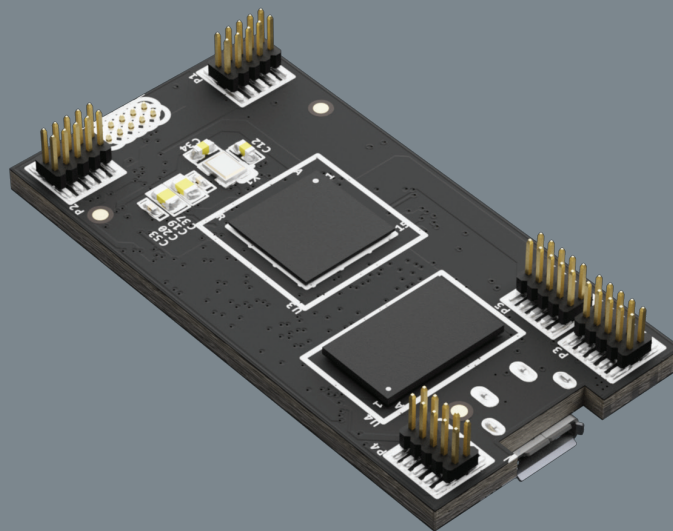




# Daisy Seed2 DFM

Embedded DSP Platform For Industrial Applications



## 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
- 33 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!

Programming the Daisy is a breeze with support for a number of languages including C++, 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)



---

## Colophon

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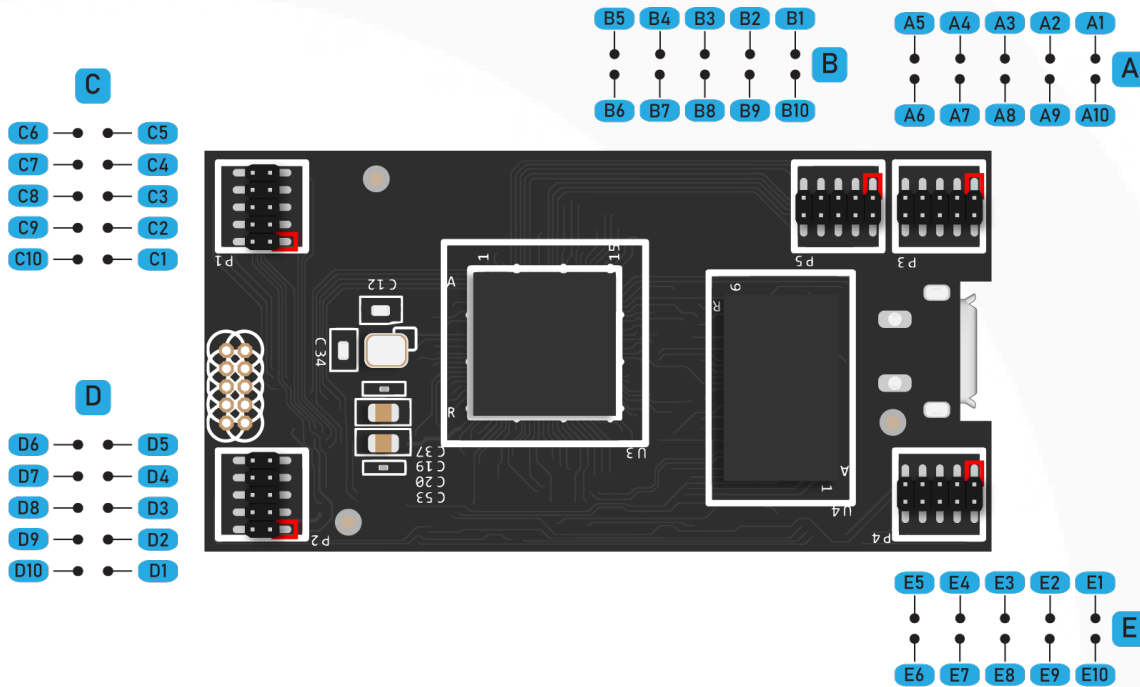
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# Pinout

Red boxes in illustration indicate Pin 1 for their respective bank.



| A Table     | B Table       | C Table             | D Table            | E Table             |
|-------------|---------------|---------------------|--------------------|---------------------|
| A1 ← VIN    | B1 SPI1_MISO  | C1 ADC1             | D1 AUDIO IN L      | E1 ADC9 SAI2_MCLK   |
| A2 ← VIN    | B2 SPI1_SCK   | C2 ADC4             | D2 AUDIO IN R      | E2 ADC10 SAI2_SD_B  |
| A3 → +3v3_D | B3 USART1_TX  | C3 ADC5             | D3 AUDIO VCOM      | E3 SAI2_SD_A        |
| A4 → +3v3_D | B4 SPI1_MOSI  | C4 ADC3             | D4 AUDIO OUT L-    | E4 ADC11 SAI2_SCK_B |
| A5 → +3v3_A | B5 USART1_RX  | C5 ADC2             | D5 AUDIO OUT L+    | E5 SDMMC_CK         |
| A6 GND      | B6 SPI1_NSS   | C6 ADC6             | D6 AUDIO OUT R+    | E6 SDMMC_CMD        |
| A7 GND      | B7 I2C1_SCL   | C7 ADC0             | D7 AUDIO OUT R-    | E7 SDMMC_D0         |
| A8 GND      | B8 I2C1_SDA   | C8 DAC1 ADC8        | D8 SPI2_MOSI ADC13 | E8 SDMMC_D1         |
| A9 GND      | B9 USB_HS_DP  | C9 DAC2 ADC7        | D9 USB_HS_ID       | E9 SDMMC_D2         |
| A10 GND     | B10 USB_HS_DM | C10 SPI2_MISO ADC12 | D10 SAI2_FS_B      | E10 SDMMC_D3        |

ANALOG  
AUDIO

ANALOG  
GPIO

DIGITAL  
AUDIO GPIO

PERIPHERAL  
GPIO

USB  
GPIO

GROUND

POWER

DAISY  
PIN NAMES

## Absolute Maximum Ratings - Table 1

| PIN TYPE     | MIN   | MAX   | UNIT |
|--------------|-------|-------|------|
| VIN Range    | +6.1V | +17   | V    |
| GPIO         | 0     | +5    | V    |
| Audio Inputs | -1.8V | +1.8V | V    |

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

**Powering the Daisy Patch SM from both the VIN and USB:** The Daisy Seed2 DFM requires VIN for full operation, but will not cause damage if you connect USB while it's powered. It is also possible to partially power the Daisy Seed2 DFM via USB for firmware updates, etc. without VIN applied. However, while powered this way, the Audio codec will not function properly.

