

# Teensy 4.0 MPU to NANO (for the uBITX Raduino) socket adapter V2.4 Construction Manual

From the Triumvirate Skonk Worx, [www.w0eb.com](http://www.w0eb.com)

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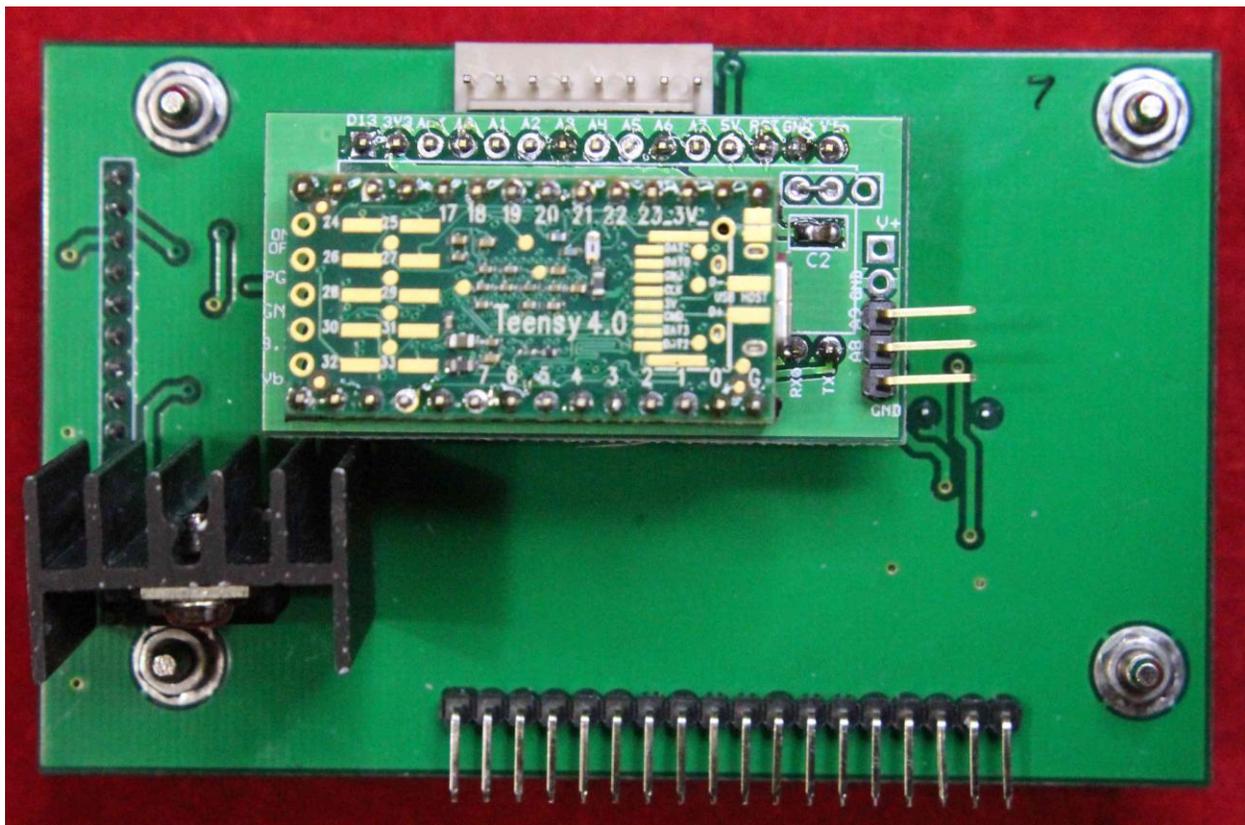


Photo 1: Adapter with Teensy 4.0 mounted on a factory uBITX V6 Raduino. NO hardware modifications are needed to use this adapter with the Factory Raduino.

Once you have your Teensy 4 adapter kit in hand, check the provided parts against the BOM (Bill of Materials) at the end of this publication and contact the TSW project coordinator (W0EB) by email at [w0eb@cox.net](mailto:w0eb@cox.net) if any are missing. The two 14 pin MALE headers for mounting the Teensy 4.0 are NOT provided with this kit and should be obtained at the same time you purchase your Teensy 4.0 (unless you have them on hand already.)

1: Starting construction – If they aren't already installed for you, first, install the two .1 uF 0805 SMD chip capacitors at C1 and C2. Check your soldering and make sure both ends are properly soldered to their terminals.

