Building a Steno Keyboard

Bill of Materials

34 key switches
- Cherry MX Red from MechanicalKeyboards.com
- $29 for a pack of 50

34 keycaps
- Row 3 or 4, not slanted, two colors, from WASD Keyboards
- $34

Top and bottom plates plus hardware and 23 diodes
- Planck, from Ortholinear Keyboards
- $24-30 + $2.30

Arduino ProMini and FTDI Friend
- From Adafruit
- $9.95 + $14.75

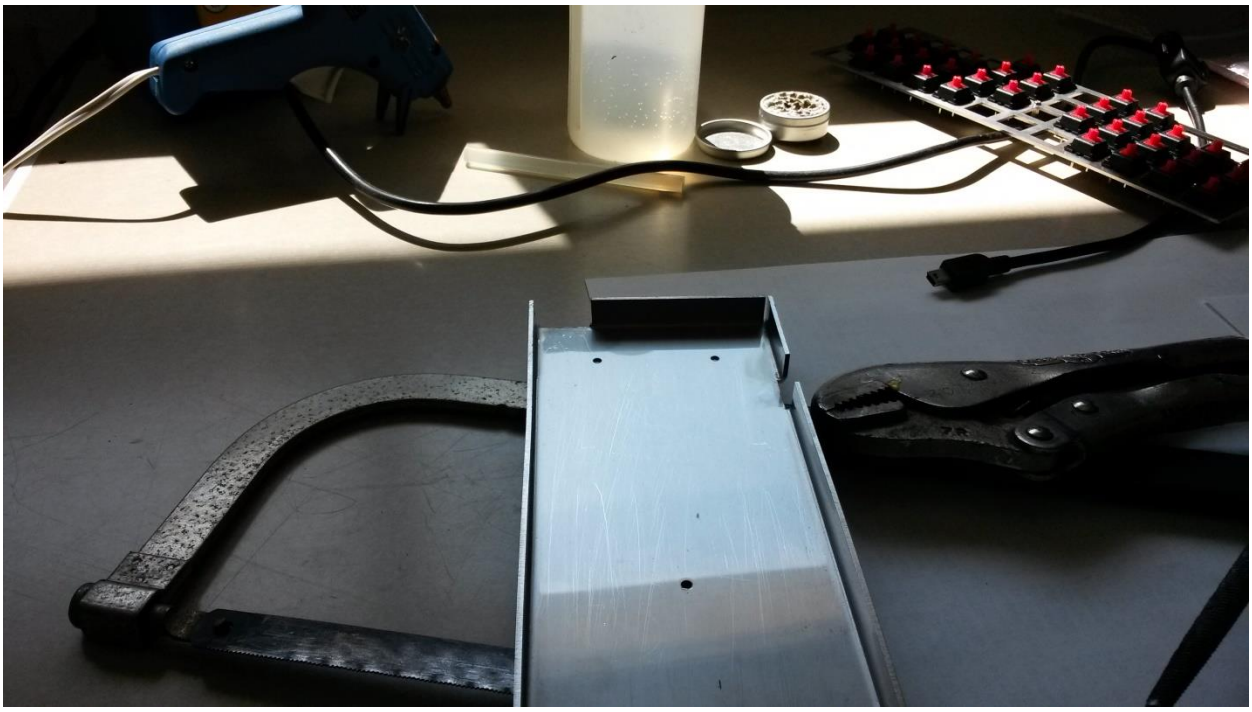
Solder and wire and USB cable
- Whatever

