How to convert an IBM Model F Bigfoot to USB with a Teensy 2.0:

Brief:

This only covers how to convert the keyboard to USB, and get it functional with a basic keymap, I won't be covering how to modify and change keys and I believe other parts of the internet have done that better than me, but this will get this keyboard Functional first and formost.

What do I need?:
- A Teensy 2.0 with pins, if you buy it without pins, this will still work, but you will need to strip one end of the header pins, and solder that to the proper pin on the Teensy, this is more work, and leaves more room for error. Pins are easier.

- 11 female to female header pins, the same size you'd see on a motherboard, these can be ordered from Amazon very cheaply, or found at hobby shops. Get a few more than 11 in case they don't hold onto the pins well, they should be a little rougher to put on, and not just fall off when on the pin, on either side.

- Appropriate tools to open the case, a regular screwdriver (Think "–" not "+") or on really old models a screw set that can handle: 5.5mm or 7/32 for the interior grounding screw, and7.5mm or 9/32 for the two screws on the underside of the keyboard. (most should have a regular channel carved in them, so a regular screwdriver is what you should need 90% of the time.)

- Grounding, be very careful about static when doing this, as even a small shock can and will destroy your keyboard, or Teensy. Use a grounding wristband, or always be touching something that is grounded: (I.E. a large metal table or the like, but really use the wristband.)

Steps:

1. Download the Soarer **CONTROLLER** (Do not download the Soarer Converter) v.120 Beta 4 folder, I've put together all the tools I used into one folder here: https://mega.nz/#!vmBmzA6Z

2. Extract it somewhere convenient and then open the folder and navigate to tools, assuming you've not already hooked up the teensy, do so now, and do so BEFORE you put it into the bigfoot case, this is important because you need to physically press a button on it.

3. Go ahead and connect your Teensy to your windows computer via USB.

3. Open teensy.exe in the tools folder once open you'll see a tiny window with a picture of your teensy on it. Press the button on the teensy now. It'll go into programming mode.

* I've been told online that you should do this after plugging it in with the pins to the keyboard, but haven't seen that be the case on my end, and have noticed that the flash works works either before it's plugged in or after. Also **MAKE SURE THIS IS THE ONLY TEENSY CONNECTED, JUST IN CASE.**

4. Then select: File > open HEX file, then select "Soarer_Controller_v1.20_beta4_atmega32u4.hex" in the same folder. This will flash it and shortly enough it will come back online. Usually around a few seconds.

5. Select Automatic Mode on the top right, and then you can now close teensy.exe.

6. Now we need to send over the keymap, because the teensy is ready to control the keyboard, but doesn't have directions on how to. This part is strange. Drag and drop bigfoot.sc over scaswr.bat, this will transfer it to the Teensy, even if it's not in programming mode, and you shouldn't be anymore for this part.

7. A terminal will open giving you some information and detailing if the transfer was a success. I've never had it fail, so I'd assume there was something wrong with the teensy involved if this were the case.