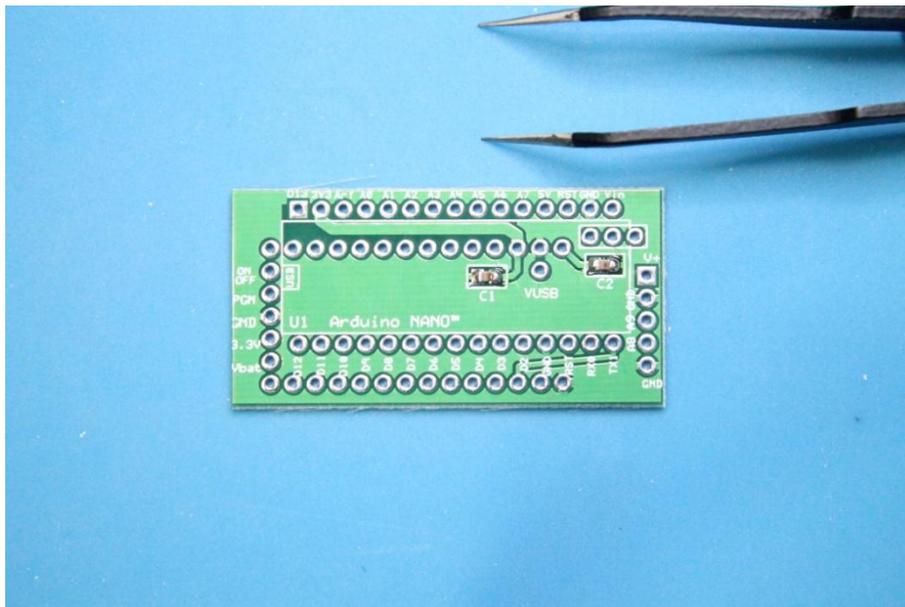


Photo 2: Capacitors in place

2: On the side of the board showing the Teensy V4 silkscreen, solder a jumper wire between JP1 terminal B and the center terminal. (Once you have identified the pads for the jumper, it does not matter which side of the PC board you solder this jumper on.)

**CAUTION!** Pay close attention to the orientation here as it is **CRITICAL** to proper operation.

3: On the side OPPOSITE the NANO silkscreen, (refer to Photo 3), insert the 15 pin MALE header that has been supplied WITH A MISSING PIN in the row of pads just under the top edge of the PCB. Orient this header so the missing pin is where the A6 pad is on the PCB – THIS IS CRITICAL!!

Solder 1 pin first and check to insure the pin separator is flat to the board and the long pins are vertical. Reheat the soldered pin and reposition as necessary until you are satisfied. Now solder ALL BUT the pin to the A6 pad (silkscreen A6 on the PCB). Refer to the silkscreen on the side of the board with the Arduino NANO silkscreen on it to see which pin is A6!

Check for shorts and poor solder joints – correct as necessary.

Now, on the same side, insert & solder ALL pins of the remaining 15 pin MALE header and solder/check your work like you did the first one.

