

**Analog front-end**

J1  
5-146253-8

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

R13 1K C1 22nF CH0  
R8 100 C2 22nF CH1  
R9 1K C3 22nF CH2  
R6 100 C4 22nF CH3  
R5 1K C5 22nF CH4  
R10 100 C6 22nF CH5  
R12 1K C7 22nF CH6  
R14 100 C8 22nF CH7  
R15 1K C9 22nF CH8  
R11 100 C10 22nF CH9  
R7 1K C11 22nF CH10  
R3 100 C12 22nF CH11  
R16 1K C13 22nF CH12  
R2 100 C14 22nF CH13  
R4 1K C15 22nF CH14  
R9 100 C16 22nF CH15

CH1 29 AVDD\_30  
CH2 31 AGND\_2  
CH3 32 AGND\_3  
CH4 33 AGND\_4  
CH5 34 AGND\_5  
CH6 35 AGND\_6  
CH7 36 AGND\_7  
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CH238 267 AGND\_238  
CH239 268 AGND\_239

## Reference voltage source

The diagram illustrates the reference voltage source circuit. It features a REF34xxT (U4) connected to a +5V supply (pin 4) and ground (pin 2). The output (pin 6) is labeled Vref and is connected to a 1nF capacitor (C24) to ground. A 100nF capacitor (C21) is connected between the +5V supply and ground. A jumper JP1 is shown connecting Vref to Vref\_ADC.

Raspberry Pi connector (pins are mirrored)

## Notes

ADC header has 16 pins: 8 x ADC inputs and 8 x GNDs  
The RC-LPF filter at the each channel input has a cut frequency of 45KHz  
Each channel ground is connected to the board ground not directly but via a 100 Ohm resistor.  
This is done because if the device from where the measured signal comes by any chance has some high voltage level at it's ground so the short circuit current will be limited by the 100 Ohm resistor or only this resistor will burn out but not the Raspberry Pi  
If you want to connect directly to ground replace 100 Ohm resistors with jumpers.

R25 and R26 are not compulsory because Raspberry Pi must have the same pullups.

Short circuit the JP1 if you want to use external reference voltage for ADC chip.

# Status Indicators

The schematic diagram illustrates the status indicators for the smuHAT. It features three LEDs: a blue LED (D2) for the Power Indicator, a yellow LED (D3) for the ADC conversion indicator, and a dual LED (D4) for the Standby indicator. The circuit includes a MOSFET (Q1) controlled by not\_EOC, a MOSFET (Q2) controlled by not\_SDN, and a 74VHC00 (S1) inverter. Various resistors (R18, R19, R20, R21, R22, R23, R24) and capacitors (C23, C25) are used for timing and current limiting. Power is supplied by +5V and GND.

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