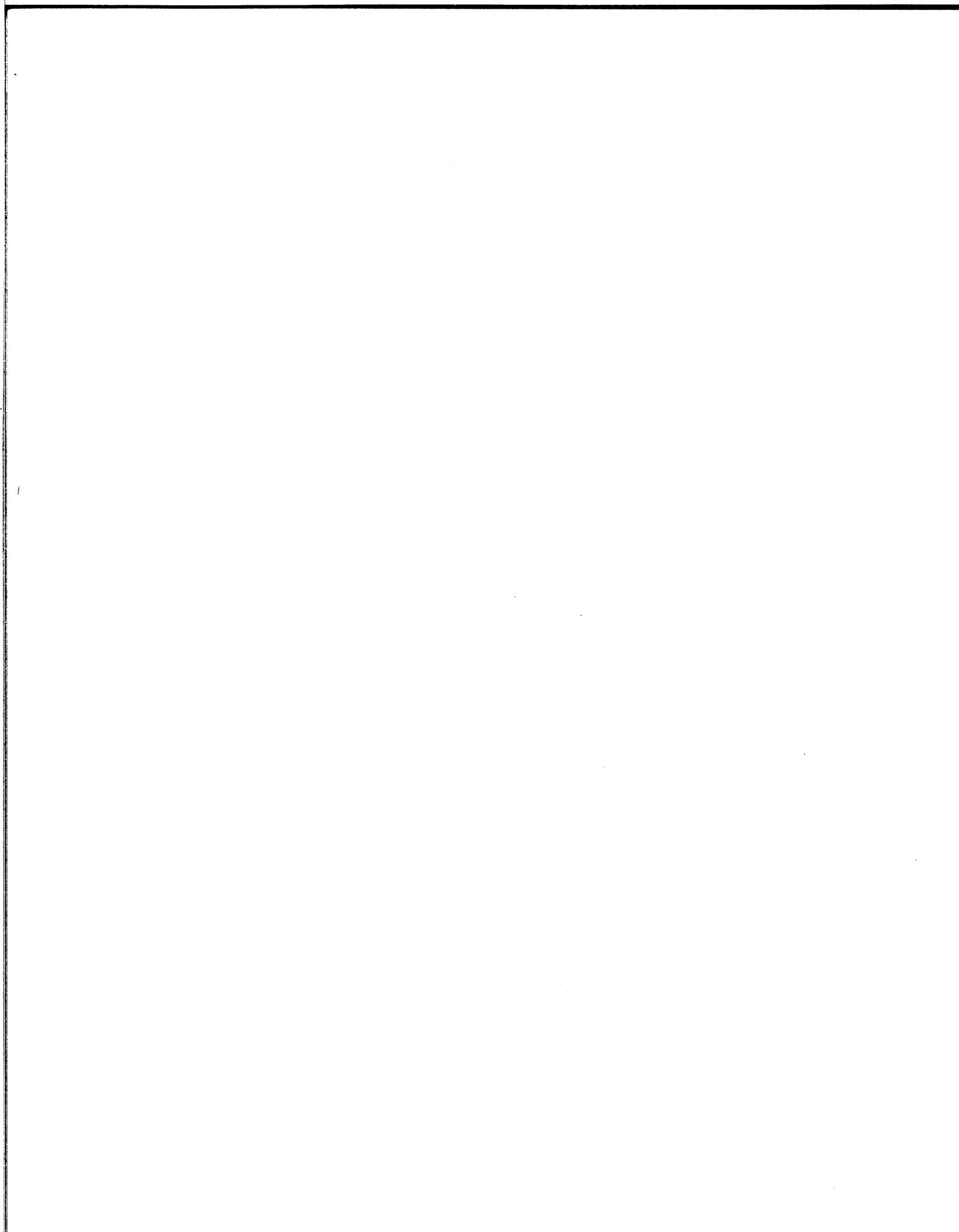


**How to Generate Your
DOS System**

093-000222-00



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093-000222-00

For the latest enhancements, cautions, documentation changes, and other information on this product, please see the Release Notice (085-series) supplied with the software.

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How to Generate Your
DOS System
093-000222

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Preface

Before you can do anything useful with your Data General equipment, you must have an operating system up and running. This manual tells you how to bring up an operating system -- specifically, our Disk Operating System -- on a Data General microNOVA or NOVA computer.

The first part of system generation involves checking the disks or diskettes you will use, and bringing up the DOS starter system. These steps vary, depending on whether you have a hard-disk subsystem or diskette subsystem to support DOS, and, if you have a diskette subsystem, whether it will run under a microNOVA or NOVA machine. We describe these preparation steps in Chapters 2 through 4.

After you have the starter system running, you'll use it to generate a DOS system tailored to your own needs. We describe this procedure in Chapter 5.

We have organized the manual as follows:

Chapter 1 introduces DOS, tells you about console control characters, and briefs you on the program load procedure.

Chapter 2 explains preparing for system generation on a hard-disk subsystem.

Chapter 3 describes preparing for system generation on a diskette-based microNOVA system.

Chapter 4 explains preparing for system generation on a diskette-based NOVA system.

Chapter 5 leads you step by step through the system generation procedure (SYSGEN).

Chapter 6 tells you what to do after SYSGEN on a hard disk system.

Chapter 7 tells you what to do after SYSGEN on a diskette-based system.

Chapter 8 covers the details of the DOS disk initializer program, DOSINIT.SV.

