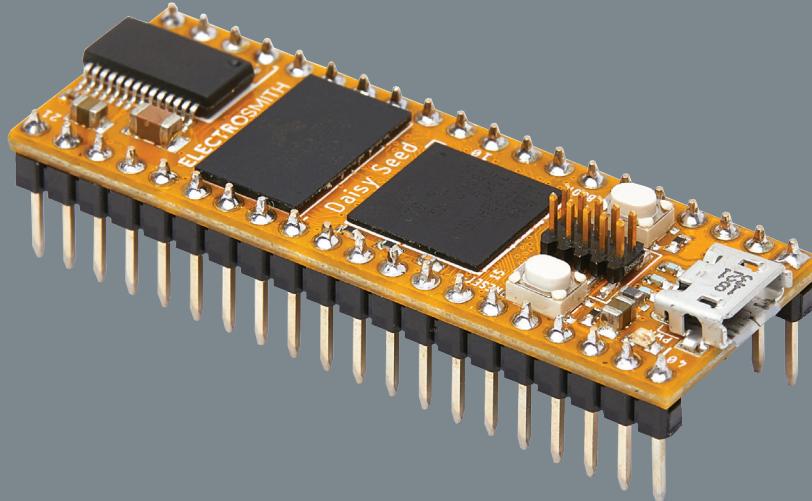


# Daisy Seed

Embedded DSP Platform



## Features:

- Embedded platform for audio applications
- 96kHz / 24-bit audio hardware
- 64MB of SDRAM for up to 10 minute long audio buffers
- ARM Cortex-M7 MCU, running at 480MHz
- 31 total GPIO pins with configurable functionality
- 12-bit Digital to Analog Converters (x2)
- SD card interfaces
- PWM outputs
- Serial Protocols for connecting external sensors and devices (SPI, UART, I2S, I2C)
- Dedicated VIN pin for power
- Micro USB port, and additional USB pins for full OTG-support as host and device

## Description:

Daisy is an embedded platform for music. It features everything you need for creating high fidelity audio hardware devices. Just plug in a USB cable and start making sound! No soldering required.

Programming the Daisy is a breeze with support for a number of languages including Arduino, and Max/MSP Gen~. To get started, simply upload an example program over USB, and start tweaking!

Documentation, and examples are hosted on our Github repository for easy download. All firmware that we develop is released for free under a permissive open source license(MIT).

## Applications:

- Electronic Instruments (Eurorack modules, synthesizers, samplers, drum machines)
- Effects Units (Desktop Effects, Effects Pedals)
- Audio Playback (Sound Installations, Audio Feedback Devices)



# ELECTROSMITH

## Colophon

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The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:  
this device may not cause harmful interference, and  
this device must accept any interference received, including interference that may cause undesired operation.

### WARNING

The connection of a non-shielded equipment interface cable to this equipment will invalidate the FCC Certification of this device and may cause interference levels which exceed the limits established by the FCC for this equipment. It is the responsibility of the user to obtain and use a shielded equipment interface cable with this device. If this equipment has more than one interface connector, do not leave cables connected to unused interfaces. Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

### WARNING

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

Disclaimer: Electrosmith products should not be used in medical or life saving devices, or any uses requiring fail-safe performance. Electrosmith reserves the right to change, add, or remove any information and assets included in the Daisy Seed datasheet at any time without prior notice.

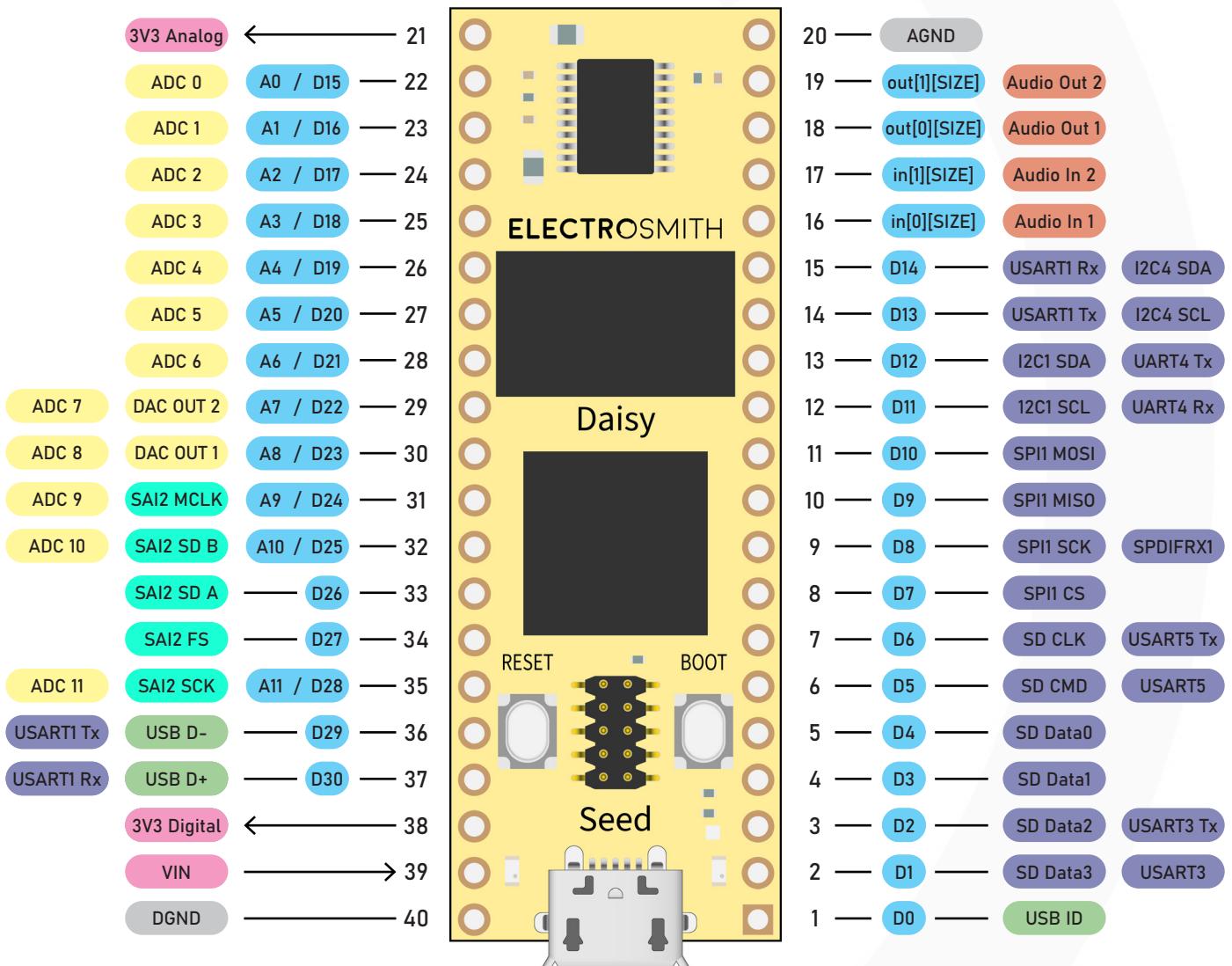
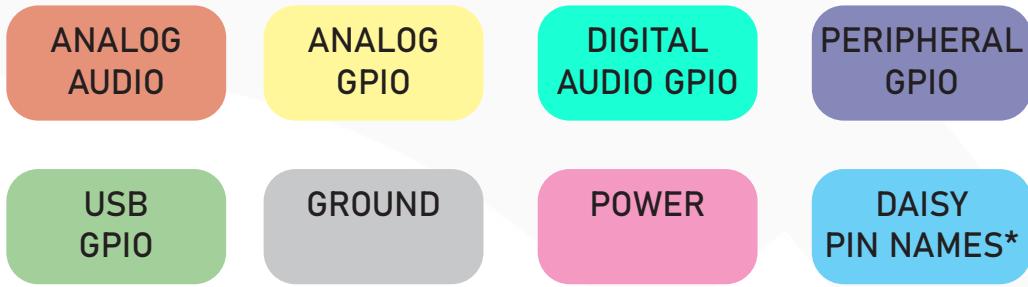


