

Teensy 3.5/3.6 Breakout

(Revision A, DIP-64)

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 **DIP-64 Edition** doesn't break out every single signal, but it does break out all the inaccessible bottom pads and all 18 additional digital GPIO pins. It includes extra-long headers for the interior through-hole pins as well as a right-angle header for the USB data signals and the debug port. The assembly is designed to fit perfectly into a standard 64-pin DIP socket, or it works just as well with a typical full-size solderless breadboard. *The A2 revision adds scored carrier rails with mounting holes.*

Included Parts (a visual part identification sheet is attached)

	Count	Part Type	Pos.	Tech.	Rows	Pins	Mfr.	Part Number/Desc.
A	1	Bare PCB	64	TH	2	32	Tall Dog	DIP-64 REV-A or A2
B	4	Male Header	40	TH	1	40	Generic	Standard
C	3	Male Header	5	TH	1	5	Samtec	TSW-105-09-T-S
D	1	Male Header	7	TH	1	7	Generic	Right Angle
E	1	Male Header	10	SMD	2	5	Generic	Standard
F	1	Male Header	8	SMD	2	4	Generic	Standard
G	1	Male Header	6	SMD	2	3	Generic	Standard
H	4	Pogo Pin	1	TH	1	1	Mill-Max	0906-1-15-20-75-14-11-0
I	2	Slide Switch	3	TH	1	3	Generic	SS12D00G3
J	2	Jumper	2	TH	1	2	Generic	Standard

Detailed Specs (values do not include carrier rails)

- **Grid Spacing** — 0.1 in (2.54 mm)
- **Board Dimensions** — 3.2 in (81.28 mm) × 1.0 in (25.4 mm)
- **Board Surface Area** — 3.2 in² (20.65 cm²)
- **Board Thickness** — 0.063 in (1.6 mm)
- **Number of Breakout Pins** — 64 pins (2 rows × 32 pins)
- **Row Spacing** — 0.9 in (22.86 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. If the Teensy Breakout PCB (part A) has carrier rails (REV-A2 or later), decide whether you want to leave them in place or remove them. Otherwise, skip this step.
 - a. If you leave the carrier rails in place, you can jump whichever signals you want out onto the rails. You can also cut any of the exposed traces connecting the holes on the underside of the board. The mounting holes at either end of the rails are designed for #2 or M2 machine screws (not included). The v-scoring is pretty strong, but you can further strengthen the perforated area with a thin line of epoxy.
 - b. If you remove the carrier rails (for typical breadboard use), apply pressure to one rail until you feel the material in the perforated area (v-score) begin to break. Using a pair of flat-head pliers makes this easier. Apply pressure in the opposite direction. Work the joint back and forth until it separates, then do the same for the other rail. You can sand or file down any rough edges. Cut two 32-pin lengths of through-hole male header from the 40-pin strips (part B) and put them aside to use later (in step 17).
4. Choose one of the following:
 - a. Place and solder a slide switch (part I) into the three holes outlined with a rectangle and marked VIN-VUSB on the breakout board. If you're using a Teensy 3.6, you can also install the second 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 J) in place of either switch for a more permanent method of configuring these signals.
5. Place and solder the 7-pin right-angle male header (part D) in the holes along the short edge of the breakout board (marked VUSB, D1-, D1+, GND, DE, DC, DD). The header should be installed on the top side of the board and the pins should be facing out.
6. 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 17.
7. 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 H) into each of these four holes. The elongated shape of the pads allow 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 front and side angles.

8. Choose one of the following:

- a. 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.
- b. Use one of the extended-length 5-pin male headers (part C) instead of the standard-length header. Since most of the internal through-hole pins are not broken out, you might want to use these extended-length headers to easily interface with jumper wires or female DuPont headers. If you use the extended-length header, the black insulation block should be positioned on the top side of the Teensy instead of the bottom.

9. Choose one of the following:

- a. 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.
- b. Use another extended-length 5-pin male header (part C) instead of the standard-length header, as described above in step 8b. You still need to remove a metal pin from the 2nd position. Remember to position the black insulation block on the top side of the Teensy if you use an extended-length header. You'll cover up one surface-mount component with the blank space in the header, which is fine.

10. Place the Teensy so the bottom side is facing up. If you used extended-length headers in steps 8 or 9, you can stick the Teensy upside-down into a breadboard. Apply flux onto the 10 (2 by 5) rectangular pads 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 E) onto the pads and solder it in place. You can secure the header using tape or a small drop of glue, or you can tack one pad first to get it aligned. The alignment doesn't have to be too perfect, just get it as close as you can.

11. Apply flux onto the 6 (2 by 3) rectangular pads marked 51, 52, 53 on the first row and 42, 41, 40 on the second row. Place the 2×3 SMD male header (part G) onto the pads and solder it in place, as described above in step 10.

12. Apply flux onto the 8 (2 by 4) rectangular pads 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 F) onto the pads and solder it in place, as described above in step 10.