Labor
- Priceless, i.e. free

Total
- $120

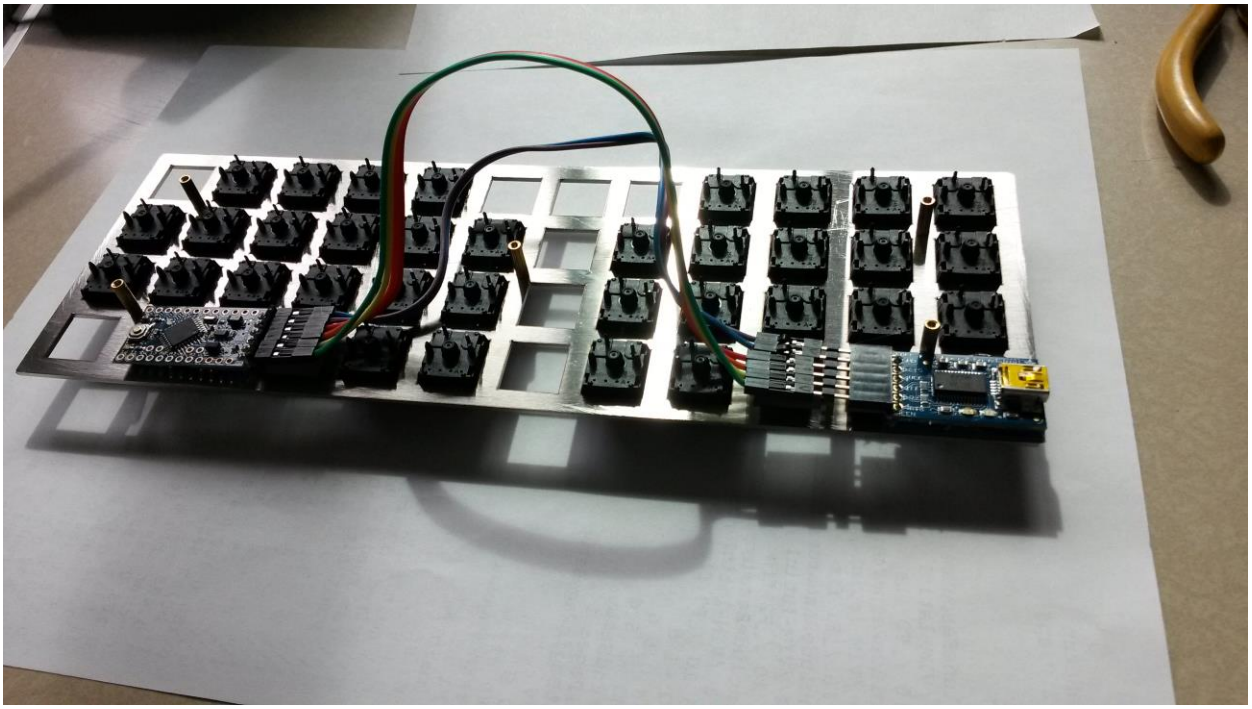
I couldn't see how to fit the FTDI Friend under the keys in the space allotted…

… so I decided to cut a new hole in the side with a hacksaw and some vice grips. I inserted the key switches in the top plate along with the posts (see upper right corner).



And then I hot-glued the Arduino and the FTDI Friend to the top plate.

