# Teensy 3.5/3.6 Breakout (Revision A, Uno)

This is a breakout for the Teensy 3.5 and Teensy 3.6 development boards by PJRC. Included are all the pin headers you need to assemble it, a switch to select between USB or external power, and a switch to set the USB host port's power mode (3.6 only). As an option during assembly, you can use the included jumpers (with pin headers) in place of the switches. This breakout can also optionally be assembled with the **Teensy 3.5/3.6 Socket Kit** (available separately).

This **Uno Edition** provides physical compatibility with typical Arduino-style shields. While this board doesn't break out a ton of the Teensy's extra signals, it does provide easy access to debug signals and the Teensy 3.6's USB host port in a convenient and familiar form-factor for working with existing Arduino-compatible hardware modules. Note that the Teensy's onboard Micro USB port will be blocked, but the necessary signals are routed to the breakout's full-size USB-B port.

## Included Parts (visual part identification sheet attached)

|   | Count | Part Type | Pos. | Tech. | Rows | Pins | Mfr. | Part Number/Desc. |
|---|-------|-----------|------|-------|------|------|------|-------------------|
| **A** | 1 | Bare PCB | *N/A* | TH | *N/A* | *N/A* | Tall Dog | Uno REV-A |
| **B** | 2 | Male Header | 40 | TH | 1 | 40 | *Generic* | *Standard* |
| **C** | 1 | Male Header | 10 | SMD | 2 | 5 | *Generic* | *Standard* |
| **D** | 1 | Male Header | 8 | SMD | 2 | 4 | *Generic* | *Standard* |
| **E** | 1 | Male Header | 6 | SMD | 2 | 3 | *Generic* | *Standard* |
| **F** | 4 | Pogo Pin | 1 | TH | 1 | 1 | Mill-Max | 0906-1-15-20-75-14-11-0 |
| **G** | 3 | Slide Switch | 3 | TH | 1 | 3 | *Generic* | SS12D00G3 |
| **H** | 3 | Jumper | 2 | *N/A* | 1 | 2 | *Generic* | *Standard* |
| **I** | 1 | USB-A Jack | 4 | TH | 1 | 4 | *Generic* | *Standard* |
| **J** | 1 | USB-B Jack | 4 | TH | 2 | 2 | *Generic* | *Standard* |
| **K** | 1 | Male Header | 10 | TH | 2 | 5 | *Generic* | 0.05″ Spacing |
| **L** | 1 | Male Header | 6 | TH | 2 | 3 | *Generic* | *Standard* |
| **M** | 1 | Female Header | 10 | TH | 1 | 10 | *Generic* | *Standard* |
| **N** | 2 | Female Header | 8 | TH | 1 | 8 | *Generic* | *Standard* |
| **O** | 1 | Female Header | 6 | TH | 1 | 6 | *Generic* | *Standard* |

## Detailed Specs

- **Grid Spacing** — 0.1″ / 2.54 mm
- **Board Dimensions** — 2.7″ × 2.1″ / 68.58 mm × 53.34 mm
- **Board Surface Area** — 5.67 in² / 36.58 cm²
- **Board Thickness** — 0.063″ / 1.6 mm
- **Number of Mounting Holes** — 4 holes
- **Mounting Hole Diameter** — 0.125″ / 3.71 mm

## Recommended Tools

- Soldering iron
- Solder and flux
- Breadboard
- Diagonal cutters
- Blue tape
- Razor blade

## Assembly Instructions

1. Cut the trace to separate VIN from VUSB on the underside of the Teensy.

2. Cut the trace to separate the middle and left USB host power pads (marked H) on the underside of the Teensy. If you're using a Teensy 3.5, you can skip this step.

3. Choose one of the following:

   a. Place and solder a slide switch (part G) into the three holes outlined with a rectangle and marked VIN-VUSB on the breakout board. Place a second slide switch into the similarly marked location in the DEBUG area. If you're using a Teensy 3.6, you can also install a third slide switch into the similar location marked HOST-PWR.

   b. You can use a 3-pin length of male header (from part B) and a jumper (part H) in place of any of the switches for a more permanent method of configuring these signals.

4. If you're using the **Teensy 3.5/3.6 Socket Kit**, stop here and switch to the instructions included with the Socket Kit. Keep parts from each kit separate since they both use similar part lettering schemes. When you're finished with the Socket Kit instructions, skip to step 15.