8. Once this is done, it's time to open the Bigfoot and get at the connector pins. This is very straightforward, remove the two screws on the back of the case, and pull off the back.
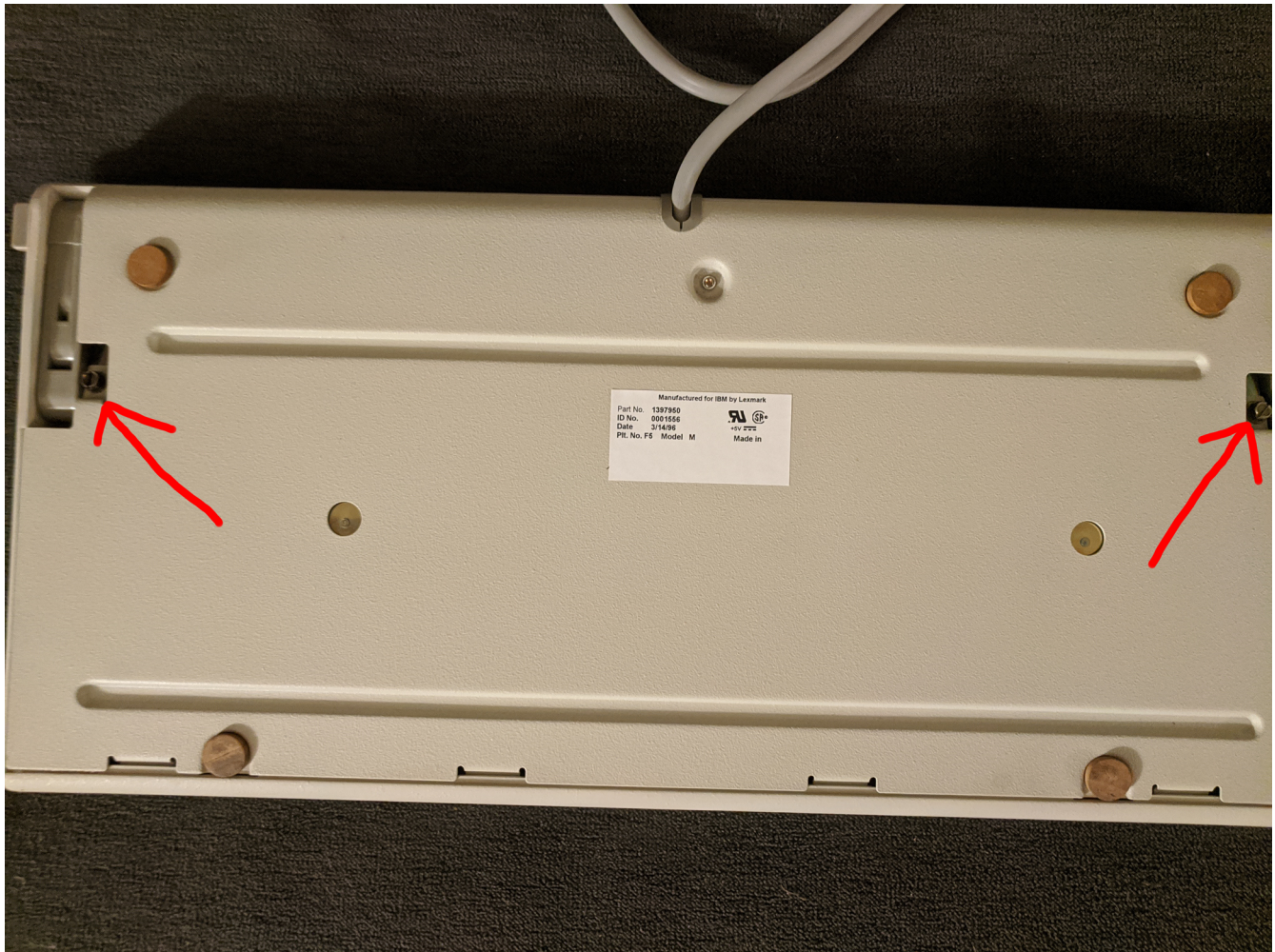
The Bigfoot Serial cord is connected both to the PCB, and the back of the keyboard, you will need to remove the