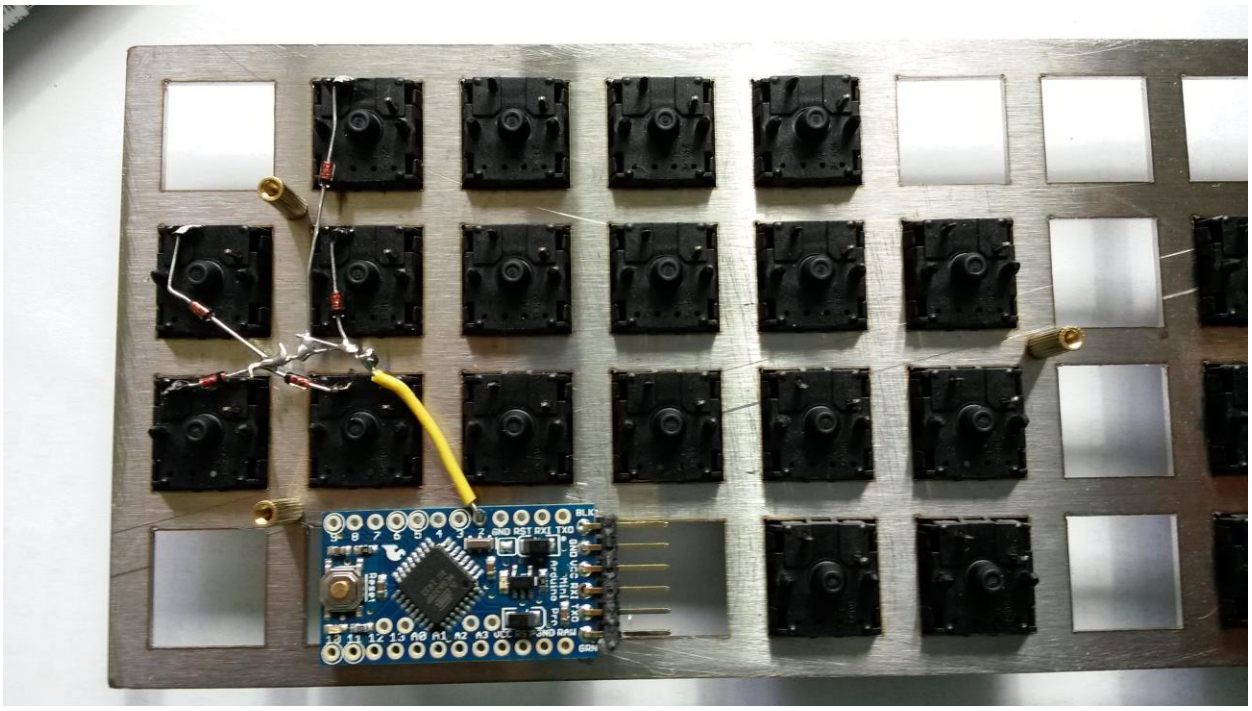
After gluing the boards down I tested to be sure they still worked. I hoped the glue would prevent shorts on the metal plate.



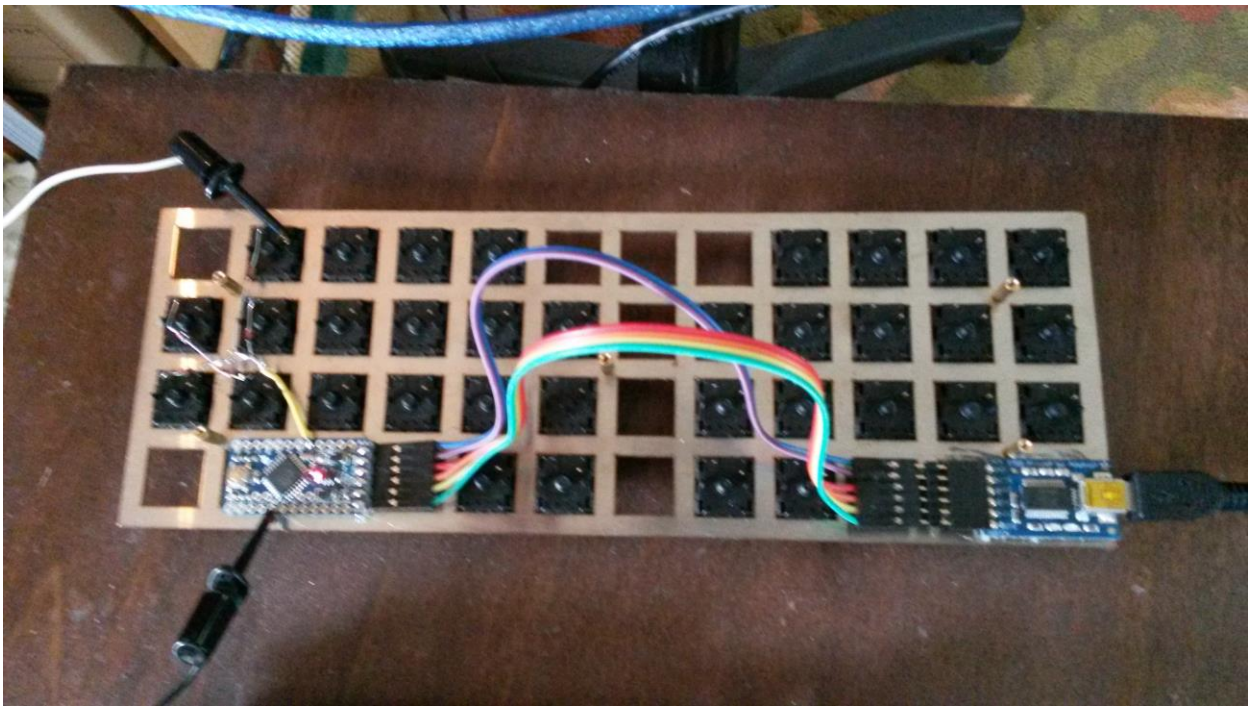
Before starting the wiring, I made a diagram to help me when the board is upside down.