In summary:

- If your hardware includes a hard-disk subsystem, read Chapters 1, 2, 5, 6, and, optionally, Chapter 8.
- If you have diskettes only, and a microNOVA computer, read Chapters 1, 3, 5, 7, and, optionally, Chapter 8.
- If you have diskettes only, and a NOVA machine, read Chapters 1, 4, 5, 7, and, optionally, Chapter 8.

Reader, Please Note:

We use these conventions for command formats in this manual:

COMMAND required *[optional]* ...

Where	Means
COMMAND	You must enter the command (or its accepted abbreviation) as shown.
required	You must enter some argument (such as a filename). Sometimes, we use: $\left\{ \begin{array}{l} \text{required}_1 \\ \text{required}_2 \end{array} \right\}$ which means you must enter <i>one</i> of the arguments. Don't enter the braces; they only set off the choice.
<i>[optional]</i>	You have the option of entering some argument. Don't enter the brackets; they only set off what's optional.
...	You may repeat the preceding entry or entries. The explanation will tell you exactly what you may repeat.

Additionally, we use certain symbols in special ways:

Symbol	Means
)	Press the RETURN key on your terminal's keyboard.
□	Be sure to put a space here. (We use this only when we must; normally, you can see where to put spaces.)

All numbers are decimal unless we indicate otherwise; e.g., 35 (octal).

Finally, we usually show all examples of entries and system responses in THIS TYPEFACE. But, where we *must* clearly differentiate your entries from system responses in a dialog, we will use

THIS TYPEFACE TO SHOW YOUR ENTRY)
THIS TYPEFACE FOR THE SYSTEM RESPONSE

End of Preface

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Chapter 1

Introduction

What is DOS?

Data General's Disk Operating System lets you manipulate disk- or diskette-stored data and program files on Data General microNOVA or NOVA computers. You can communicate with DOS by typing in commands directly on your computer's system console, or by coding calls to the DOS software from within your own programs.

DOS is a compatible subset of the Real-Time Disk Operating System (RDOS). It interfaces perfectly with both RDOS and DG's memory-resident Real-Time Operating System, RTOS.

In addition to its own assembly-language interface, DOS supports FORTRAN IV and both single- and multiuser Extended BASIC. Depending on your equipment, it also supports Data General's Business BASIC.

This book assumes only that you have received your computer, disk and/or diskette drive(s), system console, and other peripherals (if any), and plugged them in. With your equipment, you received all the DOS software you need, complete on several diskettes. (You also may have received other DOS support software on other diskettes.)

To generate a DOS system, you need:

- microNOVA or NOVA computer;

- either a diskette unit with at least one drive and a hard disk subsystem; or
- a diskette unit with two drives;
- system console -- teletypewriter or keyboard/display terminal.

To generate a diskette-based system, you also should have three (absolute minimum of two) properly-formatted blank diskettes (preferably Data General diskettes) for your first system.

Control Characters

You'll be using several programs to bring up DOS, and you may want to interrupt execution of these programs -- for example, if you make a mistake or change your mind about an answer. If so, type CTRL-A; that is, press the CTRL key, then, while you are holding CTRL down, press A. This interrupts execution of the command and returns you to the program.

You can suspend display on your terminal by typing CTRL-S and restore it by typing CTRL-Q. This feature can help you read long files on a CRT terminal. We tell you about it here because you may inadvertently type CTRL-S and suspend display. If output suddenly stops, try typing CTRL-Q.

Program Load

To load a DOS system (or any other program) you must manipulate certain controls for the computer. As you read the following paragraphs, look at the computer front panels shown in Figure 1-1 (or better yet, look at them on your computer).

For microNOVA computers, the controls are the keys on the hand-held console (if you have the hand-held console option), the system console (if you have the console debug option) or the front panel CONTINUE switch (if you have the CPU program load option).

For NOVA computers, the controls are the front panel data switches (numbered 0 through 15), and, if you have automatic program load, the RESET/STOP and PROGRAM LOAD switches. If you lack automatic program load, the controls include the data switches, EXAMINE/EXAMINE NEXT, DEPOSIT/DEPOSIT NEXT and START/CONTINUE switches.

All the NOVA switches except the data switches are three-position, center-neutral switches; for example, you lift the switch to DEPOSIT and press the same switch to DEPOSIT NEXT. These switches are spring-loaded and return to the neutral position after you use them.

The First Steps

Check that all of the equipment has power.

Proceed according to your hardware. The procedure diverges widely here.

- If your hardware includes a hard-disk subsystem, go to Chapter 2.
- For diskette-based microNOVA hardware, go to Chapter 3.
- For diskette-based NOVA hardware, go to Chapter 4.