grounding screw that holds it to that (Green Arrow), The cord will need to have it's entry bracket that is attached to the back case removed, but that bracket can be wrapped off the cord and put back on afterward, be careful with the plastic it is old.
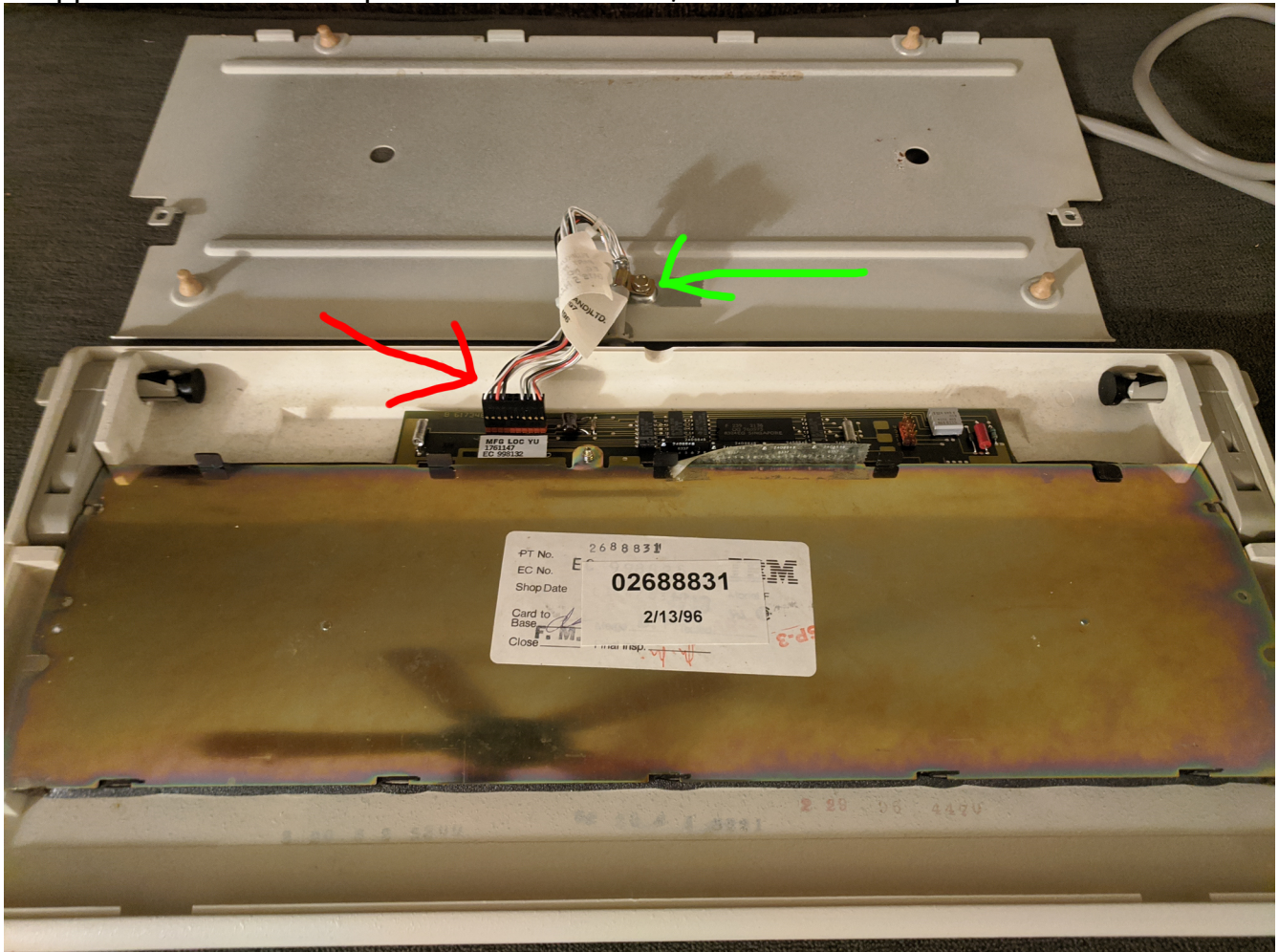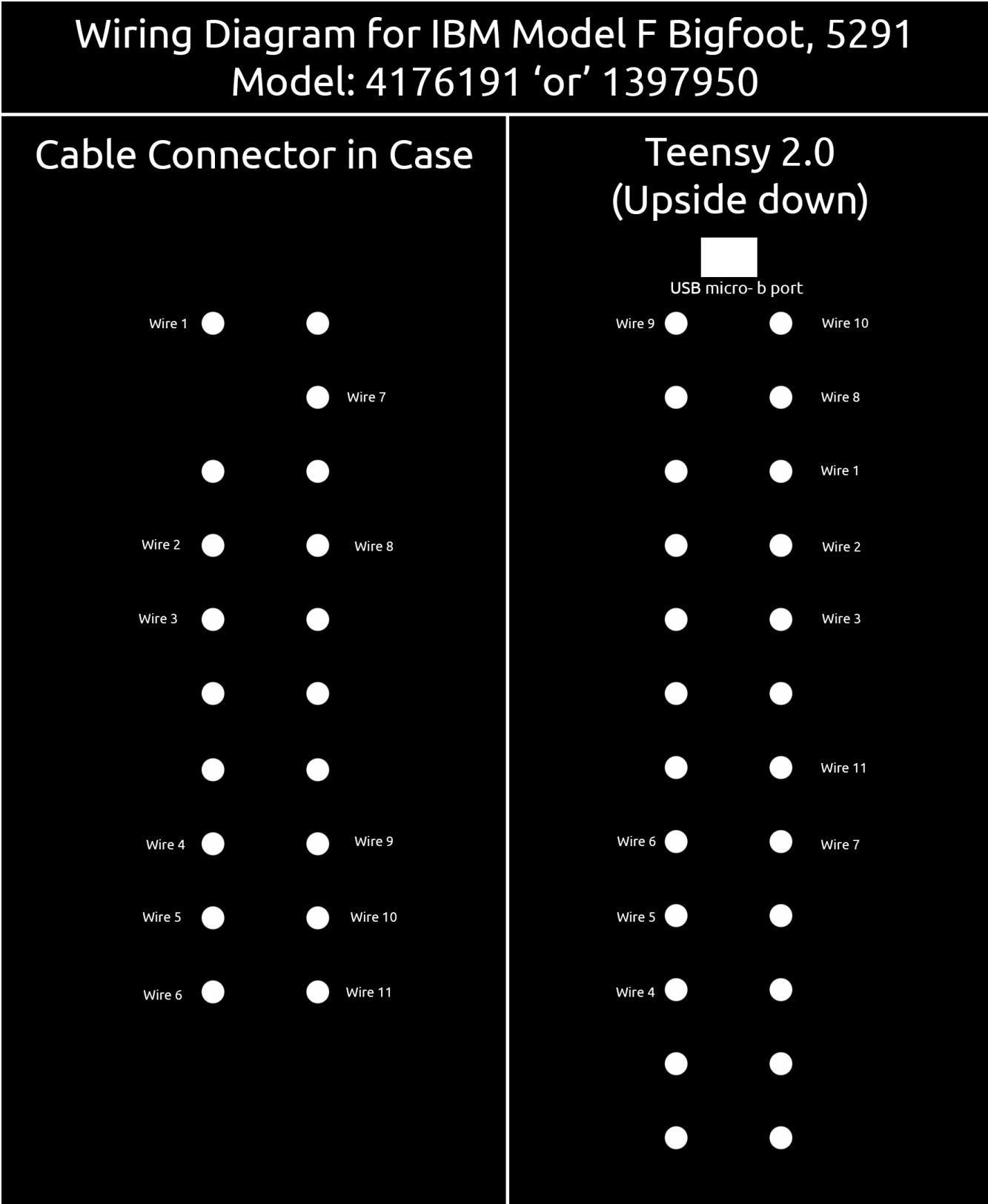

