



molecular computer

May 24, 1984

SOFTWARE RELEASE ANNOUNCEMENT

Molecular Computer is pleased to announce a new release of the n/STAR Network Operating System, version 2.62B. N/STAR release 2.62B is now released for shipment to customers, and will be shipped with Molecular Systems beginning June 15th, 1984.

N/STAR 2.62B is a major release, with several new features and error corrections from previous releases. N/STAR 2.62B can be installed on all Supermicro and Supermicro X systems.

(PLEASE NOTE: The Molecular Computer MC Series; the Series 9/20 and the Series 9/40 utilize n/STAR version 3.00 and greater. These versions of n/STAR (starting with version 3.00) are distributed on 5.25" diskettes and have a separate release schedule.)

The following features are highlights of n/STAR version 2.62B:

o NEW PRODUCT SUPPORT

MOLECULAR MODULAR INTERCONNECT (MMI)

The Molecular Modular Interconnect (MMI) provides the capability to link Molecular Series 9 and/or Supermicro X systems together to operate as a single, larger system. MMI allows users to expand an individual computer system or to share data and peripheral resources between two systems. MMI extends the m/BUS Interprocessor Link between system modules. MMI is not supplied standard with a system but can be ordered with the system or ordered separately and installed later.

MS-DOS

The system utility MAINT has been modified to allow the specification of a file name that is to be loaded on an AP/86 processor so that either n/STAR86 or MS-DOS may be run. The command "SYSTEM: =" has been added. The SYSTEM command should only be used in the system configuration screen of a 16-bit Application Processor.

TAPE APPLICATION PROCESSOR (TAP8015/TAP8020)

A Tape Application Processor is available to facilitate backup of the Molecular system's mass storage. File-by-file, modified files (using the archive bit) and image streaming backup are supported.

TAP8015: On-line backup card for Supermicro A Systems

TAP8020: On-line backup card for Supermicro X Systems

o NEW TAPE PROCESSING UTILITIES

Several enhancements have been added to tape operations that provide increased functionality and reliability. The program TAPE has been replaced by the program LTAPE. A "pseudo-online" program called STREAM is provided for streaming tape operations, while on-line operations are speeded up when a special server program called OLTSERVE is used with LTAPE. (These programs require the Tape Application Processor, TAP8015 or TAP8020.) Details on these enhancements are included in n/STAR 2.62B Software Release Notice and the Tape Backup Users Guide (Order number 87100680.)

o MP/M SUPPORT

MP/M queues have been implemented in NSTAR-86. MP/M processing has been enhanced to include additional BDOS functions.

NOTE: In order to use queues on existing 8086 boards, a new set of proms is required. To take advantage of this new feature, proms can be ordered using the attached software order form.

Over 50 field reported problems have been corrected in this release. These problems are listed in the Software Release Notice. In the future, corrections to field reported problems will be listed as part of the Software Release Announcement.

Several additions have been included in this Software Release Notice. Please be aware of them:

- A Publications Order Form has been included. Molecular Computer has a growing library of technical information. Please order these manuals to complete your library.

- An SPR (Software Problem Report) Form has been included. Please use this form for submitting problems you have uncovered or for requesting enhancements to the operating system. NOTE: This form is to be used by direct customers and Maintenance customers only. If you are a Dealer or an end user not covered by the Molecular Maintenance Contract, please forward this form through your Sales/Support channels.

- Extra copies of the n/STAR 2.62B Package can be ordered by using the attached form. If you copy diskettes for your customers, be sure to copy the Software Release Notice. It contains important information specific to n/STAR 2.62B

Molecular Computer continues to enhance its software product offerings. The addition of MP/M Queue capability greatly increases the availability of multi-user software that can run on Molecular Systems. The multiprocessor implementation of queues which Molecular has chosen assures a higher level of software application performance than is available on a true MP/M-based system.

SOFTWARE ORDER FORM

May 24, 1984

Molecular Computer periodically updates its N/STAR, Network Operating System and associated utilities. In an effort to provide a better service to its direct and indirect customers, a new Software Distribution Policy is being developed. Beginning with the release of n/STAR 2.62B, all future releases of software will be announced by way of a Software Release Announcement mailed directly to direct customers and to Molecular Maintenance Customers. The Software Release Announcement will also be reprinted in M/NET NEWS, Molecular Computer's monthly newsletter. Attached to the Software Release Announcement will be a software order form.

Mail your order to:

Molecular Computer
251 River Oaks Parkway
San Jose, California 95134-1986
ATTN: Order Entry Dept.

(If you are a direct customer of Molecular Computer orders can be placed directly with your District Sales Office.)

SOFTWARE ORDER FORM

1. n/STAR v2.62B Software Release Package

Order # 87100820 at \$75.00 each qty. _____ \$ _____

Package contains:

- * Software Release Notice
- * Publications Order Form
- * Diskettes (8" IBM3740 format)
 - * n/STAR 2.62B
 - * Diagnostic v1.06
 - * LTAPE tape utility

2. NSTAR86 MP/M86 Prom Set

Order # 052050320/
E52050330 at \$50.00 per set qty. _____ \$ _____

Prom Set contains:

- * Two (2) proms for
 replacement into existing AP/86s
 (one Set for each AP/86)
- * Instructions for replacing existing proms

**n/STAR V 2.62B
Tape Diagnostics V 1.20
Software Release Notice**

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This engineering specification describes the additions to version 2.60A of the n/STAR Network Operating System for Molecular Computer Supermicro series to make version 2.62B. Version 2.62B is a full release version. BECAUSE n/STAR AND THE MOLECULAR DIAGNOSTICS ARE NOW SEPARATE PRODUCTS, THIS DOCUMENT DOES NOT DESCRIBE DIAGNOSTIC DISKETTE FUNCTIONS. A separate release notice will accompany the next Diagnostic Diskette release. The next full release will be version 2.70. Version 2.62B includes the following changes/enhancements:

- o MMI, Microsoft(r) MS-DOS(tm), ATOM, AP8015, and tape server AP are supported.
- o New tape backup utilities are provided for more reliable tape backups as well as more functionality in operations. The program TAPE has been replaced by the program LTAPE.
- o m/BUS drivers for A series products have been changed to correct a timing problem causing bus hangs on some systems.
- o MP/M-86 queues have been implemented. MP/M processing has been speeded up. In addition, functions have been added to allow correct termination. (A PROM replacement kit is required on the AP/86 to use MP/M-86 queues.)
- o Problems involving LIST, DESPOOL, and QMAINT have been fixed.
- o Problems involving NSTAR86 have been fixed. It now fully supports software development and compiler operations.
- o Changes have been made to MAINT and NSTAR86.SYS to support MS-DOS.
- o Support of 38.4k baud has been added.
- o ATOM users and volumes have been defined.
- o Event routine calling sequence has been changed.
- o Get File Size function (45) has been corrected.
- o The ability of Sysint to redirect bad sectors has been improved.

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RELEASE GROUP

The software is released on the following diskettes:

Part Number	Description
88002411	n/Star distribution (not bootable)
88002271	CP/M serialized distribution (bootable)
88002451	Tape Utilities (not bootable)

The n/STAR distribution diskette is to be used for field upgrades of existing systems and for installation on new systems. The CP/M distribution diskette is used to generate bootable n/STAR and Diagnostic diskettes. The Tape Utilities diskette contains the new tape programs.

All new systems contain a serialized CP/M diskette, the n/STAR diskette, tape utilities diskette, and a Molecular diagnostic diskette. Field upgrades do not contain the CP/M diskette.

The following files are available on each diskette (note that the numbers in each column indicate CP/M User Numbers under which each file resides):

file	diskette		description
	n/STAR	CP/M	
AM808Z.RSP	1		Resident system process for Access Manager
ASM.COM		0	DRI assembler
*ASSIGN.COM	1		user profile maintenance utility
D.COM	1		directory display program
DBIOS4.HEX	0	0	universal floppy BIOS
DBIOSN1.HEX	0	0	SM8 floppy BIOS
DBIOSN2.HEX	0	0	SM32 floppy BIOS
*DESPool.COM	1		system despooler
DEVICES.COM	1		lists created devices
DDT.COM		0	DRI interactive debugger
*DOWN.COM	1		Power off command
DUMP.ASM		0	DRI file display utility
DUMP.COM		0	DRI file display utility
ED.COM		0	DRI editor
*GENSTAR.COM	0		n/STAR installation program
*GENSTAR.SUB	0		n/STAR installation control file
*GENSYSF.COM	0		generate .SYS files on MAINT volume
GPMON.COM	1		FP/AP debug monitor
*INSTALL.SUB	0		new system installation
*LIST.COM	1		n/STAR list utility
LOAD.COM		0	DRI object file editor
LOGOFF.COM	1		user signoff program
*LOGON.COM	1		user signon program
*MAINT.COM	1		n/STAR system maintenance utility
MESSAGE.SYS	0		default terminal message
MOVCPM.COM		0	DRI CP/M relocation program
*NEWCON.COM	1		Z80 TLink adaptor
*NSTAR80.SYS	1		n/STAR-80 system image

file	diskette n/STAR CP/M	description
*NSTAR86.SYS	1	n/STAR-86 system image
PIP.COM	0,1 0	DRI file copy utility
*POSTBOOT.COM	0 0	Floppy post boot processor
*PRLDR.COM	1	PRL and RSP program loader
*PRTLOG.COM	1	example program to display the system log
*QMAINT.COM	1	queue maintenance utility
*RESET.COM	1	reset an AP
SET.COM	1	set file attributes
*SETBAUD.COM	1	temporarily change AP baud rates
STAT.COM		0 DRI system status utility
SUBMIT.COM	0,1 0	DRI batch execution utility
SYSGEN.COM		0 copy system tracks of floppies
*SYSINT.COM	0	initialize the system drive
TLINK.COM	1	terminal link program for use with 8086
TOD.COM	1	time of day utility
VOLS.COM	1	show volumes utility
WARMSTAR.COM	1	n/STAR warmstart program
*WHO.COM	1	list APs and users of system
XSUB.COM	1 0	CP/M SUBMIT utility

*: changed from n/STAR 2.60A

Note that files on the n/STAR diskette reside under two different user numbers. Therefore, just doing a DIR on this disk will not show all of the files.

The Tape Utilities Diskette contains the files necessary for tape operations as well as the files used for CP/M plus. Note that TAPE is still supplied on the Diagnostic diskette for this release. The Tape utilities diskette contains:

Tape Programs	BIOS	CP/M 3.0
LTAPBACK.OVL	DBIOS3.HEX	CCP.COM
LTAPREST.OVL	DBIOS4.HEX	CPM3.SYS
LTAPDIR.OVL	DBIOSN1.HEX	TYPE.COM
LTAPMENU.OVL	DBIOSN2.HEX	DIR.COM
LTAPBSUB.OVL	POSTBOOT.COM	ERASE.COM
LTAPE.COM		RENAME.COM
SELDRIVE.COM		CPMLDR.COM
TAPEAFP.OVL		
TAPEAP.OVL		
TAPEOLT.OVL		
TAPEXFP.OVL		

INSTALLATION PROCEDURE

The n/STAR and Tape Utilities diskettes are distributed without a bootable CP/M on them. This is because the CP/M that is shipped to new customers is serialized and registered with DRI. It is the customer's responsibility to move it around to where he needs it. The following installation procedures begin by placing a copy of the serialized CP/M (or any other CP/M) onto the n/STAR, diskette.

o Upgrade from a previous n/STAR release

Requirements: the n/STAR distribution diskette
a Supermicro diagnostic diskette
any bootable CP/M distribution diskette
a Molecular computer

Step 1. Make the diskettes bootable and copy.

- a. The n/STAR and Tape Utilities diskettes must be made bootable before they can be used. If you have a bootable diskette from the last installation of your system (the CP/M distribution diskette) you can simply use SYSGEN to write your CP/M on the two diskettes. If the CP/M you have is not a 56K CP/M with the Molecular DBIOS, you must follow the procedure in Appendix 1 to MOVE your CP/M.
- b. After you make the diskettes bootable, make copies using the IMAGE program on one of your Diagnostic Diskettes. Instructions for using IMAGE are contained in the n/STAR System Administrator's Guide or n/STAR Installation and User Reference Manual that came with your system.
- c. File the original distribution diskettes safely away, and use your copies to perform the actual upgrade or installation.

IMPORTANT

The CP/M distributed with n/STAR 2.49 and later have been modified to run on the X-series hardware. The CP/Ms distributed before then will not operate on X-series hardware. The CP/M must have the new DBIOS installed to run on both the A and X versions of hardware.

Step 2. Determine the current disk configuration.

- a. Insert your existing (earlier version) bootable Diagnostic Diskette.
- b. Bring the system up in Diagnostic Mode.

- c. Type

A>STAT B:DSK: <RETURN>

The screen displays the current disk configuration. Make a note of the number listed as the "Kilobyte drive capacity" and the number of "32-byte directory entries."

- d. Remove the Diagnostic Diskette and insert a copy of your new bootable n/STAR Diskette.
- e. Press ^C to inform the system that the diskette has been changed.
- f. Proceed to the Step 3 below to install n/STAR from the distribution diskette.

Step 3. Install n/STAR from the distribution diskette.

IMPORTANT

The location of the Configuration sector has been changed in versions 2.60A and later. You must run the SYSINT "D" option when upgrading (you are prompted to do this as you proceed with the installation).

