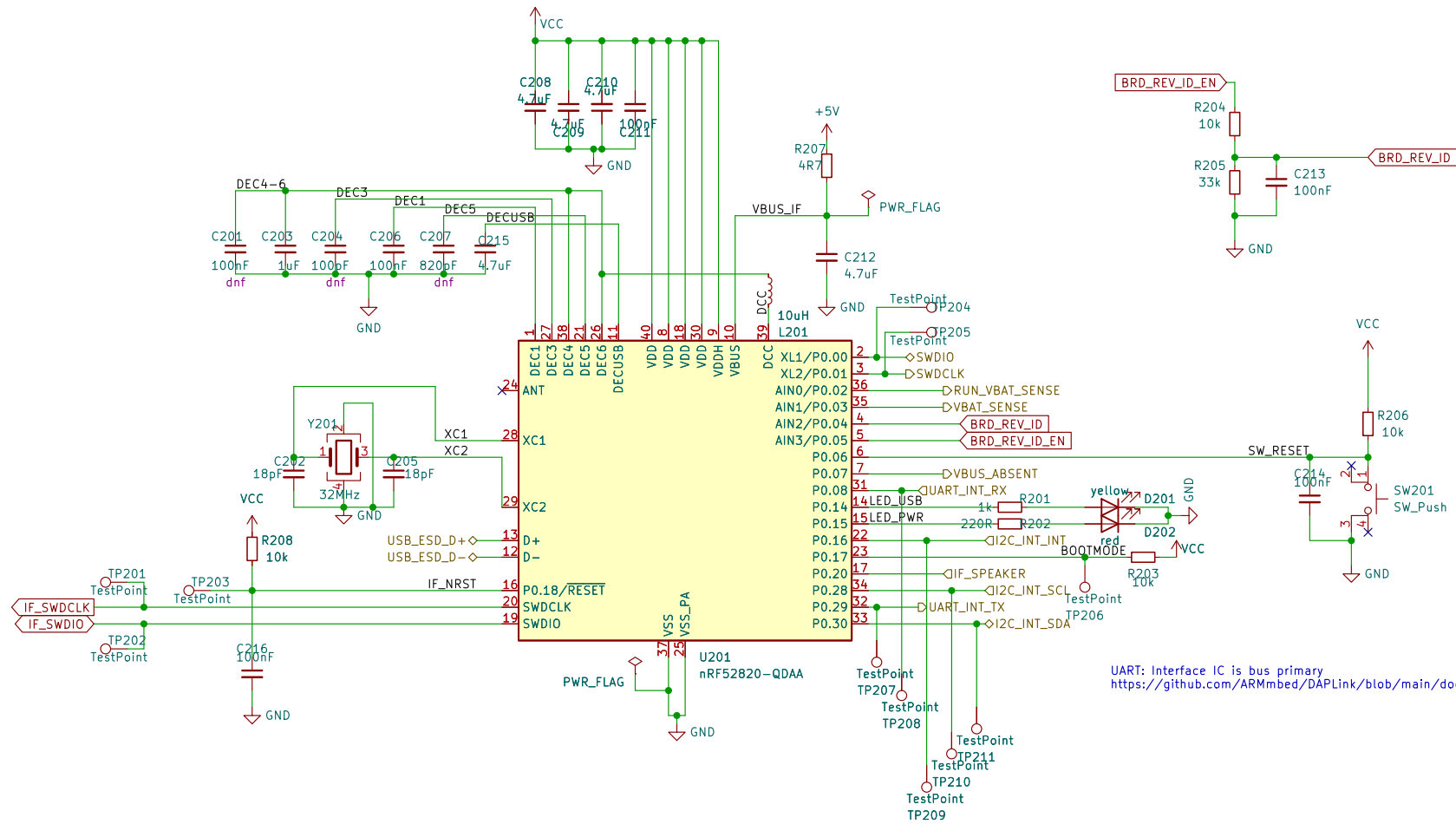
Sheet: /  
File: miniv3.kicad\_sch

Title: miniv3

Size: A4 | Date: 2023-10-12  
KiCad E.D.A. | kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Rev: REV14\_2  
Id: 1/11

# Interface Processor



UART: Interface IC is bus primary  
<https://github.com/ARMmbed/DAPLink/blob/main/docs/hic/nrf52820.md>