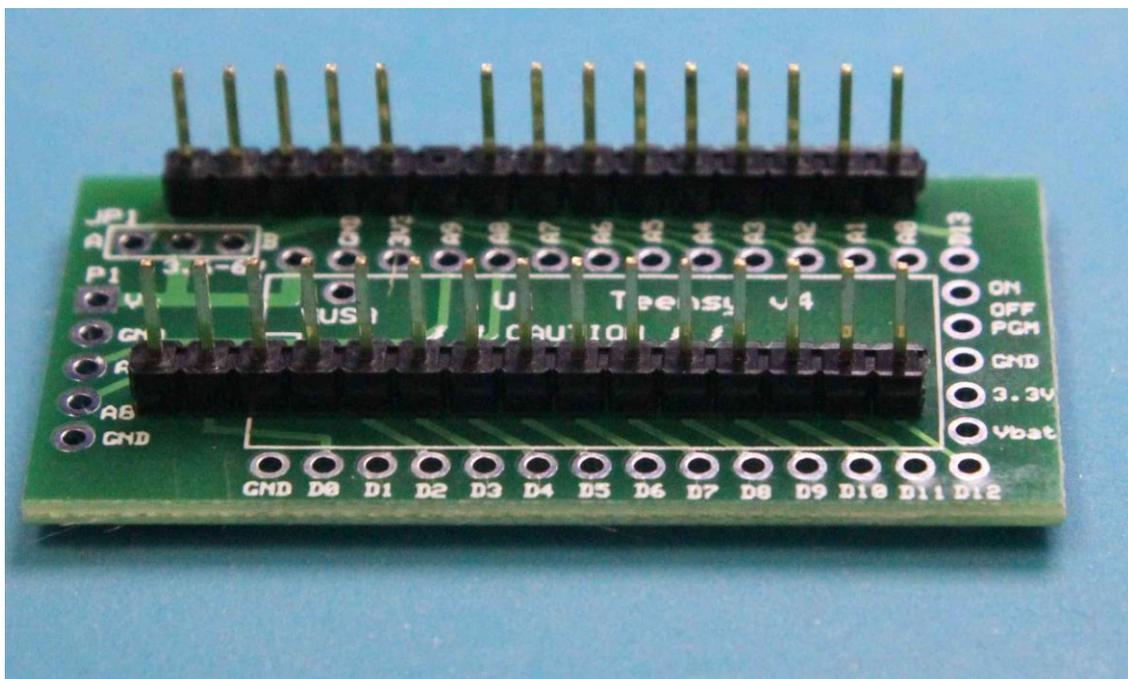


Photo 3: Male pins properly soldered in place. The removed A6 pin MUST be the sixth pin from the left with the board oriented as in the above picture.

4: Once you are satisfied that all the MALE pins are properly installed, flip the board over and insert the 3 pin, right angle, MALE header so that they sit in the holes labeled A9, A8 and GND (same end of the PC board as the wire jumper). Solder 1 pin first and check. Reheat the pin and adjust the header for proper orientation and then solder the remaining two pins. Check for shorts, etc.

NOTE: These 3 pins are for the extra KEYSER PADDLE Jack for CW, not for the USB connection. These 3 pins will connect to your key paddle jack which MUST be separate from the one mounted on the uBITX main board itself in order to use the Teensy's keyer routine. They are connected as follows: GND to the "SLEEVE" terminal of the paddle jack, A8 to the TIP (DOT) connection and A9 to the "RING" Dash connection of the extra stereo jack.

The USB connector is on the Teensy 4 itself and also note, the Teensy 4's USB connection is a USB Micro Female, not the USB Mini used on the Arduino NANO so you might want to make sure you have a proper USB cable on hand. One end should have the connector that plugs into your computer's USB port and the other should have a USB Micro "Male" connector to plug into the Teensy 4.0.

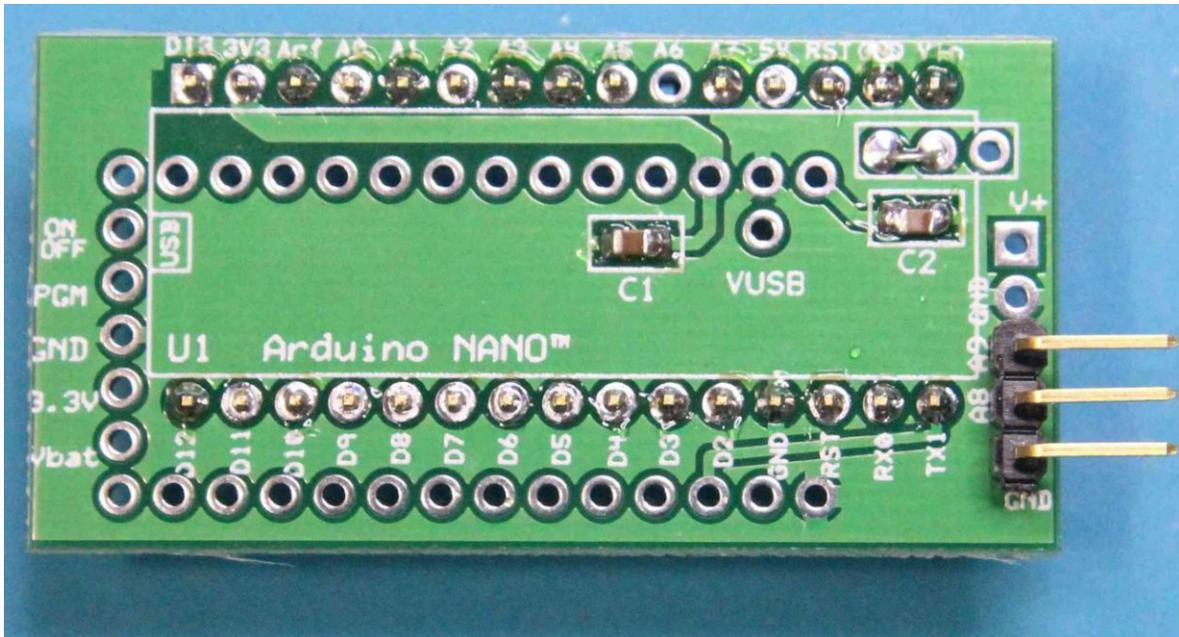


Photo 4: Right angle header for A8, A9 & GND properly installed.

