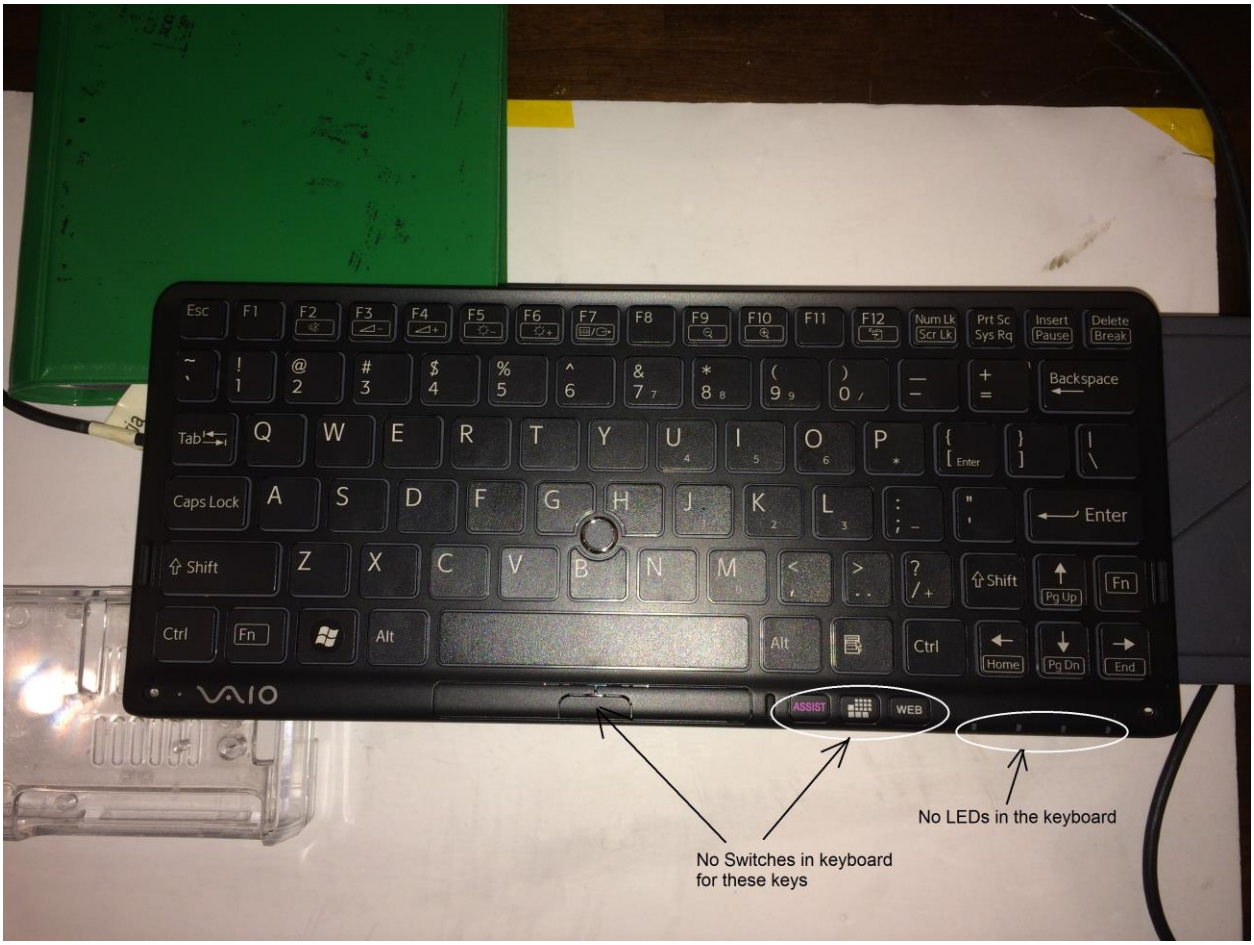
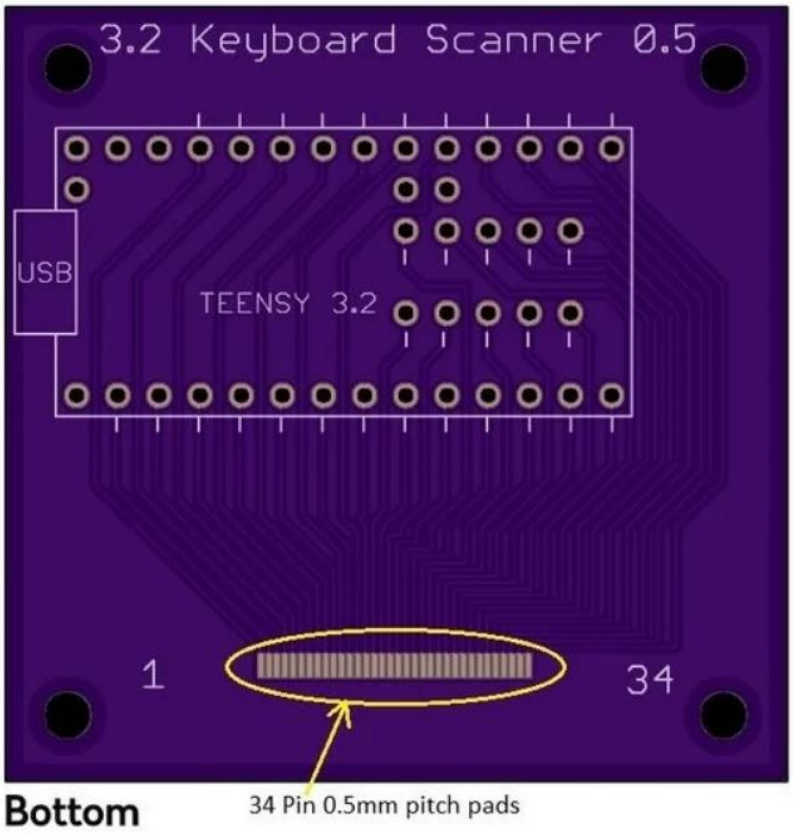
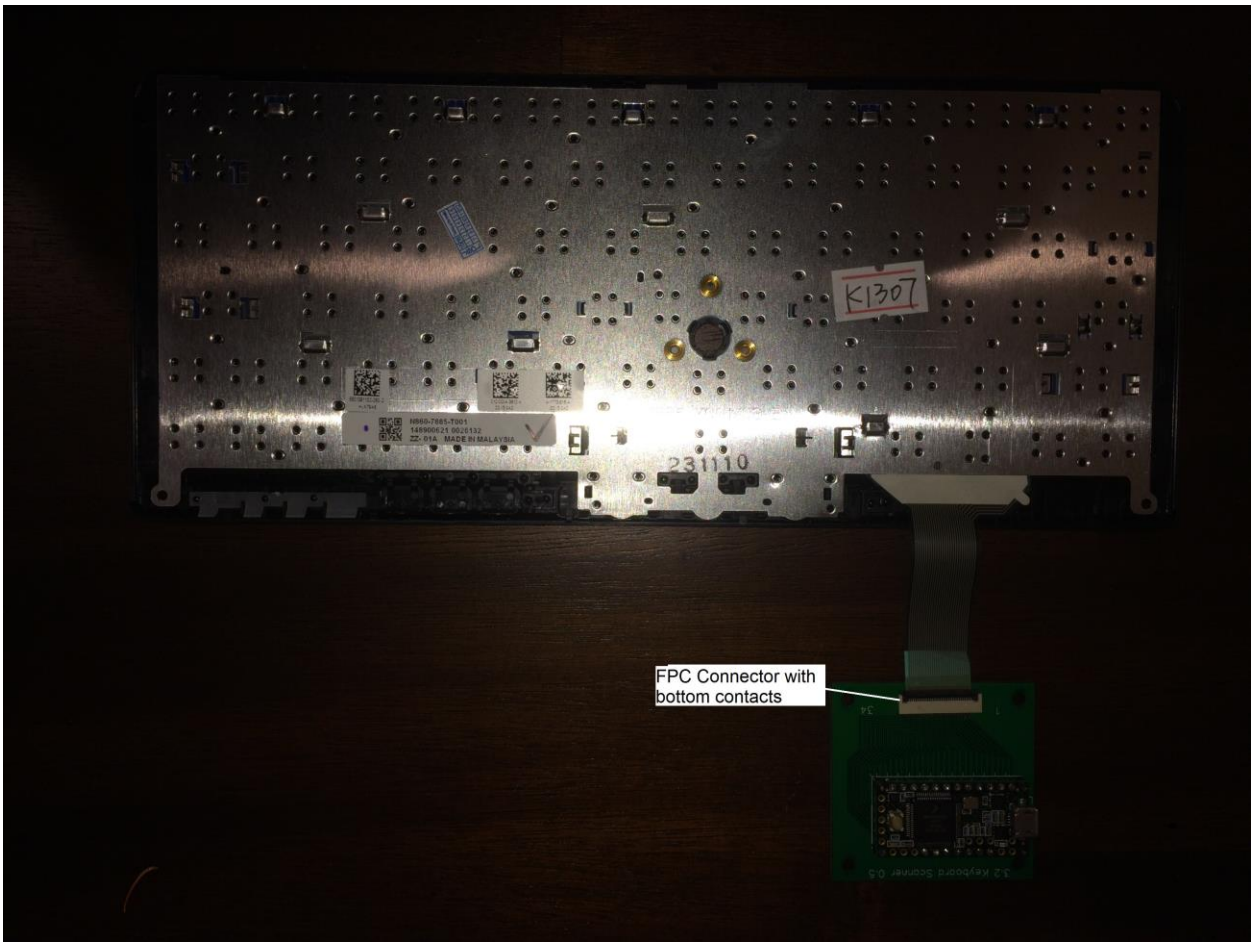
Sony Vaio P Keyboard part number N860-7885-T001 converted to USB with a Teensy 3.2.