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## Pinout



\* "D" for Digital GPIO or "A" for Analog I/O, depending on use case.

PIN TYPE	MIN	MAX	UNIT
VIN Range	+4	+17	V
GPIO	0	+5	V
Audio Inputs	-1.8V	+1.8V	V

---

Audio inputs are AC coupled and 3.6Vpp, or approx. 1Vrms.

All GPIO Pins are 5V tolerant I/O except for the following pins which are 3.3V tolerant I/O:

- Pin 24 - (PB1, ADC2)
- Pin 25 - (PA7, ADC3)
- Pin 28 - (PC4, ADC6)
- Pin 29 - (PA5, ADC7)
- Pin 30 - (PA4, ADC8)

PINOUT	DAISY PIN NAME*	STM32 PIN NAME	PRIMARY FUNCTION	ALT. FUNCTION 1	ALT. FUNCTION 2	ALT. FUNCTION 3
1	D0	PB12	USB_HS_ID	UART5_RX	USART3_CK	TIM1_BKIN
2	D1	PC11	SDMMC1_D3	USART3_RX/UART4_RX	SPI3_MISO/I2S3_SDI	HRTIM_FLT2
3	D2	PC10	SDMMC1_D2	USART3_TX/UART4_TX	SPI3_SCK/I2S3_CK	HRTIM_EEV1
4	D3	PC9	SDMMC1_D1	UART5_CTS	I2S_CKIN	MCO2
5	D4	PC8	SDMMC1_D0	UART5_RTS		
6	D5	PD2	SDMMC1_CMD	UART5_RX		
7	D6	PC12	SDMMC1_CK	UART5_TX	USART3_CK	SPI3_MOSI/I2S3_SDO
8	D7	PG10	SPI1_NSS		SPI1_NSS/I2S1_WS	HRTIM_FLT5
9	D8	PG11	SPI1_SCK	SPI1_SCK/I2S1_CK	LPTIM1_IN2	HRTIM_EEV4
10	D9	PB4	SPI1_MISO	UART7_RX	SPI1_MISO/I2S1_SDI/SPI3_MISO/I2S3_SDI/SPI6_MISO	
11	D10	PB5	SPI1_MOSI	UART5_RX	SPI1_MOSI/I2S1_SDO/SPI3_MOSI/I2S3_SDO/SPI6_MOSI/I2C4_SMBA	TIM17_BKIN
12	D11	PB8	I2C1_SCL	I2C1_SCL/I2C4_SCL	UART4_RX	TIM16_CH1/TIM4_CH3
13	D12	PB9	I2C1_SDA	I2C1_SDA/I2C4_SDA/I2C4_SMBA	UART4_TX,SPI2_NSS/I2S2_WS	TIM17_CH1/TIM4_CH4
14	D13	PB6	USART1_TX	USART1_RX/LPUART1_RX/UART5_RX	I2C1_SCL/I2C4_SCL	TIM16_CH1N/TIM4_CH1
15	D14	PB7	USART1_RX	USART1_RX/LPUART1_RX	I2C1_SDA/I2C4_SDA	TIM17_CH1N/TIM4_CH2
16	NC	x	AUDIO IN L			
17	NC	x	AUDIO INR			
18	NC	x	AUDIO OUT L			
19	NC	x	AUDIO OUT R			
20	NC	x	AGND			
21	NC	x	+3V3A			
22	A0, D15	PC0	ADC0	SAI2_FS_B		
23	A1, D16	PA3	ADC1	USART2_RX		TIM2_CH4/TIM5_CH4
24	A2, D17	PB1	ADC2			TIM1_CH3N/TIM3_CH4
25	A3, D18	PA7	ADC3	SPI1_MOSI/I2S1_SDO/SPI6_MOSI		TIM1_CH1N/TIM3_CH2
26	A4, D19	PA6	ADC4	SPI1_MISO/I2S1_SDI/SPI6_MISO		TIM1_BKIN/TIM3_CH1
27	A5, D20	PC1	ADC5	I2S1_MCK		
28	A6, D21	PC4	ADC6			
29	A7, D22	PA5	ADC7	DAC1_OUT2	SPI1_SCK/I2S1_CK/SPI6_SCK	D2PWREN/TIM2_CH1
30	A8, D23	PA4	ADC8	DAC1_OUT1	SPI1_NSS/I2S1_WS/SPI3_NSS/I2S3_WS/SPI6_NSS	D1PWREN
31	A9, D24	PA1	ADC9	SAI2_MCLK_B	UART4_RX	TIM2_CH2/TIM5_CH2
32	A10, D25	PA0	ADC10	SAI2_SD_B	UART4_TX	TIM2_CH1/TIM2_ETR/TIM5_CH1
33	D26	PD11	SAI2_SD_A	I2C4_SMBA	LPTIM2_IN2	
34	D27	PG9	SAI2_FS_B	USART6_RX	SPI1_MISO/I2S1_SDI	
35	A11, D28	PA2	ADC11	SAI2_SCK_B	USART2_TX	TIM2_CH3/TIM5_CH3
36	D29	PB14	USB_HS_D_-	USART1_RX		TIM1_CH2N
37	D30	PB15	USB_HS_D_+	USART1_RX		
38	NC	x	+3V3D			
39	NC	x	VIN			

\* Pin names are the same indices preceded by "D" for Digital GPIO or "A" for Analog I/O

\* The min/max rating in this table represents the expected operating range for the device. Signals outside of this range will not necessarily damage the Daisy Seed. See [Table 1](#) for Absolute min/max ratings.

