

SWTP 6800 Emulator, Version 2.0
By Bill Beech

General

The software for the SWTP 6800 emulator has been broken into files following the design of the original machine. Each file provides the emulation of a set of identical boards, a single board, or devices on a single board. This was done to allow a virtual machine to be “constructed” by linking in the required devices and boards into one executable file. This allows me to build two versions of the SWTP 6800 system and to easily add the MP-09 M6809 processor to build a SWTP 6809 system.

The options provided on the real machines via switches, jumpers, or board selection are provided by emulator commands before the SWTP 6800 emulation begins. Two versions of the emulator are provided, the swtp6800MP-A and the swtp6800MP-A2.

This software provides the emulation the following SWTP products:

MP-A or MP-A2 CPU Board,
MP-B2 Mother Board,
MP-S Serial Board (for console emulation),
6 each MP-8M 8kB Memory Boards,
DC-4 Floppy Disk Controller.

SWTP 6800 MP-A Emulator

The MP-A2 provides the emulation of the boot ROM (bootrom.c), which is addressed at 0xE000 and is also mapped to the highest memory above 0xF000 for the reset vectors. The ROM type can be selected from 2704 to 2764 (512 to 4096B). The type is set with the command “**set bootrom 2708**” for the swtbug image. The device must be attached to a binary file containing the ROM image to be used. A binary image of SWTBUG is provided in swtbug.bin. The attach command is “**att bootrom swtbug.bin**”. To use SWTBUG on this board requires the following command “**set mp-a2 swt, mon**”. This allows a 1kB boot image and maps the boot image into high memory for the reset vectors.

The software for the MP-A emulator interacts as follows:

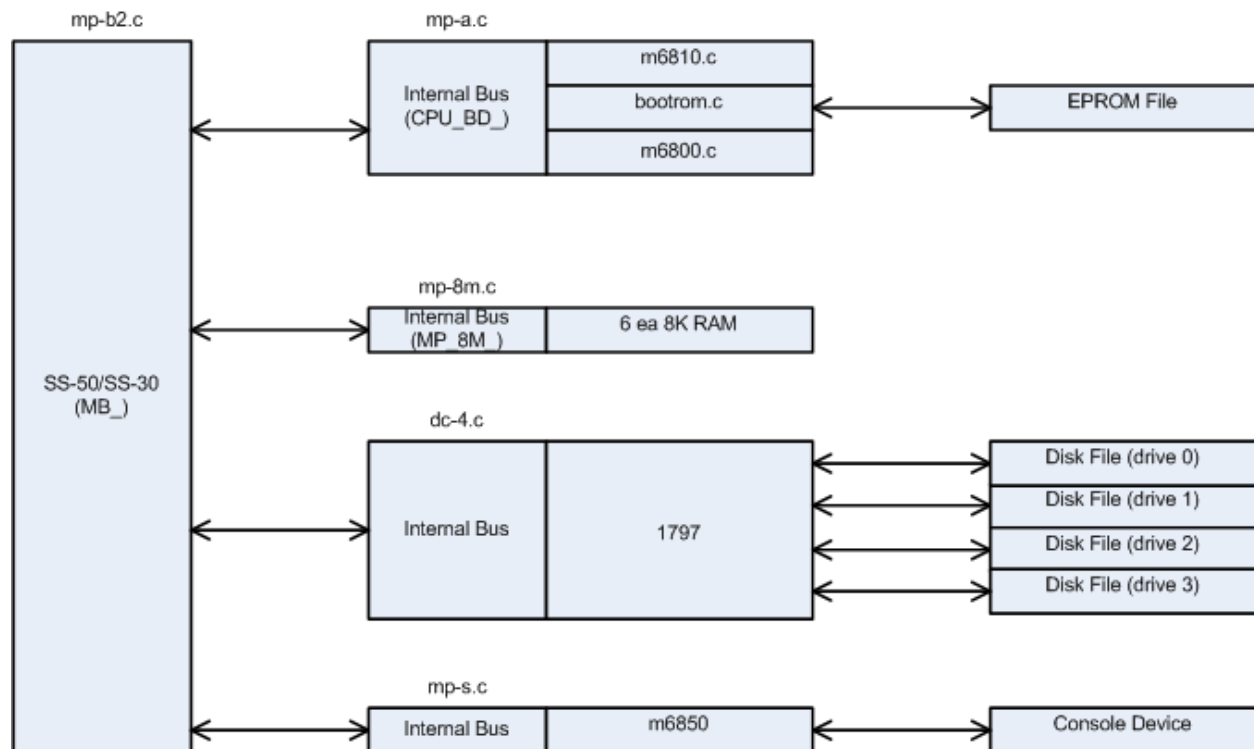


Figure 1 – SWTP 6800 with MP-A Processor Board

The MP-A emulation uses the M6810, bootrom, and M6800 files to build a emulation of the actual MP-A Processor Board. Its configuration can be set with SIMH commands just like the MP-A. The MP-B2 emulation provides the emulation of the actual MP-B2 Mother Board. Its configuration can also be set with SIMH commands just like the MP-B2.