5. Apply some flux onto the four oblong outlined pads on the top side of the breakout board. Place and solder a gold pogo pin (part F) into each of these four holes. The elongated shape of each pad allows you to solder the pogo pins more easily from the top. The pogo pins must sit flush and be aligned perpendicularly to the board. You can secure the board to the edge of your work surface with tape, allowing the pads to hang over the edge. While soldering each pin, drag the tip of your soldering iron along the pin's base to rotate it slightly, which can help to improve alignment. After soldering, hold the board up and check that the pins are reasonably perpendicular to the board. Check from both the front and the side.

6. Cut a 5-pin length of through-hole male header (from part B). Place the header so that it interfaces with the RESET, PROGRAM, GND, 3.3V, and VBAT pins along the underside of the Teensy. Solder the header in place. You can use a breadboard to align the pins and an extra header strip turned sideways to keep the Teensy perpendicular.

7.  Cut another 5-pin through-hole male header (from part B) and remove the metal pin from the 2nd position using your diagonal cutters as pliers. Solder the modified header (now a 4-pin header with one blank space) onto the underside of the Teensy so that it occupies the A11, A10, AREF, and VUSB positions. You can use a breadboard for alignment here also.

8.  Place the Teensy so the bottom side is facing up. Apply flux onto the 2 rows of 5 rectangular pads (10 in total) marked 3.3V, 47, 48, 49, 50 on the first row and GND, 46, 45, 44, 43 on the second row. Place the 2×5 SMD male header (part C) onto the pads and solder it in place. You can secure the header using tape or a small drop of glue. The alignment doesn't have to be too perfect, just get it as close as you can.

9.  Apply flux onto the 2 rows of 3 rectangular pads (6 in total) marked 51, 52, 53 on the first row and 42, 41, 40 on the second row. Place the 2×3 SMD male header (part E) onto the pads and solder it in place, as described above in step 8.

10. Apply flux onto the 2 rows of 4 rectangular pads (8 in total) marked 54, 55, 56, 57 on the first row and DD, DC, DE, G on the second row. Place the 2×4 SMD male header (part D) onto the pads and solder it in place, as described above in step 8.

11. Cut another 5-pin through-hole male header (from part B) and place it so it interfaces with the pins marked G, G, D+, D-, 5V on the underside of the Teensy. These holes aren't on the same 0.1 inch grid as the rest of the holes so you won't be able to use a breadboard for alignment here. Tack one pin and then solder them all.

12. Cut two 24-pin lengths of through-hole male header (from part B). Position them along the two longer edges on the underside of the Teensy. You won't be able to use a breadboard to align these headers, so tack them in place before fully soldering them.

13. Mate the Teensy and the breakout board assemblies together. You might need to apply some pressure depending on the alignment of the headers. If any pins are significantly misaligned, you may have to manually bend them so the two boards can mate. The distance between the boards will ultimately be determined by the surface-mount headers since they sit higher than the through-hole headers. As a result, there will be a small gap between the through-hole headers and the breakout board, which is normal.

14. Tack the four corner pins to provide some stability, then check for proper alignment. Using diagonal cutters, trim all the protruding pins so they're reasonably flush with the bottom surface of the breakout board. You can place your finger over the pin that you're trimming to prevent it from flying across the room when you snip it. Secure the assembly in place with the underside of the breakout facing up. You can use two pieces of tape, one placed over each end. Solder all the trimmed pins.

15. Install the optional USB-A host jack (part I). This only applies to the Teensy 3.6, so skip this step if you're using a Teensy 3.5. Place the USB-A jack into the corresponding holes in the area marked USB2 on the top side of the breakout board, tack it in place, then solder it.

16. Install the USB-B power and programming jack (part J). Place the USB-B jack into the corresponding holes in the area marked USB1. Tack and solder.

17. Install the fine-pitch debug header (part K). If necessary, remove a metal pin from the 7th position on the header. Place the header into the corresponding holes in the area marked DEBUG, then tack and solder it in place.

18. Install the four female sockets along the long edges of the breakout board. You'll be using one 10-pin header (part M), two 8-pin headers (part N), and one 6-pin header (part O). Make sure the female headers are installed perpendicular to the board. Tack and solder them.

19. Install the 2×3 male header (part L) into the holes marked SPI0 on the top of the board. If you don't need this header in your project, you can leave it out and retain access to the Teensy's onboard Micro USB jack. Otherwise, you'll have to use the breakout board's USB-B jack for USB power and/or for programming the Teensy.

