Release Notes

Radio Shack Hard Disk Option - Release 2.25

February 15, 1984

SYSDEF - Define System Parameters

This program only operates under the 64K unbanked (Level I) floppy system. Any changes made to the 64K system are copied to the hard disk when HDINIT function 1 is executed. No HDSYSDEF is provided and old copies of HDSYSDEF must not be used since the result will be unpredictable. Note that SYSDEF function 9 is unusuable in the hard disk context.

Skew Factor

The skew factor has a default value of 5. On the 80K system or a Level II system with at least 96K of Z-80 RAM, this can be reduced to 4. You can experiment with other factors for specific applications to see if disk throughput is increased. The skew factor usually has only a small effect on system performance.

Hardware Considerations

Extensive field experience with ATON CP/M and Radio Shack hard drives has pinpointed a number of hardware problem areas that need to be recognized.

The hard drives are high density devices that are sensitive to temperature. Don't format a hard disk unless it has been running at least a half hour. This gives it time to warm up and mechanical expansion of the disk platter to occur. Try not to write on the drive for this length of time as well.

The hard disk controller is in two pieces: part. of it is in the computer (interface board) and part of it is in the drive (controller board). The connecting cable carries high speed electrical signals that are sensitive to electrical noise.

The computer, disk drive, floppy expansion box and line printers must all be connected to the same AC power source. To connect some to different circuits can cause ground loops which generate enough electrical noise to cause problems. The best way to eliminate ground loops is to use a power strip with enough plugs for the computer and all peripheral devices attached to it.

The 50 pin ribbon cable that connects the computer and hard disk drive should be kept away from AC power cables and devices that generate strong magnetic fields. The signals in this cable are easily disrupted by noise induced by magnetic fields. Light dimmer controls used for room lighting can also be responsible for noise on the AC line.

A third potential problem is static electricity generated by carpeting or room air ionizers. If you pick up a static charge from the carpet or air ionizer and then walk over to the computer, you can disable the computer until it is reset. The Models II and 16A are more sensitive to this than are Models 12 and 16B.

Turning the power on or off on the parallel port line printer can generate enough electrical noise to cause problems in the computer as well. Disconnecting pins 25 and 28 on the printer cable will help this some, although disconnecting pin 28 will also disable the printer off line check in CP/M.

Sharing Operating Systems on One or More Hard Drives

ATON CP/M is extremely flexible and can be set up to share the hard drive with other operating systems. The other systems will boot up normally when you use the RESET switch. To boot CP/M, use the RESET and BREAK keys to boot the ATON CP/M floppy, then use HDBOOT to bootstrap ATON hard disk CP/M. HDBOOT can be activated automatically using AUTOEXEC. If CP/M uses the entire drive, then HDBOOT is not needed and simply using the RESET switch will boot CP/M.

With some operating systems, such as Xenix, the technique is simply to tell the Xenix installation program that there are less cylinders on the drive than there really are. CP/M can then be installed on the remainder of the drive and other drives if available.

With TRSDOS, a different approach is needed since the TRSDOS FORMAT program generates spurious error messages if less than 135 cylinders are specified. Format the entire drive as you normally would, except specify the directory to go on cylinder 1 with the [DIR=1] option. After the drive is formatted and TRSDOS is booted up, enter the FREE command. It will list the number of blocks in each free extent. The last one is the area on the high numbered cylinders available for CP/M.

The last number listed by the TRSDOS FREE command is the number of 256 byte blocks available for CP/M. There are 34 blocks per head or 136 blocks per cylinder on an 8 meg drive or 204 blocks per cylinder on a 12 or 15 meg drive. For example, if you specify [DIR=1] on a 12 meg drive under TRSDOS 4.2, the last number listed by the FREE command will be 27344. Dividing this by 204 yields 134 cylinders available for CP/M. Since there are 230 cylinders on a 12 meg drive (306 on a 15 meg or 256 on an 8 meg) and cylinder numbers start at 0, you can specify cylinder 96 up to 224 as a starting cylinder for CP/M and 229 as the ending cylinder. The rest of the numbers on the FREE list add up to 18153 so there are about 89 cylinders of free space for TRSDOS files if you start CP/M at cylinder 96.

ATON CP/M makes use of a unique hardware feature to ensure that even though TRSDOS thinks it has the whole drive to itself, it won't be able to overwrite CP/M (and vice versa). If TRSDOS fills up enough of the disk, to the point where it would try to overwrite CP/M, it will simply report disk errors instead of disk full, and no damage to either TRSDOS or CP/M files will occur.

No modifications of any sort to TRSDOS are required when installing ATON CP/M.

There exists a publically available Unix program written in "C" called CPMUTL that will read and write single sided, single density CP/M diskettes under XENIX. It is on a number of bulletin boards and ARPANET.

Spare Tracks and Locking Out Defective Tracks

When formatting the drive, a number of tracks (default 10) can be set aside as spares. Later on, if a track goes bad and generates BDOS errors, the bad track's data can be relocated onto one of these spares without having to reformat and reload the entire drive. You can determine the defective cylinder and head from the data on the status line. If you are using a 24 line display, use CTRL-8 to shift the display down to see the status line.

The system error code is shown on the status line immediately to the left of the date. It is in the form d: ccc hs ee. Where d is the logical drive code, ccc is the absolute cylinder number in hex (from the beginning of the drive, not just from the beginning of the CP/M area), h is the head number, s is the 512 byte sector number and ee is the error code. Convert the cylinder number to decimal by multiplying the high order digit by 256, the middle digit by 16 and adding them all together. "A" means 10, "B" means 11, etc. Now that you know the cylinder and head numbers, you can use HDINIT function 3 to declare the track bad. HDINIT will attempt to read as much of the bad track as possible in order to move the data to one of the spares. You can then edit the file without getting BDOS errors.

Redetermine Disk Format EIOS Call

This call always purges modified buffers for the selected drive. It also sets disk changed status for floppies and clears logged in drive status for hard disk logical units.

Hard Disk Utility Prgrams

HDAUTO and HDCLEAR have been integrated into HDINIT. HDSYSDEF has been eliminated by having changes made by SYSDEF on floppy, then transferring these to disk via HDINIT function 1. HDCOPY has been replaced by COPY. And SYSGEN has ben replaced by COPYSYS.