- a. Type

SUBMIT GENSTAR <RETURN>

The screen displays

*** Upgrade to 2.62B ***

When SYSINT runs, DO NOT format or verify your disk.
Use the "D" option to reselect your disk configuration.
A>SYSINT

The installation procedure requires you to run SYSINT to set up the disk directories for directory hashing. This procedure is non-destructive to your existing data AS LONG AS YOU SELECT THE DISK CONFIGURATION CURRENTLY IN USE. The screen displays

SYSTEM DISK INITIALIZATION ROUTINE

DRIVE 0, 1, 2, 3 ([])

- b. Enter the number of the hard disk drive to configure. Do not press RETURN. The screen displays

F=Format/Verify, V=Verify Only, D=Disk Option R=Redirect ([])

- c. Enter

D

Do not press RETURN. Be certain that you do not select format or verify at this time. The screen displays

*****WARNING*****

TO CHANGE THE DIRECTORY/BLOCKSIZE OPTION ON YOUR DISK,
YOU MUST ARCHIVE ALL YOUR DATA AND REFORMAT THE DISK.

CONTINUE ? Y/N ([])

Since you will select the same option as you now are using, you may disregard this message. You will not destroy any data on your disk if you correctly follow this procedure. Type

Y

Do not press RETURN. The screen displays a table of possible disk configurations and details about each. At the bottom of the table, the screen displays

SELECT CONFIGURATION OPTION (0-4) ([])

- d. Enter the number of the configuration your system is now using, as determined in Step 2 above. BE SURE TO ENTER THE CORRECT NUMBER, OR EXISTING DATA MAY BE DESTROYED. The screen displays a table of information pertaining to the configuration you select. At the bottom of this table, the screen displays

CONFIGURATION CORRECT ? Y/N ([])

- e. If you are certain that you entered the correct configuration, type

Y

do not press RETURN. (If you entered the wrong configuration, type N to make another selection.) The screen displays

FUNCTION COMPLETE
Hit BREAK key to exit program

- f. Press the BREAK key. The screen displays

```
A>GENSTAR  
  
NEW N/STAR VERSION = 2.62B  
  
FUNCTION COMPLETE  
  
A>PIP B:=A:*. *[G1VR]  
COPYING -  
filename 1  
filename 2  
filename 3  
.  
.  
.  
filename n  
UPGRADE COMPLETE  
A>
```

- g. When all of the files are copied from the n/STAR Diskette onto the hard disk, remove the n/STAR Diskette from the diskette drive. Then press BREAK (with the terminal still connected to the FP) to bring up the system in Multi-User Mode under the newly installed version of n/STAR.

- o **Install n/STAR on a new system drive**

NOTE

New systems have a bootable n/STAR already installed on the hard disk.

Requirements: the n/STAR Distribution Diskette
the CP/M Distribution Diskette
a Molecular computer

Step 1. Create a bootable n/STAR diskette.

Follow the procedure described in Step 1 above, under the heading "Upgrade from a previous n/STAR release."

Step 2. Initialize the system drive and install n/STAR.

- a. Using a copy of your new, bootable n/STAR system diskette, bring up the Supermicro in Diagnostic Mode.

- b. Type

SUBMIT INSTALL

and press RETURN. The screen displays

```
A>SYSINT
      SYSTEM DISK INITIALIZATION ROUTINE

DRIVE 0, 1, 2, 3 ([])
```

- c. Supply the appropriate information as you are prompted to format, verify and select disk options on this hard disk drive. (When this entire process is complete, you must run the SYSINT program on all add-on drives in the system.) When SYSINT is finished, the screen displays

```
FUNCTION COMPLETE
Hit BREAK key to continue
```

- d. Press BREAK, and the screen displays

```
Supermicro*xx yyMB

56K CP/M V2.62B
A>GENSTAR

NEW N/STAR VERSION = 2.62B

A>PIP B:=A:MESSAGE.SYS[VR]
A>PIP B:FS.SYS=A:GENSTAR.COM[VR]
A>PIP B:=A:*. *[G1VR]
COPYING -
filename 1
filename 2
filename 3
.
.
.
filename n
A>GENSYSF
A>
```

- e. When all files are copied onto the hard disk, remove the n/STAR Diskette from the diskette drive and store it in a safe place.
- f. Press BREAK to bring up the system in Multi-User Mode operating from the newly installed version of n/STAR.

Your Supermicro has now been completely reinitialized, and contains only the operating system, utilities, and three user IDs. You must log on as either DEMO or MAINTUSR and use the utility MAINT to establish users and volumes.

ERROR CORRECTIONS

The following errors were corrected in release 2.62B:

- o SPR77. NSTAR86 has been fixed to enable running CIS COBOL Level II (and other compilers) on the performance accelerator.
- o SPR87. TLINK timeouts have been increased.
- o SPR104, 108. Miscellaneous SYSINT corrections.
- o SPR111. Corrected erasure of previous data.
- o SPR113. In SYSINT, the configuration table for the 60-32 system (option number 3 only) with two add-on drives caused memory conflict with n/STAR tables. The option was changed to select reduced capacity tables. **NOTE:** To upgrade to 2.61 and later releases using option number 3, all files must be backed up to another media other than the hard disk. Otherwise, data may be lost.
- o SPR114. PIP now correctly transfers file attributes.
- o SPR115. An esoteric hole in the ASSIGN security has been patched.
- o SPR117. SYSINT 2.60A did not give a warning message asking the user to backup data on the disk. The warning message has been restored.
- o SPR118. Specifying LIST SPOOL (queuename) with multiple copies did not result in more than 1 copy. This feature now works.
- o SPR119. QMAINT allowed entry of HOLD 245/0 (or /1) instead of HOLD 245/A (or B). This has been corrected.
- o SPR122. Inserting an AP86 board into a live system caused the system to hang. The system reset function has been enhanced. **NOTE:** Users should NEVER insert ANY board into a powered-on system.
- o SPR126. LIST SPOOL with the queue name specified on the ASSIGN page caused the AP to go into a loop. This has been repaired.
- o SPR128. On the SM32X, the baud rates were incorrect. This has been rectified.
- o SPR129. LIST specified to the SYSTEM printer would continually output, trying to output 255 copies, thus effectively hanging the AP.
- o SPR131. Doing a DIR of an invalid drive resulted in an incorrect error message. The error message reporting has been fixed.
- o SPR133. QMAINT correctly executes TOP and UP functions.
- o SPR134, 135, 152, 161, 202. Miscellaneous problems with TAPE corrected in LTAPE.

- o SPR137. Illegal "ghost" active entries were showing up on QMAINT display of print queues. This has been corrected.
- o SPR138. Break now resets the FP on X systems
- o SPR141. In SYSINT, the configuration table for the SM15-8 was incorrect. The table has been corrected.
- o SPR143. In QMAINT, if the CANCEL function was specified with an illegal (nonexistent) entry, garbage resulted. Any such illegal entry is now flagged as an error.
- o SPR145. Function 141 (DELAY) delayed an incorrect length of time for some values. This has been corrected.
- o SPR146. Files no longer continuously queued for print.
- o SPR155. When a file was queued to be listed by the despooler, if the file was currently in use, the despooler would drop the file from the queue instead of retrying. This has been fixed.
- o SPR162, 149. System hung on some A series systems. This was an m/BUS hang problem. The m/BUS drivers have been modified to alleviate this problem.
- o SPR165. POSTBOOT now displays the error code when an error on the hard disk is encountered.
- o SPR168. Baud rate supported increased to 38.4K baud.
- o SPR173. BDOS function 45 sometimes returned an incorrect value if the file was still open. n/Star now checks to see if the file is open and larger than indicated by the information on the disk.
- o SPR172. Corrected BDOS function 44.
- o SPR174. Correction in LIST.COM
- o SPR178 (85). nHub correctly calculates the size of a file.
- o SPR179. CCP has been modified to allow initial command (CMD:= with ASSIGN) execution when SPOOL <filename> is also specified.
- o SPR180. An incorrect entry in the definition table for PRIAM 3450 configuration (floppy) has been corrected.
- o SPR183. STAT did not work with new version of NSTAR86.
- o SPR185. New versions of CCP86 and NSTAR86 incorporate corrections allowing DDT86, etc., to work correctly.
- o SPR187. On MMI systems, accessing an illegal volume caused the system to hang. This error is now correctly handled.

- o SPR189. Under heavy usage, updating of the system clock was sometimes lost. The system now ensures that the time is updated, even under heavy system load.
- o SPR 199 Added support for MP/M BDOS function 6.
- o SPR203, 204. Caused by incorrect compute file size.
- o SPR205. Spool files were sometimes not automatically deleted after printing.
- o Some arithmetic routines were shortened or optimized in nHub, ISDRVR, and CBIOS. Also, multi-sector reads (READS) have been optimized for better response.
- o Multi-sector reads only allowed up to 15 sectors at a time. Now n/Star correctly allows up to 16 sectors.

ERRORS NOT CORRECTED IN THIS RELEASE

The following errors were not corrected in this release:

- o SPR164 <BREAK> DURING PRINT JOB CAUSES TRASHED DIRECTORY
(Reported under n/STAR Version: 2.60A).

PROBLEM: Executing a <BREAK> during a print operation (to abort print job), may cause "trashed" directories on logical drive A:. WORK-AROUND: Use a DESPOOLing printer and cancel print jobs with QMAINT. NOTE: "Trashed" means that a DIRectory listing will be confused and probably consist of colons ":".
- o SPR211: INTERMITTENT "BUS HANGS" WHEN USING ACCESS MANAGER.
(Reported under n/STAR Versions: 2.60A & 2.62a.)

PROBLEM: Occasional "bus hangs" occur on systems running Access Manager. WORK-AROUND: DOWN the system from Diagnostic Mode and bring it back up in Multi-User Mode. NOTE: "Bus hang" is a condition in which all the terminals are locked out of the system.
- o SPR212: INTERMITTENT "ABORTS" WHEN USING ACCESS MANAGER.
(Reported under n/STAR Versions: 2.60A & 2.62a.)

PROBLEM: When attempting to load an application, Access Manager will occasionally issue the error message: "Access Manager is not installed." WORK-AROUND: A second attempt to load the application will usually be successful.
- o SPR224: TAPE WILL REWIND OFF END-OF-REEL UNDER LTAPE.COM.
(Reported under n/STAR Versions: 2.60A & 2.62a)

PROBLEM: When <ESC> is hit more than once (to abort the current TAPE or LTAPE operation), the cassette tape may wind off the end of the reel.
- o SPR237: RESET TO AP ON "A" SERIES SYSTEM MAY CAUSE BUS HANG.
(Reported under n/STAR Version: 2.62a.)

PROBLEM: A RESET to an "A" series AP may cause a "bus hang." WORK-AROUND: DOWN the system from Diagnostic Mode and power-up as usual.

- o SPR241: PROBLEMS WITH "DOWN" ON 15-8s.
(Reported under n/STAR Version: 2.62a.)

PROBLEM: On some 15-8s, after copying files to the FLOPPY using PIP.COM, the system will not DOWN. WORK-AROUND: DOWN the system from Diagnostic Mode.

- o SPR249: 300 IS BAUD NON-FUNCTIONAL ON NEWCON & LOGON DEVICES.
(Reported under n/STAR Version: 2.62a.)

DISK CONFIGURATIONS SUPPORTED

This is a list of the disk configurations supported by release 2.62 of n/STAR. Option "1" is the configuration that manufacturing installs before shipping.

OPTIONS:		0	1	2	3	4
		Name = "DIRAC 30MB"				
PRIAM	DIRECTORY:	320	640	1280	1024	512
3350	BLOCKSIZE:	16K	8K	4K	8K	16K
14'	SIZE (MB):	4.9	4.9	4.9	7.3	7.3
	PARTITION:	6	6	6	4	4
	MAX DRIVE:	2	2	2	3	3

		Name = "Supermicro*64 60MB"				
PRIAM	DIRECTORY:	320	640	1280	1024	512
6650	BLOCKSIZE:	16K	8K	4K	8K	16K
14"	SIZE (MB):	4.9	4.9	4.9	8.0	8.0
	PARTITION:	12	12	12	7	7
	MAX DRIVE:	1	1	1	1	1

		Name = "Supermicro*32 30MB"				
PRIAM	DIRECTORY:	512	1024	1920	1024	1280
3450	BLOCKSIZE:	16K	8K	4K	16K	8K
8"	SIZE (MB):	7.6	7.6	7.6	9.8	9.8
	PARTITION:	4	4	4	3	3
	MAX DRIVE:	3	3	3	3	3

		Name = "Supermicro*32 60MB"				
PRIAM	DIRECTORY:	512	1024	2048	1536	1536
7050	BLOCKSIZE:	16K	8K	4K	8K	16K
8"	SIZE (MB):	7.7	7.7	7.7	15	21
	PARTITION:	8	8	8	4	3
	MAX DRIVE:	1	1	1	3	3

		Name = "Supermicro*16 30MB"				
PRIAM	DIRECTORY:	512	1024	1920	1024	1280
3450	BLOCKSIZE:	16K	8K	4K	16K	8K

8"	SIZE (MB):	7.6	7.6	7.6	9.8	9.8
	PARTITION:	4	4	4	3	3
	MAX DRIVE:	3	3	3	3	3

Name = "Supermicro*8 10MB"

RMS	DIRECTORY:	320	640	1280
	BLOCKSIZE:	16K	8K	4K
5.25"	SIZE (MB):	5.0	5.0	5.0
	PARTITION:	2	2	2
	MAX DRIVE:	3	3	3

Name = "Supermicro*8A 10MB"

SEAGATE	DIRECTORY:	320	640	1280
412	BLOCKSIZE:	16K	8K	4K
5.25"	SIZE (MB):	4.7	4.7	4.7
	PARTITION:	2	2	2
	MAX DRIVE:	3	3	3

Name = "Supermicro*8 15MB"

SEAGATE	DIRECTORY:	512	1024	2048
419	BLOCKSIZE:	16K	8K	4K
5.25"	SIZE (MB):	7.3	7.3	7.3
	PARTITION:	2	2	2
	MAX DRIVE:	3	3	3

Note that configurations with partitions larger than 8MB cannot be backed up under CP/M 2.2 (the usual offline backup method). If you have partitions (or individual files) larger than 8MB, you must use either CP/M 3.0 (provided on the Tape Utilities diskette) or the tape server AP under n/STAR. (CP/M 3.0 is provided only for tape backup purposes and is not to be used for other purposes. If you attempt to use CP/M 3.0 to make any of the diskettes bootable, or if you try to use CP/M 3.0 utilities under n/STAR, you will encounter problems with unpredictable consequences.)