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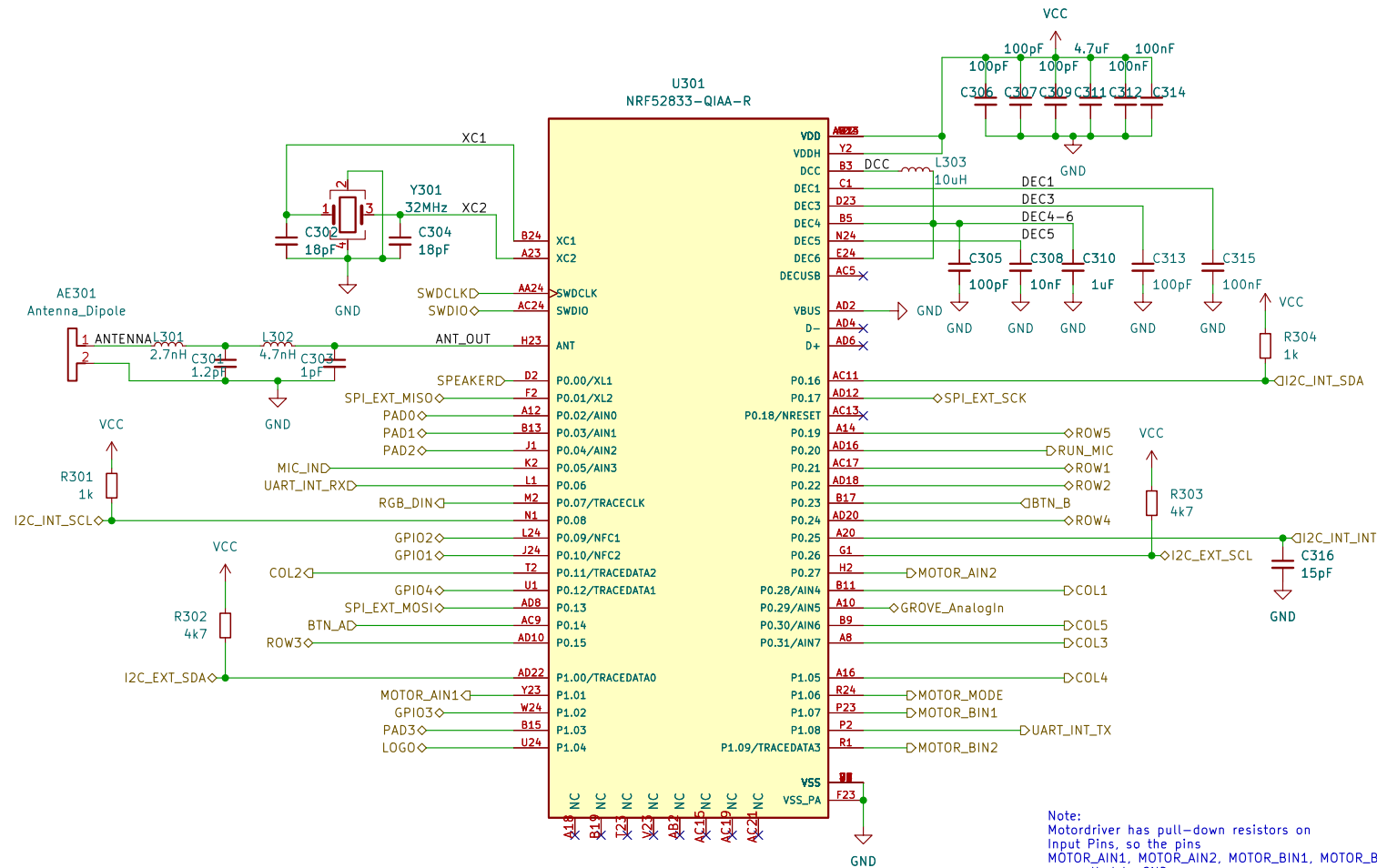
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**Title: miniv3**

Size: A4 Date: 2023-10-12  
 KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Rev: REV14\_2  
 Id: 2/11