20. As an option, you can install three 4-pin sections of through-hole male header (from part B) into the these three spots: the first is marked GND, VBAT, PRGM, AGND, the second is marked A9, A8, A7, A6, and the third is located in the area marked DEBUG. These areas break out additional signals which might be useful.

21. Inspect the finished assembly thoroughly. Connect it to power (via the USB-B jack) and make sure it functions correctly. I hope you enjoy using your new board, and best of luck with your project!
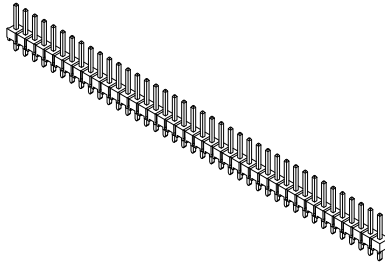
## *Congratulations, you're finished!*

***If you like using this product*** *please consider leaving a positive review on Tindie!*
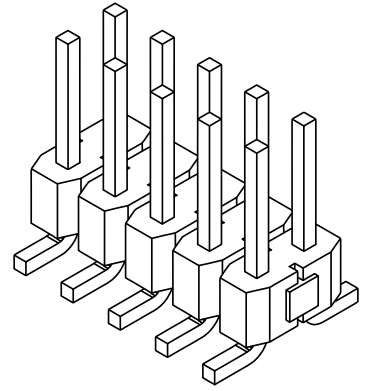***If you have any concerns or problems*** *please contact me at the email address above.*
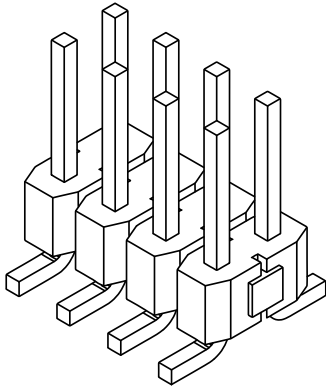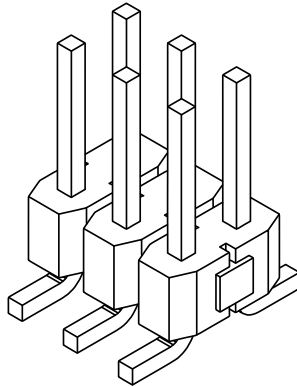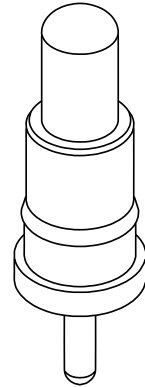
A
1×