Do not use CP/M 3.0 for any purpose other than tape backup as described in the Tape Backup User's Guide.

IMPORTANT

If you received an "Add-on Drive Backup Diskette" for backing up add-on disk drives, do not use it any longer. Instead, use the Tape Utilities diskette described in this document.

MEMORY MAP

The FP memory map is:

<u>2.60</u>	<u>2.62</u>	<u>contents</u>
0300H	0300H	n/HUB base
		CBIOS base
		ISDRVR base
		Z80 system loader
		8086 system loader
		lock table
6C72H	6C72H	base of buffer pool
F700H	F700H	new m/BUS drivers
F780H	F780H	end of system RAM
34D	34D	number of buffers

The Z80 AP memory map is:

<u>2.60</u>	<u>2.62</u>	<u>contents</u>
0000H	0000H	base page
0100H	0100H	beginning of TPA
D900H	D900H	CCP initialization
DD00H	DD00H	CCP
E800H	E800H	n/STAR initialization
EA06H	EA06H	n/STAR (end of TPA)
F800H	F800H	base of PROM area

MAINT CHANGES

=====

MAINT has been modified to allow the specification of a file name that is to be loaded on an AP/86 board so that either n/STAR86 or MS-DOS may be run. The MAINT system configuration menu now appears as:

```

n/STAR System Maintenance Program

Configuration of unit 195

|BAUD RATE FOR THE CONSOLE SERIAL PORT
|C:=9600
|BAUD RATE FOR THE PRINTER SERIAL PORT
|P:=9600
|INITIAL COMMAND
|CMD:=
|SYSTEM:=
|RTS LOW ON PORT A CAUSES A REBOOT (YES OR NO) RTS:=NO
|DTR LOW ON PORT A CAUSES A REBOOT (YES OR NO) DTR:=NO
|Enter command
|( )
```

The effect of entering a file name in the SYSTEM field is to specify that that file will be loaded onto the AP/86 board. Thus, entering SYSTEM:=MSDOS.SYS will cause the MS-DOS operating system to be loaded onto the 8086 board. Leaving the SYSTEM field blank is the same as specifying NSTAR86.SYS, and will cause the n/STAR-86 operating system for 8086 boards to be loaded.

The SYSTEM command should be used only in the system configuration screen of a 16-bit Application Processor. Do not supply a SYSTEM parameter for an AP connected to a terminal.

Molecular's implementation of MS-DOS is fully explained in the MS-DOS Operations Manual included with MS-DOS software.

EVENT ROUTINE CALLING SEQUENCES

=====

The event routine that could be associated with a queue was called in a rather clumsy way in n/STAR 2.60A. In trying to use the event routines, we have found that the implementation did not work well. Therefore, before many people write event routines, the calling sequence has been changed.

The specified event routine is called whenever a record is successfully read or written from or to the queue. The routine is called just as the queue handlers are exiting. The program that was running when the event happened has had all of its registers saved and a return would restore the registers and return to the interrupted routine. A writer of an event routine must keep in mind that the routine is called by an interrupt so any system context information may be in a funny state.

The event routine calling sequence for the Z80 processor is:

SP = interrupted program (beware of overuse)
A = 80H if a record was written into the queue
 81H if a record was read from the queue
DE = address of queue control block
Interrupts are disabled
CALL EventRoutine

Flags, A, BC, DE, and HL may be modified. All other registers MUST be unmodified.

The event routine calling sequence for the 8086 processor is:

SS:SP = interrupted program (beware of overuse)
AL = 80H if a record was written into the queue
 81H if a record was read from the queue
DS:BX = address of queue control block
Interrupts are disabled
CALLF EventRoutine

Flags, AX, BX, CX, DX, DS and ES may be modified. All other registers MUST be unmodified.

CAUTION

BDOS CALLS SHOULD NOT BE MADE FROM WITHIN THE EVENT ROUTINE.

This may destroy the stack and stack pointers because n/STAR is not reentrant, and consequently may cause the bus to hang.

ATOM VOLUME GENERATION

=====

New users of a Molecular system will not have to create the files used by ATOM. When SUBMIT INSTALL is performed during initialization of the system, the program GENSYSF automatically creates 3 volumes (ATOM, NEWMAIL, and MMAIL). Also, a user called ATOMADMN is created. This is in addition to the other volumes (SYSTEM, SAMPLE, MAINT, FLOPPY, and FLOPPY1D) and users (MAINTUSR and DEMO) which have always been created by GENSYSF.

The characteristics of the volumes are:

ATOM	Unsecured	Location A1
NEWMAIL	Unsecured	Location A2
MMAIL	Secured	Location A3

The characteristics of the user are:

ATOMADMN with drive assignments of

A:= ATOM
B:= SYSTEM
P:= FLOPPY1D (since ATOM is distributed as
single-sided/double-density)

TAPE PROGRAM CHANGES

=====
The previous backup program "TAPE" has been obsoleted and replaced by "LTAPE". A "pseudo-online" program called "STREAM" is provided for streaming tape operations (streaming requires a tape server AP). while online operations are speeded up via creation of a special server program called "OLTSERVE" used with LTAPE. **These programs are documented in a new Tape Users manual, and will not be detailed here.** However, off-line tape backup using the LTAPE program is covered in Appendix 3, for the benefit of those users who will receive no other documentation.

IMPORTANT

Backup tapes produced by the program TAPE are NOT compatible with LTAPE.

Attempting to restore a tape with the wrong program will cause an error message. TAPE is still supplied on the release diskette to facilitate this transition period; it will be removed from the distribution diskettes in the next release of n/STAR.

LTAPE may be used in either offline mode (as TAPE was) or in online mode with the tape server AP. In either use, it provides significant reliability improvements:

1. The error detection and retry logic has been improved. The program will now continue processing after encountering an "unrecoverable data error". Previously, TAPE would abort in that situation making the rest of the tape inaccessible. LTAPE skips the one bad block, and processes the rest of the tape as normal.

Error messages are produced notifying the user of this occurrence.

2. The data structure written on the tape has been changed to reduce the block size (from 32K bytes to 24K bytes) and also to properly handle "hole in file" conditions. Previously, TAPE would not properly process files containing holes or unwritten data.
3. A "verify" command has been added which insures the tape is readable and that all internal checksums (within tape blocks) are correct. Previously, the tape was checked by performing a directory of the tape after backup. Doing the directory did not adequately check the tape; this command does. It is also faster.

4. Provision has been made to restore to a different volume than was backed up from. This allows a backup to be performed, then a restore to a different volume, then a comparison of the data between the two volumes to ensure the tape is readable and correct. It also allows backing up offline, then restoring online (or vice-versa) and re-directing the data to the same logical drives. (Ordinarily, the data would restore to the wrong partition.)
5. Provision has been made for selective backup of files based upon archive bit setting. This allows backup of only those files that have been changed. This significantly reduces the time (and tape) required for backups and should facilitate more frequent backup cycles. Provisions are also made for selectively resetting the archive bit, allowing composite backups to be made. (n/STAR automatically clears the archive bit whenever you modify a file and LTAPE sets the bit during backup.)

A clear archive bit means the file has been modified; a set archive bit means the file has not been modified. You can display the setting of the archive bit (and other attributes) by using the n/STAR D command. You can manually set the archive bit by entering the command **SET filename.typ \$ARC**. You can manually clear the archive bit by entering the command **SET filename.typ \$MOD**.

6. Numerous other user features have been added. Although these features do not increase reliability per se, they do provide a more complete program which should make backups/restores easier.

All features listed above are usable in offline mode and also in online mode. The same program supports both modes of operation as well as the full A and X products line, using the tape as a start/stop device. For offline mode, the program is loaded into the File Processor and executes from there, using the tape interface on the FP. For online mode with a terminal AP TLINKed to the tape server AP, the program runs in the tape server AP using the tape interface on the tape server AP.

In online mode with Tape Server AP, file and record locking, and backup by logical volume name are also supported. Performance is improved by making use of n/STAR's multisector read operation.

In online mode only, OLTSERVE is provided to speed up the backup/restore operation. The LTAPE program runs in the terminal AP, with OLTSERVE running in the Tape Server AP; communication is via n/STAR's queue system. The performance improvement comes from overlapping disk and tape operations.

Tapes written by the old TAPE program are not compatible with LTAPE. LTAPE produced tapes can be processed interchangeably by any mode of operation - offline, online, or online/OLTSERVE.

The program STREAM only functions with a Tape Server AP. It runs in pseudo-online mode in that it is initiated from a terminal AP in Multiuser Mode under n/STAR (not Diagnostic Mode) and makes the system quiescent (all users must be logged off except the user doing the backup). It loads itself from the AP into the FP. After performing the indicated operations, it automatically restores the system to n/STAR state. It is not necessary to move terminal cables.

STREAM uses the tape drive in streaming mode, not start/stop mode. This means the tape operations are much faster and the tape itself is stressed much less than in stop/start mode. There is some feeling in the field that using the unit in streaming mode will be more reliable than in start/stop mode, but this is not substantiated (nor refuted) by engineering data.

STREAM performs backups and restores by physical partition images, not file by file oriented as LTAPE. The partitions are those defined in the disk configuration. It does provide disk redirects, but treats each partition as a logical disk. Data may be restored to a different partition than it was backed up from; however, partitions will be overwritten with the new data. (Note that when you are restoring to a different partition, **the new partition must be the same size as the partition from which the data was backed up.**)

The streaming backup is significantly faster than file by file backup although at a cost of reduced capacity on the tape. To keep the tape streaming, write underrun is performed. The net effect of this is to reduce the cartridge capacity to one half the capacity when used in file by file mode.

Performance measurements of the various tape options done in engineering indicate:

LTAPE performance depends upon the characteristics of the files being processed. Many small files takes longer than a few big files with same total capacity. The limiting factor is File Processor throughput, not tape speed.

LTAPE performance in offline mode is about 300K bytes/minute.

LTAPE used in online mode will be 20% faster than in offline mode, about 360K bytes/minute.

LTAPE used with OLTSERVE will be 45% faster than in offline mode, about 500K bytes/minute.

Using the archive bit to select only modified files in most cases will significantly reduce the amount of data being written and hence significantly reduce the time needed to perform the backup.

STREAM will operate at streaming speeds with underruns, which means on 30 ips drive, will do about 1M byte per minute; on 90 ips drive about 3M bytes/minute.

CP/M 3.0 OPERATIONS

=====

The purpose of supplying CP/M 3.0 is to support off-line tape backup/restore of a file or partition that is bigger than 8M bytes. If the partition/file is smaller than 8M bytes, CP/M V2.2 will do the operation properly.

n/STAR continues to be based upon CP/M 2.2 with extensions. The CP/M 2.2 manual will continue to be shipped with n/STAR systems. Only those portions of CP/M 3.0 necessary for file backup are supplied - a full distribution of all utilities is not included.

Description of CP/M 3.0 files supplied:

Filename	Purpose
CPMLDR.COM	Reading CPM3.SYS and CCP.COM to the proper memory location and bringing up CP/M 3.0.
CPM3.SYS	CP/M V3.0 BIOS and BDOS.
CCP.COM	Console Command Processor, it will load by cold start or warm start.
DIR.COM	Extended support function for CCP.
ERASE.COM	Extended support function for CCP.
TYPE.COM	Extended support function for CCP.
RENAME.COM	Extended support function for CCP.

All the above files are useless under the n/STAR operating system and should not be used with n/STAR. **These programs should be used only in Diagnostic Mode.**

To bring up CP/M 3.0:

1. Insert Tape Utilities diskette (previously made bootable)
2. Bring up normal CP/M V2.2 in Diagnostic Mode.
3. Type CPMLDR<RETURN>

The entire system will now be in the CP/M 3.0 environment and LTAPE can be used for backup/restore. If your system has partitions larger than 8MB, they will be correctly backed up/restored.

NSTAR86 CHANGES

=====
Numerous changes and corrections were implemented in NSTAR86 and CCP86. Compiler problems in previous versions were corrected. In addition, an outside firm conducted a validation test suite of various application software packages.

The following problems were fixed:

Errors in BDOS function 36 (Set Random Record) were corrected.