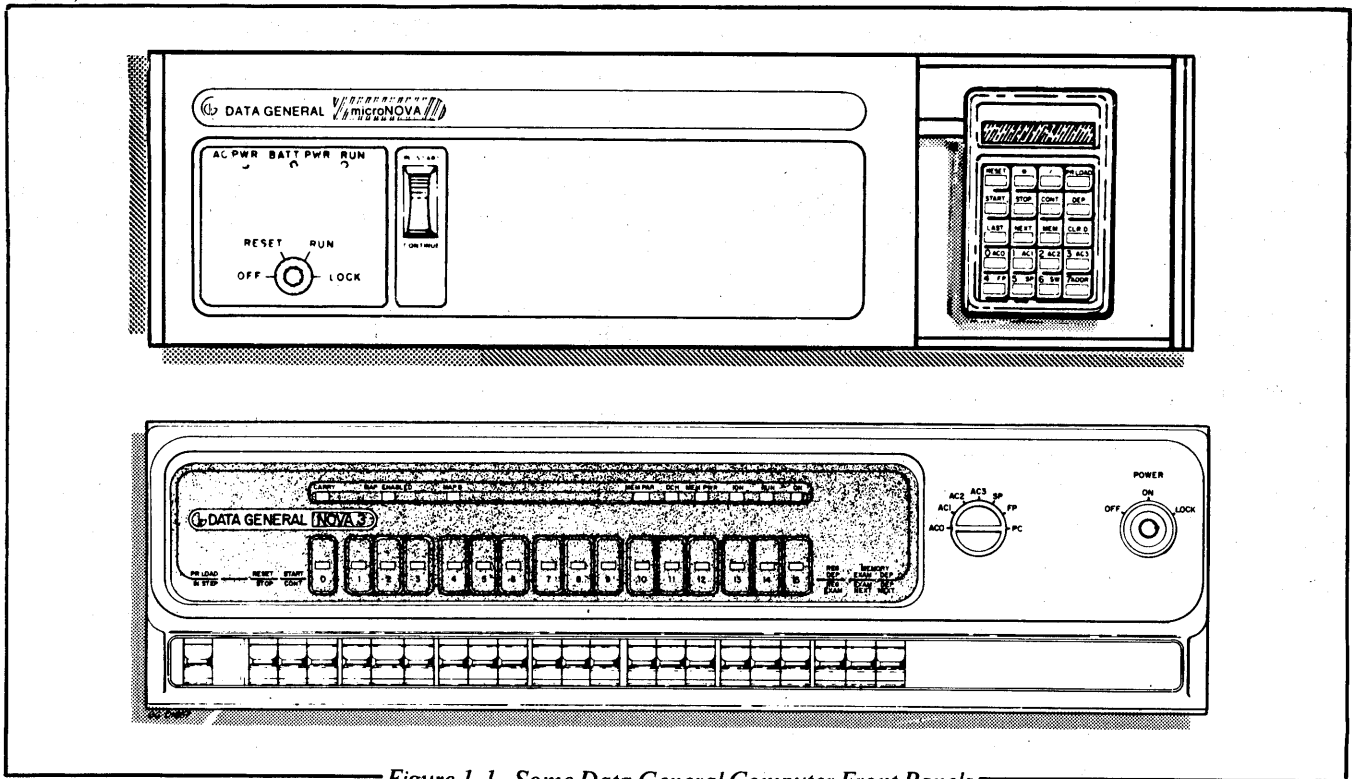


Figure 1-1. Some Data General Computer Front Panels

End of Chapter

Chapter 2

Preparing to Generate a DOS System on a Hard-disk Hardware Configuration

This chapter explains the steps you must execute before you generate your first DOS system on a hard-disk configuration.

We assume that you have the following hardware:

- microNOVA or NOVA computer;
- a diskette enclosure with at least one slot (drive);
- a hard-disk drive. Each drive contains two disks; the top platter is removable, the bottom is not;
- system console -- teletypewriter or keyboard/display terminal.

Before you generate a DOS system, you must first prepare your disks using the DOS initializer program, DOSINIT.SV. (This is required procedure for *any* disk or diskette you plan to use in your system.) Next, you install a *bootstrap root* on the disks. Then you install the DOS starter system, which allows you to load the DOS utility programs and generate your tailored DOS system.

The procedures described in this chapter assume that your diskette drive is the first drive connected to the first controller, on device code 33 octal. For a microNOVA system, we assume that your hard disk controller is connected to its first device code, 27 octal. For a NOVA system, we assume that the hard disk controller is connected to the same controller as the diskette, 33 octal. (You can, of course, have a second hard disk drive and up to three more diskette subsystems, but the devices you use for your first SYSGEN must be connected as described.)

Loading Programs on microNOVA Systems

Before you can proceed, you must know how to load a program into your microNOVA's memory. This requires both a disk procedure and a CPU procedure. To load from diskette, you turn ON the diskette drive, then place a diskette in the diskette drive. To load from

hard disk, you must insert the removable cartridge, flip the power switch to ON, and flip the LOAD/READY switch to READY. Then you wait for the disk's READY lamp to light.

Program Load

After readying the diskette or disk, you tell the CPU to read a short loader program from the disk or diskette into memory. The way you do this depends on your microNOVA hardware configuration. First, turn the microNOVA power key to RUN; then:

- If your microNOVA has a hand-held console, press the RESET key, then the CLR D key. For diskette, enter 33 in the display (press 3 twice); then, press the PR LOAD key. To load from the hard disk, press RESET, CLR D, enter 100027 in the display, and press PR LOAD.

- If you lack the hand-held console, but have the console debug interface to the terminal control board, type:

33L) (for diskette)

or

100027L) (for hard disk)

on the system console.

- If you have neither of the above, you must have the CPU program load option. With this option, certain hardware jumpers must be inserted in the diskette, disk, and CPU controller boards; we'll describe these later. Assuming that the jumpers are properly inserted, you press the rocker switch on the front panel to the PL/START position (it will return to neutral afterward).

The appropriate procedure above reads a loader program into the microNOVA's memory; this loader then loads a larger loader program. The larger loader program asks what program you want and uses your answer to load the desired program. You'll be using the system console until you are done with the desired program; you'll repeat the loading steps above to load another program.