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

C5 - (A2/D17, PB1, ADC2)  
C4 - (A3/D17, PA7, ADC3)  
C6 - (A6/D21, PC4, ADC6)  
C9 - (A7/D22, PA5, ADC7)  
C8 - (A8/D23, PA4, ADC8)

## Pin Functions - Table 2

| PINOUT | DAISY PIN NAME* | STM32 PIN NAME | PRIMARY FUNCTION | ALT. FUNCTIONS 1                   | ALT. FUNCTIONS 2                                                     |
|--------|-----------------|----------------|------------------|------------------------------------|----------------------------------------------------------------------|
| A1     |                 |                | VIN              | VIN                                |                                                                      |
| A2     |                 |                | VIN              | VIN                                |                                                                      |
| A3     |                 |                | +3v3D            | 3v3_D                              |                                                                      |
| A4     |                 |                | +3v3D            | 3v3_D                              |                                                                      |
| A5     |                 |                | +3v3A            | 3v3_A                              |                                                                      |
| A6     |                 |                | GND              | GND                                |                                                                      |
| A7     |                 |                | GND              | GND                                |                                                                      |
| A8     |                 |                | GND              | GND                                |                                                                      |
| A9     |                 |                | GND              | GND                                |                                                                      |
| A10    |                 |                | GND              | GND                                |                                                                      |
| B1     | D9              | PB4            | GPIO             | SPI1_MISO/UART7_TX                 | SPI1_MISO/I2S1_SDI/SPI3_MISO/I2S3_SDI/SPI6_MISO                      |
| B2     | D8              | PG11           | GPIO             | SPI1_SCK/I2S1_CK                   | LPTIM1_IN2/HRTIM_EEV4                                                |
| B3     | D13             | PB6            | GPIO             | USART1_TX/LPUART1_TX/UART5_TX      | I2C1_SCL/I2C4_SCL/TIM16_CH1N/TIM4_CH1                                |
| B4     | D10             | PB5            | GPIO             | SPI1_MOSI/UART5_RX                 | SPI1_MOSI/I2S1_SDO/SPI3_MOSI/I2S3_SDO/SPI6_MOSI/I2C4_SMBA/TIM17_BKIN |
| B5     | D14             | PB7            | GPIO             | USART1_RX/LPUART1_RX               | I2C1_SDA/I2C4_SDA/TIM17_CH1N/TIM4_CH2                                |
| B6     | D7              | PG10           | GPIO             | SPI1_NSS/I2S1_WS                   | HRTIM_FLT5                                                           |
| B7     | D11             | PB8            | GPIO             | I2C1_SCL/UART4_RX                  | I2C4_SCL/TIM16_CH1/TIM4_CH3                                          |
| B8     | D12             | PB9            | GPIO             | I2C1_SDA/UART4_TX/SPI2_NSS/I2S2_WS | I2C4_SDA/I2C4_SMBA/TIM17_CH1/TIM4_CH4                                |
| B9     | D30             | PB15           | GPIO             | USB_HS_D+/USART1_RX                |                                                                      |
| B10    | D29             | PB14           | GPIO             | USB_HS_D-/USART1_TX                | TIM1_CH2N                                                            |
| C1     | D16 / A1        | PA3            | GPIO             | ADC1/USART2_RX                     | TIM2_CH4/TIM5_CH4                                                    |
| C2     | D19 / A4        | PA6            | GPIO             | ADC4/SPI1_MISO/I2S1_SDI/SPI6_MISO  | TIM1_BKIN/TIM3_CH1                                                   |
| C3     | D20 / A5        | PC1            | GPIO             | ADC5                               |                                                                      |
| C4     | D18 / A3        | PA7            | GPIO             | ADC3/SPI1_MOSI/I2S1_SDO/SPI6_MOSI  | TIM1_CH1N/TIM3_CH2                                                   |
| C5     | D17 / A2        | PB1            | GPIO             | ADC2                               | TIM1_CH3N/TIM3_CH4                                                   |
| C6     | D21 / A6        | PC4            | GPIO             | ADC6/I2S1_MCK                      |                                                                      |
| C7     | D15 / A0        | PC0            | GPIO             | ADC0/SAI2_FS_B                     |                                                                      |
| C8     | D23 / A8        | PA4            | GPIO             | DAC1/ADC8                          | SPI1_NSS/I2S1_WS/SPI3_NSS/I2S3_WS/SPI6_NSS/D1PWREN                   |
| C9     | D22 / A7        | PA5            | GPIO             | DAC2/ADC7                          | SPI1_SCK/I2S1_CK/SPI6_SCK/D2PWREN/TIM2_CH1                           |
| C10    | D31** / A12     | PC2            | GPIO             | SPI2_MISO/ADC12                    |                                                                      |

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

\*\* In Arduino, Pin D31 is named D32 due to the built-in LED having been preassigned to D31 on the the original Daisy Seed

| PINOUT | DAISY PIN NAME* | STM32 PIN NAME | PRIMARY FUNCTION | ALT. FUNCTIONS 1             | ALT. FUNCTIONS 2                    |
|--------|-----------------|----------------|------------------|------------------------------|-------------------------------------|
| D1     |                 |                | AUDIO IN L       | AUDIO IN L                   |                                     |
| D2     |                 |                | AUDIO IN R       | AUDIO IN R                   |                                     |
| D3     |                 |                |                  | AUDIO VCOM                   |                                     |
| D4     |                 |                | AUDIO OUT L      | AUDIO OUT L-                 |                                     |
| D5     |                 |                | AUDIO OUT L      | AUDIO OUT L+                 |                                     |
| D6     |                 |                | AUDIO OUT R      | AUDIO OUT R+                 |                                     |
| D7     |                 |                | AUDIO OUT R      | AUDIO OUT R-                 |                                     |
| D8     | D32** / A13     | PC3            | GPIO             | SPI2_MOSI/ADC13              |                                     |
| D9     | D0              | PB12           | GPIO             | USB_HS_ID/UART5_RX/USART3_CK | TIM1_BKIN                           |
| D10    | D27             | PG9            | GPIO             | SAI2_FS_B/USART6_RX          | SPI1_MISO/I2S1_SDI                  |
| E1     | D24 / A9        | PA1            | GPIO             | ADC9/SAI2_MCLK_B             | UART4_RX/TIM2_CH2/TIM5_CH2          |
| E2     | D25 / A10       | PA0            | GPIO             | ADC10/SAI2_SD_B              | UART4_TX/TIM2_CH1/TIM2_ETR/TIM5_CH1 |
| E3     | D26             | PD11           | GPIO             | SAI2_SD_A/I2C4_SMBA          | LPTIM2_IN2                          |
| E4     | D28 / A11       | PA2            | GPIO             | ADC11/SAI2_SCK_B             | USART2_TX/TIM2_CH3/TIM5_CH3         |
| E5     | D6              | PC12           | GPIO             | SDMMC_CK/UART5_TX/USART3_CK  | SPI3_MOSI/I2S3_SDO                  |
| E6     | D5              | PD2            | GPIO             | SDMMC_CMD/UART5_RX           |                                     |
| E7     | D4              | PC8            | GPIO             | SDMMC_D0/UART5_CTS           |                                     |
| E8     | D3              | PC9            | GPIO             | SDMMC_D1/UART5_CTS           | I2S_CKIN/MCO2                       |
| E9     | D2              | PC10           | GPIO             | SDMMC_D2/USART3_TX/UART4_TX  | SPI3_SCK/I2S3_CK/HRTIM_EEV1         |
| E10    | D1              | PC11           | GPIO             | SDMMC_D3/USART3_RX/UART4_RX  | SPI3_MISO/ I2S3_SDI/HRTIM_FLT2      |