Function 59 (Program load) now returns an error when the current record field is non-zero.

Function 24 (return login vector) has been corrected.

Error reporting for invalid system calls has been made consistent. Registers AX and BX return with a -1 (hex OFFF) when an invalid system function is requested.

Additional minor problems were corrected.

In addition, MP/M queues have been implemented for the 8086 boards and NSTAR86.

IMPORTANT

To use queues on existing 8086 boards, a PROM kit is required.

The corrections listed above are applicable to existing PROMS with the new NSTAR86. The PROM kit is required only if queue support is required, otherwise the existing prom can continue to be used. The PROM kit may be ordered from Molecular Field Service.

The following software packages have been tested and run successfully with the new NSTAR86:

CIS Cobol compiler, DRI C compiler, CBASIC-86, PL/1-86, Pascal MT+, RASM-86, LINK-86, SID-86.

Supercalc 2, Superwriter, Milestone, Datebook, dBase II, Friday, WordStar, Mailmerge, Microplan, Fileplan.

APPENDIX 1 — Installing CP/M 2.2 on your Molecular Computer

=====

Normally one has or receives a serialized CP/M that has been configured to run on the Molecular Computer. If, however, you need to install CP/M on a Molecular Computer, the procedure is to make a 56K version of CP/M and then add the Molecular Computer patches that interface it to the hardware. **This procedure is only necessary if you are upgrading from n/STAR Version 2.242 or earlier. Please note that the DBIOS3.HEX has been removed from the n/STAR 2.62B diskette.**

You need a bootable CP/M disk with at least 9K of available disk space and the files:

MOVECPM.COM	DRI program to place CP/M in memory
DDT.COM	DRI diagnostic program
SYSGEN.COM	DRI program to write CP/M on a disk
DBOOT.HEX	Initialization patch for CP/M
DBIOS.HEX	Molecular disk drivers for CP/M

Boot the CP/M disk and relocate CP/M to use 56K of memory:

```
A>MOVCPM 56 *
A>SAVE 34 CPM56.COM
A>DDT CPM56.COM
```

Insert the disk to be made bootable and patch CP/M as follows:

```
ISYSGEN.COM
R0
IDBOOT.HEX
R900
IDBIOS.HEX
R4580
F5D,5D,20 ;clear the default fcb
G100 ;execute SYSGEN
(return) ;skip the read operation of SYSGEN
```

Enter

A

and RETURN to write the boot-image onto the diskette. You now have a bootable diskette.

When you boot the newly initialized diskette, the signon message will be one of the following:

DIRAC 30MB Diagnostic Diskette
Supermicro*64 60MB Diagnostic Diskette
Supermicro*64 136MB Diagnostic Diskette
Supermicro*32 60MB Diagnostic Diskette
Supermicro*32 30MB Diagnostic Diskette
Supermicro*8 15MB Diagnostic Diskette
Supermicro*8 10MB Diagnostic Diskette
Supermicro*8A 10 MB Diagnostic Diskette

followed by

56K CPM V2.2

Note to system programmers: For a diskette to be bootable, the following must be true

1. The system tracks must contain the boot image.
2. The diskette must contain the following files:

POSTBOOT.COM
DBIOS4.HEX (for configured systems)
DBIOSN1.HEX (for Supermicro 8 systems)
DBIOSN2.HEX (for Supermicro 32 systems)

APPENDIX 2 — list of BDOS functions in n/STAR

=====
This is a list of all of BDOS functions supported by n/STAR:

- 00 - SYSTEM WARM-BOOT
- 01 - GET CONSOLE CHARACTER
- 02 - PUT CONSOLE CHARACTER
- 03 - GET READER CHARACTER
- 04 - PUT READER CHARACTER
- 05 - PUT LIST CHARACTER
- 06 - RAW CONSOLE I/O
- 07 - GET I/O BYTE
- 08 - PUT I/O BYTE
- 09 - PUT CONSOLE BUFFER
- 10 - GET CONSOLE BUFFER
- 11 - GET CONSOLE STATUS
- 12 - RETURN VERSION NUMBER
- 13 - RESET DISK
- 14 - SELECT DISK
- 15 - OPEN FILE
- 16 - CLOSE FILE
- 17 - SEARCH FOR FIRST DIRECTORY ENTRY
- 18 - SEARCH FOR NEXT DIRECTORY ENTRY
- 19 - DELETE FILE
- 20 - READ SEQUENTIAL
- 21 - WRITE SEQUENTIAL
- 22 - CREATE FILE
- 23 - RENAME FILE
- 24 - RETURN LOGIN VECTOR
- 25 - RETURN CURRENT DISK
- 26 - SET DMA ADDRESS
- 27 - GET ALLOC TABLE
- 28 - POWER-DOWN SYSTEM
- 29 - GET READ-ONLY VECTOR
- 30 - SET FILE ATTRIBUTES
- 31 - GET DISK PARAMETER BLOCK
- 32 - SET/GET USER CODE
- 33 - READ RANDOM
- 34 - WRITE RANDOM
- 35 - COMPUTE FILE SIZE
- 36 - SET RANDOM RECORD
- 37 - RESET DRIVE
- 40 - WRITE RANDOM WITH ZERO FILL
- 42 - LOCK RECORD
- 43 - UNLOCK RECORD
- 44 - SET MULTI-SECTOR COUNT
- 45 - SET BDOS ERROR MODE
- 47 - CHAIN TO PROGRAM (n/STAR86 only)
- 49 - GET SYSDAT ADDRESS (n/STAR86 only)
- 50 - DIRECT BIOS CALL
- 51 - SET DMA BASE (n/STAR86 only)

52 - GET DMA ADDRESS (n/STAR86 only)
 53 - GET MAX MEMORY (n/STAR86 only)
 54 - ALLOC ABS MAX MEMORY (n/STAR86 only)
 55 - ALLOC MEMORY SEGMENT (n/STAR86 only)
 56 - ALLOC ABS MEMORY SEGMENT (n/STAR86 only)
 57 - FREE MEMORY SEGMENT (n/STAR86 only)
 58 - FREE ALL MEMORY (n/STAR86 only)
 59 - LOAD PROGRAM (n/STAR86 only)
 104 - SET DATE AND TIME
 105 - GET DATE AND TIME
 134 - MAKE QUEUE
 135 - OPEN QUEUE
 136 - DELETE QUEUE
 137 - READ QUEUE
 138 - CONDITIONAL READ QUEUE
 139 - WRITE QUEUE
 140 - CONDITIONAL WRITE QUEUE
 141 - DELAY
 142 - DISPATCH
 143 - TERMINATE PROCESS
 152 - PARSE FILENAME
 153 - GET CONSOLE NUMBER
 155 - GET DATE AND TIME
 156 - RETURN PROCESS DESCRIPTOR ADDRESS
 158 - ATTACH LIST
 159 - DETACH LIST
 160 - SET LIST
 161 - CONDITIONAL ATTACH LIST
 162 - CONDITIONAL ATTACH CONSOLE
 163 - RETURN MP/M VERSION NUMBER
 164 - GET LIST NUMBER
 240 - N/STAR ESCAPE CODE
 240.00 - GET SYSTEM DATA ADDRESS
 240.01 - COLD START
 240.02 - GET SYSTEM REVISION
 240.03 - WARM START
 240.10 - CREATE DEVICE
 240.11 - DESTROY DEVICE
 240.12 - ACQUIRE DEVICE
 240.13 - CONDITIONAL ACQUIRE DEVICE
 240.14 - RELEASE DEVICE
 240.15 - READ FIRST DEVICE
 240.16 - READ NEXT DEVICE

Any request not in this table is treated as a NOP (no operation) which means that nothing is affected by the request and A and HL are returned with the value of zero. This means that some of the MP/M requests that are not directly implemented by n/STAR "work". For instance, function 146 (attach console) will perform as defined by MP/M but since each process has a console the operation is really nothing.

APPENDIX 3 — Off-Line Tape Backup Operation

=====

Since many users will be receiving the new Tape Utilities diskette but will not have the manual which comes with the tape server AP, this tutorial is provided to allow use of the LTAPE program in offline mode for those who do not have to the Tape Backup User's Guide.

(For a complete description of how to use the tape programs in both online and offline modes, and for complete information on tape backup philosophy, methods, and preventive maintenance, you should obtain the Tape Backup User's Guide, part number 87100680.)

To use the Tape Backup System, all users must log off and the system must be configured for Diagnostic Mode.

With the system in Diagnostic Mode; no other terminals can access the system until you return it to Multiuser Mode operation. Note that if you want to back up a file or partition bigger than 8 megabytes, you must boot the system with CP/M 3.0 included on the diskette supplied with the tape backup option. CP/M 2.2 supplied on the system distribution diskette supports files and partitions up to 8 megabytes maximum.

The TAPEDISK.DAT File

To operate the LTAPE program, a file on the Tape Utilities diskette called TAPEDISK.DAT must contain the partitions on the hard disk to be backed up. Before beginning the backup procedure, check that this file contains the partition letters that correspond to your system's configuration. Type

```
TYPE A:TAPEDISK.DAT <RETURN>
```

Make sure that the hard disk drive partitions listed match the partitions for your system configuration. You can determine the appropriate partitions by examining your Volume ID chart prepared when your system was installed, or by reading the applicable information in your n/STAR System Administrator's Guide.

For example, if you have a Supermicro 32 with a 60M byte drive having 8 partitions, your screen should look like this:

```
A>TYPE TAPEDISK.DAT <RETURN>
BCDEFGJK
A>
```

Remember that when you run your computer in Diagnostic Mode, the A: partition of the hard disk becomes the B: partition, because the diskette becomes the A: drive. This means that Volumes which reside on the A: partition of your hard disk in Multiuser Mode will be located on the B: partition while you are

operating in Diagnostic Mode. This is important - keep it in mind when you are using the LTAPE program. (To backup or restore the Multiuser A: partition, you must specify the B: partition.) In our example above, the partitions under Multiuser Mode have the following correspondence:

Diagnostic Mode Partitions:	B	C	D	E	F	G	J	K
Multiuser Mode Partitions:	A	B	C	D	E	F	I	J

(Remember that in Multiuser Mode, the G, H, O, and P partitions are reserved for diskette operation -- their corresponding Diagnostic Mode partitions [H, I, P, and Q] have no purpose when operating in Diagnostic Mode.)

If the partitions listed do not match your system's configuration, you must change the contents of the file TAPEDISK.DAT. You may do this by typing the following command:

B:PIP A:TAPEDISK.DAT=CON: <RETURN>

The cursor will move to the beginning of the next line. Type the letters corresponding to the Diagnostic Mode partitions on your system. Letters must be in UPPER CASE only. Do not use any commas, spaces, or other separators between the partition letters you enter. If you make a mistake, enter <CTRL-Z> to exit and start over. DO NOT use <Backspace> or <CTRL>-H to fix typos. Press <CTRL-Z> at the end of this character string to save the file and return to the A> prompt.

NOTE

The file TAPEDISK.DAT may contain only the drive partition letters (in upper case), followed by a <RETURN>. It must not contain any other text, spaces, or data.

Running the Tape Program

With the system in Diagnostic Mode, the Tape Utilities Diskette in the diskette drive, and the A> prompt on your screen, enter:

LTAPE <RETURN>

The screen displays the Tape Backup Menu:

Molecular Tape Backup Utility

Ver n.nn mm/dd/yy

B = Back up disk files to tape
R = Restore disk files to tape
V = Verify tape
D = List tape directory
T = Re-tension tape
Q = Quit

Select option ()

Select the option you want. Do not press RETURN.

General Tape Backup System Operation

All operations performed with the Tape Backup System are the same whether you are using on-line tape backup or off-line tape backup. The following information applies to both methods. It does not apply, however, to streaming mode, which is not covered here.

- Backing Up Disk Files to Tape

Use the following procedure to routinely back up your disk files to tape. To begin, make sure the tape backup menu is displayed on your terminal's screen.

1. Type

B

The screen displays

Enter today's date (MM/DD/YY): (_ / /)

2. Enter the date in the format shown. For example, if today is January 27, 1984, type

012784

Do not press RETURN. Note that the cursor automatically skips over the "/" as you enter just the numbers for the date. The screen then displays

Today is mm/dd/yy, correct (Y/N)? ()

3. If you entered the correct date, type

Y

to continue. Now the screen displays

Do you want to do volume locking backup (Y/N)? ()

4. Enter Y if you want to perform Volume locking backup. Volume locking backup takes advantage of SECURED Volumes which have read and write passwords.

You will be asked to enter the names of n/STAR Volumes to back up. Press <RETURN> after each Volume name you enter, and press <RETURN> without making an entry to finish the entry cycle.

When the Tape Backup System actually backs up the Volume, the write password is temporarily changed to prevent users from accessing files in the Volume while it is being backed up. (If a user has a file opened in the Volume being backed up, and the Volume is SECURED, that file will not be backed up. The file name is displayed on your terminal, and the file is skipped.)

Enter N if you do not want to perform Volume locking backup.

Either a Y or an N response causes the following message to display:

Enter FP address (for example, FE) to be backed up: _

You can enter an FP address in hex and press <RETURN>, if you are backing up a system having multiple File Processors connected by the Molecular Model Interconnect (MMI). If you just press <RETURN>, the default address of FF is used. After entering your response, the screen displays:

Do you want to do change-only backup (Y/N)? ()

5. This option lets you specify that you only want to back up files which do not have their ARC (archive) bit set. If the ARC bit was originally set (see Step 6 below), it is cleared whenever you modify the file. Therefore, by selecting this option, you can back up only those files which have been modified since your last backup.