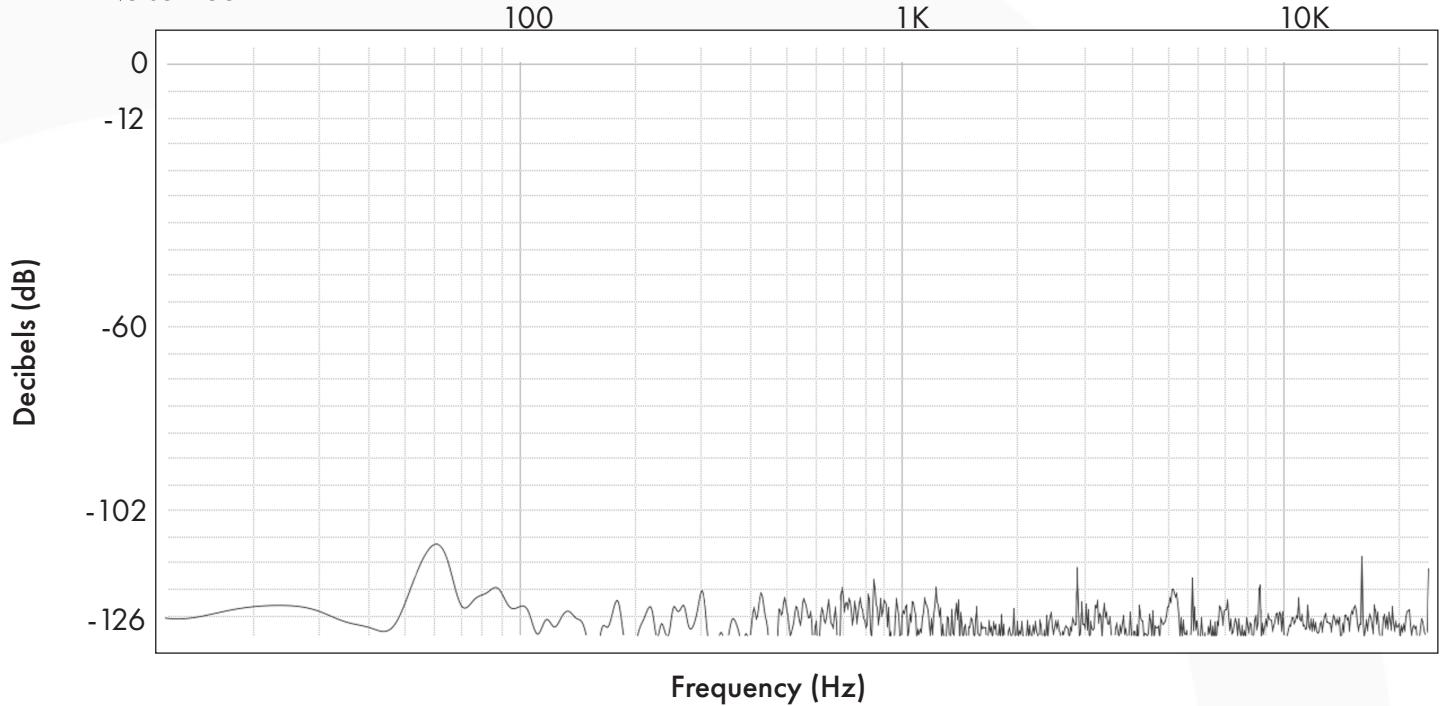
PIN NAME	PRIMARY NAME	Min	Max	Typical
1	USB_HS_ID	0V	+3V3	0 to +3V3
2	SDMMC1_D3	0V	+3V3	0 to +3V3
3	SDMMC1_D2	0V	+3V3	0 to +3V3
4	SDMMC1_D1	0V	+3V3	0 to +3V3
5	SDMMC1_D0	0V	+3V3	0 to +3V3
6	SDMMC1_CMD	0V	+3V3	0 to +3V3
7	SDMMC1_CK	0V	+3V3	0 to +3V3
8	SPI1_NSS	0V	+3V3	0 to +3V3
9	SPI1_SCK	0V	+3V3	0 to +3V3
10	SPI1_MISO	0V	+3V3	0 to +3V3
11	SPI1_MOSI	0V	+3V3	0 to +3V3
12	I2C1_SCL	0	+3V3	0 to +3V3
13	I2C1_SDA	0	+3V3	0 to +3V3
14	USART1_TX	0	+3V3	0 to +3V3
15	USART1_RX	0	+3V3	0 to 3V3
16	AUDIO IN L	0	+3V3	0 to 3V3
17	AUDIO INR	-3V	+3V	-3V to +3V
18	AUDIO OUT L	-3V	+3V	-3V to +3V
19	AUDIO OUT R	-3V	+3V	-3V to +3V
20	AGND			GND
21	+3V3A			+3V3 (output only)
22	ADC0	0V	+3V3	0 to +3V3
23	ADC1	0V	+3V3	0 to +3V3
24	ADC2	0V	+3V3	0 to +3V3
25	ADC3	0V	+3V3	0 to +3V3
26	ADC4	0V	+3V3	0 to +3V3
27	ADC5	0V	+3V3	0 to +3V3
28	ADC6	0V	+3V3	0 to +3V3
29	ADC7	0V	+3V3	0 to +3V3
30	ADC8	0V	+3V3	0 to +3V3
31	ADC9	0V	+3V3	0 to +3V3
32	ADC10	0V	+3V3	0 to +3V3
33	SAI2_SD_A	0	+3V3	0 to +3V3
34	SAI2_FS_B	0	+3V3	0 to +3V3
35	ADC11	0	+3V3	0 to +3V3
36	USB_HS_D_-	0	+3V3	0 to 3V3
37	USB_HS_D_+	0	+3V3	0 to 3V3
38	+3V3D			+3V3 (output only)
39	VIN	+4V	+17V	+4V to +17V
40	DGND			GND