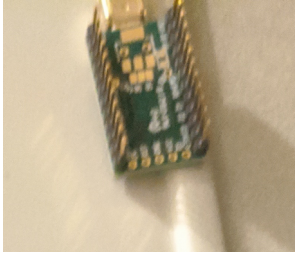and then simply pull the pin end out of the PCB (Red Arrow). Then the pins will be laid bare:
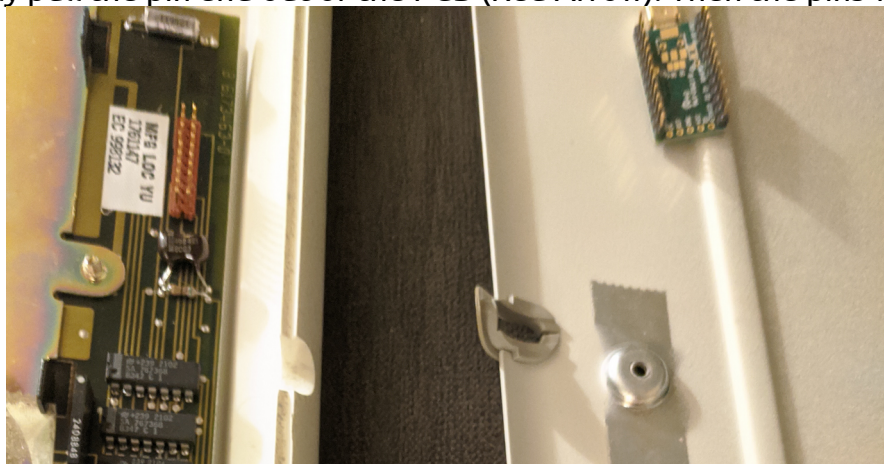
Now it's time to hook them up!

