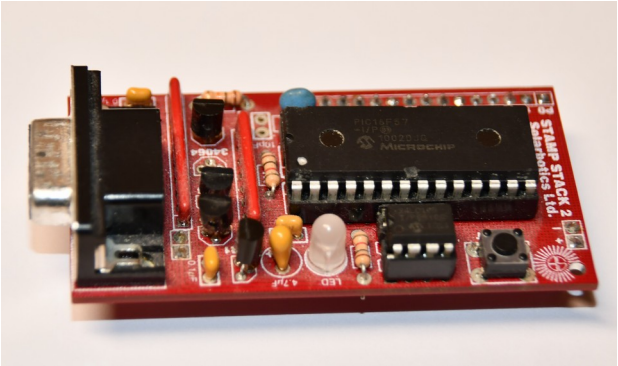
Project and Circuit Description

The original Coco2 keyboard is of a simple matrix design with 55 keys/functions and the Coco responded when a key was released – except the Shift key which was required to be pressed whenever a “shifted” function was required. Its key codes are unique being row and column. Even the PS2 keyboard uses serial communication thus some kind of code changer is required to to convert the serial codes of the PS2 keyboard[1] to emulate the matrix keyboard signals needed by the Coco.

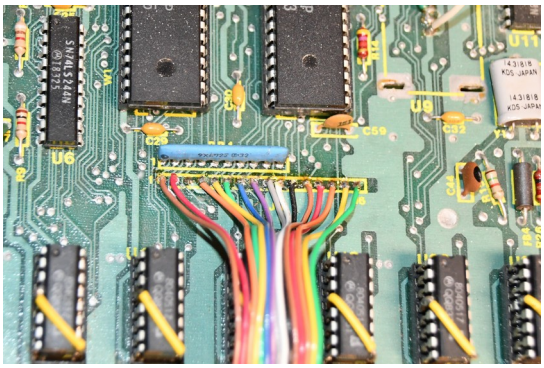
The ‘schematic.pdf’ file shows the circuit I designed to fit this requirement. The connector at the top of the diagram connects to a Parallax Stamp StackII which I programmed to do the code conversion. (The Stamp StackII I used was in my spare parts box and required a serial connection for programming.) My circuit board design has the Stamp Stack as a plug in piece.



The Stamp StackII

The two connectors on the right of the circuit (see schematic.pdf) connect to the Coco keyboard connector .

I removed this connector from the Coco main board (picture) and soldered wires directly to it. It was quite a tricky task to remove the connector without damaging the board. I used colour coded wires for pin identification with pin 1 being on the left (brown) in the picture. Note that pin 3 is missing on the connector. This identifies the ‘ROW’ connections.



Coco Main Board showing Connections

The upper left connector is where the PS2 keyboard plugs in and below it is the +5Volt power connection which I linked in to the Coco power supply.

The six integrated circuits on the left of the diagram do the actual decoding of the PS2 scan codes and feed their output to the Stamp StackII as a 7 bit parallel word. The Stamp StackII program outputs two binary coded bytes to the circuitry on the right which emulates the old keyboard matrix.

1 Key codes found at HTTP://www.techtoys.com.hk/Downloads/Download/Microchip/PS2_driver/ScanCode.pdf

There are a few keys that do not match the PS2 keyboard or are not present (clear, break etc.) and some that do not match up with today's keyboard layout (Brackets key etc.). These functions I arbitrarily assigned to various keys[2] not used for other purposes. They can be changed in the Stamp StackII program by reassigning the scan codes.

My Tandy Coco2 defunct Keyboard

The coding process was fairly straight forward. Principally just a form of lookup table was required. The only wrinkles were the use of the Stamp Pin 3 to enable the row and column decoders and Pin 7 to enable the pulses to be output to the rows. Pin 15 was used for the shift function. Just a quick note here about operating systems. If you don't use Windows as an operating system you will have a problem running the Parallax IDE[3] software I didn't try a Mac system but it won't run in Ubuntu Linux. I used a Windows 10 tablet which also had a serial port for the Stamp as a bonus. My program is available here in the "akeyrowlookup.bs2" file

This project gave me a working replacement keyboard for my old Coco2. Lucky for me the parts – except for the circuit board itself – all came from my spares box and the final result is that my Coco2 can now be used for all its original functions albeit with more actual computing power in the new keyboard than in the Coco itself!

2 The arbitrary keys chosen are:
Break = Alt: Clear = Ctrl: @ =]: : = [: ^ = Shift &: & = Shift ': " = Shift(: Keys not available on the Coco are not coded.

3 IDE software can be downloaded from HTTP://www.parallax.com/package/basic-stamp-editor-software-for-windows/