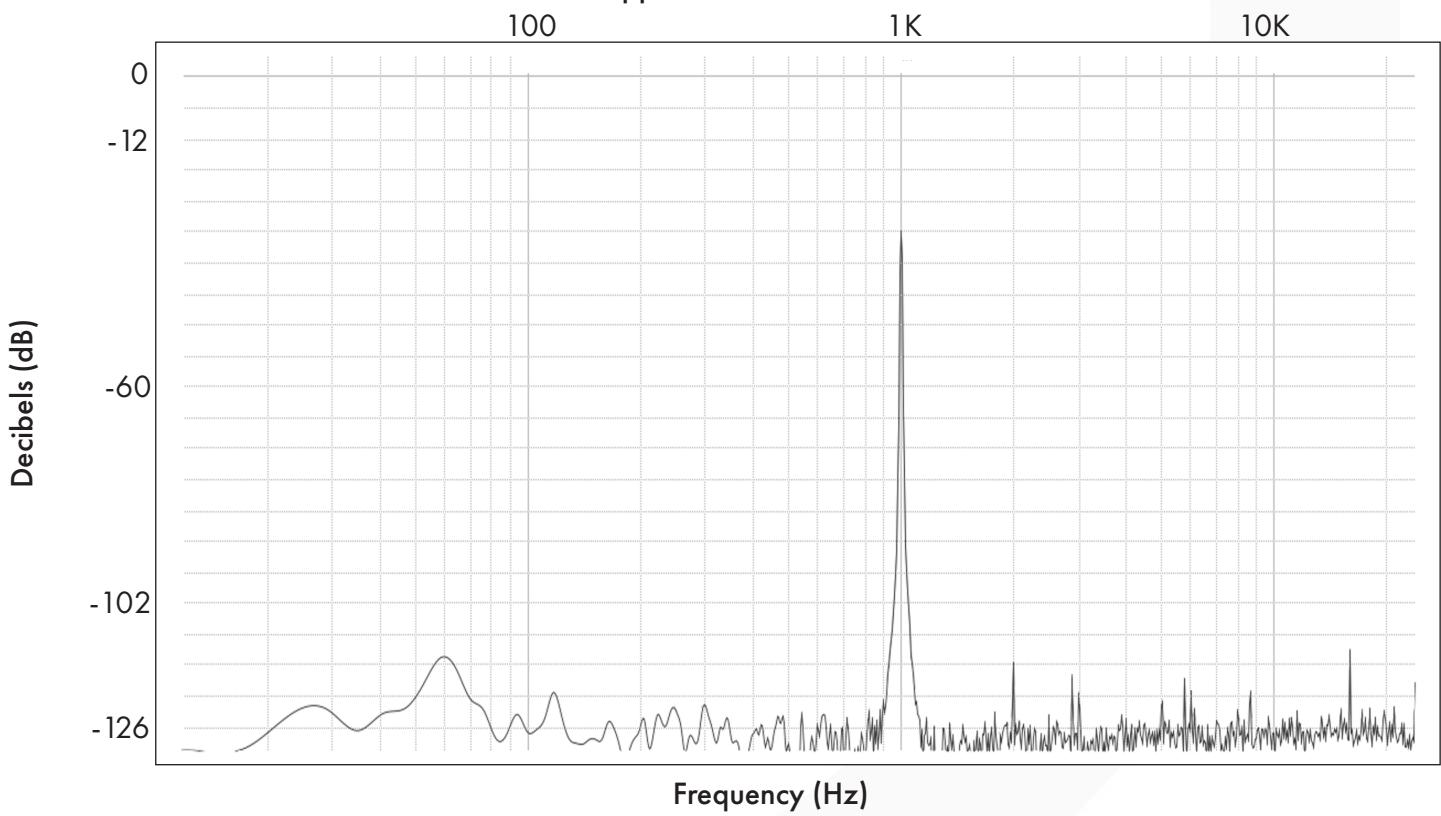
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## Audio Performance

Noise Floor



SNR: 1kHz Reference Sine Wave - 9.5Vpp

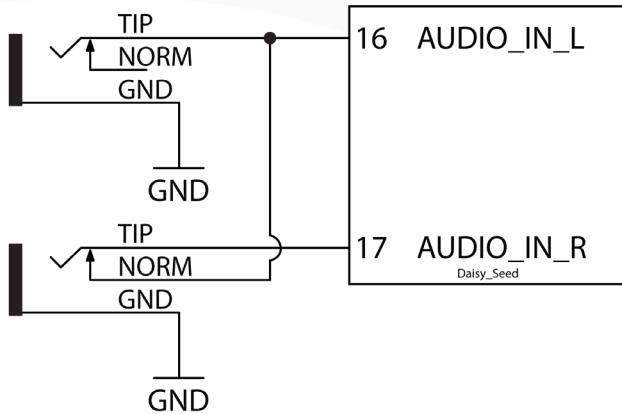




## Typical Applications

For electrical characteristics, see Table 2

Figure 1.1 - Stereo Audio Input application example



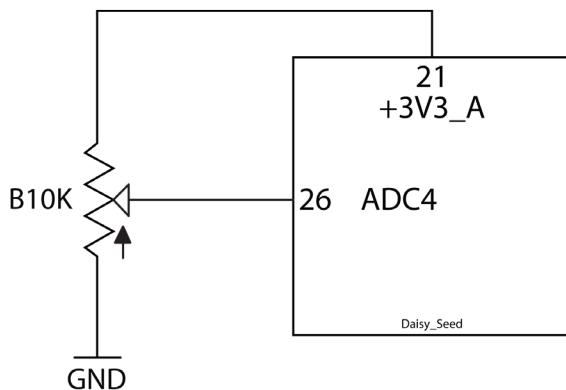
Input Impedance: 30K ohm(typ.)

Example Parts:

[Thonkiconn 3.5mm Mono Eurorack Jack](#)

MPN: WQP-WQP518MAv

Figure 1.2 - Potentiometers application example



Available Pins: Any ADC

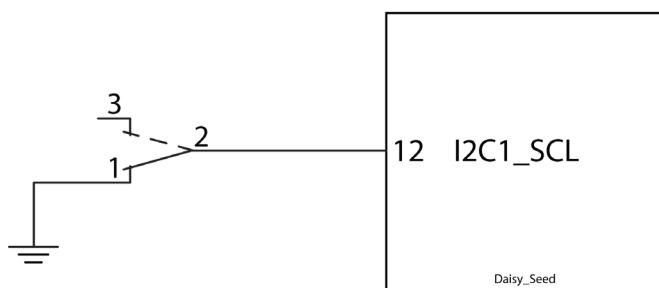
Example Parts:

[Alpha 9mm Linear 10K D Shaft](#)

MPN: RD901F-40-15F-B10K-00D70

\* When using ADC\_9 to ADC\_12, use +3V3 OUT (A10) instead of +5V OUT (A6)

Figure 1.6 - Toggle Switch application example



Available Pins: Any GPIO

Example Parts:

[Toggle Switch](#)