Figure 1-1 shows a microNOVA front panel with hand-held console and rocker switch for CPU program load option.

Loading Programs on NOVA Systems

Before you can proceed, you must know how to load a program into your NOVA's memory. This requires both a disk procedure and a CPU procedure. To load from diskette, you turn ON the diskette drive and dial "0" on the diskette drive you want to load from. Dial any nonzero value on the hard DISK thumbwheel and on other diskette drives, if any. Then insert a diskette in drive 0. To load from hard disk, you must insert the removable cartridge, and make sure that the drive number (as selected by thumbwheel) is "0" and that no other disk or diskette drive that is on-line has the number "0". Then, you flip the disk power switch to ON, flip the LOAD/READY switch to READY, and wait for the disk's READY lamp to light.

Program Load

After readying the diskette or disk, you tell the CPU to read a short loader program from the diskette or disk into your NOVA's memory. To do this, you'll use the switches on your computer's front panel. There are 16 toggle switches, numbered 0 through 15; these are the data switches and they have two positions: up (on) and down (off). Other switches, like the RESET and PROGRAM LOAD switches, are center-neutral switches; you either lift them or depress them according to the command you want to give the machine.

First, turn the computer POWER key to ON; then

- If your machine has the automatic program load option, set its front panel data switches to 100033 octal (switches 0, 11, 12, 14 and 15 up, the rest down). Lift the RESET switch, then the PROGRAM LOAD switch.
- If you lack automatic program load, execute the following steps:

Set the front panel data switches to 000376 octal (switches 8 through 14 up, the others down).

Lift the EXAMINE switch, hold it up, and verify that the ADDRESS lights match the switch settings.

Set the data switches to 060133 octal (switches 1, 2, 9, 11, 12, 14 and 15 up, the others down).

Lift the DEPOSIT switch and hold it up; verify that the lights match the switch settings.

Set the data switches to 000377 octal (switches 8 through 15 up, the others down).

Depress the DEPOSIT NEXT switch and hold it down; verify that the lights match the switch settings.

Set the data switches to 000376 octal again (put down switch 15); lift and release the RESET switch, then the START switch.

The appropriate procedure above reads a loader program into the computer's memory; this loader then loads a larger loader program. The larger loader program asks what program you want and uses your answer to load the desired program. You'll be using the system console until you are done with the desired program; you'll repeat the loading steps above to load another program.

For a picture of a NOVA computer panel, see Figure 1-1.

Inserting and Removing a Diskette on All Systems

Follow these steps to insert a diskette in a drive and prepare the drive for operation:

- Turn diskette power switch to ON. The POWER ON indicator will glow.
- On a NOVA system, make sure that the drive has a unique number dialed -- i.e., no other disk or diskette drive you'll be using has this number. The drive number must be 0 if you plan to start up a program or system from a diskette in this drive.
- Remove a diskette from its paper storage envelope. If this is one of the Data General-supplied DOS system diskettes, it already has a label and you won't be writing data to it. Skip the rest of this step and the next step. If you will be writing data to this diskette, cover the *write-protect* hole at the edge of the envelope with a piece of opaque tape. Data General supplies such tape with its blank diskettes. Wrap the tape over the edge to cover both sides of the hole.
- If there is no label on the inner envelope, affix one. This procedure is described in Chapter 3 or 4, under the section "Inserting a Diskette."
- Open the drive door by depressing the latch below the door.
- Slide the diskette into the drive with the label on the envelope facing up, as shown in Figure 2-1. The diskette should slide in smoothly and come to a positive stop in the drive.

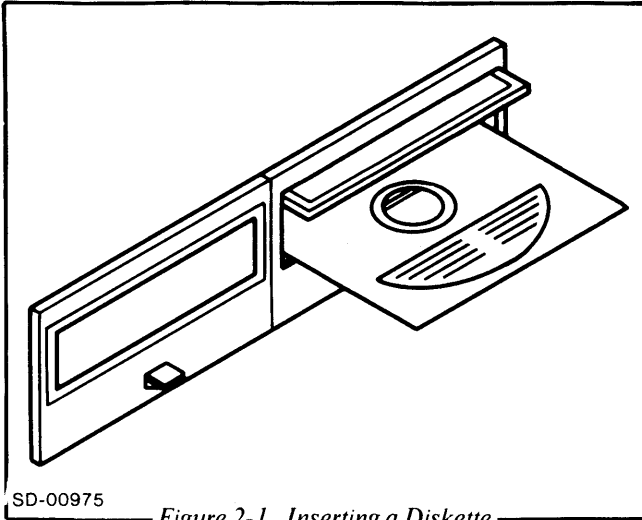


Figure 2-1. Inserting a Diskette

- Close the drive door so that it latches shut. The READY light will glow and on NOVA systems the TRACK0 light will glow. If you left the write-protect hole open, the WRITE LOCK light will also glow.

The diskette drive is now ready to execute commands.

To remove a diskette, open the drive door as above, slide out the diskette, and place it in its storage envelope. Now turn the diskette drive OFF.

Inserting and Removing Disk Cartridges on All Systems

Only the cartridge (top disk) of your disk subsystem is removable. Note that the subsystem requires a cartridge to run; NEVER try to run it without a cartridge.

To insert a removable cartridge, pull down the clips on the sides of the disk drive, and slide the drive gently out of the chassis until it comes to a definite stop. Turn to the cartridge.

