

## CP/M for Poly-8813 with Polymorphic Single Density Controller

### Polymorphic CP/M

Polymorphic released CP/M for the Poly-8813 in late 1980. Support of CP/M on Polymorphic hardware is difficult because CP/M requires RAM starting at address zero but the Poly CPU board has 3K of PROM starting at address zero. Further, the standard 8813 configuration for System-88 (Exec) places the video board memory and disk controller communication areas between 1000h and 2000h.

In order to run CP/M on the Poly, hardware mods are required to allow run-time swapping of the lower 8K of address space (0000h-1FFFh) between normal 8813 hardware (as listed above) and RAM for CP/M. This is accomplished with modifications to the Poly CPU board, video board, and a memory board. The CPU board is modified to generate a new active low signal on bus pin 16, CPM\*. When asserted low, the lower 8K of address space is RAM. When CPM\* is de-asserted (high), the lower 8K of address space is the CPU PROMs, video board, etc. The video board is modified to not respond to bus access when CPM\* is asserted. Finally, the DRAM board is modified to provide 8K of RAM from 0000h-1FFFh that is enabled/disabled under control of the CPM\* signal on bus pin 16.

Given a Poly-8813 with this modified board set, the Poly-8813 can boot and run System-88 (Exec) or CP/M depending on which disk is inserted. More information about the hardware mods can be found in the "Hardware" folder.

Unfortunately, I have not been able to find a copy of Polymorphic's own version of CP/M for the Poly-8813. The version here is one I created to run under Polymorphic's hardware mods for CP/M.

### Disk Image Files

**CPM22v10-48K-SDC.DSK** is track-buffered CP/M 2.2 for a Poly-8813 with the Polymorphic single density controller. CP/M on the disk is sized for 48K of RAM. Performance of the track buffered CP/M is 20%-70% faster than non-buffered versions across a variety of activities. This performance increase is obtained even with write verify enabled (enabled by default, see the MODE byte in the file BIOS.ASM).

A customized MOVCPM is included to size CP/M for different amounts of RAM (run MOVCPM followed by SYSGEN). Included are typical CP/M programs as well as file transfer utilities to exchange CP/M files with a PC.

### Writing a Disk Image File to Floppy Disk

The utility PC2FLOP is used to write a disk image transferred via XMODEM over a serial port onto a floppy disk in the Poly-8813. PC2FLOP can be run on a "cold" machine without an operating system or bootable disk. See the ReadMe.pdf file in the "Disk Image Transfer" folder for instructions. PC2FLOP can also be run from disk in the System-88 (Exec) environment. Typically, you'll want to first create a bootable System-88 disk (e.g., write the EXEC961.PM disk image which includes PC2FLOP and other utilities already on the disk), and then run PC2FLOP from that disk to create the CP/M disk and any other disks you want.

## IOBYTE

Poly-8813 CP/M provides full IOBYTE support. The IOBYTE allows redirection of logical CP/M devices to different physical devices. IOBYTE implementation is required by some programs (e.g., Kermit) for proper operation. The possible logical-to-physical device assignments are shown below:

<b>CON</b> device (bits 1,0): 00 - TTY uses serial port 01 - CRT uses keyboard/video* 10 - BAT indirect through RDR and LST logical device 11 - UC1 uses serial port	<b>PUN</b> device (bits 5,4): 00 - TTY uses serial port 01 - PTR uses serial port* 10 - UR1 uses serial port 11 - UR2 uses keyboard/video
<b>RDR</b> device (bits 3,2): 00 - TTY uses serial port 01 - PTP uses serial port* 10 - UP1 uses serial port 11 - UP2 uses keyboard/video	<b>LST</b> device (bits 7,6): 00 - TTY uses serial port 01 - CRT uses keyboard/video 10 - LPT uses serial port* 11 - UL1 uses serial port

\* = Default IOBYTE

The STAT utility in CP/M is typically used to change device assignments. These assignments are temporary and the defaults shown above are restored whenever CP/M is cold started. To permanently modify the IOBYTE, use DDT to patch location 2134h of a CP/M SYSGEN image while the image is in memory. After exiting DDT, immediately run SYSGEN to write the patched CP/M image to the boot tracks, or save the patched memory image to a CPMxx.COM file.