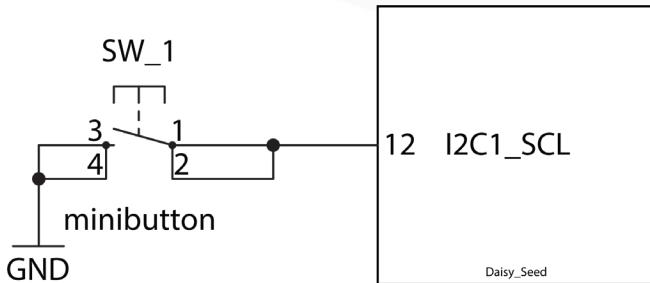
MPN: 2MS1T1B1M2QES



## Typical Applications

For electrical characteristics, see Table 2

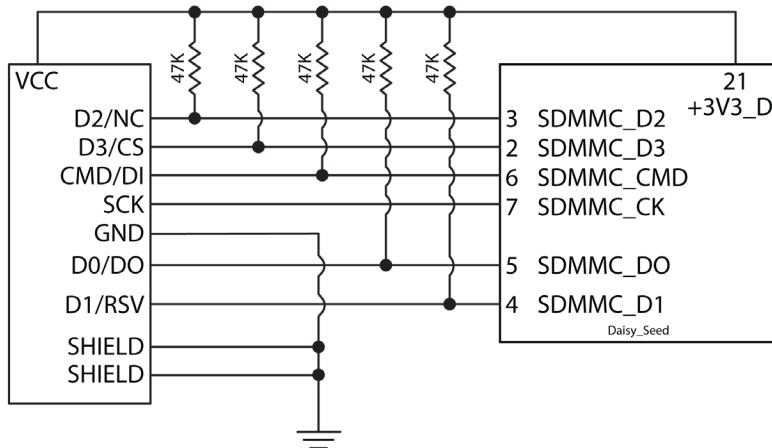
Figure 1.5 - Tactile Switch application example



Available Pins: Any GPIO

Example Parts:  
[Tactile Switch](#)  
 MPN: TL1105SPF250Q

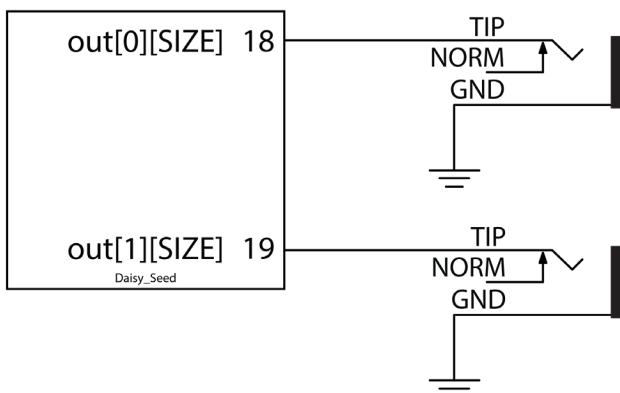
Figure 1.7 - Micro SD application example



47K pullup resistors necessary, except for Pin 7.

Example Parts:  
[Vertical MicroSD Card Connector](#)  
 MPN: PJS008U-3000-0

Figure 1.8 - Stereo Audio Output application example



Output Impedance: 100R

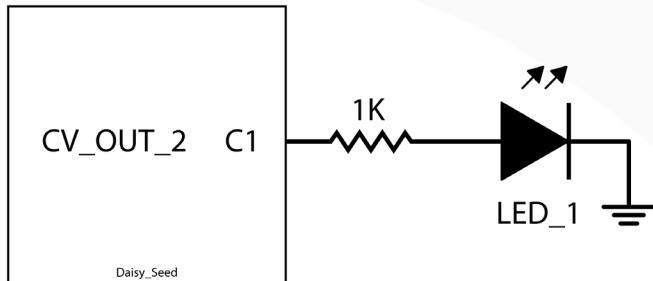
Example Parts:  
[Thonkiconn 3.5mm Mono Eurorack Jack](#)  
 MPN: WQP-WQP518MA



## Typical Applications

For electrical characteristics, see Table 2

Figure 1.12 - LED application example



Output Impedance: 100R

Available Pins: Any GPIO\*

Example Parts:

[3mm LED](#)