If you want to use this option, press Y. If you do not want to use this option, press N. Either response causes the following message to display:

Do you want to set the archive bit (Y/N)? ()

6. If you answer Y to this question, the ARC bit of each file backed up will be set. Thereafter, modifying the file will clear the ARC bit, flagging it for another backup operation. If the file is not modified, and you answer Y in Step 5, above, that file will not be backed up again until the ARC bit is cleared by modifying the file.

If you answer N to this question, the ARC bit will not be changed during the backup process.

If you answered **Y** to the Volume Locking question, skip to Step 10. If you answered **N** to the Volume Locking question, the screen displays:

Do you want to back up all disk files (Y/N)? ()

7. If you answer **Y**, the screen displays:

All files on disk will be backed up

Skip to Step 13 for further instructions.

If you answer **N**, or if you answered **N** in Step 6 above, the screen displays:

Disk names or ranges (e.g. A or B-D): _

8. At this point, you may enter a letter or a range to indicate which disk names you want backed up. Press **<RETURN>** between each letter or range entered, and press **<RETURN>** again when you are finished responding to this question. Or, if you want all logical drives backed up, press **<RETURN>** as your first entry. The screen then displays:

User numbers or ranges (e.g. 0 or 9-15): _

9. Now you can enter the CP/M User Numbers you want to back up. The format for entry is the same as for the previous question. Enter a number or a range of numbers, then press **<RETURN>** and enter another number or range. Use your Volume ID chart to identify the User Numbers at which the Volumes you want to back up are located.

When you have entered all User Numbers desired, press **<RETURN>** again to continue. Or, if you want to back up all User Numbers, simply press **<RETURN>** as your first entry. The screen displays:

File names to be backed up (* and ? allowed,e.g.*.COM,TEST.DAT,or XYZ.H??)

10. You respond to this question in the same manner as the previous two questions. That is, enter either an ambiguous or unambiguous file name, then press **<RETURN>** and enter another. When you have entered all desired file names, press **<RETURN>** a second time to continue. Or, if you want to back up all files in the specified drives and User Numbers, simply press **<RETURN>** as your first entry.

NOTE

An ambiguous file name is one which contains wildcards (? and/or *). An unambiguous file name is a specific file name.

The screen displays:

Do you want to specify files to be excluded from the backup (Y/N)?

11. If you answer N, skip to step 13. However, if you answer Y, the screen displays:

File names to be excluded (same format as above) _

12. Now you may enter the names of files already specified that you actually do not want to back up. For example, if you specified that you wanted to backup files B:*DOC, and you don't want to back up any files that start with G and have the DOC extension, you could enter:

B:G*.DOC

and only those files that have the extension DOC and do not begin with the letter G will be backed up. Press <RETURN> between each filename you specify, and press <RETURN> again when you have entered all filenames to be excluded. The screen then displays:

Enter a description of this backup tape:

13. Type a description of up to 79 characters, and end it by pressing <RETURN>. The screen then displays:

Are all the above entries correct (Y/N)? ()

14. Enter Y or N. If you type N, the backup program starts over and asks you all questions again. If you type Y, the screen displays:

Please insert backup tape to be written. Ready (Y/N)? ()

15. If you have not already done so, make sure the write protect switch on the data tape cartridge is not in the SAFE position, and insert the tape cartridge into the tape drive slot on the front of the cabinet.

16. Enter:

Y

Do not press RETURN. The screen momentarily displays:

Preparing tape for backup...

then proceeds with the backup operation. During backup, your terminal indicates backup progress as it displays:

Reading: d:filename.ext [User n] nnn files written to tape

n soft (recovered) tape errors

where:

<u>d</u>	=	disk drive
<u>filename</u>	=	valid CP/M file name
<u>ext</u>	=	valid CP/M file name extension
<u>n</u>	=	number of User, number of files written to tape, or number of soft errors

17. If the tape cartridge will not hold all the data from the backup process, when the tape becomes full the screen displays:

Tape full, insert another tape for Volume n of this backup. Ready (Y/N)? ()

where n is the number of the tape cartridge in the sequence. If this message displays, remove the tape cartridge from the tape drive, and place another tape in the drive. Then enter:

Y

Do not press RETURN. Again, the screen displays the progress of the tape backup process. When all designated files have been backed up, the screen displays:

nnn file(s) not backed up

nnn soft (recovered) tape errors

Backup completed. Ready (Y/N)? ()

18. Either a Y or N response returns you to the Tape Backup Menu.

- Verifying the Tape

You should always verify a tape after doing a backup, to ensure the integrity of the data. If the tape does not verify, you should clean the tape head and try again. If the tape still does not verify, you should backup again on a new tape.

To verify a tape, follow these steps:

1. Select:

V Verify tape

from the Tape Backup Menu. The screen displays

Please insert tape cartridge. Ready (Y/N)? ()

2. Set the protect switch on the tape cartridge to the SAFE position, then insert the tape.
3. Press Y. The screen displays:

Verifying tape...

When the verification process completes, the screen displays:

Tape is verified. Ready (Y/N)? ()

4. Enter either Y or N to return to the Tape Backup Menu.

- Listing the Tape Directory

To display or print a directory of the files that are currently on a backup tape, first make sure that the Tape Backup Menu is displayed on your screen.

1. Enter:

D

Do not press RETURN. The screen displays

Molecular Tape Backup Utility
Ver n.nn mm/dd/yy

C = list to console, P = list to printer, B = both (_)

Listing tape file directory *** Press the ESC key to cancel ***

2. Type a letter to indicate your choice. If you select a printer, output will go to the system printer at 9600 baud.

Please insert tape cartridge. Ready (Y/N)? (_)

3. Make sure the Write Protect switch on the data cartridge is in the SAFE position, then place the tape into the tape drive.

4. Press:

Y

Do not press RETURN. The screen momentarily displays:

Preparing tape for directory listing...

then:

Tape format 1

Tape Backup Created mm/dd/yy (Volume n). Description is:
description of tape

Continue (Y/N)? (_)

(Note: "Tape format 1" indicates that the tape was backed up using LTAPE. STREAM produces a message indicating tape format 2. You must use the same program for both backup and restore.)

5. Press Y or N. If you press N, your terminal asks you to insert another tape. If you press Y, your terminal displays a listing of all files on the tape.

6. You may enter either a Y or an N to return to the Tape Backup Menu.

- Restoring Disk Files from Tape

Use the following procedure if you need to restore a backed-up file from the tape onto the hard disk. To begin, make sure the tape backup menu is displayed on your terminal's screen.

1. Enter

R

The screen displays:

Do you want to restore all files from tape (Y/N)? ()

2. You may enter Y or N. If you type Y, the screen displays:

All files on tape will be restored

Skip to Step 11. If you enter N, the screen displays:

Answer the following questions to specify the files to be restored. Press the RETURN key after each response. To select more than one choice for a question, press RETURN after each choice, and an extra RETURN to move on to the next question. To select "all" for a particular question, press RETURN by itself as the first response.

Disk names or ranges (e.g. A or B-D): _

3. At this point, you may enter a letter or a range to indicate which disk names you want restored.

Press <RETURN> between each letter or range entered, and press <RETURN> again when you are finished responding to this question. Or, if you want all logical drives restored, press <RETURN> as your first entry. The screen then displays:

User numbers or ranges (e.g. 0 or 9-15): _

4. Now you can enter the CP/M User Numbers you want to restore. The format for entry is the same as for the previous question. Enter a number or a range of numbers, then press <RETURN> and enter another number or range. When you have entered all User Numbers desired, press <RETURN> again to continue. Or, if you want to restore all User Numbers, simply press <RETURN> as your first entry. The screen displays:

File names to be restored (* and ? allowed, e.g. *.COM, TEST.DAT, or XYZ.H??):

5. You respond to this question in the same manner as the previous two questions. That is, enter either an ambiguous or unambiguous file name, then press <RETURN> and enter another. When you have entered all desired file names, press <RETURN> a second time to continue. Or, if you want to restore all files in the specified drives and User Numbers, simply press <RETURN> as your first entry. The screen displays:

Do you want to specify files to be excluded from the restore (Y/N)? ()

6. If you answer **N**, skip to Step 11. However, if you answer **Y**, the screen displays:

File names to be excluded (same format as above) _

7. Now you may enter the names of files already specified that you actually do not want to restore. For example, if you specified that you wanted to restore files B:*.DOC, and you don't want to restore any file that start with G and have the DOC extension, you could enter:

B:G???????.DOC

and only those files that have the extension DOC and do not begin with the letter G will be restored. Press **<RETURN>** between each file name you specify, and press **<RETURN>** again when you have entered all file names to be excluded. The screen then displays:

Do you want to redirect disk/user (Y/N)? (_)

8. Enter **Y** or **N**, as desired. If you enter **N**, skip to Step 11. If you enter **Y**, the screen displays:

Enter FP address (e.g., FE to be restored):

9. Enter the File Processor address (press **<RETURN>** for FF). The screen displays:

Are all the above entries correct (Y/N)? (_)

10. Enter **Y** or **N**. If you type **N**, the restore program starts over and asks you all questions again. If you type **Y**, the screen displays:

Please insert tape to restore files from. Ready (Y/N)? (_)

11. If you have not already done so, make sure the write protect switch on the data tape cartridge is in the **SAFE** position, and insert the tape cartridge into the tape drive slot on the front of the cabinet.

12. Enter:

Y

Do not press RETURN. The screen momentarily displays:

Preparing tape....

then

Tape format 1

Tape backup created on mm/dd/yy (Volume n). Description is:
description name

OK (Y/N)? (_)

13. Enter Y or N. If you enter N, the program returns to Step 11. However, if you enter Y, the recovery process begins. As recovery proceeds, your terminal indicates its progress:

Restoring to: d:filename.ext [User n] nnn files restored to disk

where

<u>d</u>	=	disk drive
<u>filename</u>	=	valid CP/M file name
<u>ext</u>	=	valid CP/M file name extension
<u>n</u>	=	User number
<u>nnn</u>	=	number of files written to tape

14. If the tape cartridge reaches its logical end of tape before all files are restored, the screen displays:

End of tape, please insert Volume n of the same backup. Ready (Y/N)? ()

where n is the number of the tape cartridge in the sequence.

If this message displays, remove the tape cartridge from the tape drive, and place the next tape in the sequence into the drive. Then enter:

Y

Do not press RETURN. If you insert a cartridge out of sequence, the screen displays:

Warning: This is not the next volume of the same backup. OK (Y/N)? ()

Enter Y to proceed with the cartridge that is inserted. Enter N to tell the program that you are going to insert a different cartridge. Again, the screen displays the progress of the restore process. When all designated files have been restored, the screen displays:

Restore completed. Ready (Y/N)? ()

15. Either a Y or N response returns you to the Tape Backup Menu.

- Retensioning the Tape

To retension the tape, first make sure that the Tape Backup Menu is displayed on your terminal's screen.

1. Enter:

T

The screen displays:

Please insert tape cartridge. Ready (Y/N)? ()

2. Insert a tape in need of retensioning, then enter:

Y

The screen displays:

Re-tensioning tape_

while the tape drive retensions the tape. This process takes a few minutes. When done, the screen displays:

Tape is re-tensioned. Ready (Y/N)? ()

3. Enter Y or N to return to the Tape Backup Menu.

- Quitting

To quit the Tape Backup program and return to the n/STAR prompt, enter:

Q

APPENDIX 4 — Molecular Publications Order Form

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MOLECULAR PUBLICATIONS ORDER FORM

	<u>Part Number</u>	<u>Unit Price</u>	<u>Quantity Ordered</u>	<u>Total Amount</u>
Supermicro Series Installation Manual	87100420	\$25.00	_____	_____
Supermicro X Series Installation Manual	87100430	25.00	_____	_____
Series 9 System Installation Manual	87100630	25.00	_____	_____
Series 9 System Operations Manual	87100640	15.00	_____	_____
n/STAR User's Guide	87100650	25.00	_____	_____
n/STAR System Administrator's Guide	87100660	20.00	_____	_____
n/STAR Programmer's Guide	87100670	15.00	_____	_____
Tape Backup User's Guide	87100680	20.00	_____	_____
CP/M Operating System Manual (includes Pocket Guide)	87100100	50.00	_____	_____
ATOM Manual Set	98330011	80.00	_____	_____
ATOM Operations Manual	87100450	25.00	_____	_____
m/CALC Manual	87100470	25.00	_____	_____
m/WORD Manual	87100460	25.00	_____	_____
m/MAIL Manual	87100480	25.00	_____	_____
Molecular Modular Interconnect Installation and User Manual (for 16X and 32X Customer)	87100580	15.00	_____	_____
Menu Master User's Guide	87100270	20.00	_____	_____
Menu Master Reference Manual	87100260	20.00	_____	_____
MT-100 User Reference Manual	87100230	20.00	_____	_____
MT-100 Maintenance Manual		50.00	_____	_____
MT-50 Quick Reference Guide		5.00	_____	_____
MT-50 Reference Manual		25.00	_____	_____
MT-50 Maintenance Manual		50.00	_____	_____
MS-DOS Operations Manual	87100550	25.00	_____	_____
MS-DOS User's Guide	87100690	45.00	_____	_____
AP/186 and TCP Installation Manual	87100700	15.00	_____	_____
AP/186 and TCP User's Manual	87100710	20.00	_____	_____
Hardware Maintenance Manual (Supermicro Series)	87100150	150.00	_____	_____
MICRO 20-T Tape Backup Unit Installation Instructions	87100730-11	5.00	_____	_____