# Application Processor



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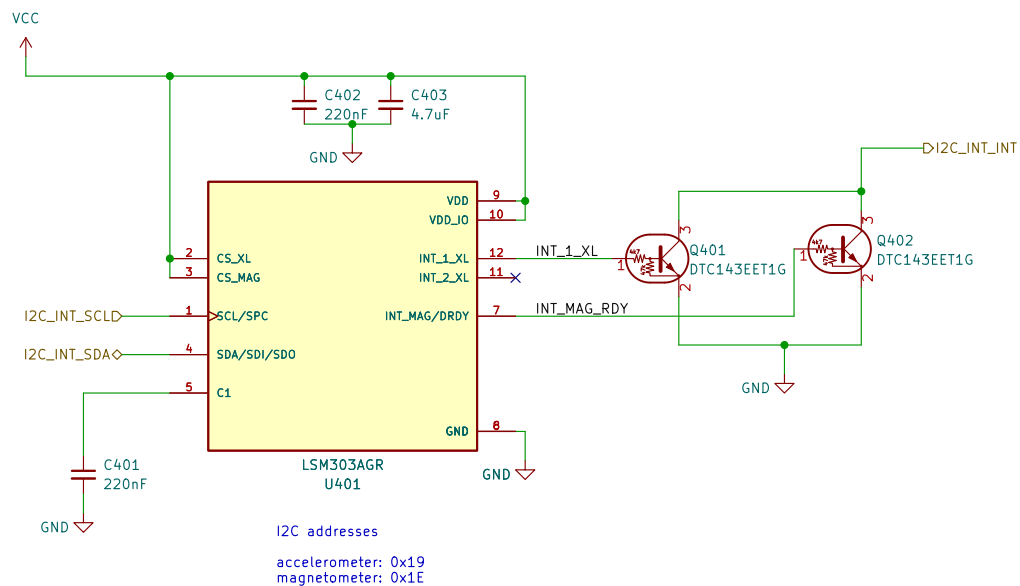
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File: Application.kicad\_sch

Title: miniv3

Size: A4 Date: 2023-10-12  
KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Rev: REV14\_2  
Id: 3/11

# Accelerometer and Magnetometer



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Sheet: /Motion/

File: Motion.kicad\_sch

**Title: miniv3**

Size: A4

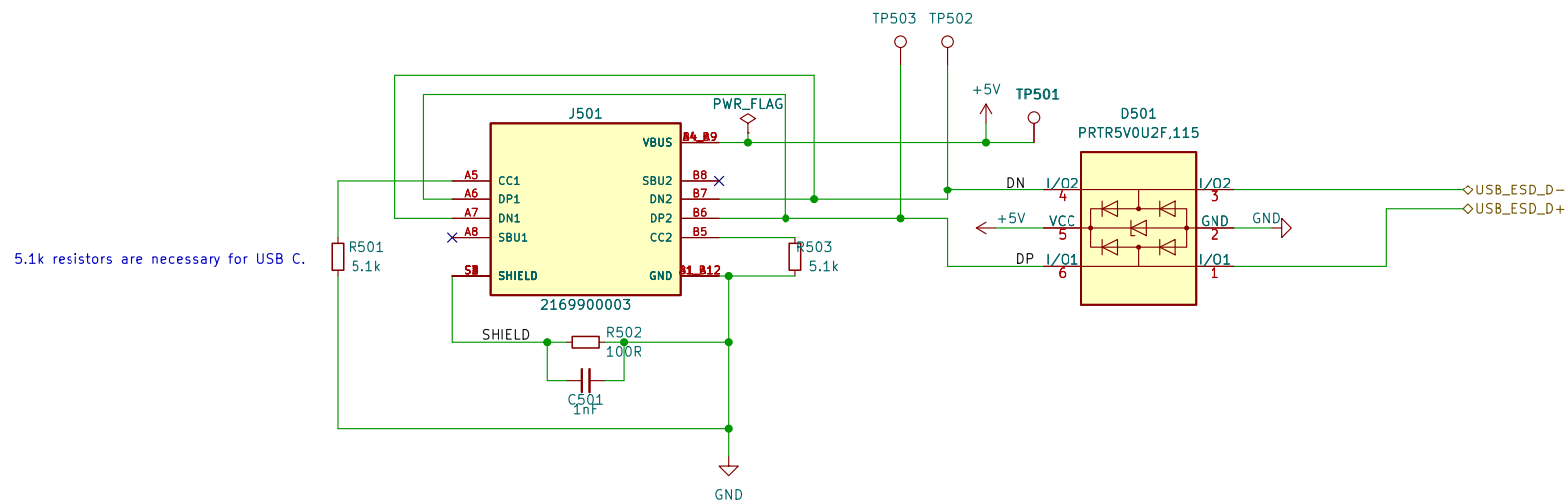
Date: 2023-10-12

Rev: REV14\_2

KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Id: 4/11

## USB C Connector



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Sheet: /USB/  
File: USB.kicad\_sch