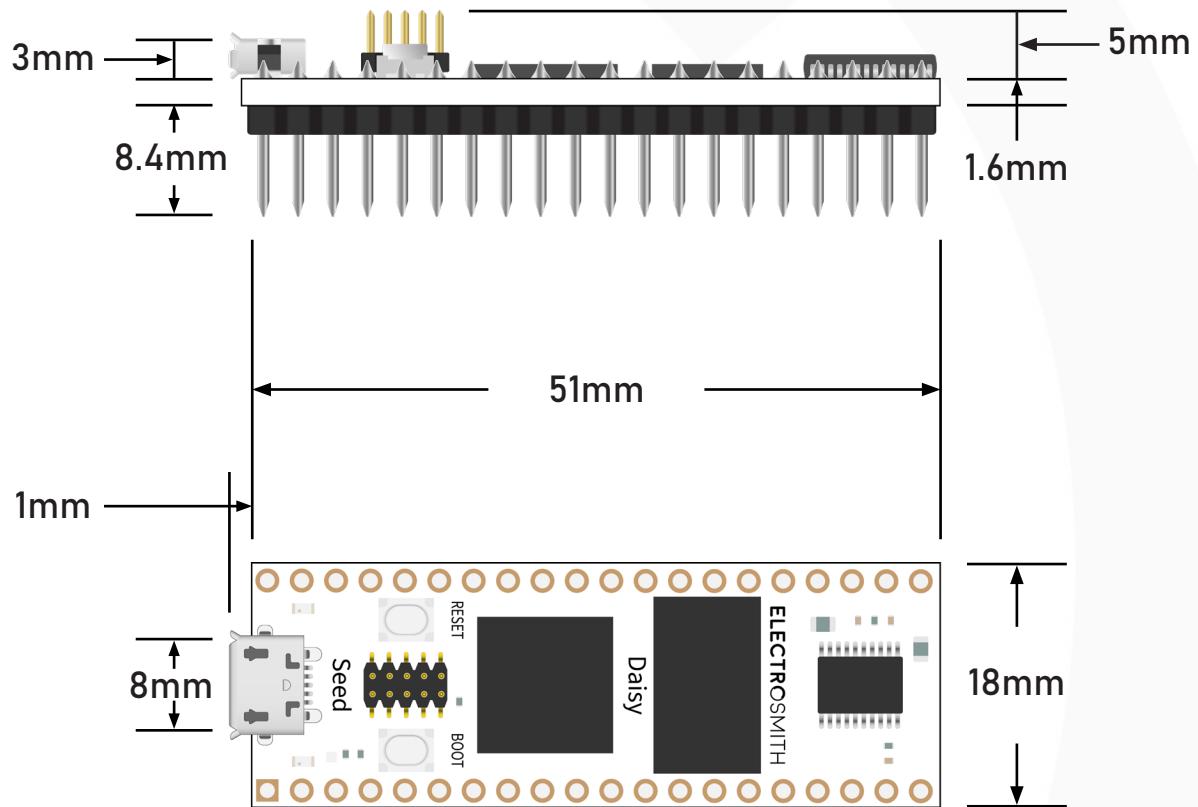
MPN: WP132XND

\* GPIO require an external resistor



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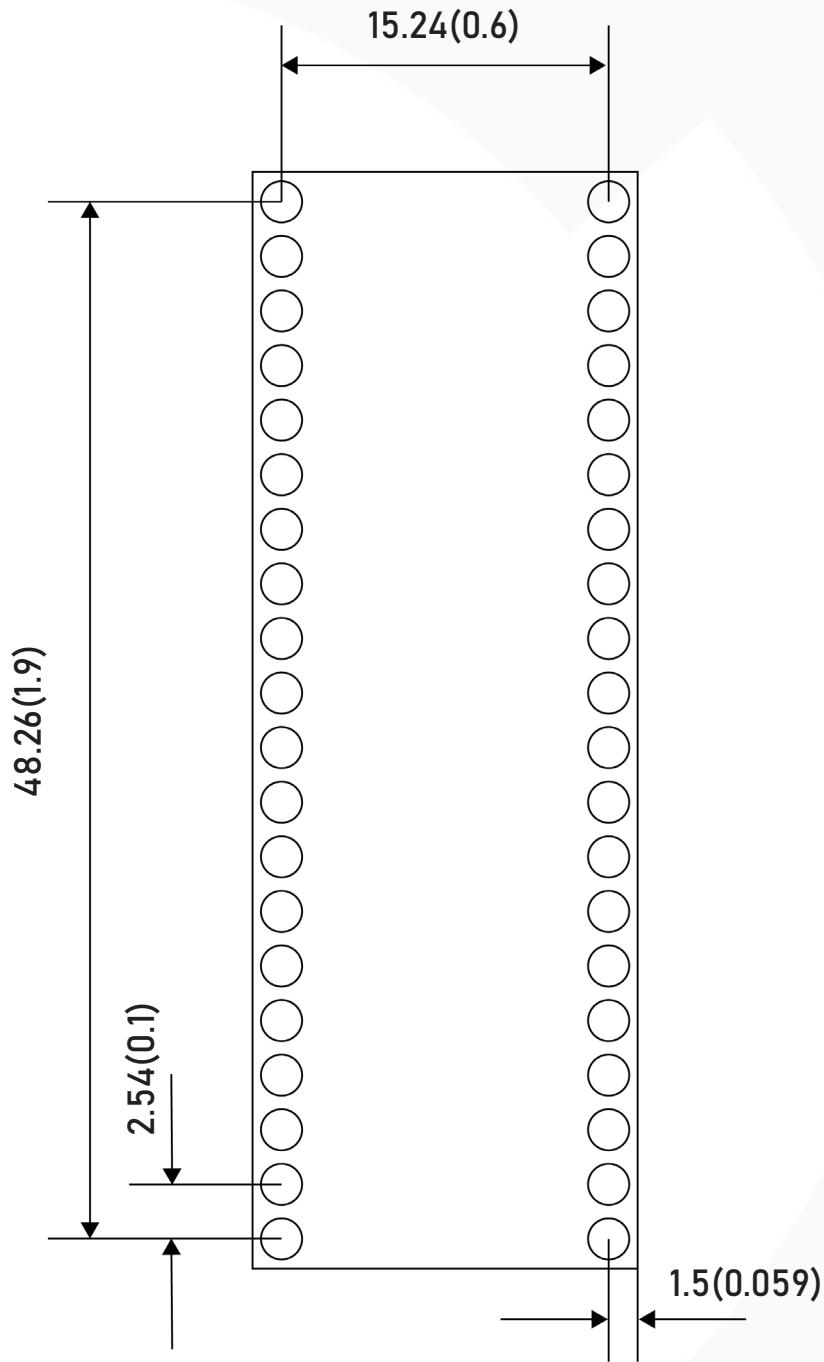
## Technical Drawing





## Landing Pattern

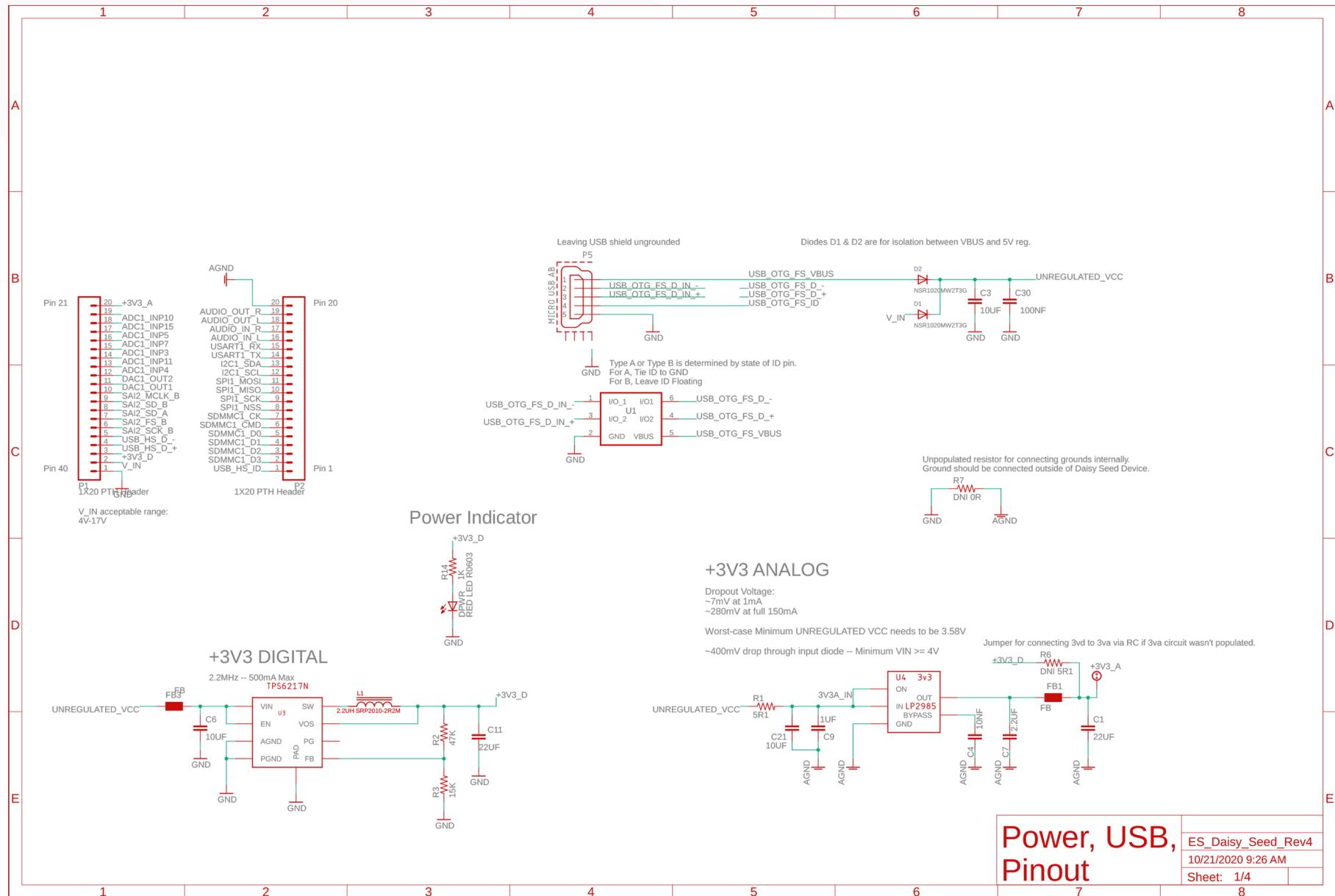
Dimensions in mm (inches)



Find the EAGLE part [here](#).