	#	#	#	#				#	#	#	#
D	T	L	P	F	*		*	H	P	T	S
Z	S	G	B	R	*		*	R	W	K	S
				U	E		O	A			

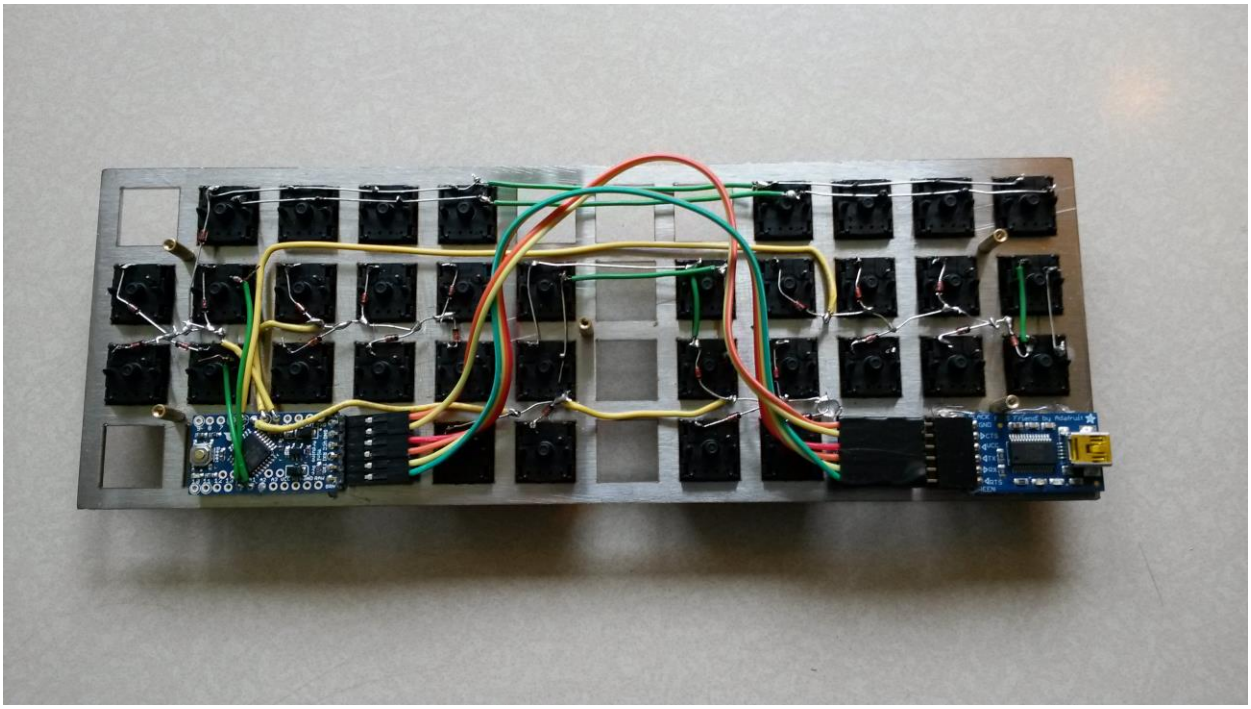
Key switches of the same color connect to the same port pin on the micro, each through a diode. The next picture shows the first row of five switches connected to Arduino port 2 with a diode for each switch.