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

\*\* In Arduino, Pin D32 is named D33 due to the built-in LED having been preassigned to D32 on the the original Daisy Seed

## Electrical Characteristics - Table 3

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.

| PINOUT | DAISY PIN NAME | MIN  | MAX  | TYPICAL            |
|--------|----------------|------|------|--------------------|
| A1     |                | +4V  | +17V | +4V to +17V        |
| A2     |                | +4V  | +17V | +4V to +17V        |
| A3     |                | 0V   | +3V3 | 0 to +3V3          |
| A4     |                | 0V   | +3V3 | 0 to +3V3          |
| A5     |                | 0V   | +3V3 | 0 to +3V3          |
| A6     |                |      |      | GND                |
| A7     |                |      |      | GND                |
| A8     |                |      |      | GND                |
| A9     |                |      |      | GND                |
| A10    |                |      |      | GND                |
| B1     |                | 0V   | +3V3 | 0 to +3V3          |
| B2     | D8             | 0    | +3V3 | 0 to +3V3          |
| B3     | D13            | 0    | +3V3 | 0 to +3V3          |
| B4     | D10            | 0    | +3V3 | 0 to +3V3          |
| B5     | D14            | 0    | +3V3 | 0 to +3V3          |
| B6     | D7             | -1V8 | +1V8 | 3.6Vpp             |
| B7     | D11            | -1V8 | +1V8 | 3.6Vpp             |
| B8     | D12            |      |      | 0dBfs @ 1Vrms      |
| B9     | D30            |      |      | 0dBfs @ 1Vrms      |
| B10    | D29            |      |      | GND                |
| C1     | D16 / A1       |      |      | +3V3 (output only) |
| C2     | D19 / A4       | 0V   | +3V3 | 0 to +3V3          |
| C3     | D20 / A5       | 0V   | +3V3 | 0 to +3V3          |
| C4     | D18 / A3       | 0V   | +3V3 | 0 to +3V3          |
| C5     | D17 / A2       | 0V   | +3V3 | 0 to +3V3          |
| C6     | D21 / A6       | 0V   | +3V3 | 0 to +3V3          |
| C7     | D15 / A0       | 0V   | +3V3 | 0 to +3V3          |
| C8     | D23 / A8       | 0V   | +3V3 | 0 to +3V3          |
| C9     | D22 / A7       | 0V   | +3V3 | 0 to +3V3          |
| C10    | D31 * / A12    | 0V   | +3V3 | 0 to +3V3          |

\* In Arduino, Pin D31 is named D32 due to the built-in LED having been preassigned to D32 on the the original Daisy Seed



## Electrical Characteristics - Table 3

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.

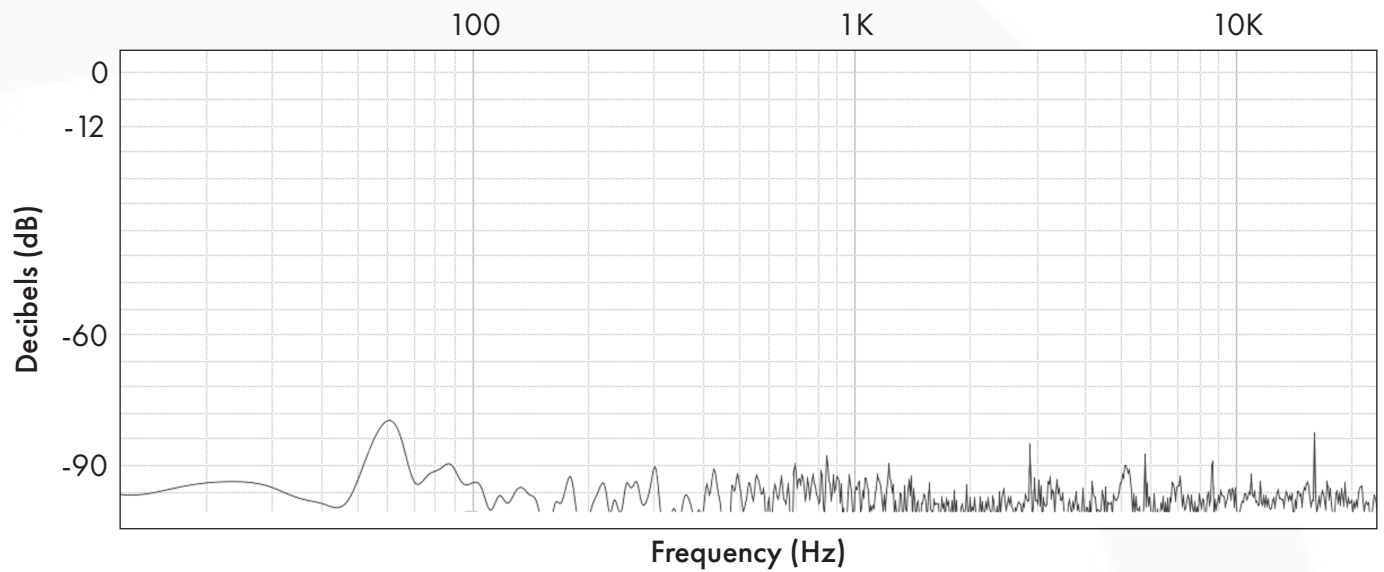
| PINOUT | DAISY PIN NAME | MIN  | MAX  | TYPICAL       |
|--------|----------------|------|------|---------------|
| D1     |                | -1V8 | +1V8 | 3.6Vpp        |
| D2     |                | -1V8 | +1V8 | 3.6Vpp        |
| D3     |                |      |      |               |
| D4     |                |      |      | 0dBfs @ 1Vrms |
| D5     |                |      |      | 0dBfs @ 1Vrms |
| D6     |                |      |      | 0dBfs @ 1Vrms |
| D7     |                |      |      | 0dBfs @ 1Vrms |
| D8     | D32* / A13     | 0V   | +3V3 | 0 to +3V3     |
| D9     | D0             | 0V   | +3V3 | 0 to +3V3     |
| D10    | D27            | 0V   | +3V3 | 0 to +3V3     |
| E1     | D24 / A9       | 0V   | +3V3 | 0 to +3V3     |
| E2     | D25 / A10      | 0V   | +3V3 | 0 to +3V3     |
| E3     | D26            | 0V   | +3V3 | 0 to +3V3     |
| E4     | D28 / A11      | 0V   | +3V3 | 0 to +3V3     |
| E5     | D6             | 0V   | +3V3 | 0 to +3V3     |
| E6     | D5             | 0V   | +3V3 | 0 to +3V3     |
| E7     | D4             | 0V   | +3V3 | 0 to +3V3     |
| E8     | D3             | 0V   | +3V3 | 0 to +3V3     |
| E9     | D2             | 0V   | +3V3 | 0 to +3V3     |
| E10    | D1             | 0V   | +3V3 | 0 to +3V3     |