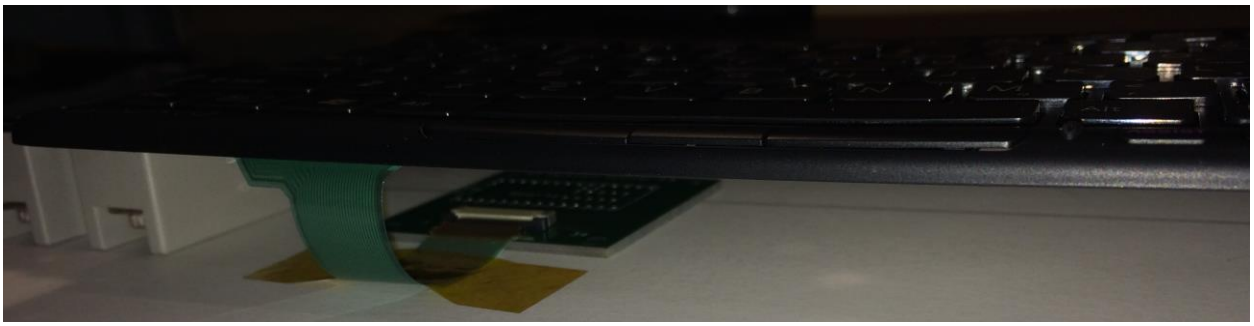
The Teensy 3.2 side of the Keyboard_Scanner_LT_0P5 circuit board is shown below. This board has pads for an FPC connector with up to 34 pins with a 0.5mm pitch. The FPC cable for a Sony Vaio P has 30 pins with a 0.5mm pitch.



