FLEX 3 on the Smoke Signal Broadcasting BFD-68(A) Controller

This folder contains the files required for running FLEX 3 on the BFD-68 or 68A disk controller from Smoke Signal Broadcasting. Compared to the SWTPC MF-68 driver or a driver using the disk routines in the BFD-68 ROM, this version provides the following improvements:

- 40% to 60% faster disk operations
- Support for double sided drives (BFD-68A only)
- Support for fast stepping drives
- Honors head load timing when switching between drives
- Honors motor start-up time
- Honors side select timing
- Honors trim erase timing
- No conflict with the commonly used $A07F system stack (a BFD-68 ROM problem)

The speed improvement was achieved by turning on the E bit only when necessary in read/write commands to the 1771 controller. This, in turn, allows FLEX to work within its designed sector interleave instead of slipping a full revolution with every sector I/O.

The step rate for seeking (as defined for the 1771) is stored at $BEB3 in the disk driver. The default value is $03 which gives a 40ms step interval. A value of $00 can be placed here to use a 12ms step interval. The STEPFAST utility does this and can be placed in the STARTUP.TXT file if desired.

Creating a FLEX Boot Disk

The PC2FLOP utility allows creation of a floppy disk from a disk image on the PC. The disk image is transferred using the XMODEM protocol through an MP-S serial port on the SWTPC 6800 and a terminal emulator on the PC.

The PC2FLOP utility is located in the “Disk Image Transfer” folder. To run PC2FLOP on the SWTPC 6800, load the file “PC2FLOP.S19” using the “L” command in SWTBUG. After the load completes, type “G” to execute the program (or “J 0100”). When PC2FLOP prompts you to send the file, use the XMODEM send option of your terminal emulator to send one of the BFDFLEX3-xx.DSK disk image files (single sided 35 track, 40 track, or double sided 40 track). Note: Choose the XMODEM checksum option, not CRC.

At 9600 baud it takes just over two minutes to create a disk. I like to put the 9600 baud clock from the CPU board onto the 600 baud motherboard line. I’ve never needed to use 600 baud and the “600” reminds me of 9600. See “MP-A 9600 Baud Mod.jpg” in this same folder for details of how to provide 9600 baud to the MP-S boards.

The FLOP2PC utility can be used to backup a disk to a disk image file on your PC. Load and execute FLOP2PC.S19 in the same manner as PC2FLOP.

Additional compatible disk images can be found in the “FLEX 2.0 and 3.0 Disk Images” folder up one level from this folder. These images will not boot on the BFD-68(A) controller, but the files on the disk are accessible by this BFD-68(A) version of FLEX. Note: FLEX 2 and FLEX 3 disks are, in general, interchangeable.

Booting FLEX on the BFD-68(A)

To boot a FLEX disk, type “J 8020” in SWTBUG to jump to $8020 which is the cold boot loader in the ROM on the BFD-68(A). With the original BFD-68 controller, and just after power up, there may be a 10 second delay after executing the jump command until any disk activity takes place. This is a bug in the boot ROM and is normal. A very simple hardware mod can fix this bug, see the BFD-68 folder in the Hardware->Smoke Signals Broadcasting section of this website.

File Transfer between a PC and FLEX

Using a terminal emulator and the XMODEM protocol, the PCGET and PCPUT utilities allow transfer of files between a PC and the FLEX operating system. PCGET retrieves a file from the PC into FLEX and PCPUT sends a file from FLEX to the PC. Both of these utilities are already on the BFDFLEX3 disk images.