5: There are two 14 pin female sockets provided. Make sure they are inserted from the side that the two capacitors are on. This is critical to proper operation of the Teensy 4.0 which will be inserted with its normal TOP side TOWARD the board just like the NANO in the later versions of the Raduino. Once you have them soldered completely and checked for proper connections, you have completed the adapter board itself.

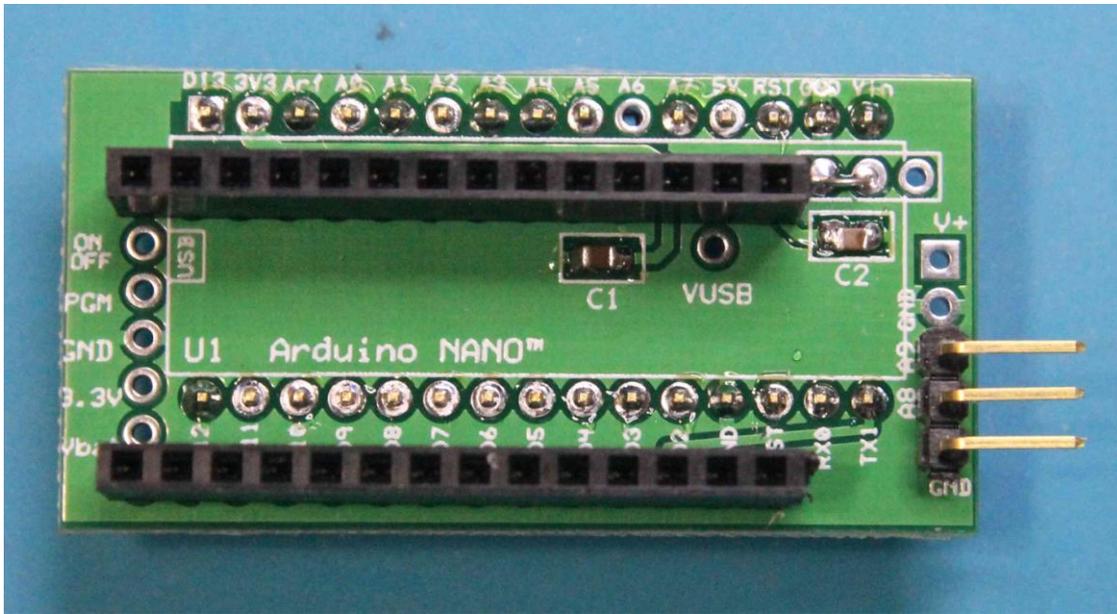


Photo 5: Female (Teensy 4.0) socket installed. (Note orientation of board.)

6: Preparing your Teensy 4.0 for use with the adapter. (You need to order your Teensy 4.0 with pins UNSOLDERED, or pick up two 14 pin male headers as these are NOT included in the adapter kit.)

7: First insert the two 14 pin male headers for the teensy into the two long female sockets with the short pins sticking up. This will help position them and give you a more stable platform for soldering them to your Teensy 4.0.

8: Turn the Teensy 4.0 upside down and orient it so the Teensy's USB connector is on the side toward C2 and the jumper JP1. (There is also a set of connection pads labeled V+, GND A9, A8 and another GND on that same end you can use for further help in orienting the USB connector properly.) Place the Teensy 4.0 over the pins so all pins fit through their respective holes in the Teensy's PCB and CAREFULLY solder/check all pins. The 5 pins opposite the USB connector on the Teensy itself are not used at this time. Also