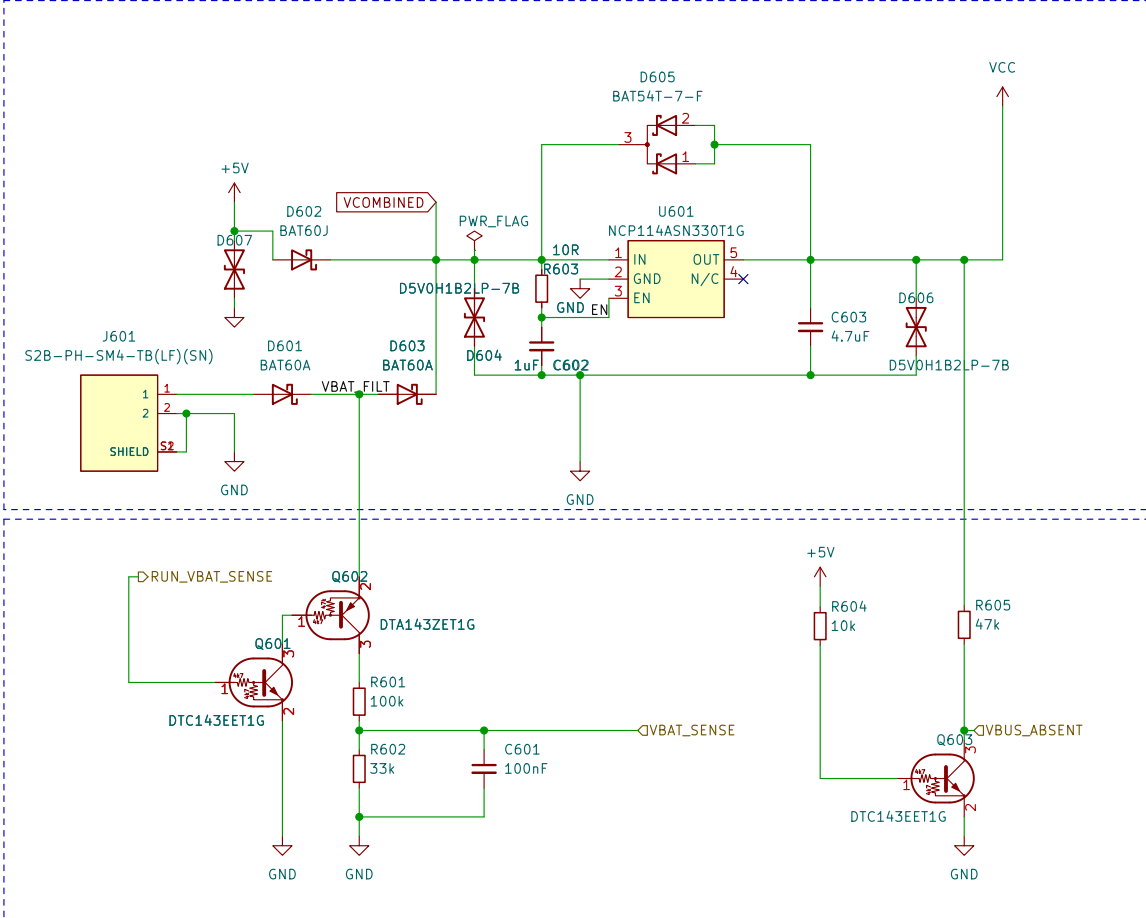
**Title:** miniv3

|                                                        |                  |
|--------------------------------------------------------|------------------|
| Size: A4                                               | Date: 2023-10-12 |
| KiCad E.D.A. kicad 6.0.11-2627ca5db0~126-ubuntu20.04.1 |                  |