13. Choose one of the following:

- a. 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-, and 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.
- b. Use another extended-length 5-pin male header (part C) instead of the standard-length header, as described above in step 8b. Remember to position the black insulation block on the top side of the Teensy if you use an extended-length header.

14. 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.

15. 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.

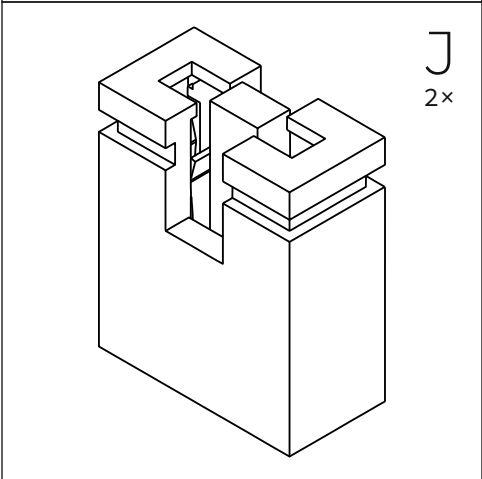
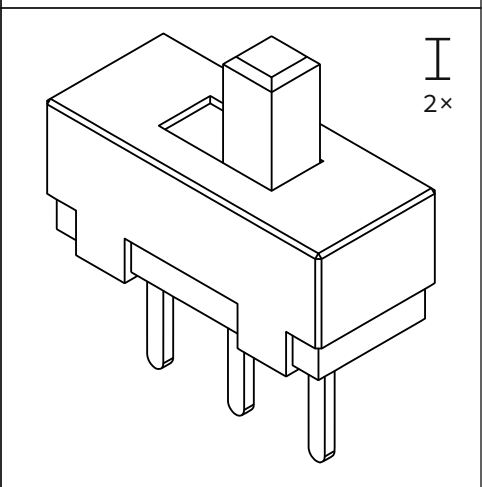
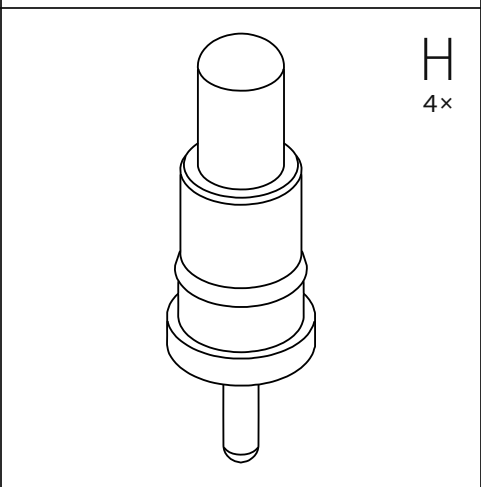
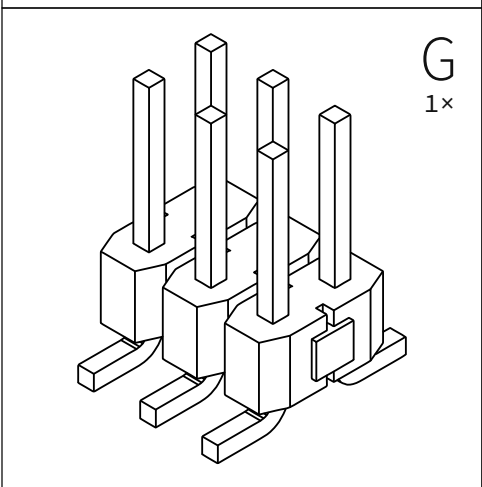
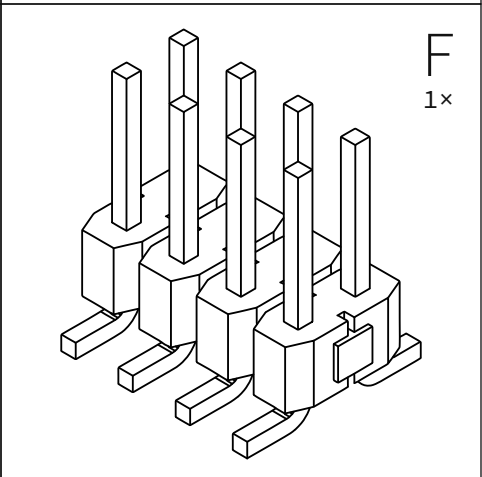
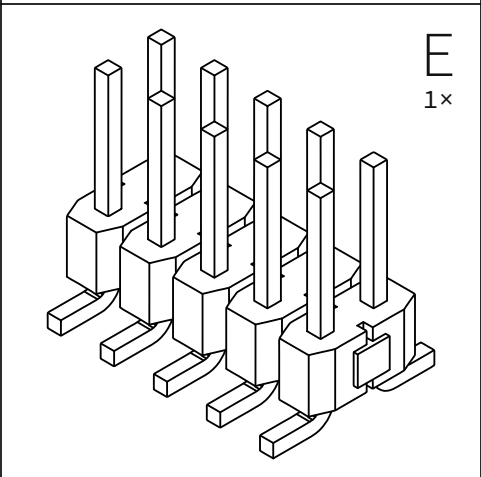
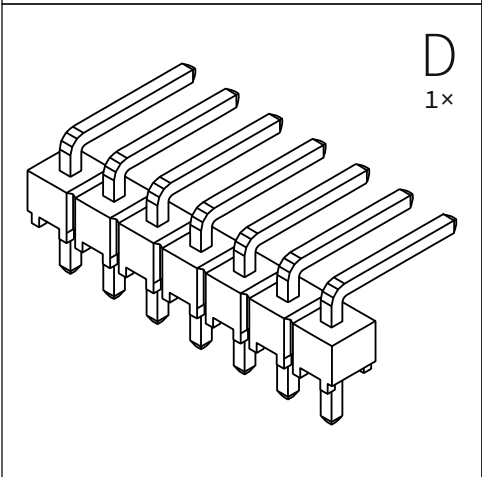
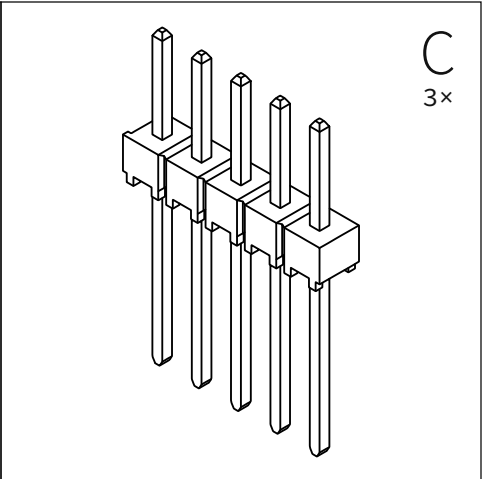
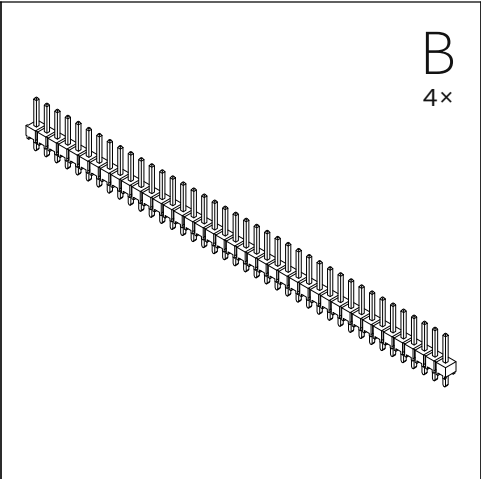
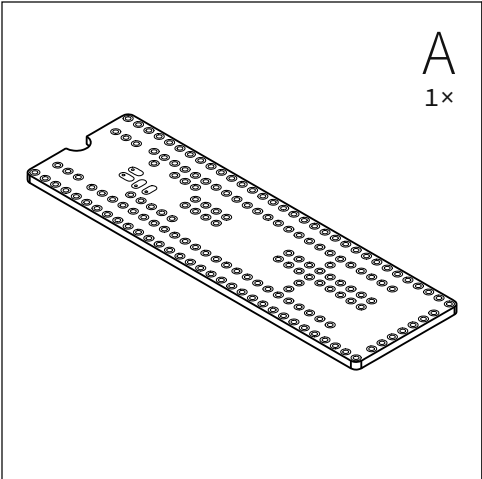
16. Tack the four corner pins to provide some stability, then check for proper alignment. Using diagonal cutters, trim all the protruding pins so they're reasonably flush with the bottom surface of the breakout board. You can place your finger over the pin that you're trimming to prevent it from flying 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.

17. If you removed the carrier rails in step 3, place the two 32-pin headers that you cut earlier along the two long edges on the underside of the breakout board. These exposed header pins will allow the entire assembly to interface with a standard breadboard, which you should use now to ensure proper alignment. Solder the headers in place. Counterintuitively, it's safer and easier to remove the assembly from a breadboard by rocking it forward and back instead of side to side. Be gentle and remove it carefully to prevent damage to any of the pins.

18. Inspect the finished assembly thoroughly. Connect it to power 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!

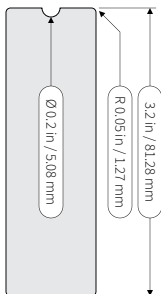
If you like using this product please consider leaving a positive review on Tindie!
If you have any concerns or problems please contact me at the email address above.



Teensy 3.5/3.6 Breakout

DIP-64 Edition

Revision A



Legend

Voltage Pins	Serial Ports	6/6
Ground Pins	I2C Ports	3/4
Digital Pins	SPI Ports	3/3
Analog Pins	CAN Bus Ports	1/2
PWM Pins	Alternate Functions	
Touch Sense Pins	Teensy 3.6 Only	

Teensy by PJRC
pjrc.com

Breakout by Tall Dog
tall-dog.com