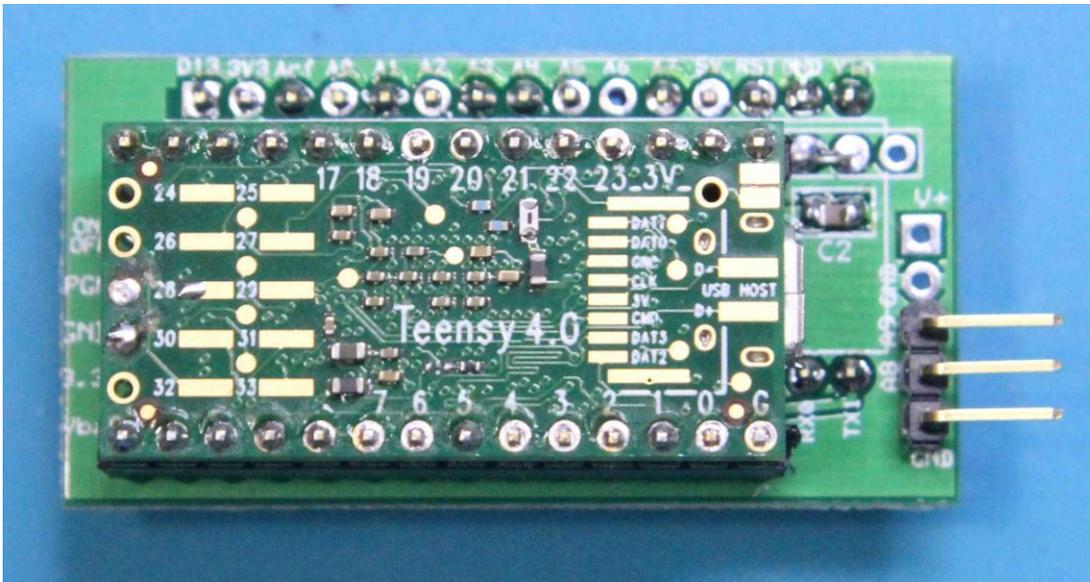


Photo 6: Teensy 4.0 with pins properly soldered and oriented, plugged into the adapter.

Now, you can plug the adapter into the Raduino from the back just like you would plug in a NANO but with USB connector toward your right. You may have to bend the 7805 regulator down slightly if the heat sink doesn't clear the bottom of the adapter board, Just be careful when you bend it and it will be OK.

If you are using the adapter with a uBITX radio, when you power up the system, you should enter the Display Touch Calibration screen by holding the encoder button in as you apply power. Follow the on screen instructions to calibrate TOUCH or the touch screen may not work for you.

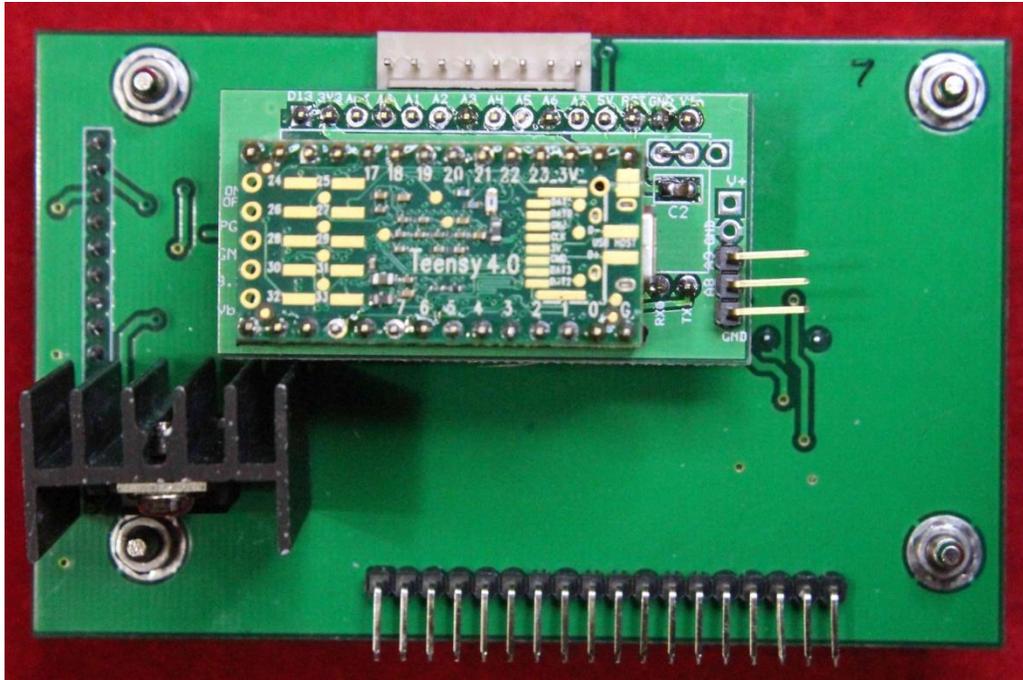


Photo 8: Completed Adapter with Teensy 4.0 on board plugged into a V6 Raduino.  
 Note the orientation of the Adapter board