With the cartridge handle flat, move the locking slide at the base of the handle against its stop and, with the slide against its stop, pull up on the handle. This frees the cartridge from its dust cover. Release the slide and lower the cartridge gently into its hole in the drive with the handle recess pointing toward the back of the drive. Rotate the cartridge gently until it settles into place, then push the handle down. If the locking slide does not return to its original position automatically, push it back to its original position. If the cartridge is properly positioned, the handle will lock down and the cartridge will lock in place. Check this by pulling gently upward on the handle; if it won't come up, you inserted the cartridge properly. Invert the dust cover and place it on top of the cartridge; then slide the drive back into its chassis until it clicks into place.

If the dust cover touches the chassis, you have not inserted the cartridge properly, and you must try inserting the cartridge again (push handle slide against stop, raise handle, and rotate cartridge gently, as above). Now, push in the clips at the side of the drive to lock it in place.

You need not remove the cartridge at all after you have it in place.

To run the drive, flip the drive's ON/OFF switch to ON; the ON light should glow. Next, flip the LOAD/READY switch to READY. After one minute or so, the READY light should glow. Your disk drive is now ready to execute commands. (The READY light will not come on if the dust cover is not in place.)

To turn off the drive, flip the LOAD/READY switch to LOAD and wait for the LOAD light. When this light glows, flip the ON/OFF switch to OFF.

To remove a cartridge, make sure the power is ON. The LOAD/READY switch should be at LOAD, and the LOAD light should be lit. Slide the drive out of its chassis as above, remove the dust cover, push handle slide against its stop, then pull up on the handle and remove the cartridge. Invert the dust cover, lower the cartridge into it, and lower the handle. If the locking slide does not return to its original position automatically, push it back. This locks the dust cover on the cartridge.

Diskette and Disk Drive Numbers

For microNOVA systems, if you have multiple diskette enclosures, you must identify drive 0 for SYSGEN. The other drive in this enclosure is drive 1, and you'll be using both drives to copy one of the DG-supplied DOS diskettes. Temporarily, label the left drive as "DP0" and the right drive "DP1". If this is wrong, you'll discover it later, and we'll tell you to swap the labels. If you have more than two drives, identify the two drives on the first controller and label them as above. You can label the others after SYSGEN. The hard disks on the first controller are called DH0 (for the cartridge) and DH0F (for the fixed disk); you cannot alter these numbers on a microNOVA system, thus you need not concern yourself with them.

For NOVA systems, if you have two diskette drives, dial "0" on one drive and "2" on the other. (This makes the drives "DP0" and "DP2" respectively.) If you have only one drive, dial 0 on it (this makes it "DP0"). If you have more than two drives, dial 0 and 2 on a pair and leave the others off. If you have more than four drives, identify the group connected to the first controller, dial 0 and 2 on a pair of these, and leave all others off. On the hard disk drive, dial "1"; this makes the cartridge "DP1" and the fixed disk "DP1F". After SYSGEN, when you run DOS from the hard disk, you'll dial "0" on the drive; but for now the number must be "1".

The System Diskettes

Data General supplies DOS software on several diskettes. Each of these diskettes has several programs written on it. (You may also have received additional DOS software on other diskettes.) For microNOVA SYSGEN, you'll be using the microNOVA STARTER diskette and the UTILITIES diskette. For NOVA SYSGEN, you'll be using the NOVA STARTER

diskette and the UTILITIES diskette. Table 2-1 shows the contents of each STARTER diskette; Table 2-2 the contents of the UTILITIES diskette.

For any system, check the Release Notice provided with the system for the numbers of these diskettes and verify that the numbers on the diskette labels match these numbers.

Table 2-1. Content of Data General microNOVA or NOVA STARTER Diskette

Program Filename	Program Purpose
DOSINIT.SV	A disk initializer that you must run on a disk or diskette before you can use it.
BOOT.SV	BOOT can either install a loader root program on disk or diskette or start up DOS from a disk or diskette.
MBOOTSYS.SV, MBOOTSYS.OL	Starter system save and overlay files on microNOVA STARTER diskette.
BOOTSYS.SV, BOOTSYS.OL	Starter system save and overlay files on NOVA STARTER diskette.
CLI.SV, CLI.OL, CLI.ER	The Command Line Interpreter (CLI) save, overlay, and error files. The CLI allows you to communicate with DOS from the console.
MDOA.LB, MDOSC.LB, MDOSI.LB, MDOSO.LB	SYSGEN libraries on microNOVA STARTER diskette.
DOSA.LB, DOSB.LB, DOSC.LB, DOSI.LB, DOSO.LB	SYSGEN libraries on NOVA STARTER diskette. SYSGEN uses the SYSGEN libraries to build a tailored DOS system.
RLDR.SV, RLDR.OL	The relocatable loader files. SYSGEN uses the loader to build your DOS system from the library files.
SYSGEN.SV	This program asks you questions and uses your answers to build a tailored DOS system.
ALMSPD.SR	Source (parameter) file for Asynchronous Line Multiplexor (ALM) line configuration.
ALMSPD.RB	Assembled binary file for ALM. More about these ALM files later.