B
2×

C
1×

D
1×

E
1×

F
4×

G
3×

H
3×

I
1×

J
1×

K
1×

L
1×

M
1×

N
2×

O
1×
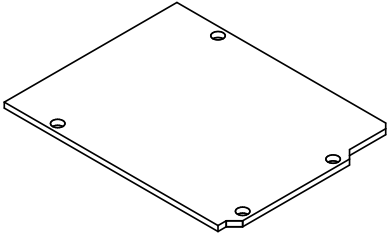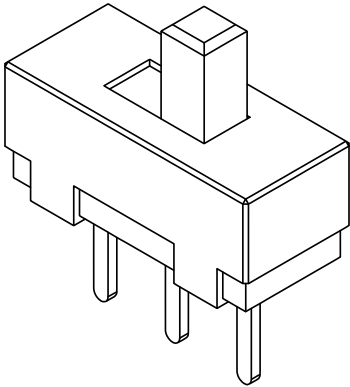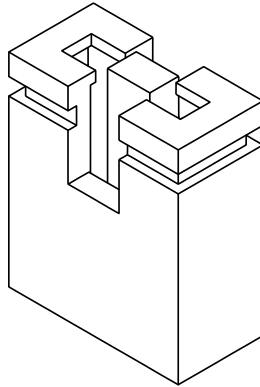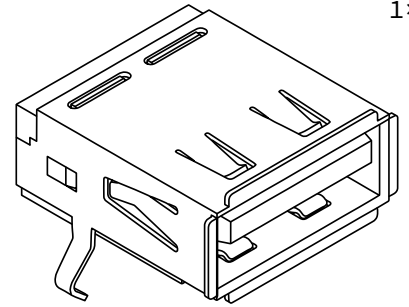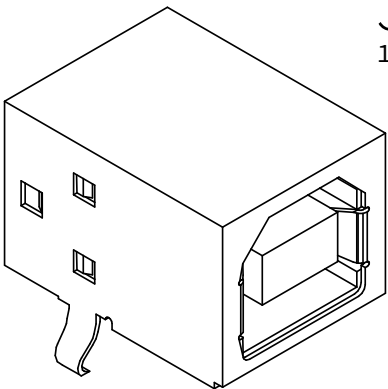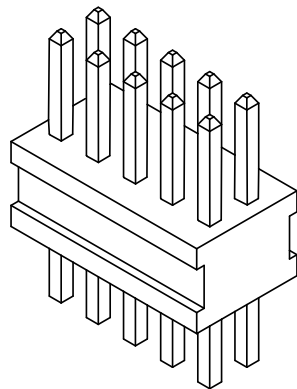