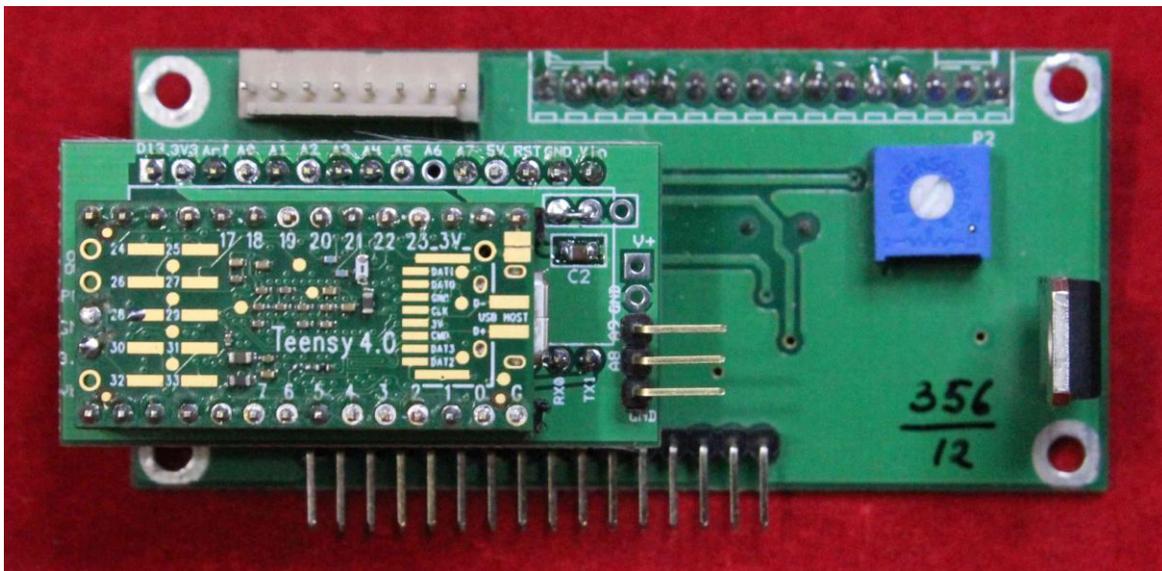


Photo 9: Completed Adapter with Teensy 4.0 on board plugged into an older V5  
 Factory Raduino. Note the orientation of the adapter board.

**NOTE: the 3 pin right angle MALE header is for the extra KEYSER PADDLE jack, not USB. USB connector is on the Teensy itself.**