At this point I connected the other side of one switch to port A0 (PORTC.0) with clip leads and ran a test program on the Arduino to be sure the diodes were in the right direction. This time they were.



I moved the clip lead to each switch in the row to be sure all switches were working and did the same as each of the rows was wired.

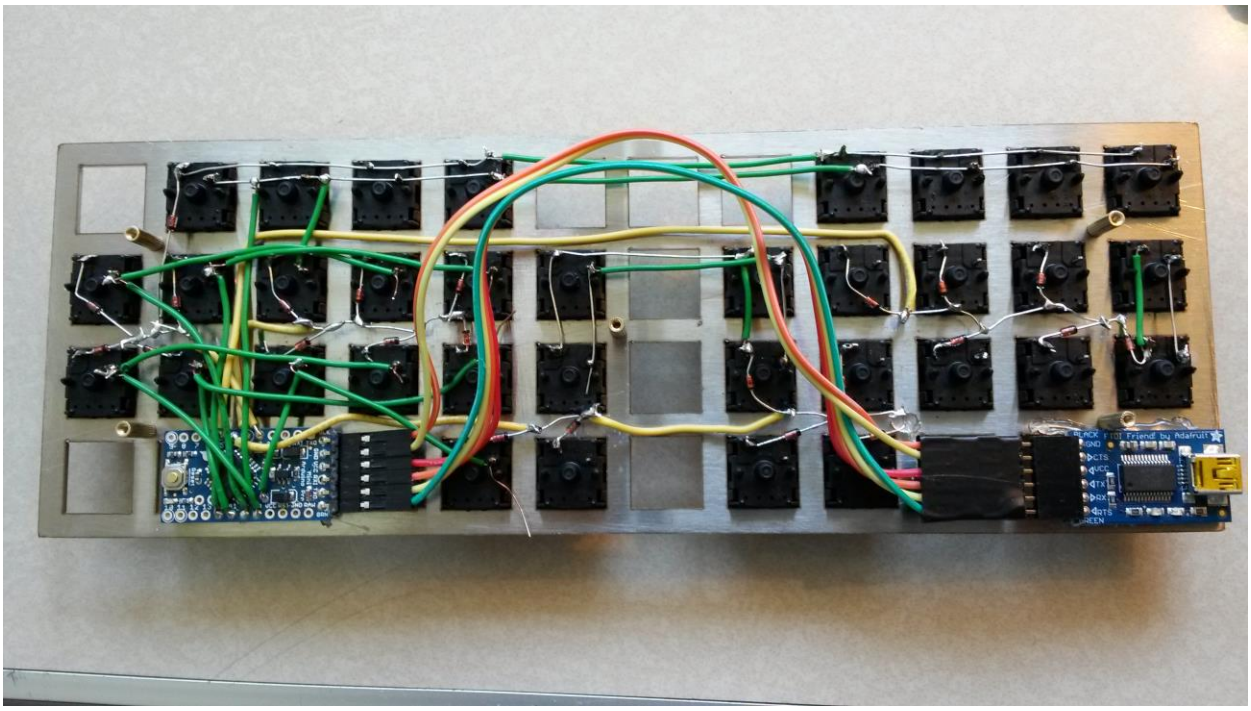


Once all the rows were wired it was time to wire the columns.