\* In Arduino, Pin D32 is named D33 due to the built-in LED having been preassigned to D32 on the the original Daisy Seed

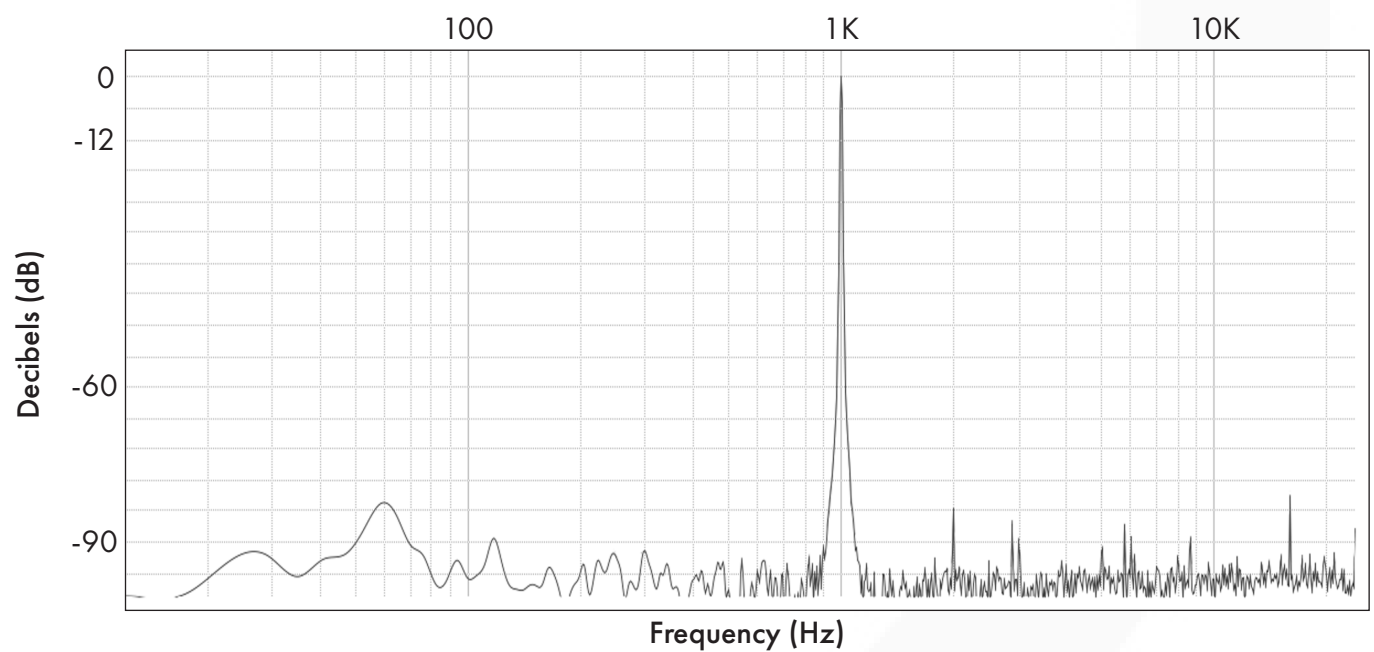


## Audio Performance

Noise Floor



SNR: 1kHz Reference Sine Wave





## Typical Applications

For electrical characteristics, see Table 2

Figure 1.0 - Power

\*  $\geq 6.1V$

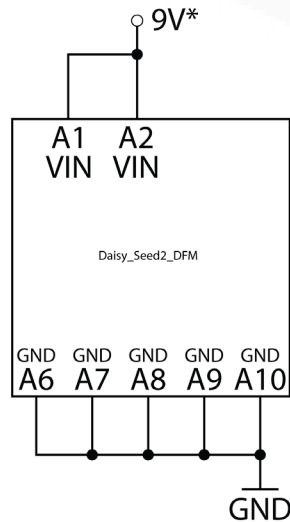


Figure 1.1 - Line Level Audio Input

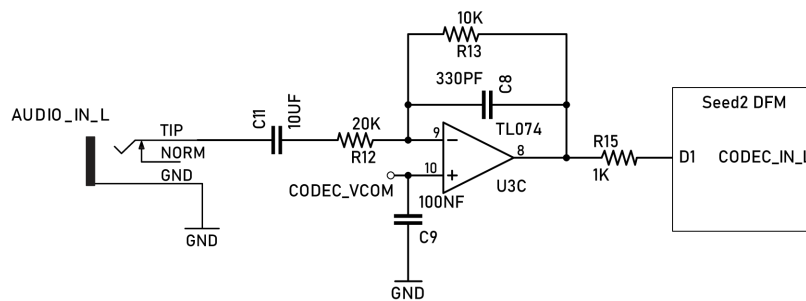
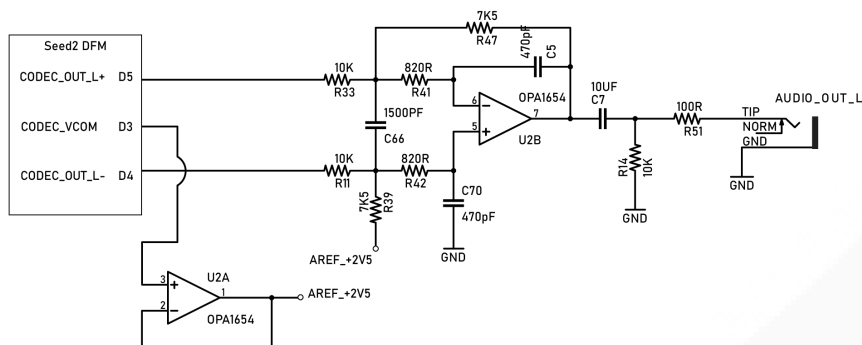


