

Teensy 3.2 Breakout (Revision B, Carrier)

This is a breakout for the Teensy 3.2 development board by PJRC. Included are all the pin headers you need to assemble it, a 32.768 kHz crystal for use with the RTC (Real-Time Clock), a 150 μ F capacitor to enable USB host mode, a switch to select between USB or external power, and two machine screws for more permanent mounting.

The **Carrier Edition** has two bus rails on each side of the board. The inner and outer pairs can easily be shorted together using solder jumpers. The underside of the bus rails have no solder mask, making it easy to cut the traces that connect each plated hole. It is your responsibility to determine how to connect the individual rails to voltages, ground, or the signals of your choice, and to customize the final build to suit your particular application.

Included Parts

- **(1×)** Teensy 3.2 Breakout (Revision B, Carrier) bare printed circuit board
- **(3×)** 40-pin (1 row \times 40 pins) through-hole male header, 0.1 in (2.54 mm) pin spacing
- **(1×)** 14-pin (2 rows \times 7 pins) surface-mount male header, 0.1 in (2.54 mm) pin spacing
- **(1×)** 2-pin (1 row \times 2 pins) through-hole male header, 0.05 in (1.27 mm) pin spacing
- **(2×)** #6-32 \times 3/16" stainless steel pan-head machine screw
- **(7×)** gold-plated pogo pin (spring-loaded connector)
- **(1×)** 32.768 kHz tuning fork crystal
- **(1×)** 150 μ F tantalum capacitor (2917 package, size D)
- **(1×)** surface-mount DIP switch (SPST)

Detailed Specs

- **Grid Spacing** — 0.1 in (2.54 mm)
- **Board Dimensions** — 3.0 in (76.2 mm) \times 1.3 in (33.02 mm)
- **Board Surface Area** — 3.9 in² (25.16 cm²)
- **Number of Breakout Pins** — 60 pins (2 rows \times 30 pins)
- **Number of Bus Rails** — 4 rails, 30 pins each, 2 per side
- **Number of Mounting Holes** — 2 holes
- **Mounting Hole Distance** — 2.0 in (50.8 mm)
- **Mounting Hole Diameter** — 0.15 in (3.81 mm)
- **Mounting Hole Pad Diameter** — 0.27 in (6.858 mm)

Recommended Tools

- Soldering iron
- Solder
- Flux
- Breadboard
- Diagonal cutters
- Blue tape
- Razor blade

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Assembly Instructions

1. **Optional:** Cut the trace to separate VIN from VUSB on the underside of the Teensy. This step is recommended as long you also install the DIP switch (step 11) or you know that you're only ever going to use external (non-USB supplied) power. If you're going to install the DIP switch on the bottom of the breakout board, **you must cut the VIN-VUSB trace!**
2. Cut a 5-pin length of through-hole header. Align it to interface with the A14, PROGRAM, GND, 3.3V, and VBAT pins along the underside of the Teensy's shorter edge. 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 level.
3. Position the double-row 14-pin surface-mount header onto the rectangular pads on the underside of the Teensy. You can put some flux on the pads first, tape the upside-down Teensy to your work surface, then secure the header between the soldered 5-pin header and a second piece of tape. Solder the header in place.
4. Cut another 5-pin through-hole header and remove the metal pin from the 2nd position using your diagonal cutters as pliers. Solder the modified header (now 4-pin with one blank space) onto the underside of the Teensy so it occupies the A11, A10, AREF, and VUSB positions. You can use a breadboard for alignment here.
5. Solder the 2-pin narrow-pitch (0.05 in) through-hole header into the two RTC crystal holes on the underside of the Teensy. You may want to tack it in place first. This step is strongly recommended even if you're not installing the RTC crystal itself (step 13) so you still have the option of connecting a crystal at a later point in time.
6. Cut two 14-pin lengths of through-hole header. 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 you may want to tack them in place before soldering them.
7. Place and solder a gold pogo pin into each of the seven circled holes on the top side of the Teensy Breakout board. These pins must be soldered from the reverse side, one at a time.
8. Mate the Teensy and the Teensy Breakout board 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 be determined by the surface-mount header since it sits higher than the through-hole headers. As a result, there will be a small gap between the single-row headers and the breakout board, which is normal.
9. Using diagonal cutters, trim all protruding pins so they're reasonably flush with the underside surface of the Teensy 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.

