CP/M for Poly-88 with a North Star Single Density Disk Controller

Polex PROM

CP/M for the Poly-88 requires the Polex PROM (Poly-88 Extension) to be installed in the 2nd PROM socket on the Poly-88 CPU board. Polex handles run-time swapping of PROM and RAM in the lower 4K of address space and provides console and serial I/O for CP/M. See the Polex folder for more information about Polex and the BootMod PROM (below).

BootMod PROM

BootMod is an extension module PROM for Polex. The PROM installs in the 3rd PROM socket on the Poly-88 CPU board. It provides a single boot command (BO) for a variety of floppy controllers including Altair, Tarbell, Micropolis, and both the single density and double density North Star controllers.

Using the "EX E900" command to jump to the boot PROM on the disk controller does not work since interrupts must be disabled for disk I/O and the North Star boot PROM does not explicitly disable interrupts. Without the BootMod PROM, Polex can be used to boot a disk by executing a DI instruction and then jumping to the controller's boot PROM as follows:

```
>EN E000
E000: F3 C3 00 E9
>EX E000
```

The code at E000 will not typically be over-written by normal computer operation. You may be able to boot again by simply jumping to E000 in the future.

North Star Single Density Floppy Disk Controller

For use in the Poly-88, the disk controller should be addressed at its default address of E800h with boot PROM at E900h.

Disk Image Files

CPM22b14-56K-SDC.NSI is a SSSD image of CP/M 2.2 for a Poly-88 running a North Star SD disk controller. The CP/M boot image is sized for 56K of RAM. A customized MOVCPM is included to size CP/M for different amounts of RAM (run MOVCPM followed by SYSGEN).The disk image includes typical CP/M programs as well as file and disk image transfer utilities to exchange data with a PC.

The BIOS uses full track buffering on both reads and writes to improve performance. Verify after write is always performed. Even with full write verify, this BIOS performs 20%-40% faster than the non-buffered CP/M 1.4 BIOS.

IOBYTE

The Poly-88 implementation of North Star 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 in the table below:

CON 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
	PUN device (bits 5,4):
	    00 - TTY uses serial port
	    01 - PTR uses serial port*
	    10 - UR1 uses serial port
	    11 - UR2 uses keyboard/video

RDR device (bits 3,2):
    00 - TTY uses serial port
    01 - PTP uses serial port*
    10 - UP1 uses serial port
    11 - UP2 uses keyboard/video
	LST 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 251Dh 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 memory image to a CPMxx.COM file.

Console and serial I/O specific to the Poly-88 can be seen in the file USERPOLY.ASM. The code from this file is part of the customized MOVCPM for this version of CP/M.