Figure 1.2 - Line Level Audio Output for Single-Supply





## Typical Applications

For electrical characteristics, see Table 2

Figure 1.3 - Eurorack Level Audio Input

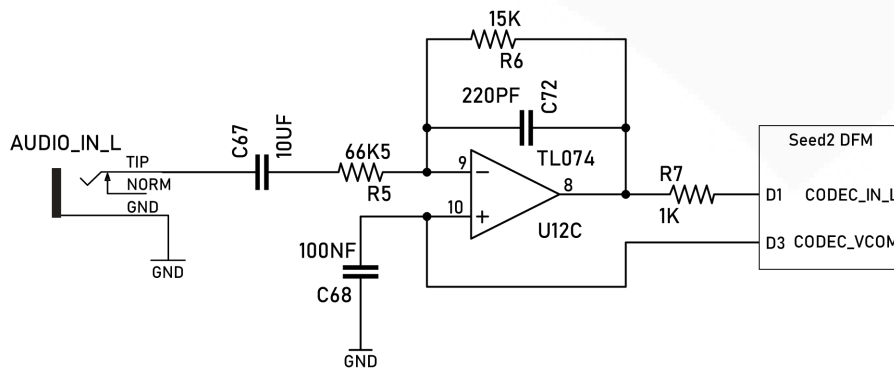


Figure 1.4 - Eurorack Level Audio Output, DC Coupled

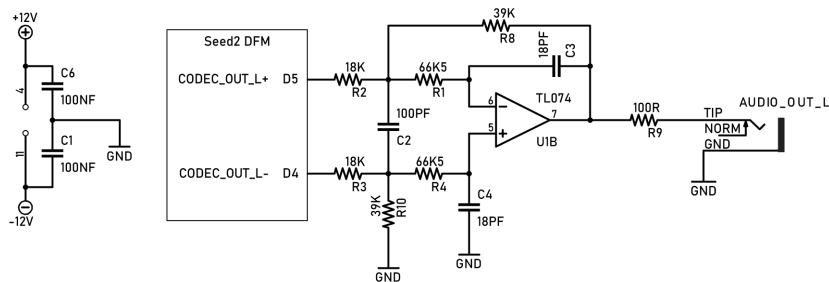
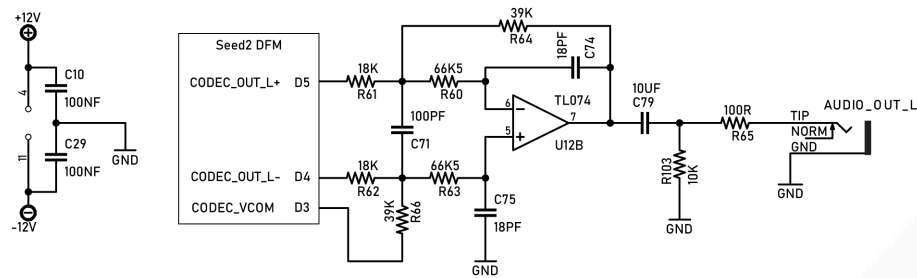


Figure 1.5 - Eurorack Level Audio Output, AC Coupled





## Typical Applications

For electrical characteristics, see Table 2

Figure 1.6 - Guitar Level Audio Input - AC Coupled

Example Parts:

Transistor MPN: MMBF4416A

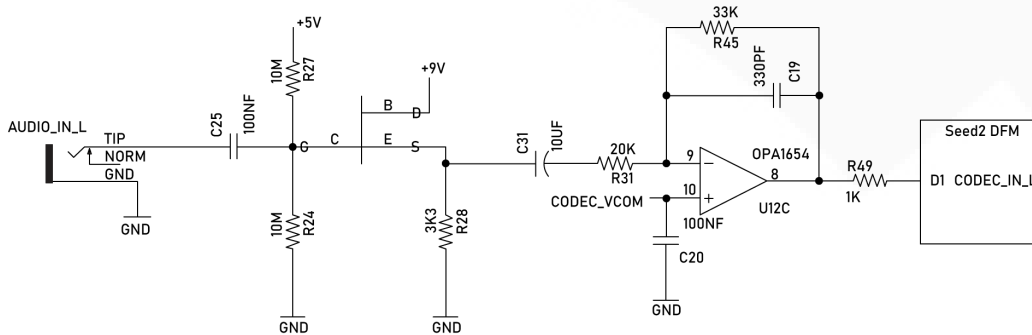


Figure 1.7 - Guitar Level Audio Output - for Single Supply

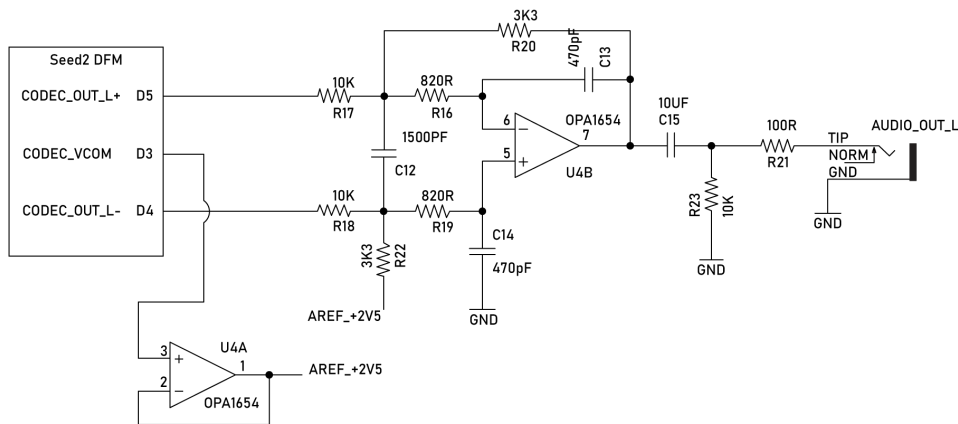
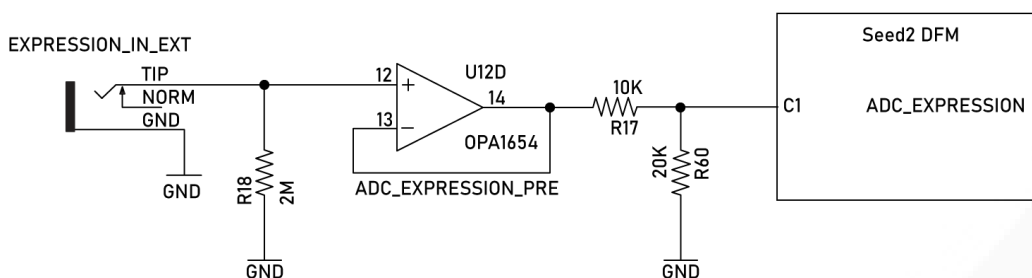