Table 2-2. Content of Data General DOS UTILITIES System Diskette

Program Filename	Program Purpose
EDIT.SV EDIT.RB MEDIT.SV	Text Editor (separate manual provided). Text Editor relocatable binary file. Multiterminal Text Editor.
NSPEED.SV SPEED.ER	Super (text) Editor (manual provided). SuperEditor error message text file.
ASM.SV XREF.SV	Extended assembler (manual provided). Extended assembler cross-reference generator.
MAC.SV MACXR.SV	Macroassembler (manual provided). Cross-reference generator.
MBID.SR NBID.SR NSID.SR FPID.SR OSID.SR NFPID.SR NSKID.SR PARU.SR	microNOVA Basic Instruction Definitions (All of these “-.SR” files are used primarily to build the Macroassembler permanent symbol file, MAC.PS.) NOVA Basic Instruction Definitions. NOVA Stack Instruction Definitions. NOVA Floating-Point Instruction Definitions. Operating System (DOS) Instruction Definitions. NOVA 3 hardware Floating-Point Instruction Definitions. NOVA Skip Instruction Definitions. User Parameter Definitions File (printed in Appendix E).
RFPI.RB	Floating-Point Interpreter relocatable binary file (manual provided).
LFE.SV	Library File Editor (manual provided).
SEEDIT.SV OEDIT.SV DSKED.SV	Symbolic File Editor (manual provided). Octal File Editor (manual provided). Disk Editor, runs without DOS (manual provided).
IDEB.RB	Interrupts-off debugger (debugger manual provided).
COPY.SV	Diskette-to-diskette copy program (described in CLI manual).
PATCH.SV ENPAT.SV	Patch Installation program (described in CLI manual). Patch File Creation program (also described in CLI manual).
RLDR.SV RLDR.OL	Extended Relocatable Loader Program file (manual provided). Relocatable Loader overlay file.
SYS.LB SYSS.LB	System library, contains tasking code, buffered I/O package, debugger (described in this manual, RLDR and debugger manuals). Old (pre-rev 2.00) version of SYS.LB.
FDUMP.SV FLOAD.SV	Fast disk dump program (described in CLI manual). Fast disk load program (also described in CLI manual).
PROM.SV	Programmable-ROM (PROM) utility program to program microNOVA PROM boards.
MICROBOOT.SV	microNOVA bootstrap installer program.

Running DOSINIT

Now you're ready to proceed.

1. Turn your system console on and place it ON-LINE. If this is an upper/lowercase console, set it in ALPHA LOCK because some of the programs you'll be using don't accept lowercase letters. If your console is a DASHER, press the VIEW MODE rocker switch so you can easily verify what you've typed.
2. Make sure that the removable cartridge is in your hard disk drive. For NOVA systems, dial 1 on this drive (irrelevant for microNOVA). Flip power ON, flip the LOAD/READY switch to READY, and wait for the READY light.
3. Turn the diskette drive ON. Insert the Data General-supplied microNOVA or NOVA STARTER diskette (as appropriate) in drive DP0: Don't tape the write-protect hole on this diskette. When you close the drive door, the READY and WRITE LOCK lights should be lit. On a NOVA system, the TRACK0 light should also be lit.
4. For a microNOVA system, turn the computer power switch to RUN, then execute the appropriate program load steps. For a NOVA system, skip to step 5.
 - a. If you have the hand-held console, press the RESET key, then the CRL D key. Enter 33 in the display, and press the PR LOAD key firmly. Go to step 6.
 - b. If you lack a hand-held console, but have the console debug option, type:

33L)

on the system console. Go to step 6.
 - c. If you lack the hand-held console and console debug option, press the front panel rocker switch to the PL/START position. Go to step 6.
5. For NOVA systems, turn the power switch to ON, then execute the appropriate program load steps:
 - a. If your computer has automatic program load, set its data switches to 100033 octal (switches 0, 11, 12, 14, and 15 up, the rest down). Lift the RESET switch, then the PROGRAM LOAD switch. Go to step 6.
 - b. If you lack automatic program load, set the data switches to 376 octal (switches 8 through 14 up, the others down), then execute the following steps:
 - c. Lift the EXAMINE switch, hold it up, and verify that the ADDRESS lights match the switch settings.
 - d. Set the data switches to 060133 octal (switches 1, 2, 9, 11, 12, 14 and 15 up, the others down).
 - e. Lift the DEPOSIT switch and hold it up; verify that the lights match the switch settings.
 - f. Set the data switches to 000377 octal (switches 8 through 15 up, the others down).
 - g. Depress the DEPOSIT NEXT switch and hold it down; verify that the lights match the switch settings.
 - h. Set the data switches to 000376 octal again (put down switch 15); lift and release the RESET switch, then the START switch. Go to step 6.
6. The computer now reads program BOOT.SV from the STARTER diskette. BOOT.SV types out on the system console:

FILENAME?

(On a microNOVA system, if nothing happens, and you have a dual-diskette drive, swap the diskettes in the drives and try step 4 again. If this works, the right-hand drive is DP0; swap the labels and proceed. If it doesn't work, tape the write-protect hole on the DG STARTER diskette, re-insert it, and try step 4 again. If this works, proceed, but follow instructions PERFECTLY. If it doesn't work, check the device code jumpers, as described in Chapter 3 under "Controller Device Code". At the same time, you might as well check the hard-disk controller jumpers; they should be the same as the diskette jumpers EXCEPT that jumper W7 should be in and jumpers W6 and W9 should not.)

(On a NOVA system, if nothing happens, verify that you have dialed the right numbers, then open and close the door of drive DP0, and execute step 5 again. This resets the read/write head to TRACK0, where it must be to read in BOOT from diskette.)