MICRO 45-TU Tape Backup Unit Installation Instructions	87100740	10.00	_____	_____
10-D (Supermicro 8/RMS) Disk Drive Add-On Installation Instructions	87100320	5.00	_____	_____
10A-D (Supermicro 8/Seagate) Disk Drive Add-On Installation Instructions	87100180	5.00	_____	_____
15-D Disk Drive Installation Instructions	87100310	5.00	_____	_____
Disk Expansion Kit D1 and D2 Installation Instructions (35-32, 70-32, 16X systems)	87100200	10.00	_____	_____
AP/86 Performance Accelerator Installation Instructions (for Series A Supermicros)	87100350	5.00	_____	_____
X AP/86 Performance Accelerator Installation Instructions (for X Series Supermicros)	87100360	5.00	_____	_____
Tape Application Processor Installation Instructions	87100540	10.00	_____	_____
Sales Training Manual (Includes Annual Subscription)	87100890	75.00	_____	_____
Annual Subscription Only		50.00	_____	_____
Technical Support Manual (Includes Annual Subscription)	87100880	75.00	_____	_____
Annual Subscription Only		50.00	_____	_____

TOTAL AMOUNT ENCLOSED _____

Ship To: _____

Attn: _____

Telephone: _____

APPENDIX 5 — SOFTWARE PROBLEM REPORT FORM

The procedure for reporting software problems to Molecular is via the Software Problem Report Form (SPR). The SPR Form is received by Field Service and is then submitted to Engineering for investigation. Attached is a copy of that form. Please submit any problems experienced with the n/STAR 2.62 release on this form and return it to the Field Service Department for processing. **Only problems reported in writing on this form will be recognized and accepted as a formal Software Problem Report.** Molecular will not respond to all SPRs submitted but only to those that are considered pertinent to generally acceptable system performance and are actually logged into the Software Problem Report system

SOFTWARE PROBLEM REPORT FORM

Name: _____ Date: _____

Company: _____ Phone: _____

Address: _____

City, State, Zip: _____

Hardware Model: _____ Program Name: _____

n/STAR Version: _____ Program Ver.: _____

History: New Installation? _____ Ran OK Previously? _____ Ver# _____

Brief Description: _____

Detailed Description: _____

PLEASE SEND THIS COMPLETED FORM AND ANY SUPPORTING DISKETTES AND/OR DOCUMENTATION TO:

MOLECULAR COMPUTER
Field Service Department
251 River Oaks Parkway

Thank You.

052484

RN9-44

REDIRECTING BAD SECTORS ON HARD DISK

New drives supplied by Molecular are formatted and have attached a record of which sectors were redirected on a DISK REDIRECT HISTORY LOG.

This log is a valuable document and is affixed to the base pan in the rear of the Supermicro. You will add entries to this log whenever you must correct for sectors that become defective due to wear.

Formatting of hard disks should not be performed unless surface analysis diagnostics indicate that additional defective sectors are present. Then and only then should single track formatting be utilized to eliminate these errors. Before formatting is attempted, all data must be backed up for restoration upon completion of formatting. Non-destructive surface analysis can be performed with SYSINT Verify mode and HDTEST read mode. Destructive surface analysis can be performed with HDTEST write mode.

Should you ever need to completely reformat this disk drive, utilize this disk redirect history log and re-enter all defective sectors listed during the format process.

CAUTION:

The procedures contained in this document pertaining to Redirecting Bad Sectors should only be attempted on systems within the following serial number ranges:

10-8 S/N 4000 and alone with FP PROM 52050210 Rev B and above

15-8 S/N 1000 and alone with FP PROM 52050220 Rev B and above

This procedure should not be attempted on systems 10-8 or 15-8 that do not meet the above criteria.

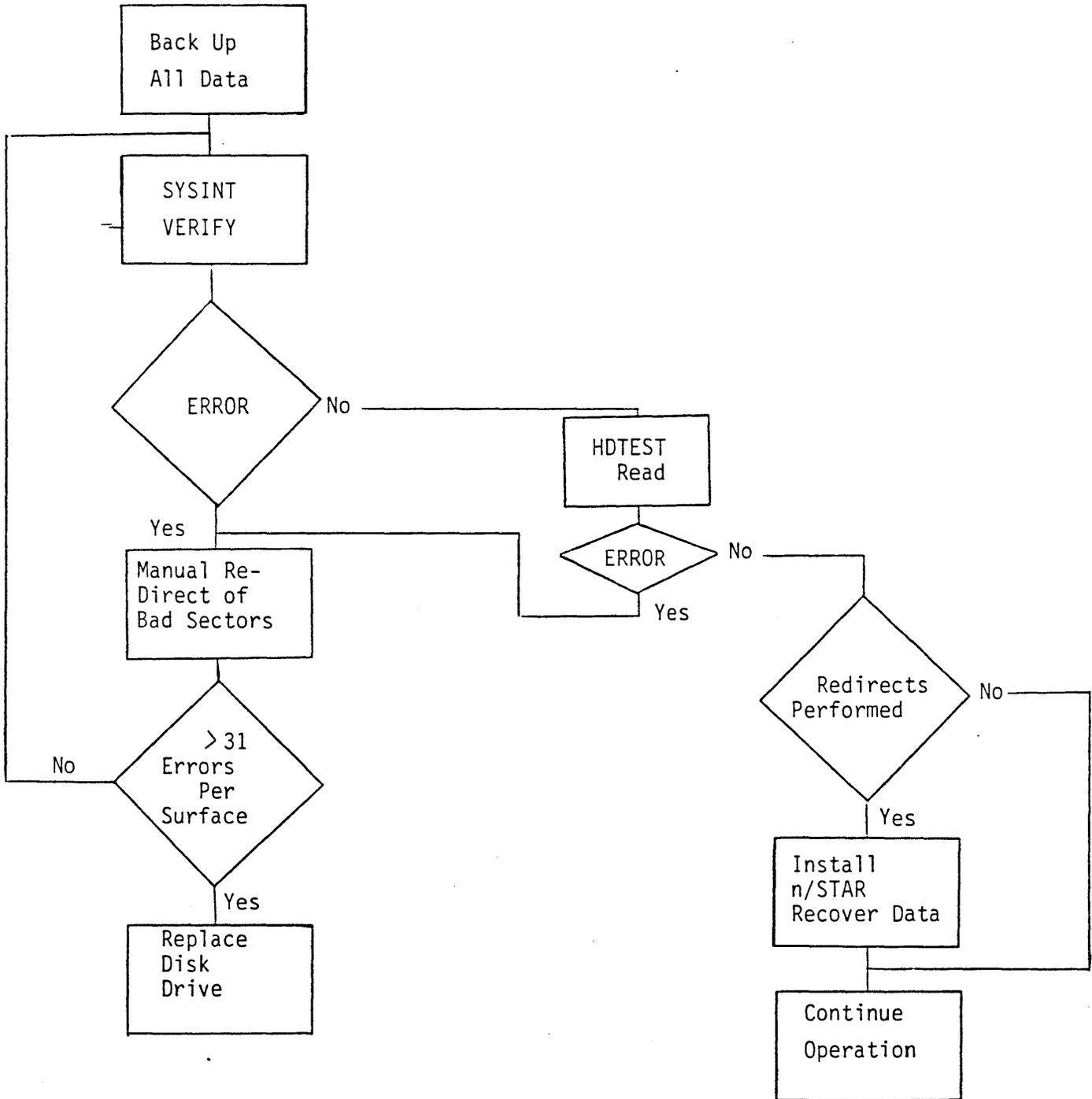
INTRODUCTION

Figures 1 and 2 are flow charts of the procedure you should follow. You will be using two programs on the Diagnostic disk, SYSINT (System Initialization) and HDTEST (Hard Disk Test). We will first outline the general procedures and then describe each major step in more detail.

Figure 1 is a non-destructive surface analysis procedure through which additional defective sectors can be identified without destroying any hard disk resident data. Redirecting of additional defective sectors will require that the n/STAR operating system and customer data be reloaded after successful redirecting of defective sectors. Once these sectors are identified, they should be added to the Disk Redirect History log for future reference.

Figure 2 is a more comprehensive surface analysis procedure which will destroy all hard disk data. This procedure also requires that the n/STAR operating system and customer data be reloaded after completion of testing and/or redirecting of additional defective sectors. If additional defective sectors are identified, they should be added to the Disk Redirect History Log for future reference.

NON-DESTRUCTIVE
DISK SURFACE ANALYSIS

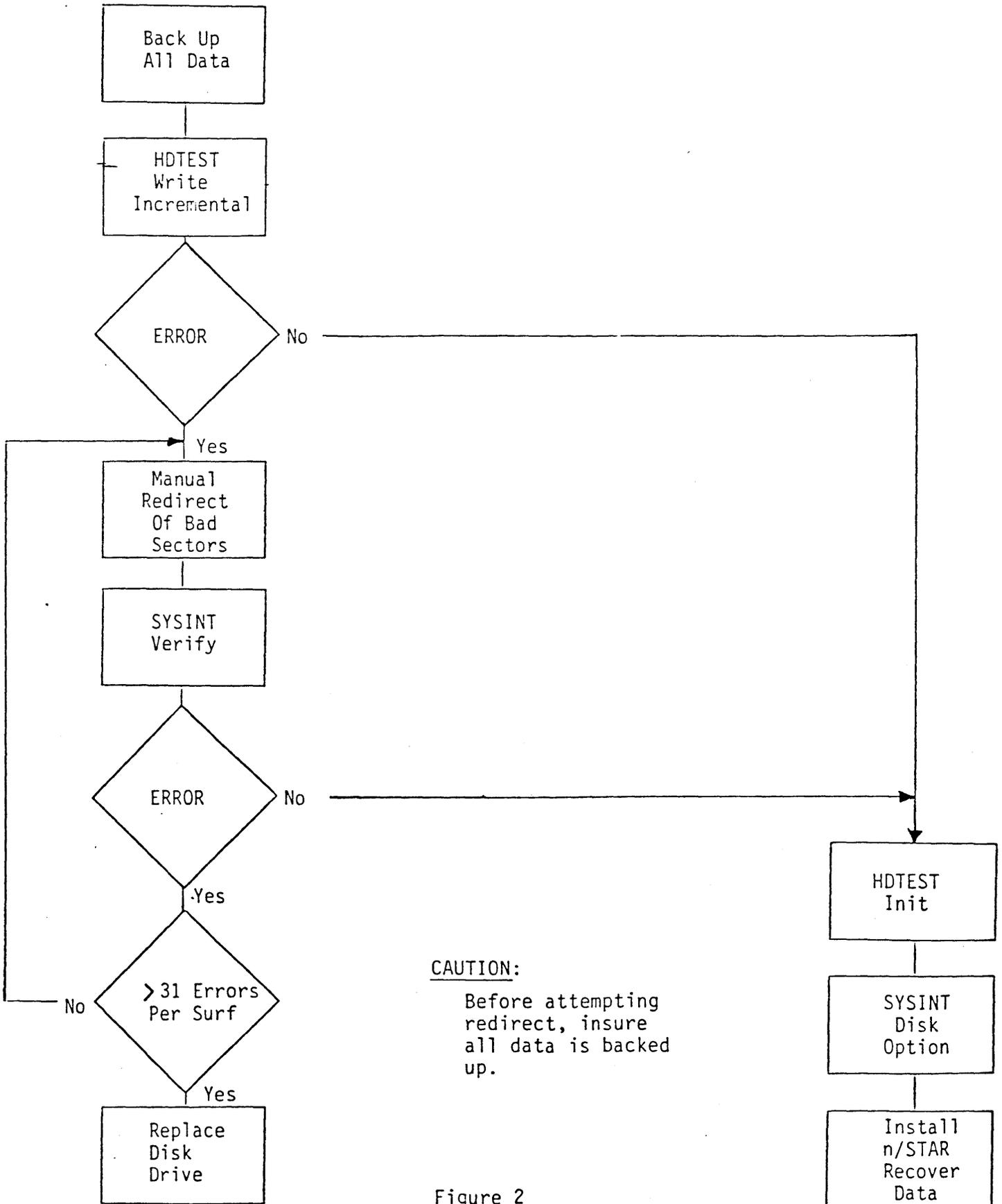


CAUTION:

Before attempting Redirect insure all data is backed up.