Figure 1.8 - Expression Input

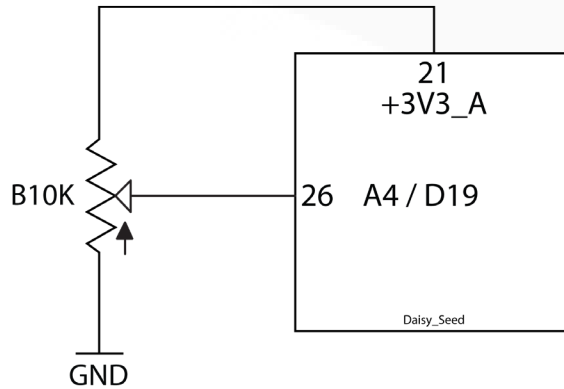




## Typical Applications

For electrical characteristics, see Table 2

Figure 1.9 - Potentiometer



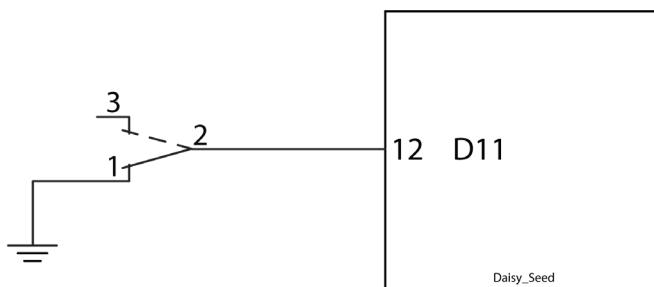
Available Pins: Any ADC

Example Parts:

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

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

Figure 1.10 - Toggle Switch



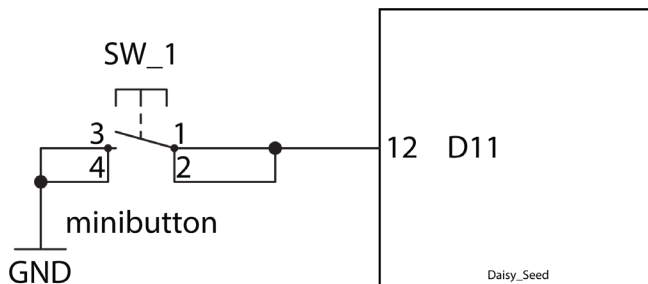
Available Pins: Any GPIO

Example Parts:

[Toggle Switch](#)

MPN: 2MS1T1B1M2QES

Figure 1.11 - Tactile Switch



Available Pins: Any GPIO

Example Parts:

[Tactile Switch](#)

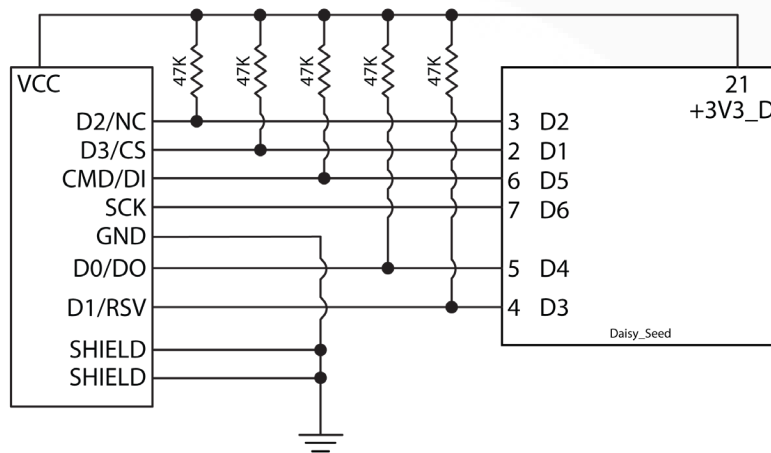
MPN: TL1105SPF250Q



## Typical Applications

For electrical characteristics, see Table 2

Figure 1.12 - Micro SD



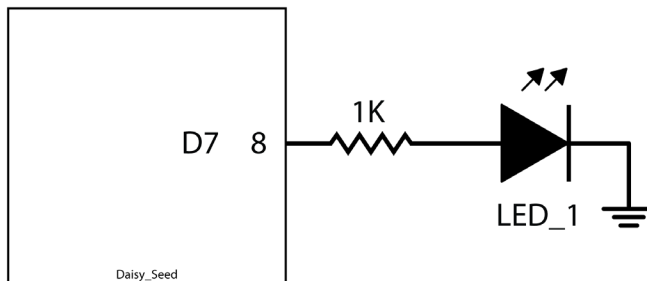
47K pullup resistors necessary, except for Pin 7.

Example Parts:

[Vertical MicroSD Card Connector](#)

MPN: PJS008U-3000-0

Figure 1.13 - LED



Available Pins: Any GPIO

Example Parts:

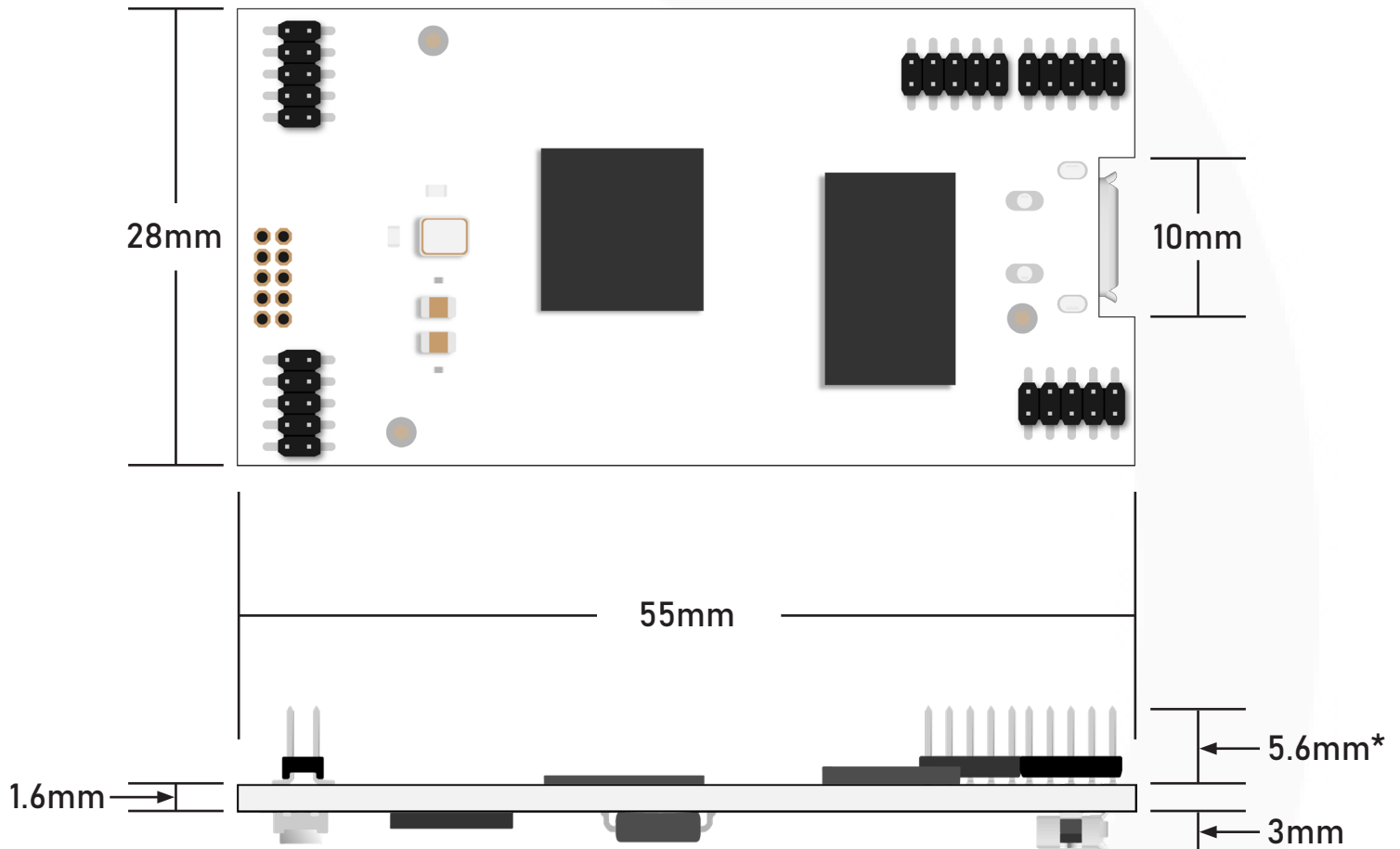
[3mm LED](#)