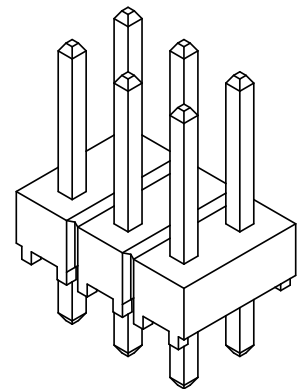
Teensy 3.5/3.6 Breakout (Revision A, Uno) **Dimension Supplement for PCB REV-A**
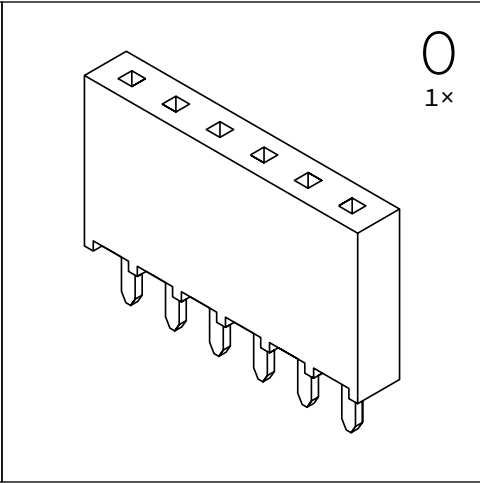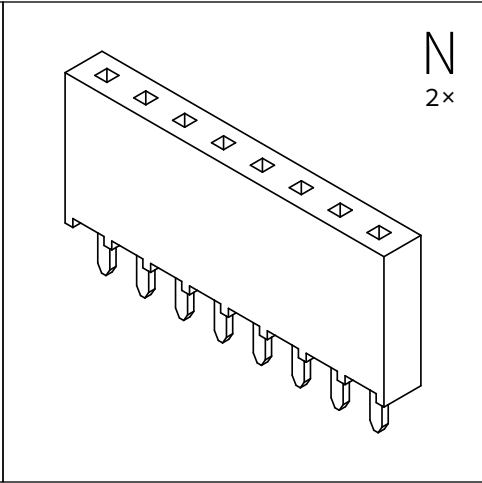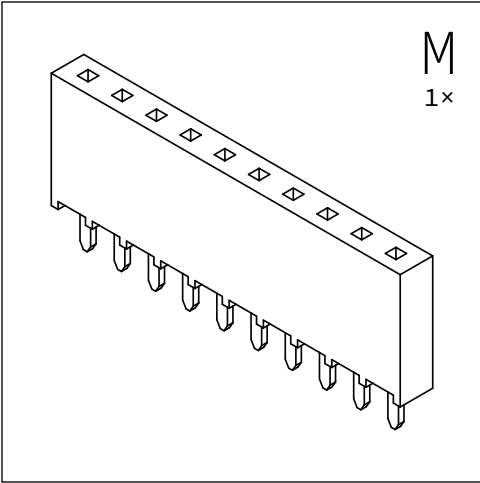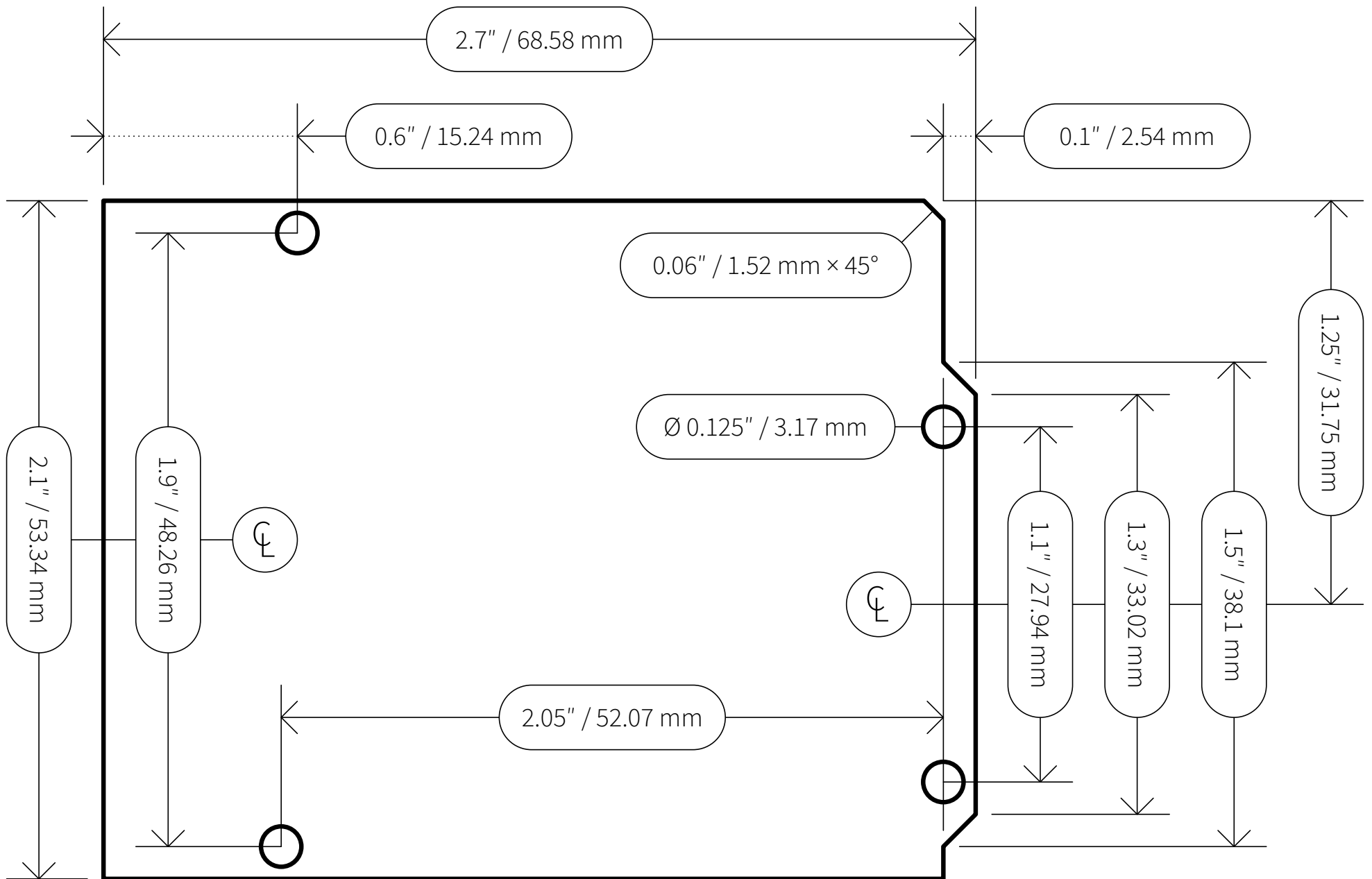
# Teensy 3.5/3.6 Breakout