9. Using this diagram (Diag A), hook up the pins from the Teensy to the Board, the board Is missing one pin, so use that missing pin to orient which way it needs to go, your teensy should be oriented like this (Diag B):
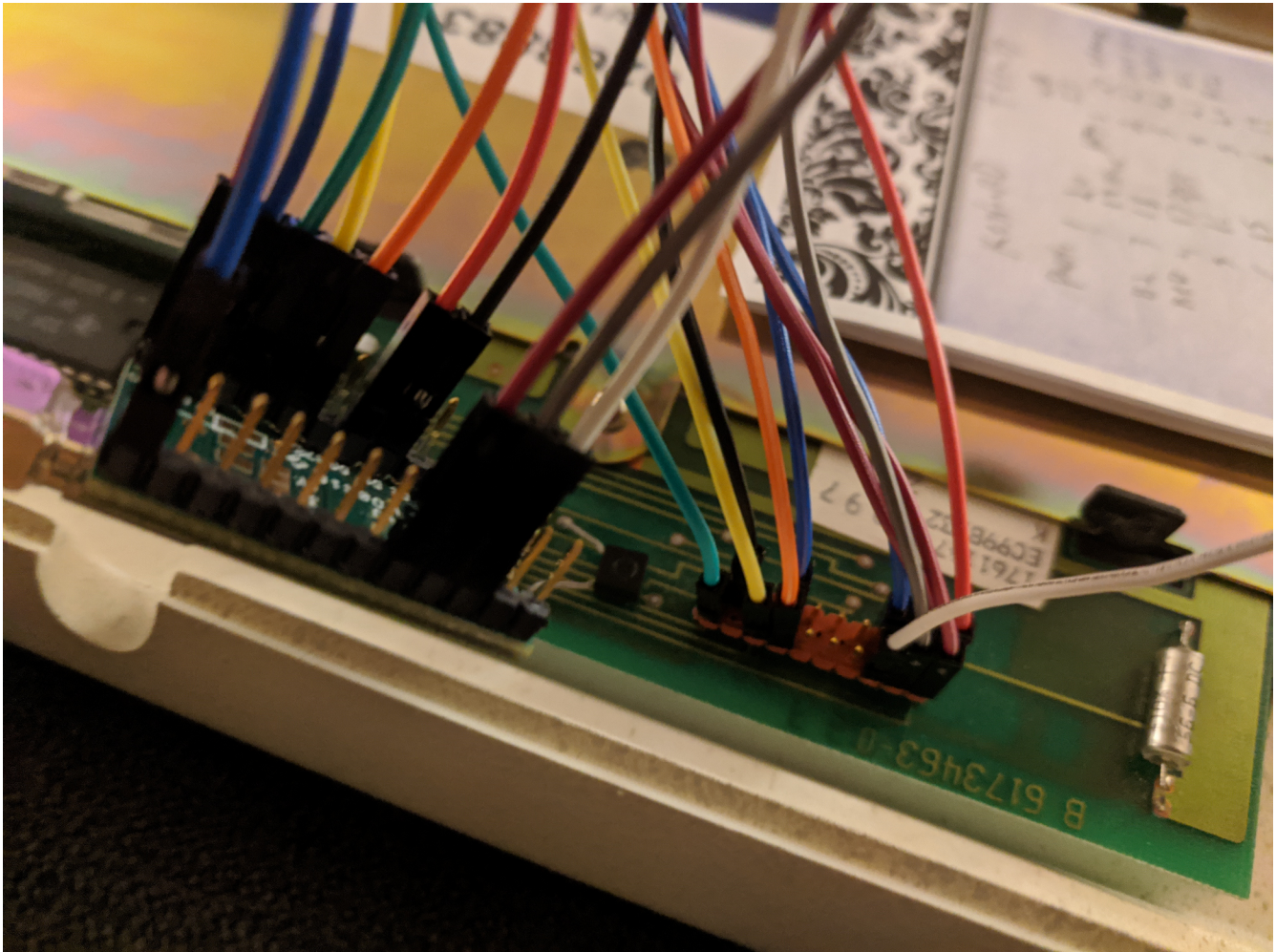
Diag A:

Wiring Diagram for IBM Model F Bigfoot, 5291 Model: 4176191 'or' 1397950

Cable Connector in Case

Teensy 2.0 (Upside down)

USB micro- b port

Cable Connector in Case	Teensy 2.0
Wire 1 ● ●	Wire 9 ● ● Wire 10
● Wire 7	● ● Wire 8
● ●	● ● Wire 1
Wire 2 ● ● Wire 8	● ● Wire 2
Wire 3 ● ●	● ● Wire 3
● ●	● ●
● ●	● ● Wire 11
Wire 4 ● ● Wire 9	Wire 6 ● ● Wire 7
Wire 5 ● ● Wire 10	Wire 5 ● ●
Wire 6 ● ● Wire 11	Wire 4 ● ●
	● ●
	● ●

Diag B:

10. Done! It should look like this now:

11. Now that that is all done, connect your usb cord to the teensy by feeding it through the hole in the bottom case:

I otherwise left the teensy free floating inside the case, and pushed it off to the side, now reverse the steps it took to get inside the case, and screw the back on, leaving the teensy inside the case connected to the USB cord:

Time to test it! Hook it up to your computer and open something and type with it, the layout isn't the most ideal, but from here on, you can find a guide to change the layout and then send it to the teensy. If certain keys work but others don't, you may have

I hope this has been helpful, if you want more pictures to prepare yourself for this work, I have an Imgur Album with my experience doing them, I noticed just now that all the pictures aren't from the same keyboard, but the steps are perfectly in order to do this, and you can watch my process as I do it:

New Old Stock IBM Bigfoot unwrapping and Teensy mod:
https://imgur.com/a/DL40jO6

TROUBLESHOOTING:

My Teensy won't start up!

Try opening it with Teensy.exe and see if it even recognizes it, if it's slow to, or otherwise strange, you may have a bad Teensy, this is incredibly rare as the guy selling them tests them vigorously.

When I type with the keyboard, it either presses tons of keys and windows open, OR it doesn't type anything at all. :(

This can be caused by the grounding screw not being tight enough, or having corroded, this one can be a tough fix because getting these screws can be difficult. I've not tried a Model M back panel screw but have a sneaking suspicion they may be the right size to replace this screw, but the first thing I would do is tighten it.

The grounding screw I'm talking about is on the other side of the PCB from the pins, pull out the metal plate, which has the keys on the other side, and lift up the foam from the

back of the PCB, you should see just ONE big metal screw, that needs to be either tightened or replaced. If it persists after both of these, you may have a failed board. :(