MPN: WP132XND

Note: Resistor value is dependent on desired brightness and/or LED part



## Technical Drawing



\* A small number of Seed2 DFMs have an alternative header height of 4.7mm due to parts shortages compensation.



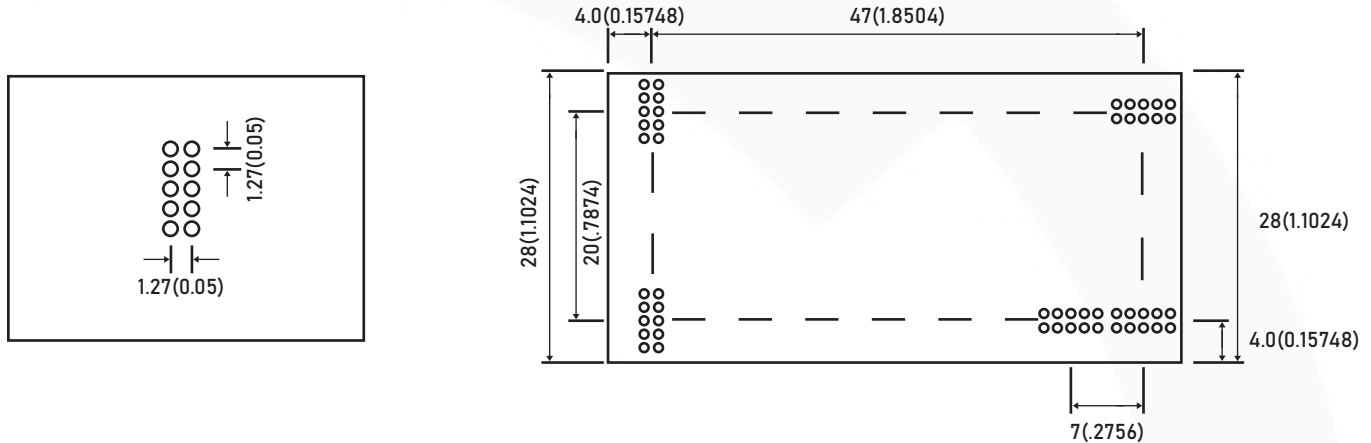


# Landing Pattern

Dimensions in mm (inches)