This shows the FPC cable inserted into the Teensy 3.2 connector board. The connector has bottom contacts so the bare metal of the FPC cable must be facing down (closest to the board).

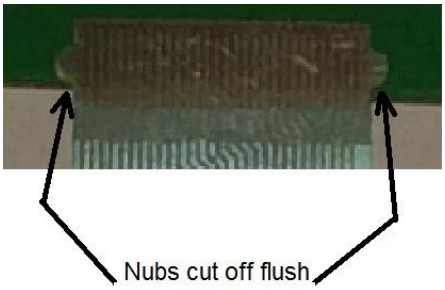



The Teensy will sit underneath the keyboard when the FPC cable is looped back as shown.



The FPC connector is shown below in the open position with the locking bar lifted up. The bottom contacts are visible.

The FPC cable had nubs on each side that were trimmed off with scissors so it would fit in a generic 30 pin 0.5mm pitch connector.



The results from running the “Matrix_Decoder_3p2.ino” code gave the following list of FPC connector pins that were connected as each key was pushed. Both keyboards were tested and gave the same results, although the pin order is sometimes different.

| | Keyboard 1 | | Keyboard 2 | |
|---|---|---|---|---|
| MODIFIERKEY_LEFT_CTRL | 13 | 24 | 13 | 24 |
| MODIFIERKEY_RIGHT_CTRL | 12 | 24 | 12 | 24 |
| MODIFIERKEY_LEFT_SHIFT | 15 | 19 | 15 | 19 |
| MODIFIERKEY_RIGHT_SHIFT | 19 | 10 | 10 | 19 |
| MODIFIERKEY_LEFT_ALT | 17 | 21 | 17 | 21 |
| MODIFIERKEY_RIGHT_ALT | 21 | 11 | 11 | 21 |
| MODIFIERKEY_GUI | 16 | 22 | 22 | 16 |
| MODIFIERKEY_LEFT_FN | 14 | 20 | 14 | 20 |
| MODIFIERKEY_RIGHT_FN | 14 | 20 | 14 | 20 |
| KEY_A | 12 | 8 | 12 | 8 |
| KEY_B | 5 | 12 | 5 | 12 |
| KEY_C | 7 | 12 | 7 | 12 |
| KEY_D | 10 | 8 | 8 | 10 |
| KEY_E | 17 | 8 | 8 | 17 |
| KEY_F | 7 | 10 | 7 | 10 |
| KEY_G | 6 | 17 | 6 | 17 |
| KEY_H | 10 | 6 | 6 | 10 |
| KEY_I | 5 | 17 | 17 | 5 |
| KEY_J | 5 | 10 | 5 | 10 |
| KEY_K | 6 | 12 | 6 | 12 |
| KEY_L | 4 | 10 | 10 | 4 |
| KEY_M | 5 | 11 | 11 | 5 |
| KEY_N | 11 | 6 | 11 | 6 |
| KEY_O | 4 | 17 | 4 | 17 |
| KEY_P | 15 | 18 | 15 | 18 |
| KEY_Q | 9 | 17 | 9 | 17 |
| KEY_R | 7 | 16 | 16 | 7 |
| KEY_S | 9 | 12 | 9 | 12 |
| KEY_T | 7 | 17 | 7 | 17 |
| KEY_U | 5 | 16 | 5 | 16 |
| KEY_V | 7 | 11 | 7 | 11 |
| KEY_W | 9 | 10 | 9 | 10 |
| KEY_X | 8 | 11 | 8 | 11 |
| KEY_Y | 6 | 16 | 16 | 6 |
| KEY_Z | 9 | 11 | 11 | 9 |
| KEY_TILDE | 14 | 23 | 23 | 14 |
| KEY_1 | 9 | 15 | 15 | 9 |
| KEY_2 | 9 | 16 | 9 | 16 |
| KEY_3 | 8 | 15 | 8 | 15 |
| KEY_4 | 8 | 16 | 8 | 16 |
| KEY_5 | 7 | 15 | 15 | 7 |
| KEY_6 | 6 | 14 | 6 | 14 |
| KEY_7 | 6 | 15 | 15 | 6 |
| KEY_8 | 15 | 5 | 15 | 5 |
| KEY_9 | 4 | 15 | 4 | 15 |
| KEY_0 | 4 | 16 | 4 | 16 |