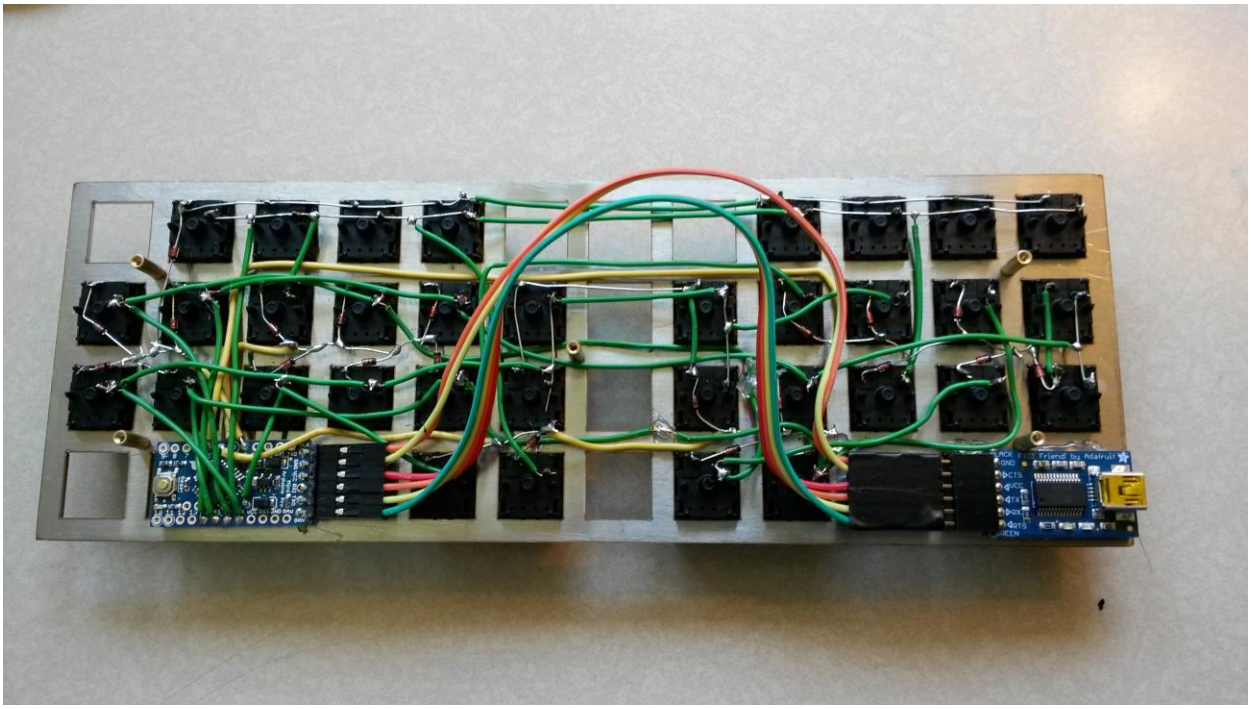
	# 4	**# X**	**# X**	**# X**				**# X**	**# X**	**# X**	**# X**
D 2	T 0	L 4	P 2	F 0	* X		* X	H 5	P 3	T 1	S X
Z 3	S 1	G 5	B 3	R 1	* X		* 3	R 0	W 4	K 2	S 0
				U 5	E 4		O 2	A 1			

This diagram helped me keep straight which switches were in the same column, both by number and by color. The # and * switches are marked with X and a slightly darker color to remind me that they don't need diodes but instead are connected to each other in parallel.

I started on the left and connected each switch from row 0 first to PORTC pins 0-4. In Arduino terms that means A0-A4, the so-called “analog” pins. They’re actually general purpose IO pins. A5 is used too, just not for row 0. This is the one row with only five keys.



Once all the port pins were connected to switches I finished wiring each of the column pins together as shown in the diagram by color and number. The numbers correspond to PORTC bits.



As I connected switch to switch I tested each one immediately using the final program and Plover. I'd press the switch and see what key turned up in the stroke display. Here's the final product, which I'm using to type this paper.