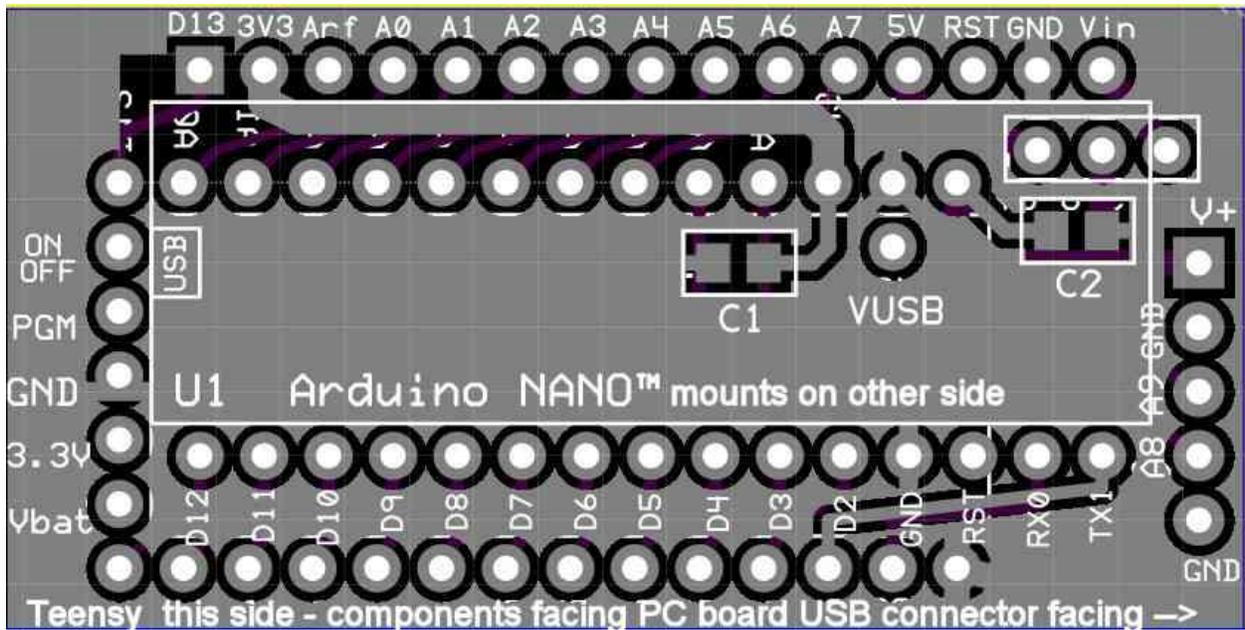
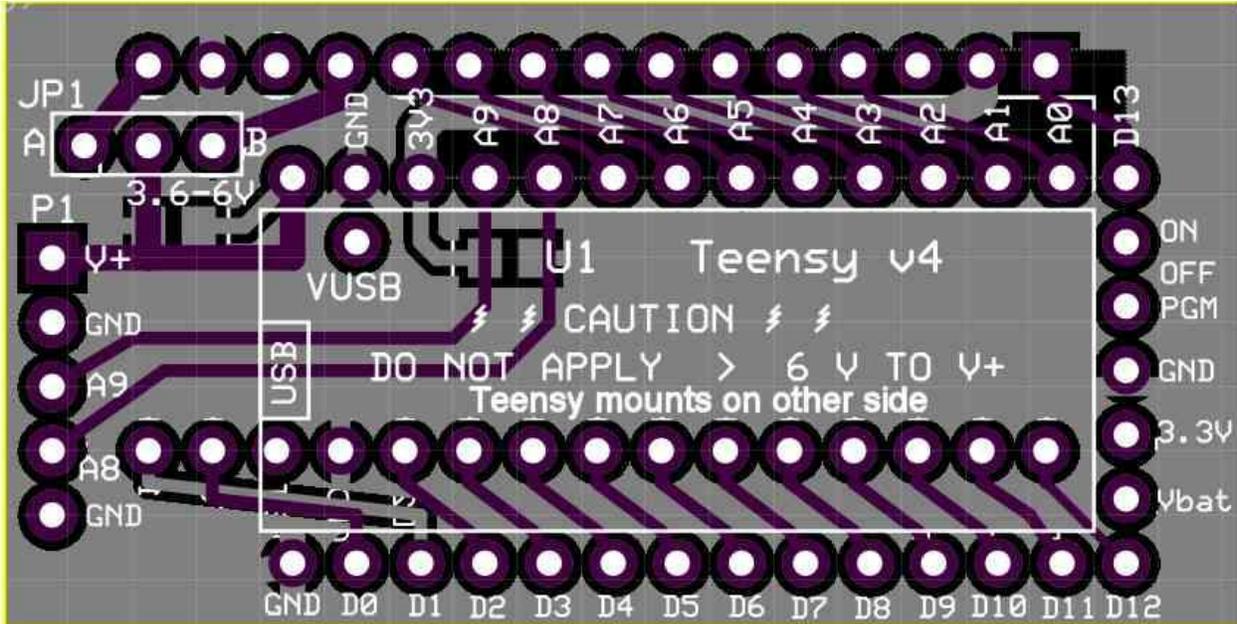
APPENDIX A: Bill of Materials Checklist:

| CHECK | QTY | PART   | SOURCE  |
|-------|-----|--|---|
| _____ | 1   | PC Board   | <a href="mailto:w0eb@cox.net">w0eb@cox.net</a>  |
| _____ | 2   | .1 uF 0805 SMD Cap. (C1, C2)   | Tayda A-942                                     |
| _____ | 1   | 15 pin MALE header .1" spc   | Many different MFG                              |
| _____ | 1   | 15 pin MALE header with a missing pin. See instructions for proper mounting. |   |
| _____ | 1   | 3 pin MALE header .1" spc  | Many different MFG                              |
| _____ | 2   | 14 pin FEMALE socket   | Tayda A1669 (15 pin)<br>carefully cut 1 pin off |