The MP-A provides the emulation of the boot ROM (bootrom.c), which is addressed at 0xE000 and is also mapped to the highest memory above 0xF000 for the reset vectors. The ROM type can be selected from 2704 to 2764 (512 to 4096B). The type is set with the command **“set bootrom 2708”** for the swtbug image. The device must be attached to a binary file containing the ROM image to be used. A binary image of SWTBUG is provided in swtbug.bin. The attach command is **“att bootrom swtbug.bin”**.

The MP-A provides a M6810 128B scratchpad RAM (m6810.c). This RAM can be disabled to allow external RAM to be used in 0xA000-0xAFFF. The command is **“set mp-a ram”** or **“set mp-a noram”**.

The MP-A also provides the M6800 emulation (m6800.c). This emulation is complete and follows the M6800 documentation. It does not provide any interrupt handling at this point. That will be added in a later version of the emulator. The emulation can be set to trap on a bad instruction or a memory fault. The commands are **“set cpu itrap”** or **“set cpu noitrap”** for instruction trapping. The commands are **“set cpu mtrap”** or **“set cpu nomtrap”** for memory trapping. Memory trapping is not currently enabled in this version of the emulator.

The MP-8M provides emulation of 6 external MP-8M RAM boards (mp-8m.c). These boards are located at 0x0000-0x1FFF (board0), 0x2000-0x3FFF (board 1), 0x4000-0x5FFF (board2), 0x6000-0x7FFF (board 4), 0xA000-0xB000 (board 5), and 0xC000-0xDFFF (board 6). The boards can be individually enabled or

disabled. The commands, for board 0, are “**set mp-b2 bd0**” or “**set mp-b2 nobd0**”. If the m6810 is enabled, the whole 0xA000-0xAFFF memory is lost!

The DC-4 provides FDC and disk drive emulation for 4 external drives (dc-4.c). The disk image files (*.IMG) are attached to the 4 emulated drives. The commands are, for drive 0, “**att dc40 disk0.img**” and “**det dc40**”. For drive 1, “**att dc41 disk0.img**” and “**det dc41**”. Each drive is currently fixed at a non-typical 1,474,560 bytes each. This is 80 cylinders by 72 sectors/cylinder by 256 byte/sector.

The MP-S provides the ACIA emulation for the software running on the SWTP 6800 emulator. It appears to the software as an MP-S serial board. It currently provides a terminal interface for the user. SWTBUG works fine on the emulator. The emulator does not provide emulation of the bit-banged MP-C serial board. MIKBUG will not work because there is no MP-C emulation.

SWTP 6800 MP-A2 Emulator

The software for the MP-A2emulator interacts as follows:

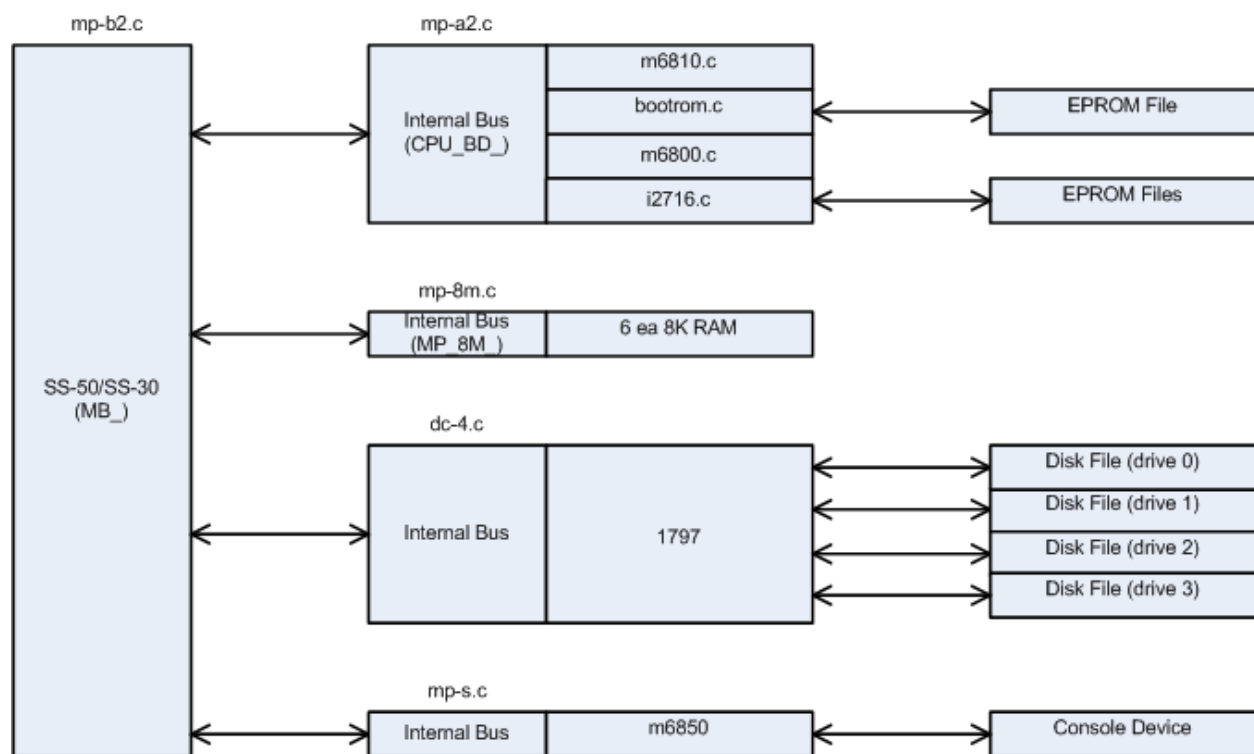


Figure 2 – SWTP 6800 with MP-A2 Processor Board

The MP-A2 provides a M6810 128B scratchpad RAM (m6810.c). This RAM can be disabled to allow external RAM to be used in 0xA000-0xAFFF. The command is “**set mp-a ram**” or “**set mp-a noram**”.

The MP-A2 provides a 2716 EPROM device (i2716.c). This device has 4 units to emulate the EPROM slots on the MP-A2. These units can be configured to be off, on located at 0xC000 or on located at 0xF000.

The off command is **"set mp-a2 nolo_prom, nohi_prom"**. To enable the EPROMS starting at location 0xC000 the command is **"set mp-a2 lo_prom"**. Finally, to enable the EPROMS starting at location 0xF000 the command is **"set mp-a2 hi_prom, nomon"**.

The MP-A also provides the M6800 emulation (m6800.c). This emulation is complete and follows the M6800 documentation. It does not provide any interrupt handling at this point. That will be added in a later version of the emulator. The emulation can be set to trap on a bad instruction or a memory fault. The commands are **"set cpu itrap"** or **"set cpu noitrap"** for instruction trapping. The commands are **"set cpu mtrap"** or **"set cpu nomtrap"** for memory trapping. Memory trapping is not currently enabled in this version of the emulator.

The MP-8M provides emulation of 6 external MP-8M RAM boards (mp-8m.c). These boards are located at 0x0000-0x1FFF (board0), 0x2000-0x3FFF (board 1), 0x4000-0x5FFF (board2), 0x6000-0x7FFF (board 4), 0xA000-0xB000 (board 5), and 0xC000-0xDFFF (board 6). The boards can be individually enabled or disabled. The commands, for board 0, are **"set mp-b2 bd0"** or **"set mp-b2 nobd0"**. If the m6810 is enabled, the whole 0xA000-0xAFFF memory is lost!

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The MP-S provides the ACIA emulation for the software running on the SWTP 6800 emulator. It appears to the software as an MP-S serial board. It currently provides a terminal interface for the user. SWTBUG works fine on the emulator. The emulator does not provide emulation of the bit-banged MP-C serial board. MIKBUG will not work because there is no MP-C emulation.

Booting Flex 2.0

The software kit for the SWTP 6800 system contains the following files:

- Swtbug.bin – the binary image of the original SWTP SWTBUG monitor ROM software.
- Swtbug.asm – the source code of the original SWTP SWTBUG monitor ROM software.
- 6800boot.img – the boot disk image file for Flex 2.0.
- 6800work2.img – the disk image file for the second drive.
- 6800work3.img – the disk image file for the third drive.
- 6800work4.img – the disk image file for the fourth drive.
- Swt6800mp-a.ini – initialization files to automatically bring the emulator up in Flex 2.0.
- Swt6800mp-a2.ini – initialization files to automatically bring the emulator up in Flex 2.0.
- Flex2um.pdf – The Flex 2.0 Users Manual.
- Basic_um.pdf – The Flex 2.0 BASIC Language Users Manual.
- SWTBUG_Users_Guide.pdf – the user's guide for the SWTBUG monitor program.