|              |
|--------------|
| Rev: REV14_2 |
| Id: 5/11     |

## Power and Monitoring

**POWER**



## MONITORING

calliope gGmbH

Sheet: /Power\_and\_Monitoring/  
File: Power.kicad\_sch

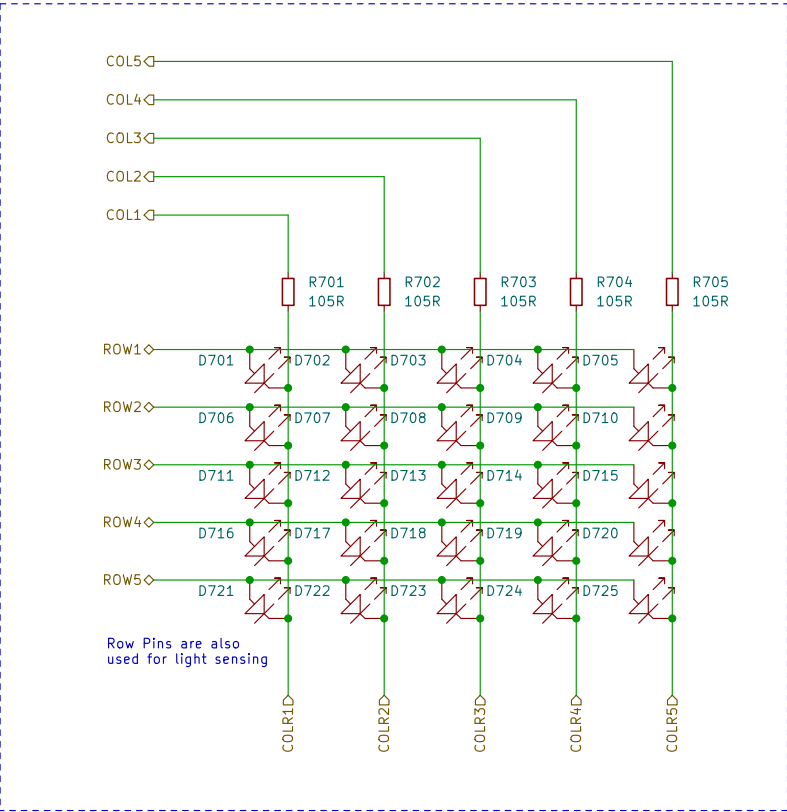
Title: miniv3

|                                                        |                  |
|--------------------------------------------------------|------------------|
| Size: A4                                               | Date: 2023-10-12 |
| KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1 |                  |

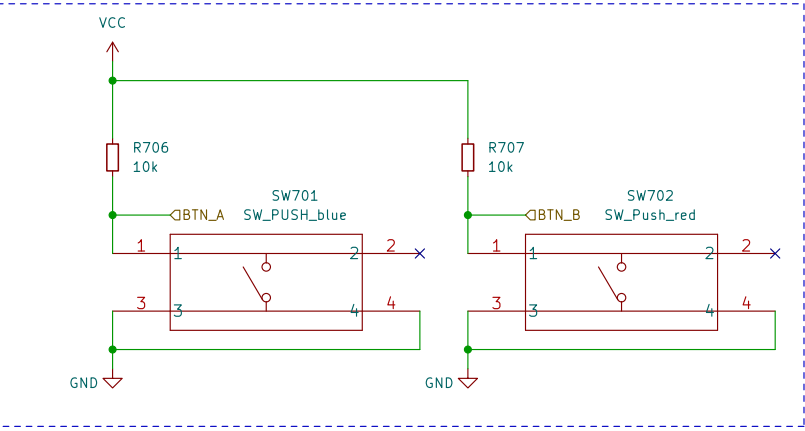
Rev: REV14\_2  
Id: 6/11

# LEDs and buttons

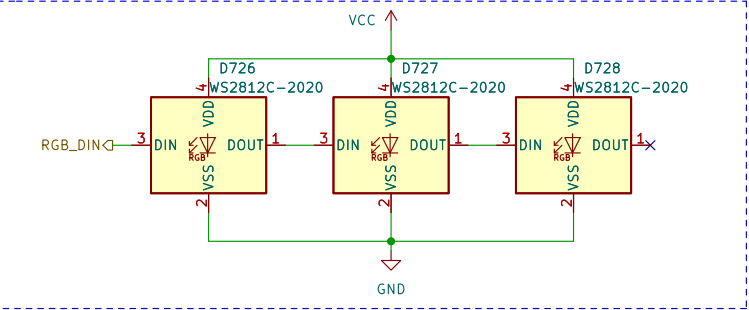
## 5x5 LED Matrix



## Input Buttons



## RGB LED



calliope gGmbH

Sheet: /LEDs\_and\_buttons/  
File: ledsandbuttons.kicad\_sch

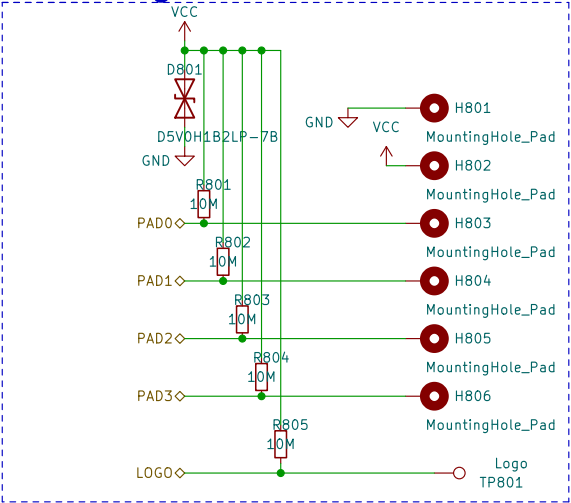
Title: miniv3

Size: A4 Date: 2023-10-12  
KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Rev: REV14\_2  
Id: 7/11