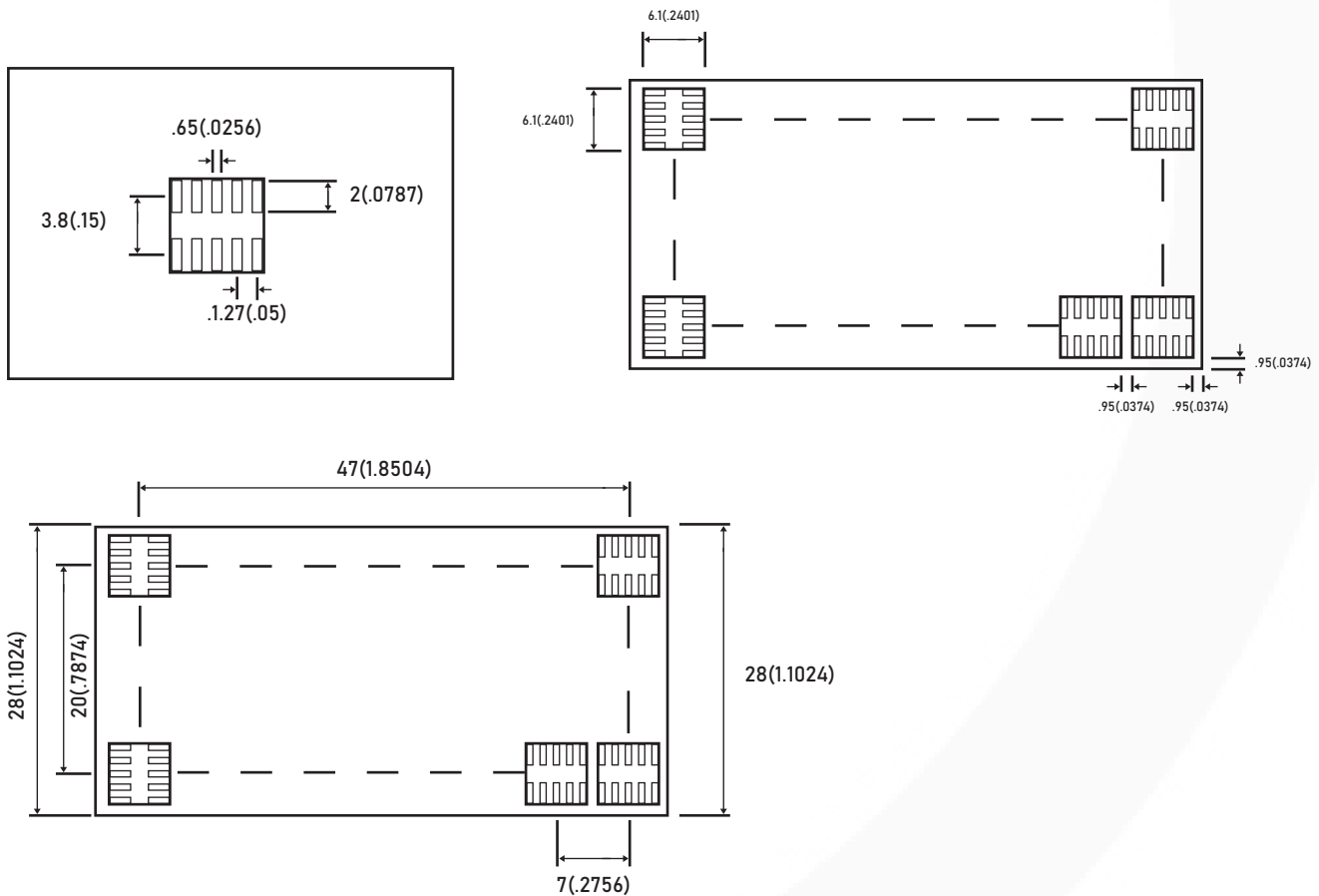
## PTH

Ships with male headers installed. Mating headers for the carrier board are female.  
Mating header MPN: 20021311-00010T4LF



## SMT

Ships with male headers installed. Mating headers for the carrier board are female.  
Mating header MPN: 20021321-00010C4LF





## Why The Daisy Seed?

### **Made In The USA**

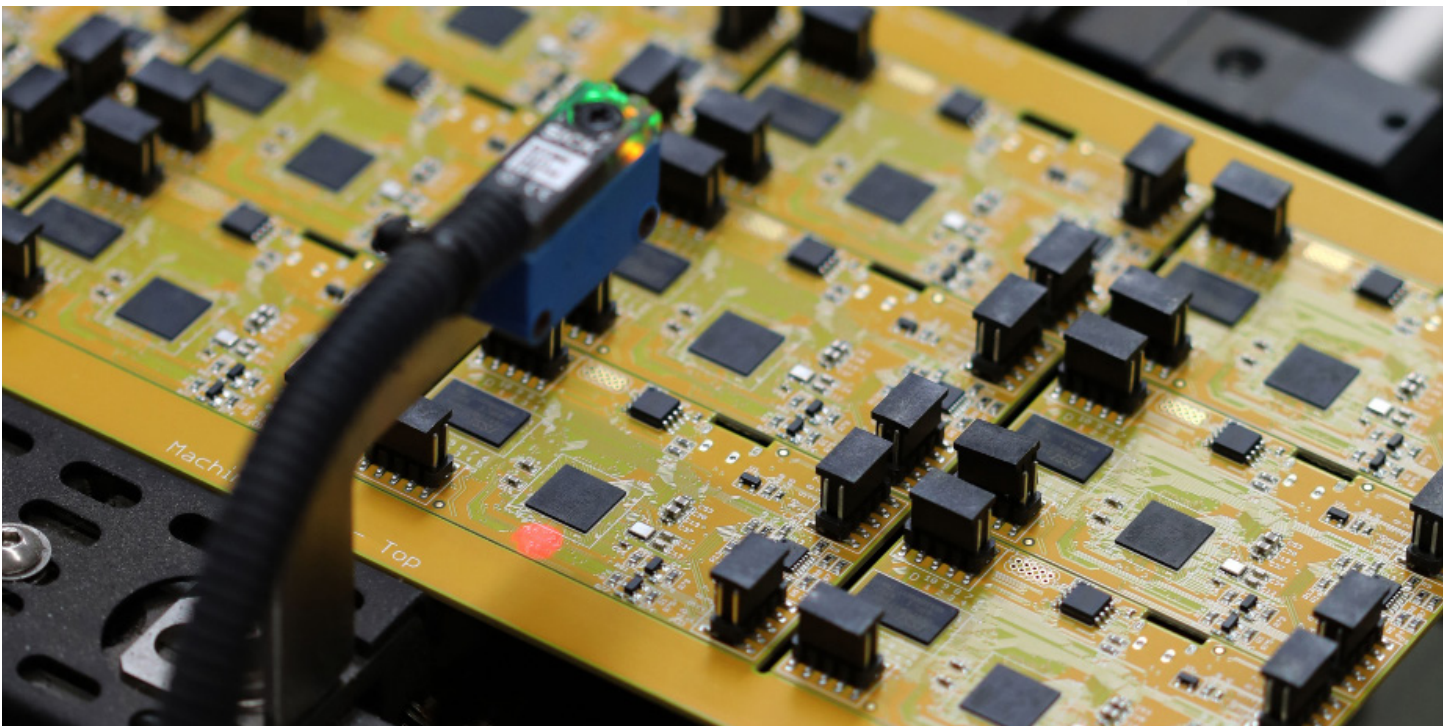
The Daisy Seed is built by the Electrosmith team in San Clemente, CA. We take pride in knowing that each stage of our manufacturing process is handled in house so that we can provide the best quality, lead time, and pricing.

### **RoHS Compliant**

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

### **CE/REACH Compliant**

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





## Changelog

| RELEASE | DATE        | DESCRIPTION                                                                                                                                                                                |
|---------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| v1.0    | 15/DEC/2021 | <ul style="list-style-type: none"><li>Initial release</li></ul>                                                                                                                            |
| v1.0.1  | 13/APR/2022 | <ul style="list-style-type: none"><li>included C10 in the pinout table</li><li>Updated landing pattern rotations</li></ul>                                                                 |
| v1.0.2  | 19/APR/2022 | <ul style="list-style-type: none"><li>updated Seed illustrations with male headers to match production units.</li></ul>                                                                    |
| v1.0.3  | 12/JUL/2022 | <ul style="list-style-type: none"><li>Added effects pedal typical applications.</li></ul>                                                                                                  |
| v1.0.4  | 14/JUL/2022 | <ul style="list-style-type: none"><li>Updated Seed2 DFM photos/graphics with male headers</li><li>Fixed landing pattern dimensions</li><li>Updated typical applications graphics</li></ul> |
| v1.0.5  | 18/JUL/2022 | <ul style="list-style-type: none"><li>Updated Daisy pin names and footnotes for C10 and D8</li></ul>                                                                                       |
| v1.0.6  | 10/JAN/2023 | <ul style="list-style-type: none"><li>hotfix: updated D8 pinout to SPI2_MOSI</li></ul>                                                                                                     |
| v1.0.7  | 25/JAN/2023 | <ul style="list-style-type: none"><li>Updated Absolute Maximum Ratings Table</li></ul>                                                                                                     |
| v1.0.8  | 13/MAR/2025 | <ul style="list-style-type: none"><li>updated pinout</li></ul>                                                                                                                             |
| v1.0.9  | 03/NOV/2025 | <ul style="list-style-type: none"><li>fixed typo in description (changed 31 GPIO pins to 33)</li></ul>                                                                                     |