Figure 1

DESTRUCTIVE DISK
SURFACE ANALYSIS



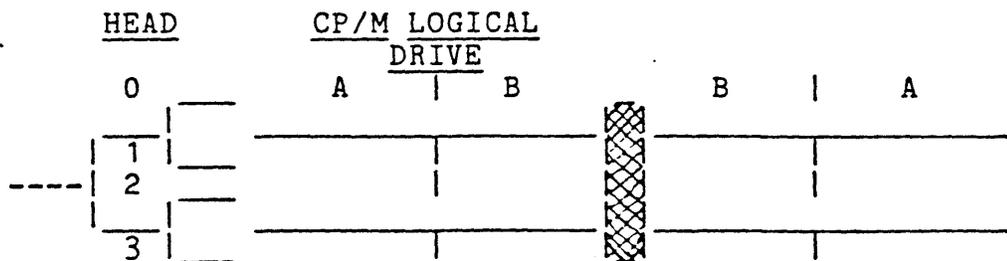
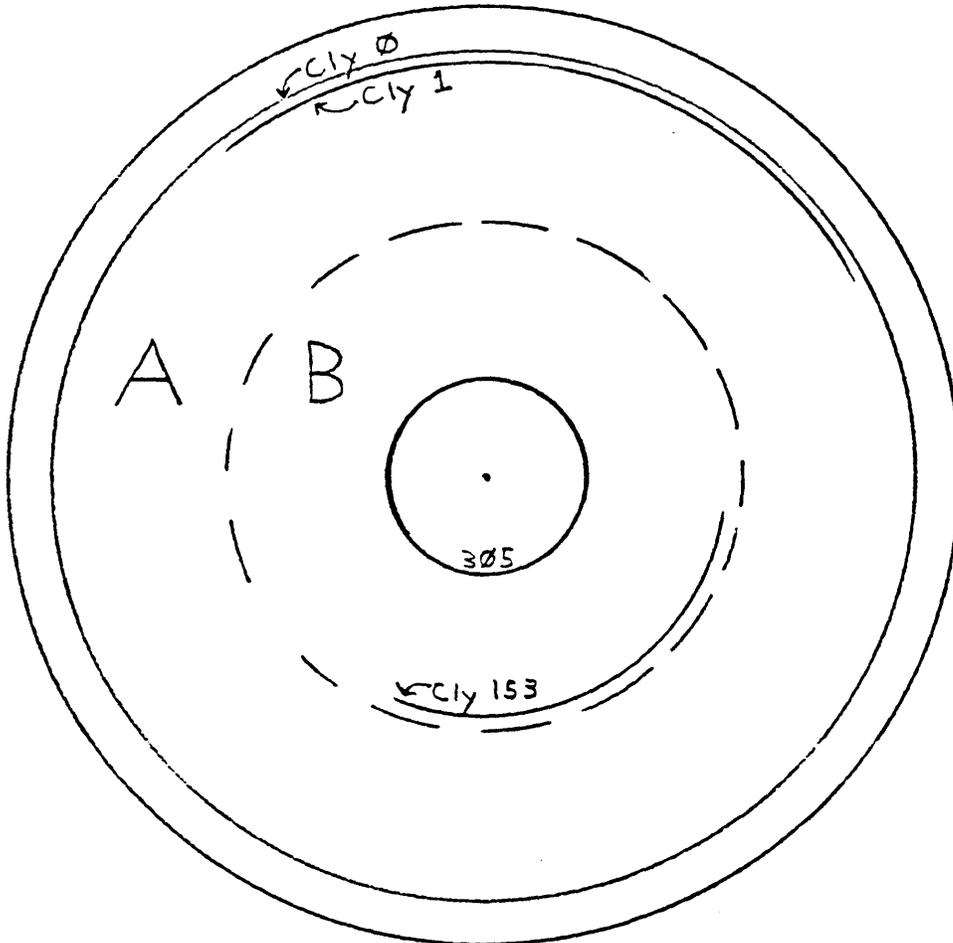
CAUTION:

Before attempting redirect, insure all data is backed up.

Figure 2

HARD DISK DRIVE ORGANIZATION

Example: 10 Megabyte, 5 1/4 inch, Winchester hard disk
 10MB formatted capacity, 306 cylinders, 32 sectors per
 cylinder, 4 heads, 1224 tracks.



TRACK # = [(CYLINDER #) X (TOTAL HEADS #)] + HEAD #
 CYLINDER # = (TRACK #) / (TOTAL HEADS); REMAINDER = HEAD #

BACKGROUND

The hard disk drives in your Supermicro system may develop bad sectors after a time. This is normal and the problem can be corrected. In fact, nearly every drive manufactured has some bad spots on the platters that make a few sectors unuseable. Correcting for these bad spots is called redirecting. A few facts about the disk drives will help you understand the process.

A hard disk drive contains two or three platters. A 10 MB (megabyte) drive contains two platters, and a 15 MB drive contains three. Both the top and bottom surfaces of the platters are used. There is a read/write head for each surface.

Each drive is logically divided into 306 cylinders with 32 sectors per track. Cylinder 0, the outermost track of each surface is reserved for correcting for bad spots on any of the other tracks. Cylinder 0 is guaranteed by the disk drive manufacturer to be error free.

New disk drives are formatted at the factory. Formatting means writing a particular pattern in every sector of every track. This pattern is necessary so that the operating system can locate particular sectors either for writing or reading data.

During formatting the patterns written on the disk are also read back to verify that they were written correctly. Whenever a sector does not read back correctly, it is redirected to one of the spare sectors on cylinder 0. What this means is that the unusable sector is flagged as unusable and a spare sector is assigned as a replacement. The redirect table that identifies which spare sectors are assigned to which bad sectors is recorded in sector 0 of track 0. For each surface as many as 31 bad sectors can be redirected since there are 31 spare sectors on cylinder 0 for each surface.

DETAILED PROCEDURES

This section tells you how to run each of the programs called out in the previous section. Information displayed by these programs are shown in **bold face**. The commands or responses you must type are underlined.

SYSINT Verify Mode

Run the SYSINT program by typing SYSINT in response to the CP/M prompt. The screen will display:

SYSINT Version V5.02

Drive 0,1,2 ()

Enter Drive # (The drive # you wish to verify)

The following is added to the screen:

F = Format, V = Verify, D = Disk Option, R = Redirected ()

Enter V

The following is added to the screen:

VERIFY SINGLE TRACKS (S) OR ALL (A) TRACKS ()

Enter A

The following is added:

C = CONTINUOUS S = SINGLE PASS ...

Enter S

The program will then verify that the disk is formatted correctly. The number of the track being verified is displayed and the display counts down from the highest track number. At completion, the errors are displayed. These errors should be recorded.

SYSINT Manual Redirect Mode

SYSINT versions before 5.02 do not include redirect mode.

There are three sources for determining which sectors must be manually redirected: (1) the DISK REDIRECT HISTORY LOG, (2) the results of HDTEST, and (3) the results of SYSINT Verify Mode.

When performing entry of defective sectors for redirect all defective sectors, for a specific cylinder # and Head #, must be entered during one session of redirect mode of SYSINT. When adding additional defective sectors to Disk Redirect History Log insure that there are no other defective sectors with the same Cylinder # and Head # present before preceeding.

If there are other defective sectors with the same Cylinder # and Head # you must proceed as follows:

1. Perform single track format of that Cylinder # and Head #.
(This will remove any sectors currently redirected).
2. Enter all defective sectors for this specific Cylinder # and Head # without entering "f" to terminate redirect mode.

Run the SYSINT program by typing SYSINT in response to the CP/M prompt. The screen will display:

SYSINT Version V5.02

Drive 0,1,2 ()

Enter Drive #

The following is added to the screen:

(Mode Selection)

F = Format, V = Verify, D = Disk Option, R = Redirected ()

Enter R

The following is added to the screen:

Caution: Tracks containing redirected sectors will be reformatted, destroying any existing data.

No More than 31 sectors can be redirected per head (surface).

Enter head, cylinder, and sector to be redirected or "f" when finished.

Head:

Enter the head number followed by a RETURN. You are then prompted for the Cylinder number and the Sector number. Enter these in the same manner. The sector will be redirected and the following will be added to the display:

Redirected sector X of track Y

You will again be prompted for a head number and you can repeat the sequence for each sector you wish to redirect. Enter a lower case "f" in response to the head, cylinder, or sector number prompt to end the program.

Redirect Ranges

It is very important that your responses to the head, cylinder, and sector prompts are within range. The ranges and errors caused by out-of-range entries are given below.

Head: Range = 0-3 for 10 MB disk and 0-5 for 15 MB disk. Entries beyond range will result in a Table Full error message.

Cylinder: Range = 1-305. Entry of 0 will result in no action being taken. An entry of 306 will result in an erroneous entry in the Redirect Table. An entry greater than 306 will destroy the Redirect Table for the head selected and the drive must be reformatted.

Sector: Range = 0-31. No error message will occur if 32 is entered; but the redirect table will be inaccurate. An entry greater than 32 will result in an error message.

Limitations

Sectors in cylinder 0 cannot be redirected. Cylinder 0 must be error free.

If cylinder 1, head 0, sectors are redirected, you may need to run the Disk Option of SYSINT. The Disk Configuration Table is stored in these sectors and must be reconstructed. Not doing so will result in an Unformatted Disk error message when booting in Diagnostic Mode.

A blank entry followed by RETURN in response to the head, cylinder, or sector prompt produces an entry of zero as the entry value.

Single Track Format Procedures

There are times when you can correct a disk problem more quickly by selecting the SINGLE TRACK option. The following information will aid you in using this option.

The SINGLE TRACK option can be selected when running SYSINT for both the Format and Verify Modes. When S is entered the screen displays:

PLEASE ENTER TRACK NUMBER TO BE Formatted or Verified.
ENTER DESIRED TRACK THEN PRESS RETURN...

Valid track numbers are in the range of 0 thru 1223 for 10 MB drives and 0 thru 1835 for 15 MB drives.

You must enter the track number in decimal. To calculate the track number when given the head and cylinder numbers, use the formula

$$\text{Track\#} = (\text{Cylinder\# times \# of Heads}) + \text{Head\#}$$

where

Cylinder# is in the range 0-305

of Heads is 4 for 10 MB drives and 6 for 15 MB drives

Head# is in the range 0-3 for 10 MB drives and 0-5 for 15 MB drives

Here are some examples.

	<u>CYL</u>	<u>HD</u>	<u>TRACK</u>
10 MB ST412	1	0	= 4
15 MB ST419	1	0	= 6
10 MB ST412	100	2	= 402
15 MB ST419	100	2	= 602

Single track formatting of tracks 0, 1, 2, 3, 4, and 5 should not be done. These tracks are reserved for redirecting. Doing so will write the pattern E5E5 (hex) in the Redirect Map Table which will falsely indicate that all table entries are used (Table Full error message).

Single track formatting of any other track clears the redirect flags in that track and clears the Redirect Map Table entries for that track on cylinder 0. If you format a track that contains any bad sectors you must manually redirect all bad sectors for that track using the Redirect option of SYSINT.

SYSINT Format Mode

SYSINT format mode with the all tracks option should only be used to initialize new disk drives or to correct disk errors caused by controller failure.

Run the SYSINT program from the Diagnostic Diskette by typing SYSINT in response to the CP/M prompt. The screen will display:

SYSINT Version V5.02

Drive 0,1,2 ()

Enter Drive # (The drive # you wish to format)

The following is added to the screen:

(Mode Selection)

_ F = Format, V = Verify, D = Disk Option, R = Redirected ()

Enter F

The following is added to the screen:

WARNING: this procedure will destroy ANY existing data on the disk. Be sure ALL files are properly archived prior to running this utility.

OK (Y or N)?

Enter Y

The following is added:

FORMAT SINGLE TRACKS (S) OR ALL (A) TRACKS ()

Enter A

The following is added:

C = CONTINUOUS S = SINGLE PASS ...

Enter S

---WARNING---

Once Format Mode is entered with SINGLE PASS selected, the only valid way to exit is to allow formatting to complete. The last data pattern written on each track is the initialization E5 (hex) pattern required by CP/M. Early termination may not produce the E5 pattern.

The program will then reformat the disk. During formatting the sector number is counted down on the screen. When formatting completes, the screen displays the configuration options. For a 10 MB disk the display is:

OPTIONS ARE:	0	1	2
DIRECTORY:	320	640	1280
BLOCK SIZE:	16K	8K	4K
SIZE(MB):	4.7	4.7	4.7
PARTITION:	2	2	2
DISK DRIVE:	3	3	3

SELECT CONFIGURATION OPTION (0-4) ()

For a 15 MB disk the display is:

OPTIONS ARE:	0	1	2
DIRECTORY:	512	1024	2048
BLOCK SIZE:	16K	8K	4K
SIZE(MB):	7.3	7.3	7.3
PARTITION:	2	2	2
DISK DRIVE:	3	3	3

SELECT CONFIGURATION OPTION (0-4) ()

SYSINT Disk Option

Run the SYSINT program by typing SYSINT in response to the CP/M prompt. The screen will display:

SYSINT Version V5.02

Drive 0,1,2 ()

Enter Drive #

The following is added to the screen:

(Mode Selection)

F = Format, V = Verify, D = Disk Option, R = Redirected ()

Enter D

The screen displays:

***** WARNING *****
TO CHANGE THE DIRECTORY/BLOCK SIZE OPTION ON YOUR DISK
YOU MUST ARCHIVE ALL YOUR DATA AND REFORMAT THE DISK

CONTINUE? Y/N ()

Enter Y. For a 10 MB disk the display is:

OPTIONS ARE:	0	1	2
DIRECTORY:	320	640	1280
BLOCK SIZE:	16K	8K	4K
SIZE(MB):	4.7	4.7	4.7
PARTITION:	2	2	2
DISK DRIVE:	3	3	3

SELECT CONFIGURATION OPTION (0-4) ()

For a 16 MB disk the display is:

OPTIONS ARE:	0	1	2
DIRECTORY:	512	1024	2048
BLOCK SIZE:	16K	8K	4K
SIZE(MB):	7.3	7.3	7.3
PARTITION:	2	2	2
DISK DRIVE:	3	3	3

SELECT CONFIGURATION OPTION (0-4) ()

After entering the desired Directory/Block size option SYSINT will display the configuration selected and ask

CONFIGURATION CORRECT? Y/N ()

Upon entering Y the Disk Configuration will be changed and the display will be

FUNCTION COMPLETE
Hit Break to Exit program

HDTEST HARD DISK DIAGNOSTIC

HDTEST is a comprehensive hard disk diagnostic package which allows a user to test a full range of hard disk functions over the entire surface of the disk. The single page menu offers a choice test (home, seek, read, write, format), type (fixed, incremental, convergent, random), driver (local, prom), and the ability to define any of the hard disk parameters (drive, cylinder, head, sector).