# Connectors

## Edge connectors

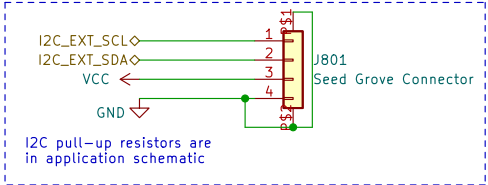


10M resistors for touch sensing

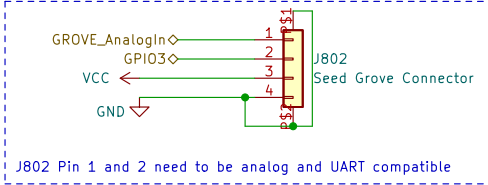
## Fiducials

- FID801
- FID802
- FID803
- FID804

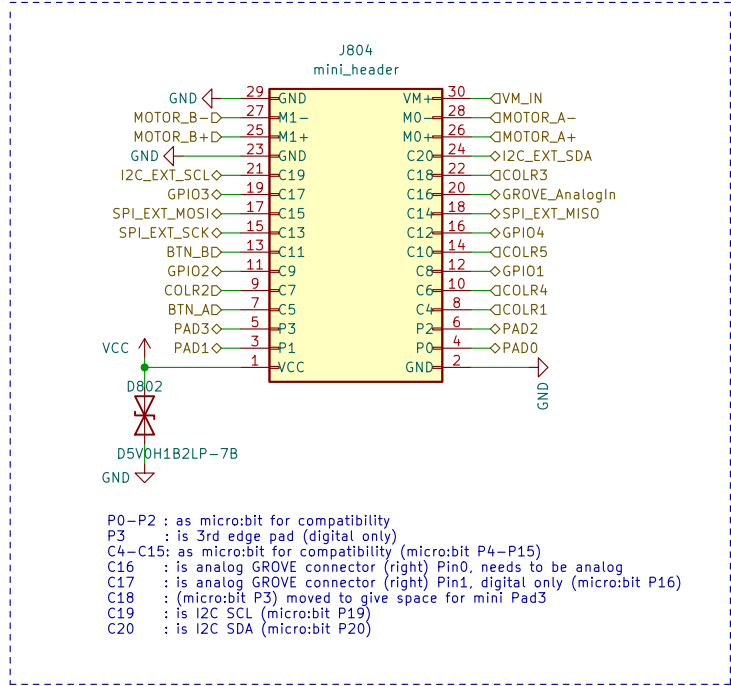
## I2C Grove Connector



## UART/Analog Grove Connector



## mini Connector



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Sheet: /Connectors/  
File: connectors.kicad\_sch

Title: miniv3

Size: A4 | Date: 2023-10-12  
KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

