Instructions for using Marcel's Python program

Download Marcel's matrixgenerator.py program to a computer that can run Python 3. I use a Raspberry Pi and transfer files back and forth to my PC with a memory stick. Load the completed pin list file from step 11 in the same directory as the Python program so the start-up menu can find it. Double click on the matrixgenerator.py program to launch the Thonny IDE. Select "Build", "Compile" and then "Build", "Execute". The start menu of the program is shown below. It lists all the .txt files in the folder and asks you to enter the index number for the file you want. Next it will ask you to enter the index number for the Teensy you are using so it can do the correct pin translation.

```
Marcel's Python program - Start Menu

index               file name
  1     Keyboard_without_number_pad.txt
-------------------------------------------------
Enter the index number of the *.txt file you want.
OR: enter your own filepath:
1
-------------------------------------------------

index  teensy device
  1          LC
  2         3.2
  3         4.0
  4         4.1
  5         2.0++
-------------------------------------------------
The pin layout is different for each teensy version.
Please enter the index number of your teensy version:
1
```

The program then gives the results in a terminal window which you should copy and paste into a text file. Save the text file on a memory stick for transfer to your PC.

Download one of the keyboard routines from my repo that is similar to your keyboard so you can modify it with the results from the Python program. If you are using a Teensy 2.0++ with your keyboard, search for "int" in the code and make them all "unsigned int" or it will give compilation errors.

An example output from Marcel's program (with added notes) is given below.

```
--------------------------------------------------
Results:
--------------------------------------------------

FPC PINS:

8 input pins:
[18, 19, 20, 21, 22, 23, 24, 25]

17 output pins:
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17]
--------------------------------------------------
TEENSY PINS (these have to be copied to the arduino file):
cols_max=8
8 input pins:
[8, 16, 9, 15, 10, 14, 11, 26]
rows_max=17
17 output pins:
[23, 0, 22, 1, 24, 2, 21, 3, 25, 4, 20, 5, 19, 6, 18, 7, 17]
--------------------------------------------------
```

Keyboard FPC Input and Output pins

FPC pins translated to Teensy I/O pins

In the USB Keyboard code, look for the line:

```
const byte cols_max = ;
```

For this example it should be set to 8;

Look for the line:

```
const byte rows_max = ;
```

For this example it should be set to 17;

Look for the line:

```
int Col_IO[cols_max] = {     }; // unsigned int is required for 2.0++
```

For this example it should list pins 8,16,9,15,10,14,11,26 inside the curly brackets

Look for the line:

```
int Row_IO[rows_max] = {     }; // unsigned int is required for 2.0++
```

For this example it should list pins 23,0,22,1,24,2,21,3,25,4,20,5,19,6,18,7,17 inside the curly brackets

The normal, modifier, media, and old_key matrixes are provided by Marcel's Python program and should be copied and pasted over the top of the existing array values as shown in the following screen captures.

Normal Keys in a row column matrix

KEY copy into int normal[rows_max][cols_max]=

```
{
{0,KEY_INSERT,0,KEY_F12,0,0,0,KEY_RIGHT},
{0,KEY_DELETE,0,KEY_F11,0,0,0,KEY_DOWN},
{KEY_UP,KEY_HOME,KEY_MENU,KEY_END,0,0,0,KEY_LEFT},
{0,KEY_F8,KEY_F7,KEY_9,KEY_O,KEY_L,KEY_PERIOD,0},
{KEY_QUOTE,KEY_MINUS,KEY_LEFT_BRACE,KEY_0,KEY_P,KEY_SEMICOLON,0,KEY_SLASH},
{KEY_F6,KEY_EQUAL,KEY_RIGHT_BRACE,KEY_8,KEY_I,KEY_K,KEY_COMMA,0},
{KEY_H,KEY_6,KEY_Y,KEY_7,KEY_U,KEY_J,KEY_M,KEY_N},
{KEY_F5,KEY_F9,KEY_BACKSPACE,KEY_F10,0,KEY_BACKSLASH,KEY_ENTER,KEY_SPACE},
{KEY_G,KEY_5,KEY_T,KEY_4,KEY_R,KEY_F,KEY_V,KEY_B},
{KEY_F4,KEY_F2,KEY_F3,KEY_3,KEY_E,KEY_D,KEY_C,0},
{0,KEY_F1,KEY_CAPS_LOCK,KEY_2,KEY_W,KEY_S,KEY_X,0},
{KEY_ESC,KEY_TILDE,KEY_TAB,KEY_1,KEY_Q,KEY_A,KEY_Z,0},
{0,0,0,KEY_PRINTSCREEN,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,KEY_PAGE_UP,KEY_PAGE_DOWN,0,0},
{0,0,0,0,0,0,0,0},
}
```

Modifier Keys in a row column matrix

MODIFIER Copy to int modifier[rows_max][cols_max]=

```
{
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{MODIFIERKEY_LEFT_ALT,0,0,0,0,0,0,MODIFIERKEY_RIGHT_ALT},
{0,0,MODIFIERKEY_LEFT_SHIFT,0,0,0,MODIFIERKEY_RIGHT_SHIFT,0},
{0,MODIFIERKEY_LEFT_CTRL,0,0,0,0,MODIFIERKEY_RIGHT_CTRL,0},
{0,0,0,MODIFIERKEY_GUI,0,0,0,0},
{0,0,0,0,0,MODIFIERKEY_FN,0,0},
}
```

Media Fn keys in a row column matrix

FN Copy to int media[rows_max][cols_max]=

```
{
{0,0,0,KEY_MEDIA_NEXT_TRACK,0,0,0,0},
{0,0,0,KEY_MEDIA_PLAY_PAUSE,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,KEY_MEDIA_VOLUME_DEC,KEY_MEDIA_MUTE,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,KEY_MEDIA_VOLUME_INC,0,KEY_MEDIA_PREV_TRACK,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,KEY_MEDIA_EJECT,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
{0,0,0,0,0,0,0,0},
}
```

old_key matrix copy to

ONE boolean old_key[rows_max][cols_max]=

```
{
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
{1,1,1,1,1,1,1,1},
}
```