MFA Mikrocomputer

Open source CP/M by Mike Douglas
http://deramp.com/downloads/mfa_computer/

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Introduction

The MFA Mikrocomputer was developed for the "Berufsförderungszentrum Essen", a vocational training centre. Apprentices often built their own module boards which were housed in a 19" rack with a passive back plane. Later the modules also were available commercially.

The documentation puts great importance on the modularity and the process of assembling and testing the system. By slowly expanding their system, the trainees were shown the inner workings of a relative simple computer system that had direct control over the hardware (e.g. parallel input/output cards) and applications like industry automation software for PLC in the monitor ROM.

Originally data exchange was done by a cassette module, but a floppy disk module was developed as well. It uses a 3.5" floppy drive that mimics a 5.25" DS/DD one by using only tracks 0-39 of the disk.

There were a lot of different modules available for the system, which later evolved into a CP/M compatible computer. An overview can be found on the MAME emulation forum at:

https://forums.bannister.org/ubbthreads.php?ubb=showflat&Number=108962&page=1

In the CP/M capable version, the MFA uses an 8085 processor, 64K RAM card with a bankable 2K boot EPROM, one or more serial cards at I/O addresses 0xA0, 0x90 and 0xF0, a printer card at E0 and a WD1793 based floppy controller at 0xC0.

The 2K boot EPROM contains the boot and bank switching logic to swap RAM back in instead of ROM and the CP/M BIOS. The disks are 320K, using a format of 8 sectors/track, 512 Bytes/Sector.

The console is at 0xA0 and can be handled via a terminal emulator on a PC or routed over the computer's bus to a video/keyboard module. The terminal is set to 9600 Baud, no parity, 1 stop bit.

A New CP/M Option

Due to availability and compatibility issues, it was desirable to have an open CP/M with source code available for a ROM monitor, the BIOS, and some file transfer utilities.

This new implementation of CP/M 2.2 for the MFA microcomputer has the following characteristics:

- Capable ROM monitor with RAM test, hex file loader, memory manipulation, CP/M boot option, and more.
- 720KB disk format using a 80 tracks, 9 sectors per track, 512 bytes/sector layout which maximizes disk usage. Compatible with 5.25" or 3.5" 720K drives.

- Standard CP/M distribution with the complete CP/M boot image (including the BIOS) residing in the system tracks on cylinder 0 of the floppy disk.
- Fast track-buffered BIOS providing a 20%-70% speed improvement for most disk-based activities versus conventional BIOS implementations.
- SYSGEN and MOVCPM customized for the MFA computer for system manipulation.
- Full IOBYTE support.
- Defined parameter patch area in the BIOS allows modification of key BIOS parameters including the default IOBYTE, serial port input/output masks, and drive timing parameters.
- Disk image transfer utilities PC2FLOP and FLOP2PC can be run directly from the ROM monitor or from CP/M. Use XMODEM to bootstrap your CP/M system by transferring and writing a complete CP/M disk image to a drive in the MFA computer.
- COPY program for copying, verifying, and formatting floppy disks.
- PCGET and PCPUT file transfer utilities provide XMODEM exchange of files between CP/M and a PC over the console or secondary serial ports.

Setting up the System

- Prepare the hardware – especially your serial card, CPU card and RAM card – as outlined in the MFA CP/M manual available at: http://oldcomputers-ddns.org/public/pub/rechner/mfa_mikrocomputer_fuer_ausbildung/mfa_cpm_handbuch/index.html
- The serial port for the console card can be safely set to 9600 Baud instead of the 1200 or 4800 that are described in the manual.
- Burn an (E)EPROM with the monitor ROM and switch on the system. You should be greeted with the "MFAMON ver 1.3" message.
- Using a terminal emulator on your PC as the console, type "L(OADHEX) 0" and send the file "PC2FLOP.HEX" from the PC to the MFA computer over the console serial port. Run the program by typing in "G(OTO) 0100"
- PC2FLOP lets you select the working drive, format a new disk (if needed), and then transfer and write the disk image to floppy via XMODEM.

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