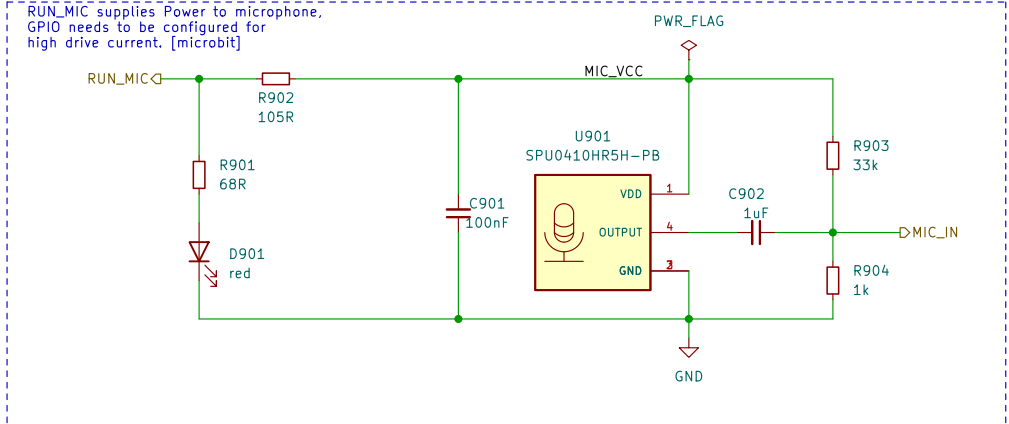
Rev: REV14\_2  
Id: 8/11



# Speaker and microphone

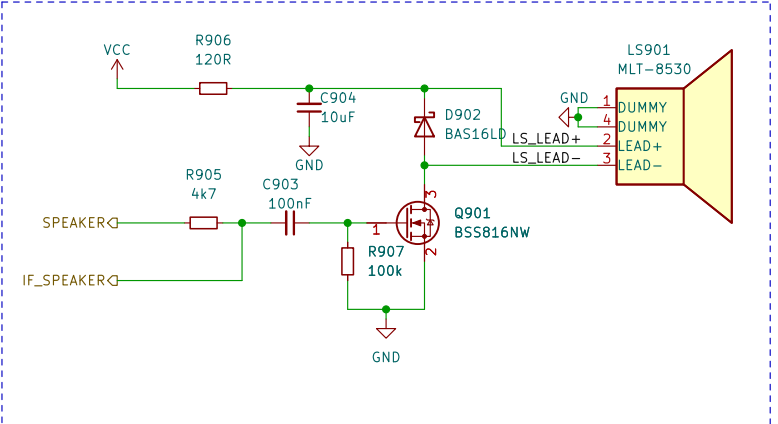
### Microphone

RUN\_MIC supplies Power to microphone, GPIO needs to be configured for high drive current. [microbit]



The microphone circuit diagram shows a microphone module U901 (SPU0410HR5H-PB) connected to a microcontroller. The module has three pins: VDD (pin 1), OUTPUT (pin 4), and GND (pin 3). The VDD pin is connected to a power source RUN\_MIC through a 105R resistor (R902) and a 68R resistor (R901) in series with a red LED (D901). The OUTPUT pin is connected to a 1k resistor (R904) and a 1uF capacitor (C902) in parallel, which is then connected to the MIC\_IN pin of the microcontroller. The GND pin is connected to a common ground. A 33k resistor (R903) is connected between the MIC\_VCC pin and the common ground. A PWR\_FLAG pin is also shown, connected to the common ground.

### Speaker



The speaker circuit diagram shows a speaker module LS901 (MLT-8530) connected to a microcontroller. The module has three pins: DUMMY (pin 1), DUMMY (pin 4), and LEAD+ (pin 2). The LEAD+ pin is connected to a 100k resistor (R907) and a 100nF capacitor (C903) in parallel, which is then connected to the IF\_SPEAKER pin of the microcontroller. The LEAD- pin is connected to a common ground. The DUMMY pins are connected to a common ground. A 120R resistor (R906) is connected between the VCC pin and the common ground. A 4k7 resistor (R905) is connected between the SPEAKER pin and the common ground. A 10uF capacitor (C904) is connected between the VCC pin and the common ground. A BAS16LD diode (D902) is connected between the VCC pin and the common ground. A BSS816NW transistor (Q901) is connected between the VCC pin and the common ground, with its base connected to the IF\_SPEAKER pin.

|                                                        |                  |              |
|--------------------------------------------------------|------------------|--------------|
| calliope gGmbH                                         |                  |              |
| Sheet: /Speaker_and_microphone/                        |                  |              |
| File: speakerandmicrophone.kicad_sch                   |                  |              |
| Title: miniv3                                          |                  |              |
| Size: A4                                               | Date: 2023-10-12 | Rev: REV14_2 |
| KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1 | Id: 9/11         |              |

B



B



Sheet: /Speaker\_and\_microphone/  
File: speakerandmicrophone.kicad\_sch

|                                     |                  |
|-------------------------------------|------------------|
| Size: A4                            | Date: 2023-10-12 |
| KiCad E.D.A. kicad 6.0.11-2627ca5db |                  |