Errors terminate test execution and are reported to screen according to status and error byte information. Error codes and bit meanings are then broken down and described briefly. The user must press a key to restart the test.

HDTEST is currently designed to run in the diagnostic mode, and is equipped with a terminal adapter program TERMINAL.COM which creates a configuration file "CRT.CRT". This file is read by HDTEST to provide the correct control and escape sequences needed by the different terminals for cursor movement and screen attributes. Enter TERMINAL and select your terminal from the list before running HDTEST.

The Menu Options

```
*****  
HARD DISK PARAMETER OPTIONS  
*****
```

The Menu provides a quick, one page overview of the current test configuration. All numbers are given in hex (base 16) format and are right justified. Entries in the first three fields (TEST, TYPE, DRIVER) require no carriage return. When entering less than four digits in the other fields press <return> to register the number.

The user may enter a new value from the choices offered or simply press <return> to accept the current value and proceed to the next line. User may enter and exit the menu by pressing <esc> (When in a 4 digit field, the user presses <esc><return> to exit.)

UNDERSTANDING HDTEST

The diagnostic HDTEST will display all information in HEX or base sixteen. SYSINT requires DECIMAL or base ten.

To change from HEX to DECIMAL use the algorithm below.

Fourth	Third	Second	First
4000	256	16	1
	1	F	2

Example #1

HEX = F2

The first digit 2, is the zeros place, the next digit F, is the 16s place and if there was another digit it would be the 256s place, then the 4000s place.

F times 16 (15 X 16) = 240, plus 2 = 242

Example #2

HEX = 1F2

1 times 256, + F X 16 + 2 = 498

To change from DECIMAL to HEX use the following algorithm.

Example #3

DECIMAL = 498

Divide 256 into 498 = 1 remainder 242, 256 is too large a divisor for 242 so the next smallest value is used 16. 16 into 242 = 15 times with a remainder of 2. 16 is now too large a divisor for 2 so the next smallest value is used 1. 1 into 2 = 2. The answer should be 1, F (think Hex 15 = F), 2 or (1F2 Hex)

HDTEST displays Errors in Hex Base 16 that will be incremented by one track to yield the LOGICAL track. In order to redirect the right sector the PHYSICAL track must be entered. The following is an example of an Error 40 that was discovered while running a write, incremental, from prom (W,I,P.):

Example #4

DRV:0000 CYL:00F1 HEAD:0005 SEC:001B PASS:0036 ERROR COUNT:0001

WD1002 STATUS REG: 51

READY

SEEK COMPLETE

ERROR DETECTED

WD1002 ERROR REGISTER: 40

CRC ERROR

The test stopped on the LOGICAL cylinder and displayed the LOGICAL cylinder at the top. The ERROR 40 was PHYSICALLY located one cylinder later. The PHYSICAL cylinder will be redirected with SYSINT.COM.

TEST: HOME, SEEK, READ, WRITE, FORMAT, DISPLAY, ERROR (H,S,R,W,F,D,E)

The TEST option defines the command which will be sent to the disk controller during the test.

HOME restores the head to cylinder zero.

SEEK moves the head to the specified cylinder. (5.25" drives disallow HOME and SEEK within the prom, so local driver should be used for these functions).

READ reads one sector at the specified location and checks for controller errors only (No data verification).

WRITE writes one sector to the specified location using the data defined in the WRITE DATA PATTERN WORD. After the write, the sector is read back and the data pattern is verified. The pattern is then rotated one bit and the write/read/rotate sequence is repeated eight times before moving on to the the next pass.

FORMAT writes the sector header information to one entire track on the cylinder/head specified. Data areas are not initialized, though initialization can be done using the INIT command with the pattern E5E5.

DISPLAY reads one sector and displays it on the screen in HEX/ASCII format (<ctrl-s> can be used to suspend display temporarily).

ERROR performs no command of its own but is used to sample the current status of the controller and report it through the error routine.

INIT initializes (writes data into sectors) the entire hard disk, using the specified data pattern. This option is normally used to prepare a disk for use by CP/M or N/STAR, using the pattern E5E5, since CP/M expects E5's in an empty directory field. The pattern is written with no read-after-write verification, and the screen is not updated during the operation in order to save time.

TYPE: FIXED, INCREMENTAL, CONVERGENT, RANDOM (F,I,C,R)

The test TYPE option determines the way in which the various disk parameters will change from one pass to the next. All changes are applied to the disk parameters from left to right (DRIVE changes most frequently, SECTOR changes least frequently). The leftmost parameter progresses through its range, then "bumps"

the parameter to its right.

FIXED locks the current parameters so that they do not change at all.

INCREMENTAL starts at the lowest value in the parameter range and increases by one at each pass.

CONVERGENT starts at the lowest value in the parameter range, then the highest, then the lowest+1, then the highest-1, etc. until they meet in the middle.

RANDOM does not progress but simply moves about randomly within all the parameter ranges.

DRIVER: LOCAL, PROM (L,P)

DRIVER defines which driver code will be used to "talk" to the controller/drive.

The **LOCAL** driver (WD1000/1001 only) is contained in HDTEST and is included as an option because the prom code cannot access cylinder zero (reserved for sparing) and rejects the HOME and SEEK commands. This option should not be used with PRIAM drives (SM32, DIRAC).

The **PROM** driver is contained in the standard system IPL prom and is the same low level code used by the operating system and utilities to "talk" to the disk. This is the option normally used for testing.

Seagate 10M/15M Ranges

[nnnn] BEGINNING DRIVE NUMBER	Range 0 to 2
[nnnn] ENDING DRIVE NUMBER	Range 0 to 2
[nnnn] BEGINNING CYLINDER NUMBER	Range 0 to 130 Hex
[nnnn] ENDING CYLINDER NUMBER	Range 0 to 130 Hex
[nnnn] BEGINNING HEAD NUMBER	Range 0 to 3 for 10 Meg 0 to 5 for 15 Meg
[nnnn] ENDING HEAD NUMBER	Range 0 to 3 for 10 Meg 0 to 5 for 15 Meg
[nnnn] BEGINNING SECTOR NUMBER	Range 0 to 1F Hex
[nnnn] ENDING SECTOR NUMBER	Range 0 to 1F Hex

60 Meg 8" Priam

30 Meg 8" Priam

Priam	Cyl# = 0 to 40E (Hex)	Cy # = 0 to 202 (Hex)
Range	Head # = 0 to 4	Head # = 0 to 4
Definition	Sector # = 0 to B (Hex)	Sector # = 0 to B (Hex)

The drive parameters define what portion of the disk surface will be tested. HDTEST automatically fills in the maximum and minimum numbers based on the unit's system ID byte (ENDING DRIVE value is initially set to zero, though additional drives may be present). The user is free to change these at any time, even to values outside the automatically assigned range. A specific trouble spot on the drive can be tested intensively by restricting the beginning and ending values of a given range to the same number. For example, by setting the beginning and ending cylinder numbers to 0010, only that cylinder would be tested.

[nnnn] WRITE TEST WORD PATTERN (0-FFFF)

The WRITE TEST WORD PATTERN is the 16 bit word pattern which is written into one full sector on the disk and then read back for verification. It is rotated one bit position and then written/read again. This occurs eight times for the given sector under test. The default value 6DB6 is the manufacturer's recommended "worst case" pattern, though any non-uniform pattern could be used.

[nnnn] NUMBER OF PASSES (0-FFFF)

The NUMBER OF PASSES determines how many iterations of the test to perform before stopping. If 0000 is specified, the test will run indefinitely.

WD Error Register

- 01 = DAM Not Found - After successful read of ID Field Data address mark not found
 - 02 = TRK00 Error - After Restore command Track 00 was not found
 - LSD 04 = Aborted - Valid command received which cannot be executed - reason for error is in status register
 - 08 = Not used
-
- 10 = ID Not Found - ID field containing cyc#, head#, sector# was not found
 - MSD 20 = CRC error ID - CRC error encounter in ID field
 - 40 = ECC/CRC Error- CRC or ECC error encountered during read in data field error not recoverable
 - 80 = Bad Block - Indicates that a bad block mark has been detected in the specified ID field

WD Status Register

	01	= Error	- Indicates one or more bits are set in <u>error</u> reg.
	02	= Not Used	
LSD-	03	= ECC (WD1001 Only)	- Read error recovered by controller
	08	= Data Request	- When set indicates that sector buffer is ready to accept data (write) or contains data to be read (read)

WD1001 Status Register

	10	= Seek Complete-	Indicates completion of seek operation
	20	= Write Fault	- Write fault detected by WD1001 - No commands will be executed when <u>ON</u>
MSD	40	= Ready	- Drive ready must be on to execute command
	80	= Busy	- WD1001 busy executing a command

The ASCII Code

ASCII is an abbreviation for the "American Standard Code for Information Interchange". This standard, shown in Figure 1-14, is the result of an international agreement concerning which binary numbers would be used to represent alphabetical letters, decimal numbers, symbols, and other special instructions for use with Teletype equipment. The ASCII code is based on a 7 digit binary numbering system. These seven digits allow for 128 different characters to have their own specific binary number. The ASCII code is widely used in the interfacing between the computer, keyboard, and display terminals.

DECIMAL	BINARY	OCTAL	HEXADECIMAL	BINARY CODED DECIMAL (BCD)	
0	00000	0	0	0000	0000
1	00001	1	1	0000	0001
2	00010	2	2	0000	0010
3	00011	3	3	0000	0011
4	00100	4	4	0000	0100
5	00101	5	5	0000	0101
6	00110	6	6	0000	0110
7	00111	7	7	0000	0111
8	01000	10	8	0000	1000
9	01001	11	9	0000	1001
10	01010	12	A	0001	0000
11	01011	13	B	0001	0001
12	01100	14	C	0001	0010
13	01101	15	D	0001	0011
14	01110	16	E	0001	0100
15	01111	17	F	0001	0101
16	10000	20	10	0001	0110
17	10001	21	11	0001	0111
18	10010	22	12	0001	1000
19	10011	23	13	0001	1001
20	10100	24	14	0010	0000
21	10101	25	15	0010	0001
22	10110	26	16	0010	0010
23	10111	27	17	0010	0011
24	11000	30	18	0010	0100
25	11001	31	19	0010	0101
26	11010	32	1A	0010	0110
27	11011	33	1B	0010	0111
28	11100	34	1C	0010	1000
29	11101	35	1D	0010	1001
30	11110	36	1E	0011	0000
31	11111	37	1F	0011	0001

FIGURE 1-15
EQUIVALENT NUMBERS IN DIFFERENT BASE SYSTEMS

TRANSACTION TABLE
Manufactures Bytes from Index to Approximate Sector

Bytes From Index	Sectors To Redirect
0 - 13	- GAP -
14 - 18	0
19 - 310	0
311 - 317	0 & 4
318 - 637	4
368 - 670	4 & 8
671 - 947	8
948 - 968	8 & 12
969 - 1259	12
1260 - 1284	12 & 16
1285 - 1570	16
1571 - 1601	16 & 20
1602 - 1880	20
1881 - 1904	20 & 24
1905 - 2191	24
2192 - 2236	24 & 28
2237 - 2502	28
2503 - 2553	28 & 1
2554 - 2813	1
2814 - 2870	1 & 5
2871 - 3124	5
3125 - 3187	5 & 9
3188 - 3435	9
3436 - 3504	9 & 13
3505 - 3746	13
3747 - 3821	13 & 17
3822 - 4057	17
4058 - 4138	17 & 21
4139 - 4367	21
4368 - 4456	21 & 25
4457 - 4678	25
4679 - 4773	25 & 29
4774 - 4989	29
4990 - 5090	29 & 2
5091 - 5300	2
5301 - 5407	2 & 6
5408 - 5607	6
5608 - 5724	6 & 10
5725 - 5922	10
5923 - 6041	10 & 14
6042 - 6233	14
6234 - 6358	14 & 18
6359 - 6543	18
6544 - 6676	18 & 22
6677 - 6854	22
6855 - 6993	22 & 26
6994 - 7165	26
7166 - 7310	26 & 30
7311 - 7446	30
7447 - 7627	30 & 3

Bytes From Index | Sectors To Redirect

7628 - 7787	3
7788 - 7944	3 & 7
7945 - 8098	7
8099 - 8261	7 & 11
8262 - 8409	11
8410 - 8578	11 & 15
8579 - 8719	15
8720 - 8896	19 & 15
8897 - 9030	19
9031 - 9213	19 & 23
9214 - 9341	23
9342 - 9530	23 & 27
9531 - 9652	27
9653 - 9842	27 & 31
9843 - 9963	31
9964 - 10164	31
10165 - 99999	- GAP -

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