| | | | | |
|---|---|---|---|---|
| KEY_MINUS | 14 | 18 | 14 | 18 |
| KEY_EQUAL | 3 | 15 | 3 | 15 |
| KEY_BACKSPACE | 15 | 2 | 15 | 2 |
| KEY_ESC | 13 | 23 | 13 | 23 |
| KEY_F1 | 13 | 9 | 9 | 13 |
| KEY_F2 | 9 | 14 | 9 | 14 |
| KEY_F3 | 8 | 13 | 8 | 13 |
| KEY_F4 | 8 | 14 | 8 | 14 |
| KEY_F5 | 7 | 13 | 13 | 7 |
| KEY_F6 | 7 | 14 | 7 | 14 |
| KEY_F7 | 13 | 6 | 6 | 13 |
| KEY_F8 | 5 | 13 | 5 | 13 |
| KEY_F9 | 5 | 14 | 5 | 14 |
| KEY_F10 | 13 | 4 | 4 | 13 |
| KEY_F11 | 4 | 14 | 4 | 14 |
| KEY_F12 | 13 | 18 | 13 | 18 |
| KEY_INSERT | 2 | 13 | 13 | 2 |
| KEY_PRINT_SCREEN | 3 | 14 | 3 | 14 |
| KEY_DELETE | 2 | 14 | 2 | 14 |
| KEY_RIGHT | 10 | 1 | 1 | 10 |
| KEY_LEFT | 1 | 11 | 1 | 11 |
| KEY_UP | 1 | 17 | 1 | 17 |
| KEY_DOWN | 1 | 12 | 12 | 1 |
| KEY_MENU | 11 | 18 | 11 | 18 |
| KEY_SLASH | 12 | 18 | 12 | 18 |
| KEY_PERIOD | 4 | 12 | 4 | 12 |
| KEY_COMMA | 4 | 11 | 4 | 11 |
| KEY_SEMICOLON | 17 | 23 | 17 | 23 |
| KEY_QUOTE | 3 | 10 | 3 | 10 |
| KEY_ENTER | 2 | 17 | 2 | 17 |
| KEY_LEFT_BRACE | 16 | 18 | 16 | 18 |
| KEY_RIGHT_BRACE | 3 | 17 | 3 | 17 |
| KEY_BACKSLASH | 2 | 12 | 2 | 12 |
| KEY_CAPS_LOCK | 16 | 23 | 16 | 23 |
| KEY_TAB | 15 | 23 | 15 | 23 |
| KEY_SPACE | 10 | 23 | 10 | 23 |
| KEY_NUM_LOCK | 13 | 3 | 3 | 13 |

The “Assist”, “Web”, and the unknown icon in-between do not have any switches in the keyboard. There are no LEDs behind the four windows in the lower right corner.

The left mouse button is connected to FPC pins 29 and 30. The right mouse button is connected to FPC pins 27 and 30. The center mouse button has no connection to the FPC cable.

The connection list above was converted to the keyboard switch matrix below.

Sony Vaio P Keyboard Matrix

FPC connector pin numbers are listed first and Teensy 3.2 I/O numbers are second. This keyboard followed the “rules” perfectly. The modifier keys (in bold) have rows all to themselves.

| FPC-I/O | 10-4 | 11-18 | 12-5 | 13-17 | 14-6 | 15-24 | 16-7 | 17-25 |
|---|---|---|---|---|---|---|---|---|
| 1-23 | RIGHT | LEFT | DOWN | | | | | UP |
| 2-0 | | | BACKSLASH | INSERT | DELETE | BACKSPACE | | ENTER |
| 3-22 | QUOTE | | | NUM_LOCK | PRINT_ SCREEN | EQUAL | | RIGHT_ BRACE |
| 4-1 | L | COMMA | PERIOD | F10 | F11 | 9 | 0 | O |
| 5-21 | J | M | B | F8 | F9 | 8 | U | i |
| 6-2 | H | N | K | F7 | 6 | 7 | Y | G |
| 7-20 | F | V | C | F5 | F6 | 5 | R | T |
| 8-3 | D | X | A | F3 | F4 | 3 | 4 | E |
| 9-19 | W | Z | S | F1 | F2 | 1 | 2 | Q |
| 18-8 | | MENU | SLASH | F12 | MINUS | P | LEFT_ BRACE | |
| 19-33 | **RIGHT_ SHIFT** | | | | | **LEFT_SHIFT** | | |
| 20-9 | | | | | **FN** | | | |
| 21-26 | | **RIGHT_ ALT** | | | | | | **LEFT_ ALT** |
| 22-10 | | | | | | | **GUI** | |
| 23-27 | SPACE | | | ESC | TILDE | TAB | CAPS_ LOCK | SEMI COLON |
| 24-11 | | | **RIGHT_CTRL** | **LEFT_CTRL** | | | | |

The Sony_Vaio_P.ino USB controller code was created using the above matrix. Caps lock works normally and also lights the LED on the Teensy. If the Num Lock key is pressed, all of the keys on the keyboard act normally except the keys shown below which become a number pad.


Volume up, down, and mute work normally. There are some special function keys (such as brightness controls) that do not work because the Teensyduino code can only send the key codes listed at the PJRC website. The following keys have no corresponding PJRC key codes so they do not do anything in the code.

Fn-F5 & Fn-F6 & Fn-F7 & Fn-F9 & Fn-F10 & Fn-F12 & Sys Rq & Break.

To make these keys give a response over USB, the code would need to be greatly modified with low level routines or replaced with the TMK/QMK software.