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6800 CPU Board Rev 3A

Introduction

Thank you for buying our 6800 CPU board!

Is this board vintage? Well, it was designed in 2014, so technically it is not. However, it uses a design very similar to the original SWTPC MP-2A using parts available at that time. The large RAM and EPROMs are not vintage, nor are some of the TTL chips.

Using older parts has been a problem because some of them have not been made in a long time, so prices are high, conditions of pulled chips are unknown, and we have to test a lot more components to verify they actually work as expected. Fortunately all the chips on this board are available from surplus inventories, but eventually they will be unavailable.

Features

- 6800 with an adjustable clock from about 1 to 2 MHz.
- Baud rate generator provides 1200, 2400, 4800 and 9600 baud.
- One baud rate line can be jumpered for ant of those rates.
- 32K RAM from 0000 to 7FFF.
- RAM from 8000 to EFFF can be enabled/disabled in 4K blocks.
- 8K of ROM from E000 to FFFF; lower 4K can be disabled and/or mapped to RAM.

Summary of Jumpers

There are a number of jumpers on the board that change the behavior. While many of them are discussed in other sections of the manual, here is a summary:

Label	Use
CLK_TST CLK_GND	These are used for adjustment of the CPU clock frequency. A frequency counter can be connected to these pins while the CLOCK ADJUST potentiometer is adjusted to get the desired clock speed. Typically it should be 1 MHz.
JP1 VAR BAUD	Selects which baud rate clock is placed onto the VAR baud rate line.
JP2 and JP3	Select whether the VAR line is on 110 baud (like 6809 based systems) or 150 baud line (6800).
SW1 RAM ENABLE	An 8 position DIP switch to map the upper 32K of address space to RAM, nothing, or EPROM (only for Exxx).

Normal settings for jumpers and switches:

Label	Default
JP1 VAR BAUD	I tend to use 4800 baud but any speed can be selected.
JP2 and JP3	JP2 should have the middle and left pins jumpered. JP3 should have the middle and right pins jumpered.
SW1 RAM ENABLE	1 = OFF, 2-6 = ON, 7 = OFF, 8 = ON

xSWTBUG

We include a version of our extended SWTBUG (xSWTBUG) in EPROM by default. It is fully software compatible with SWTBUG, having all the internal subroutines exactly as they were in the original.

One area of difference is the “C” (clear screen) command has been removed and replaced with the “X” command for extended command set. Using the X command will change the prompt from the normal ‘$’ to ‘$$’ indicating the extended command set. Once in xSWTBUG, there is help available with the ‘?’ command. Exactly which

additional features are available in a given version of xSWTBUG depends on the version:

Version 1.1 (initial release)

- M = Memory checker
- O = Othello
- N = Number guess

¡Viva Fiesta!

All of our circuit boards have something unusual on them, and since SWTPC was in San Antonio, it seemed the city would make for some interesting additions. Fortunately, I have a friend who is a native of San Antonio, so I asked her for some ideas or else I'd resort to Googling for something appropriate. She said that ¡Viva Fiesta! is a big festival held in San Antonio each year, so that seemed like a good choice. I was also excited about this board, so the exclamation points fit into my enthusiasm for this project.

Why This?

Back when SWTPC was around, I was a teenager without much money to spare. I got their catalogs and was intrigued by their inexpensive kits and simple designs that could be assembled by average people. The entry point for a working system was a bit beyond my means, so I ended up with a KIM-1 instead.

Years later, I have my own company that has been making Apple/Franklin and KIM-1 expansion boards and one night I decided it was within my abilities to make a clone of the original SWTPC machine. By using some parts available now, the design can be simplified.

Bob Applegate
May 2014

Revision History

Version	Changes
A	Initial Beta.
1	First official release.
2	Very minor PC board clean-up.
3A	Added a full 60K of RAM. Simplified the baud rate generator.

Errata

Parts List – Rev 3A

Part	Number	Description
PCB	1	Printed Circuit Board (Corsham Tech)
J1	5	Molex 09-52-3101
JP1	1	2x4 jumper block
JP2, JP3	2	1x3 jumper block
SW1	1	8 position DIP switch
C1	1	22uf 16v electrolytic capacitor
C2-C6, C8-C12	10	.1 uf disc capacitor
C7	1	56 pf disc
R1	1	1K 10 turn trim pot
R2	1	220 ohm
R3, R4	2	1K
R5, R6	2	6.8K
R7	1	10K
R8, R9	2	1K
QD1	1	2.4576 MHz oscillator
VR1	1	7805 voltage regulator, TO-220 package
LED1	1	3mm LED
U1	1	MC6800 CPU
U2	1	28C64 EEPROM
U3	1	628128 128K RAM
U4	1	MC6875
U5	1	74368
U6	1	74LS74
U7, U8	2	74LS244
U9	1	74LS145

U10	1	74LS04
U11	1	74LS08
U12	1	74LS245
U13	1	4060N
U14	1	74LS640
	3	14 pin IC sockets for U6, U10, U11
	4	16 pin IC sockets for U4, U5, U9, U13
	4	20 pin IC sockets for U7, U8, U12, U14
	1	28 pin IC socket for U2
	1	32 pin IC socket for U3
	1	40 pin IC socket for U1