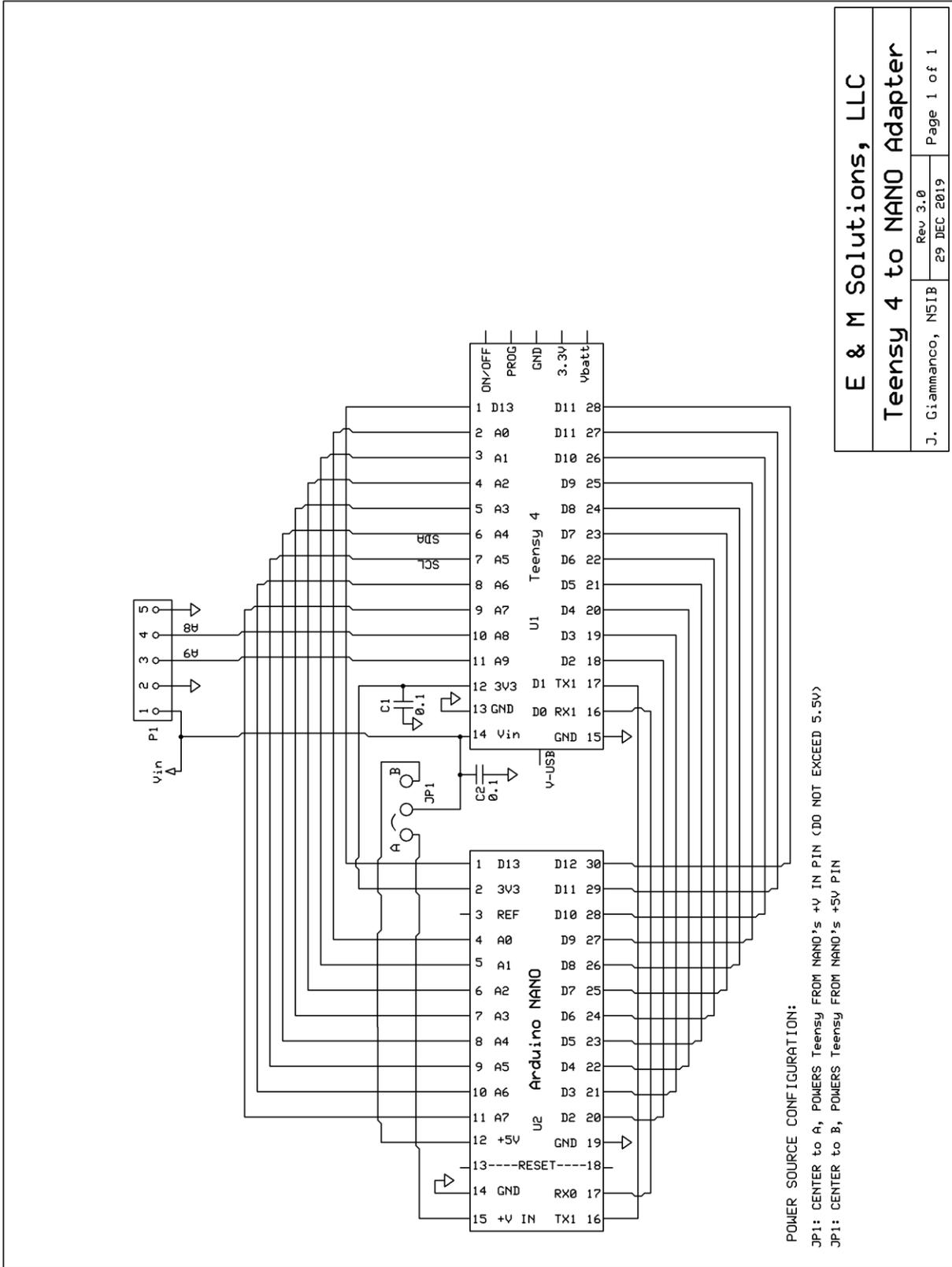
NOTE: The two 14 pin MALE headers required for mounting the TEENSY 4.0 to the adapter board's female sockets should be obtained at the same time you obtain your Teensy 4.0 if you do not already have them on hand. They should NOT be soldered to the Teensy until called for during the construction of this adapter kit

If you purchased your uBITX with the case from the factory, you will also need to obtain a different USB extension cable to match the MICRO "B" connector for the Teensy as the MINI B extension cable provided with the case will not mate with the newer style USB connector on the Teensy 4.0.

APPENDIX B: PCB Layout of the adapter.



# APPENDIX C: Schematic



|                                 |                        |
|---------------------------------|------------------------|
| <b>E &amp; M Solutions, LLC</b> |                        |
| <b>Teensy 4 to NANO Adapter</b> |                        |
| J. Giammarco, NSIB              | Rev 3.0<br>29 DEC 2019 |
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Credits:

TSW (Triumvirate Skonk Worx)

Concept and software: Ron Pfeiffer, W2CTX

PCB design and layout Jim Giammanco, N5IB

Project Coordinator, documentation Author and kit supplier,

Jim Sheldon W0EB

See the TSW website [www.w0eb.com](http://www.w0eb.com) for details and kit ordering information.

Special thanks to Armando Assante, one of our first kit builders for suggesting corrections and additions to this manual.

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