Answer the question with DOSINIT's filename:

DOSINIT)

7. BOOT.SV now reads DOSINIT.SV into memory. DOSINIT announces itself and asks for the model number of your drive:

*DOSINITREVx.xx (x.xx is the revision number.)
DISK DRIVE MODEL NUMBER?*

8. At this point, if you have two diskette drives, you should make a copy of the DG-supplied starter diskette for safety. The remainder of step 8 tells you how to do this. If you have only one diskette drive, proceed to step 9, but **MAKE SURE YOU FOLLOW INSTRUCTIONS PERFECTLY** through step 23.

a. To copy the DG starter diskette, get a blank Data General diskette, tape the write-protect hole as described earlier, attach a label and write "MY STARTER DISKETTE" on the label *with a felt-tipped pen*. Never use anything else on a diskette. Insert this diskette in the vacant slot in the enclosure which holds DP0 and close the door.

b. Answer DOSINIT's question about "DISK DRIVE MODEL NUMBER" with the Data General model number of your diskette. For a microNOVA system, this is 6038; for a NOVA system it is 6030. Type:

6038) (for microNOVA)

or

6030) (for NOVA)

If you give an invalid response, DOSINIT will type out an appropriate error message and repeat the question. If you make a typing mistake, press the RUBOUT key to remove characters one-by-one. RUBOUT echoes underscore (_) or backarrow (<) for each character erased.

Next, DOSINIT asks the unit name of the diskette you want to initialize:

DISK UNIT?

c. You want to initialize the blank diskette in DP1 (microNOVA) or DP2 (NOVA), so type:

DP1) (for microNOVA)

or

DP2) (for NOVA)

COMMAND?

d. DOSINIT has accepted the diskette information and now wants a command. Type FULL:

FULL)

*FULL INIT DESTROYS ANY PREVIOUS
DISK/DISKETTE STRUCTURE
DOS INITIF MUST BE ISSUED AFTER FULL
INIT.
DO YOU REALLY WANT A FULL INIT? (YES
OR NO)*

e. Tell DOSINIT to go ahead by typing YES:

YES)

DOSINIT now runs patterns on the diskette in DP1 to check its surface for flaws. Each pattern takes several minutes to run. You will see the following messages if the diskette is OK. (If it has any bad blocks, you must use another diskette. Place it in DP1 (microNOVA) or DP2 (NOVA) and go back to step 8d.)

**** PATTERN # 1 (125252) ***
*** PATTERN # 2 (052525) ***
*** PATTERN # 3 (155555) ***
*** PATTERN # 4 (000000) ***
*** PATTERN # 5 (177777) ****

**** ALL PATTERNS RUN ****

FULL INIT COMPLETE

COMMAND?

f. Type: COPY)

*COPY DISKETTE IS ON MPI (DP2 for
NOVA Systems)
NOW TELL ME ABOUT THE ORIGINAL
DISKETTE.
DISK DRIVE MODEL NUMBER?*

g. Again, type 6038 for microNOVA or 6030 for NOVA:

6038) (for microNOVA)

or

6030) (NOVA)

DISK UNIT?

8. h. Type:

DP0)

I AM ABOUT TO COPY MP0 TO MP1.

IS THIS CORRECT? (DP0 TO DP2 for NOVA)

ANSWER (YES) TO CONTINUE, (NO) TO STOP

i. Type:

YES)

DOSINIT now copies the DG diskette, which takes a few moments. Then it says:

I HAVE FINISHED MAKING YOUR COPY COMMAND?

j. Remove the DG original diskette from DP0, replace it in its envelope, and store it safely. Take the copy from the other drive (DP1 for microNOVA, DP2 for NOVA), insert it in drive DP0, and close the door to drive DP0.

k. Type:

DISK)

and go to step 9.

9. DOSINIT is asking for your "DISK DRIVE MODEL NUMBER?" Type the model number of your hard disk subsystem. For microNOVA, this is 6095; for NOVA it is 6045. Type:

6095) (for microNOVA)

or

6045) (for NOVA)

DISK UNIT?

10. DOSINIT wants to know the unit name of a disk. Respond with the name of the cartridge disk. For microNOVA systems, this is DH0; for NOVA systems it is DP1. Type:

DH0) (for microNOVA)

or

DP1) (for NOVA)

COMMAND?

11. DOSINIT is ready for a command, so you type FULL:

FULL)

With this, you request a full initialization of your cartridge disk. DOSINIT asks for verification, then checks the disk for *bad blocks* (portions that will not retain information). It does this by writing patterns to the disk and reading them back. Follow the steps shown in Table 2-3. On a microNOVA moving-head disk (DH0), each pattern takes about ten minutes to run; on the fixed disk it takes less time. On NOVA systems, each pattern takes two minutes or so.

If the dialog varies from that shown in the table, consult Chapter 8 for recovery procedures.