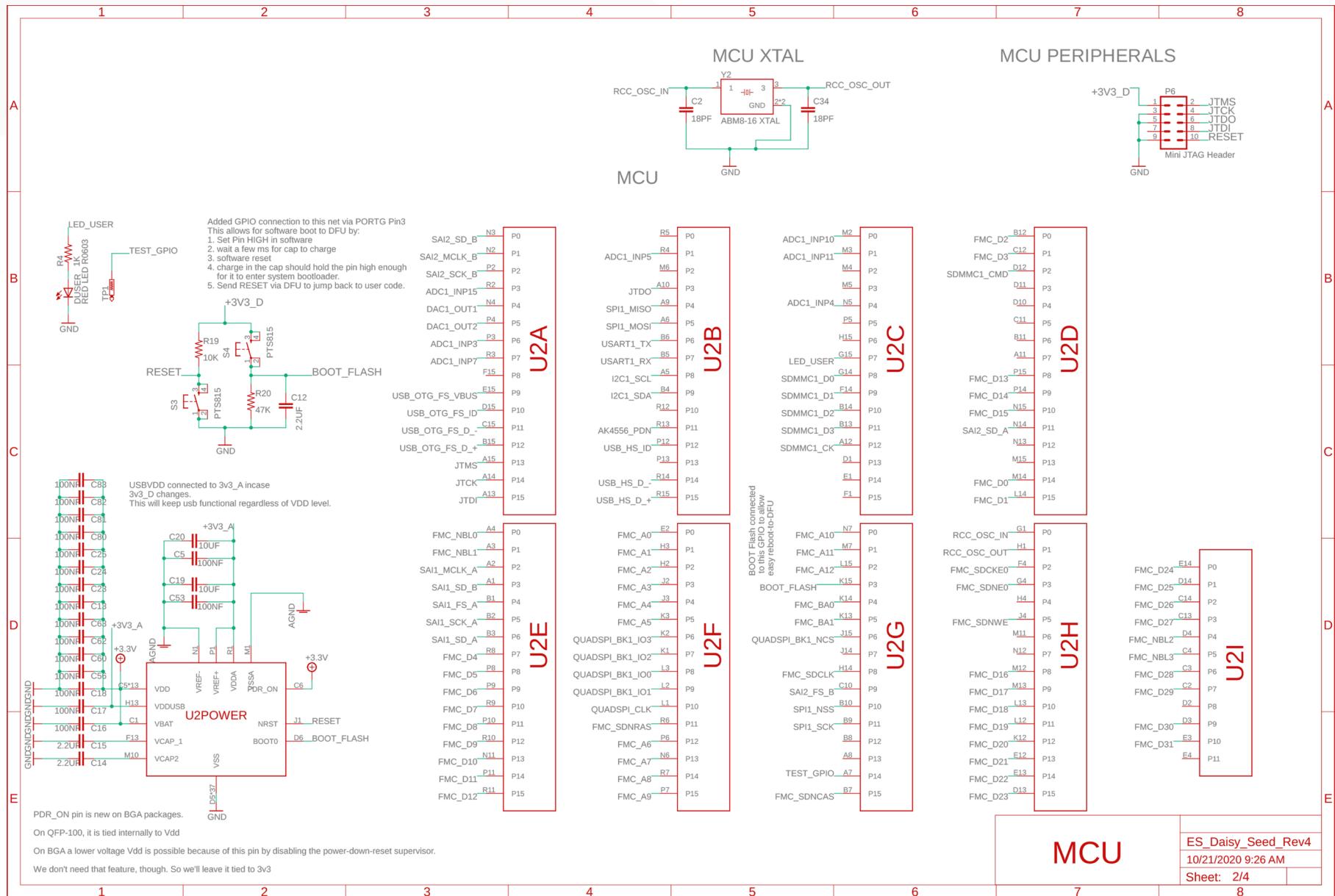


## Schematic 1 of 4



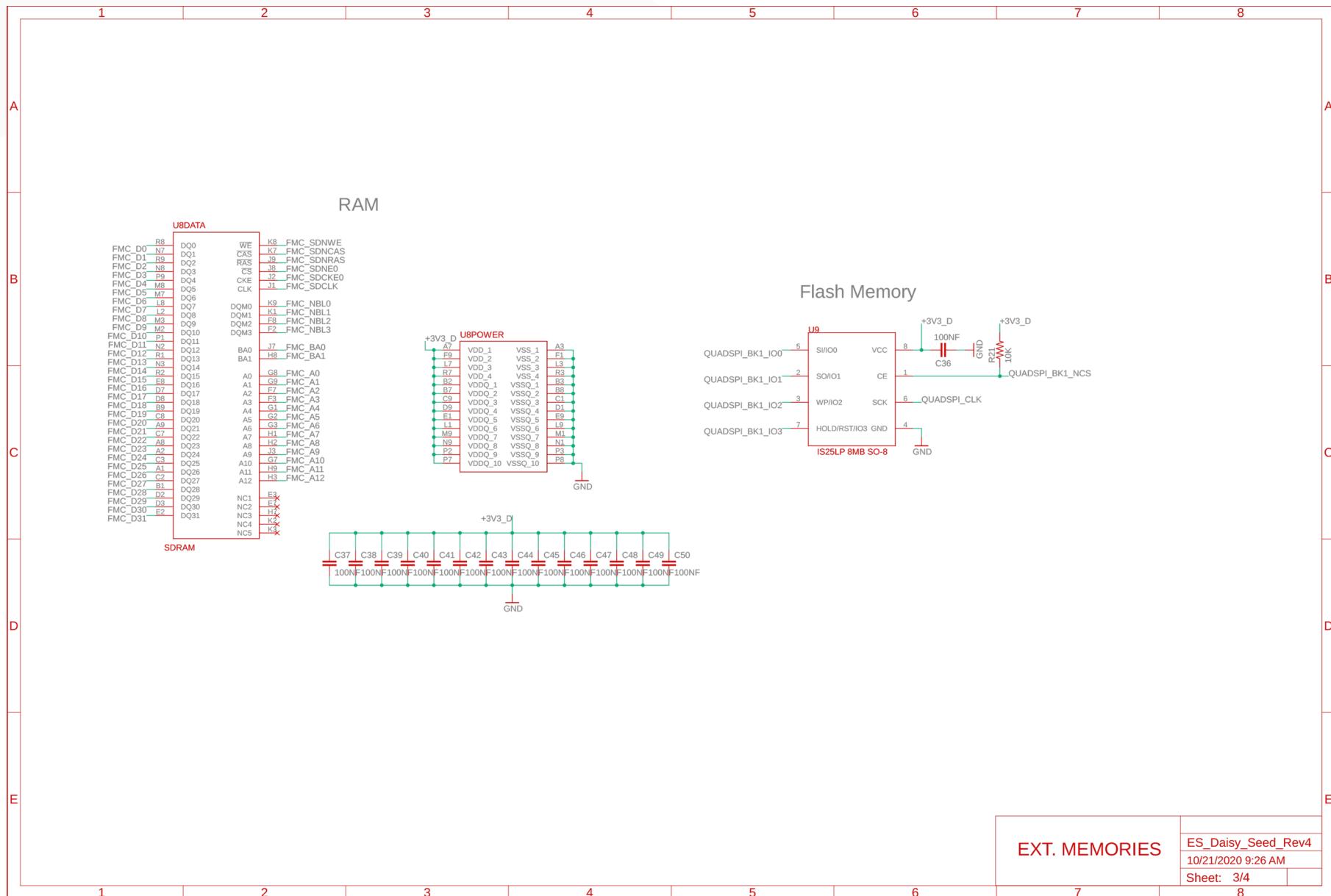


## Schematic 2 of 4



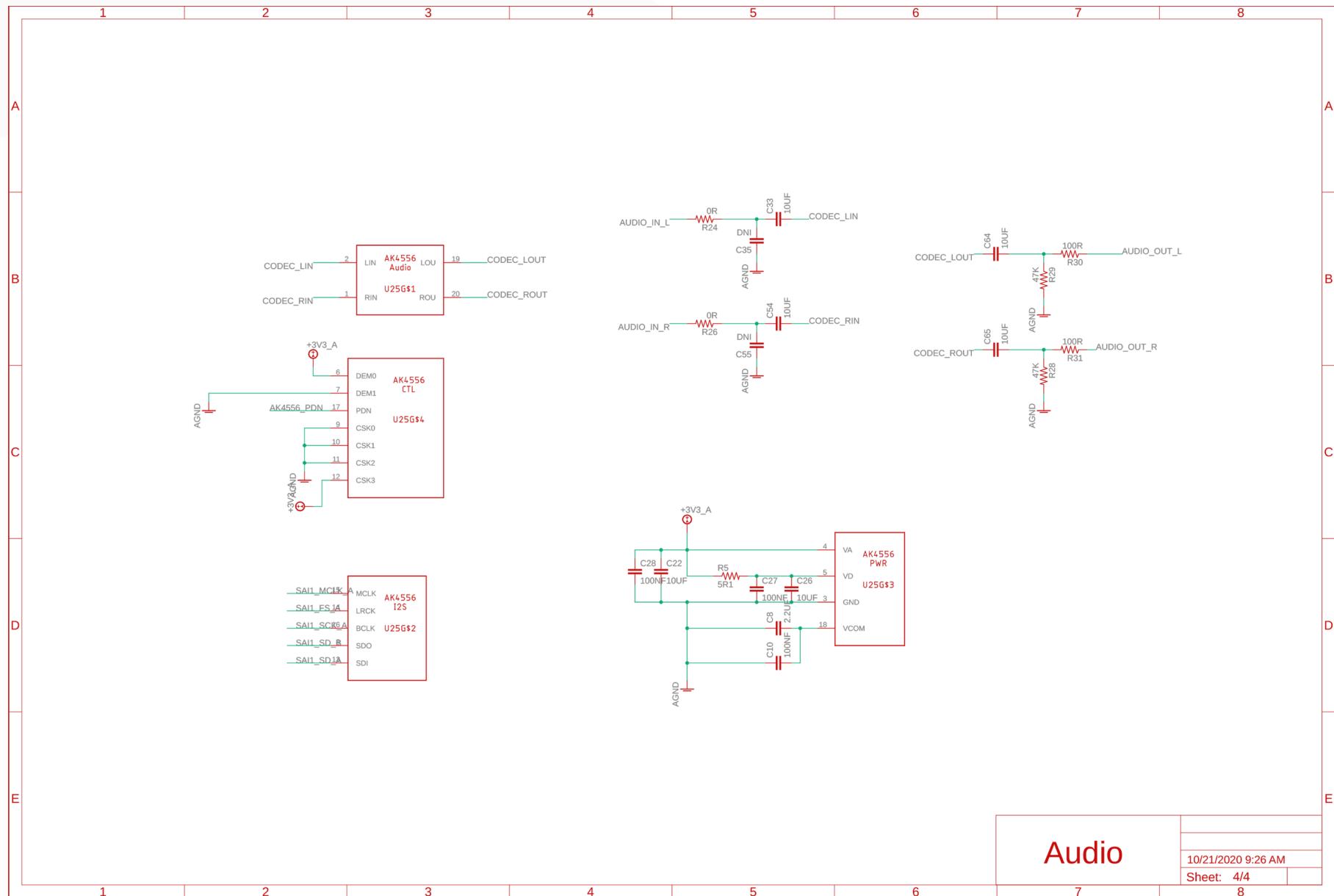


## Schematic 3 of 4





## Schematic 4 of 4



Audio

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Sheet: 4/4



### Availability

The Daisy Seed is guaranteed to be manufactured and supported until \_.

### Support

For commercial Daisy support, submit an email inquiry with [hello@electro-smith.com](mailto:hello@electro-smith.com).

For all other inquiries, you can reach out on the [Daisy Forum](#), [Daisy Slack Workspace](#), or via the submission form on our [website](#).

### Volume Price List

MODEL	SKU	MINIMUM ORDER QUANTITY	PRICE PER UNIT
Daisy Seed	ES_Daisy_Seed	1	US\$29.95
		50	US\$28.45
		100	US\$26.96
		250	US\$26.21
		500	US\$25.46
		1000	US\$23.96
		2500	US\$22.46



## Why The Daisy Seed?

### Made In The USA

The Daisy Seed is built by the Electrosmith team in San Clemente, CA. We take pride in knowing that each stage of our manufacturing process is handled in house so that we can provide the best quality, lead time, and pricing.

### RoHS Compliant

Electrosmith manufacturing is 100% RoHS compliant. All Electrosmith products are free from RoHS defined hazardous materials.

### FCC Certification

The Daisy Seed is currently undergoing testing for FCC certification. The associated paperwork will be available for download on our website once the certification is obtained.

### CE/REACH Compliant

The Daisy Seed is assembled with parts and materials that are compliant with CE/REACH standards. Design with the Patch SM knowing that it upholds the highest environmental standards for electronic products.