10. Secure the assembly in place with the underside of the Teensy Breakout facing up. You can use two pieces of tape, one placed over each end. Be careful to make sure the gaps remain even on both sides and the two boards remain parallel. Solder all the trimmed pins.
11. **Optional:** Position and solder the surface-mount DIP switch onto the box marked VIN/VUSB on the underside of the Teensy Breakout board. **Alternatively**, you can use the solder-jumper to put this connection into a permanently shorted state. This step is only necessary if you cut the VIN-VUSB trace on the Teensy (back in step 1).
12. **Optional:** Position and solder the surface-mount 150 μ F capacitor onto the box marked USB HOST MODE on the underside of the Teensy Breakout board. Make sure the polarity is correct by matching the line printed on the board to the line on the capacitor. The presence of this capacitor will place the Teensy into USB host (master) mode, as opposed to its default state of being in USB device (slave) mode.
13. **Optional:** Solder the 32.768 kHz crystal onto the holes marked RTC on the underside of the Teensy Breakout board. Solder the crystal's metal enclosure to the large rectangular pad for added structural stability. This step is required if you're planning to use the RTC (Real-Time Clock) feature of the Teensy.
14. **Optional:** Decide if you want either the inner or outer pairs of bus rails to be shorted together. Solder the jumper marked INNER on the top side of the Teensy Breakout board to connect the two inner rails. Likewise, solder the jumper marked OUTER on the opposite short edge of the Teensy Breakout board to connect the two outer rails.
15. Decide how you'd like to connect any signals, ground, or voltages to the bus rails. Sections of the rails can be isolated from each other by cutting the exposed traces on the underside of the board. Using wires, other jumpers, and/or custom connectors, complete the build to suit the needs of your particular application. Inspect the finished assembly thoroughly. Connect it to power and make sure it functions correctly.

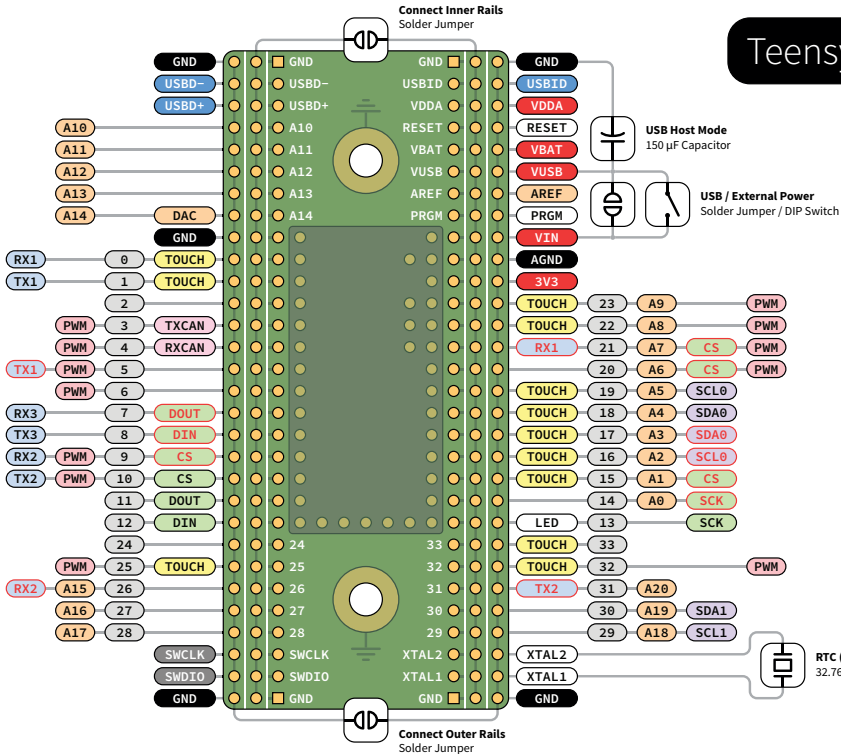
Congratulations, you're finished!

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

Teensy 3.2 Breakout

Carrier Edition

Revision B



Legend

- Voltage Pins
- Ground Pins
- Digital Pins
- Analog Pins
- PWM Pins
- Touch Sense Pins
- Serial Ports
- IPC Ports
- SPI Port
- USB Pins
- SWD Port
- Alternate Pins