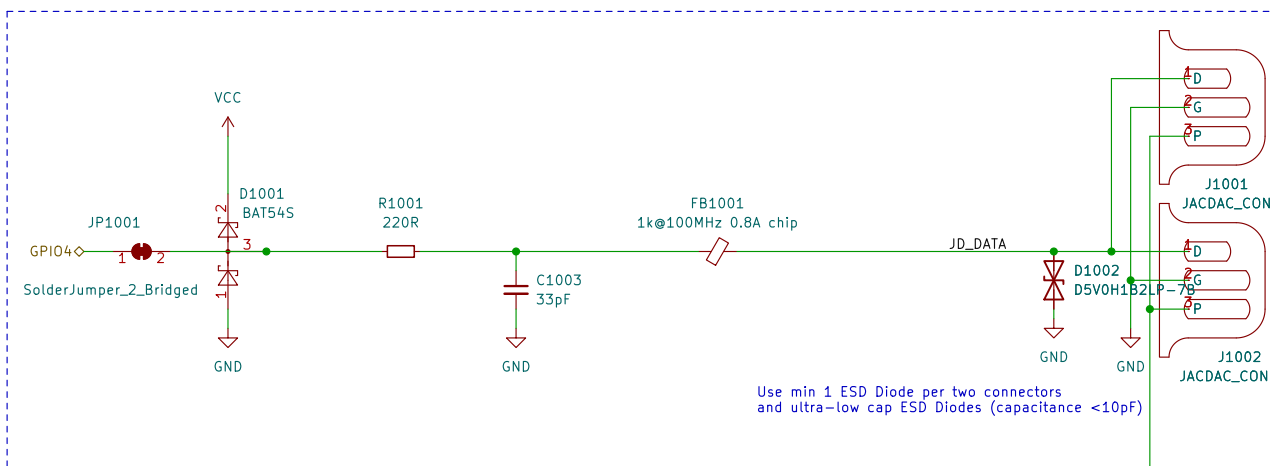
Rev: REV14\_2

Id: 9/11

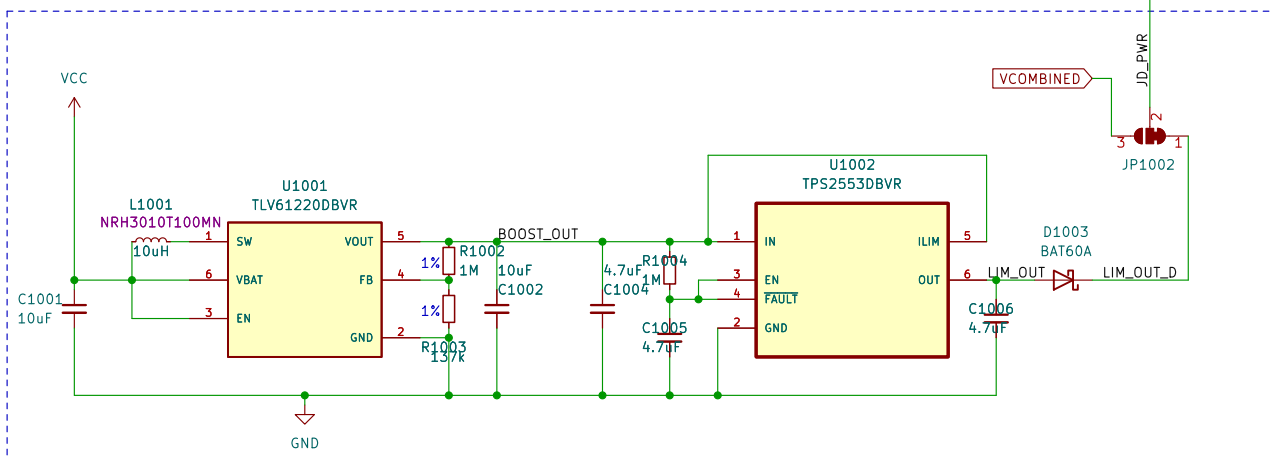
# JACDAC

based on the JACDAC-DDK by Microsoft  
<https://github.com/microsoft/jacdac-ddk>  
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<https://creativecommons.org/licenses/by-sa/4.0/>

## JACDAC Connector



## JACDAC Power



calliope gGmbH

Sheet: /JACDAC/

File: jacdac.kicad\_sch

Title: miniv3

Size: A4

Date: 2023-10-12

KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1

Rev: REV14\_2

Id: 10/11

# Motor Driver

Motor Driver circuitry is designed for Phase/Enable Mode.  
This mode only requires 1 PWM per output and 1 GPIO:  
Phase sets direction (GPIO)  
Enable sets the speed (PWM)  
NRF52833 Pins on AIN1 and BIN1 are  
low frequency recommended to ensure stable bluetooth operation.

This LDO supplies the Board when only VM present (no connected battery)

|                                                        |                  |              |
|--------------------------------------------------------|------------------|--------------|
| calliope gGmbH                                         |                  |              |
| Sheet: /Motor Driver/<br>File: motor.kicad_sch         |                  |              |
| Title: miniv3                                          |                  |              |
| Size: A4                                               | Date: 2023-10-12 | Rev: REV14_2 |
| KiCad E.D.A. kicad 6.0.11-2627ca5db0-126-ubuntu20.04.1 |                  | Id: 11/11    |

This LDO supplies the Board when only VM present (no connected battery)

Id: 11/11