Uno Edition

Revision A

## Legend

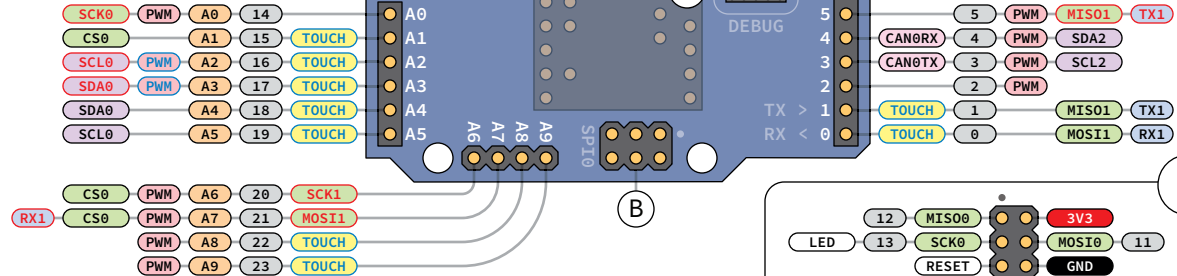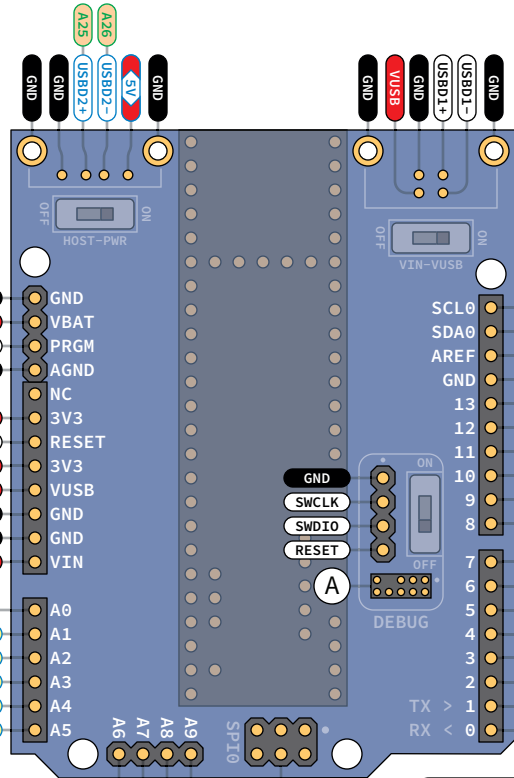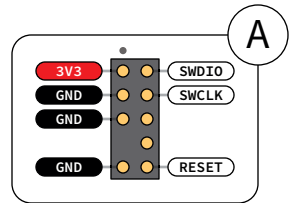| | |
|---|---|
| Voltage Pins | |
| Ground Pins | |
| Digital Pins | 24/24 |
| Analog Pins | 12/10 |
| PWM Pins | 14/16 |
| Touch Sense Pins | 0/9 |
| Serial Ports | 3/3 |
| I2C Ports | 2/2 |
| SPI Ports | 1/1 |
| CAN Bus Ports | 1/1 |
| Alternate Functions | |
| Teensy 3.5 Only | |
| Teensy 3.6 Only | |

Breakout by Tall Dog
tall-dog.com

Teensy by PJRC
pjrc.com



**Top pins (left to right):** GND, GND, USBD2+, USBD2−, A25, A26, 5V, GND

**Top pins (right group):** GND, VUSB, GND, USBD1+, USBD1−, GND

**HOST-PWR** OFF / ON

**VIN-VUSB** OFF / ON

**A panel:**
| 3V3 | | SWDIO |
| GND | | SWCLK |
| GND | | |
| GND | | RESET |

**Left header (top to bottom):**
GND — GND
VBAT — VBAT
PRGM — PRGM
AGND — AGND
NC
3V3 — 3V3
RESET — RESET
3V3 — 3V3
VUSB — VUSB
GND — GND
GND — GND
VIN — VIN

**Right header (top to bottom):**
SCL0 — SCL0 — TOUCH 19 A5 SCL0
SDA0 — SDA0 — TOUCH 18 A4 SDA0
AREF — AREF — AREF
GND — GND — GND
13 — 13 — LED 13 SCK0
12 — 12 — 12 MISO0
11 — 11 — 11 MOSI0
10 — 10 — 10 PWM CS0 TX2
9 — 9 — 9 PWM CS0 RX2
8 — 8 — SDA0 8 PWM MISO0 TX3
7 — 7 — SCL0 7 PWM MOSI0 RX3
6 — 6 — 6 PWM
5 — 5 — 5 PWM MISO1 TX1
4 — 4 — CAN0RX 4 PWM SDA2
3 — 3 — CAN0TX 3 PWM SCL2
2 — 2 — 2 PWM
TX > 1 — 1 — TOUCH 1 MISO1 TX1
RX < 0 — 0 — TOUCH 0 MOSI1 RX1

**Center debug header:**
GND
SWCLK
SWDIO
RESET
ON / OFF
DEBUG
A

**Analog left header (bottom left):**
SCK0 PWM A0 14 — A0
CS0 A1 15 — A1 TOUCH
SCL0 PWM A2 16 — A2 TOUCH
SDA0 PWM A3 17 — A3 TOUCH
SDA0 A4 18 — A4 TOUCH
SCL0 A5 19 — A5 TOUCH

A6 A7 A8 A9 SPI0

**Bottom left group:**
CS0 PWM A6 20 — SCK1
RX1 CS0 PWM A7 21 — MOSI1
PWM A8 22 — TOUCH
PWM A9 23 — TOUCH

B

## B panel

| 12 | MISO0 | | | 3V3 |
| LED | 13 | SCK0 | | MOSI0 | 11 |
| | | RESET | | GND |