Table 2-3. Running DOSINIT.SV on a Hard-disk Subsystem

11. *COMMAND?* FULL)

*FULL INIT DESTROYS ANY PREVIOUS DISK/DISKETTE STRUCTURE.
DOS INITIF MUST BE ISSUED AFTER FULL INIT.
DO YOU REALLY WANT A FULL INIT? (YES OR NO)*

a. Type: YES)

NUMBER OF PATTERNS TO RUN (1-5)?

b. We recommend that you run all five patterns on your disk to check for bad blocks. DOSINIT will report any bad blocks and place them in a bad block table on the disk, so that DOS will pass over them later. (DOS allows bad blocks on disks, but not on diskettes.) Type:

5)

****PATTERN # 1 (125252) ***
***PATTERN # 2 (052525) ***
***PATTERN # 3 (155555) ***
***PATTERN # 4 (000000) ***
PATTERN # 5 (177777) *

****ALL PATTERNS RUN ****

*DO YOU WISH TO DECLARE ANY BLOCKS BAD THAT
ARE NOT ALREADY IN THE BAD BLOCK TABLE?*

c. Type: NO)

*DEFAULT REMAP AREA SIZE IS 12 BLOCKS LONG
IT NEED TO BE AT LEAST n BLOCKS LONG*

(n is the number of bad blocks DOSINIT found on the disk)

REMAP AREA SIZE (TYPE RETURN FOR DEFAULT)?

d. Type:)

*DEFAULT FRAME SIZE IS 53
MIN IS 1 AND MAX IS 816
DISK FRAME SIZE (TYPE RETURN FOR DEFAULT)?*

e. Frame size is discussed in Chapter 8. For now, type:

)

FULL INIT COMPLETE

COMMAND?

f. You have initialized the cartridge; now you need to initialize the fixed disk. Type:

DISK)

*DOSINIT REV x.xx
DISK DRIVE MODEL NUMBER?*

Table 2-3. Running DOSINIT.SV on a Hard-disk Subsystem (continued)

11. g.	For microNOVA, type 6095; for NOVA, type 6045:
	6095) (microNOVA)
	or
	6045) (NOVA)
	<i>DISK UNIT?</i>
h.	For microNOVA, type DH0F, for NOVA, type DP1F:
	DH0F) (microNOVA)
	or
	DP1F) (NOVA)
	<i>COMMAND?</i>
i.	Execute steps 11 through 11e, to initialize the fixed disk; then type:
	STOP)

Installing the Bootstrap Root

Next, you'll want to put the disk bootstrap root on your disks. Later, this will allow you to start up a DOS system from any of these disks.

12. Repeat the appropriate program load steps for your hardware.

microNOVA Systems:

- If you have a hand-held console, press the RESET key, then the CLR D key. Enter 33 in the display, then press PR LOAD. Go to step 13.
- If you lack the hand-held console, but have the console debug option, type:

33L)

on the system console. Go to step 13.
- If you lack both options above, you have CPU program load. Press the front panel rocker switch to PL/START position. Go to step 13.

NOVA Systems:

- Open and close door to DP0.
 - If you have automatic program load, lift the RESET switch, then the PROGRAM LOAD switch. Go to step 13.
 - If you lack automatic program load, execute step 5, then proceed to step 13.
13. BOOT.SV comes into memory again; it asks for the filename you want:

FILENAME?

Type BOOT:

BOOT)

14. This loads BOOT.SV, which announces itself, then asks:

BOOTSTRAP DEVICE SPECIFIER?

For a microNOVA System, type:

DH0)

For a NOVA System, type:

DP1)

INSTALL BOOTSTRAP (Y OR N)?

15. Respond with Y to install the root on the cartridge:

Y

DONE.

BOOTSTRAP DEVICE SPECIFIER?

BOOT has written the bootstrap root on the cartridge, said DONE, and asked SPECIFIER? again.

16. for a microNOVA System, type:

DH0F)

For a NOVA System, type:

DP1F)

INSTALL BOOTSTRAP (Y OR N)?

17. Type:

Y

DONE.

BOOTSTRAP DEVICE SPECIFIER?

Installing the bootstrap root on both disks allows you to BOOT up a DOS system or program from either disk in the future. (You can install a bootstrap root on a disk or diskette at any time, but you must shut down DOS and use BOOT to do so.)

Installing the DOS Starter System

At this point, you're ready to install the DOS starter system. BOOT is still asking for a BOOTSTRAP DEVICE SPECIFIER.

18. Get BOOT to ask FILENAME by typing DP0 and N:

DP0)

INSTALL BOOTSTRAP (Y OR N)

Type:

N

FILENAME?

19. Respond with the starter system name. For microNOVA, this is MBOOTSYS; for NOVA, it is BOOTSYS. Type:

MBOOTSYS) (for microNOVA)

or

BOOTSYS) (for NOVA)

20. You have asked BOOT to bring up the starter system on the diskette. This may take a few minutes.

Eventually, the starter system will come up and type out:

DOS REV 3.00
DATE (M/D/Y)?

Enter the current date, in the format "month date year"; for example:

9 1 78)

Now, it asks for the time:

TIME (H:M:S)?

21. Enter the time, in the format "hours-in-24 minutes seconds". The seconds entry is optional; for example:

15 05)

Now the starter system invokes the Command Line Interpreter, which types its prompt:

R

Your DOS Starter System is running from diskette.

22. Prepare the hard disk to receive data by typing:

INIT/F DH0) (for microNOVA)

or

INIT/F DP1) (for NOVA)

R

The INIT command with the /F switch writes a new file and map directory to the hard disk. You MUST type INIT/F for any blank disk or diskette you will use on the system. INIT/F destroys all files on the destination disk or diskette, but there are no files on your hard disk at this point.

23. The next step is to copy all files from diskette to the hard disk. This will take a little while because file transfers from diskette take time to execute -- don't be alarmed at the delay. Type:

MOVE/V DH0) (for microNOVA)

or

MOVE/V DP1) (for NOVA)

(The CLI verifies filenames copied to the hard disk.)

R

This step gives the hard disk all files it needs to start up and run DOS, including BOOT.SV and the Command Line Interpreter.

24. Bring up the starter system on the hard disk by typing:

BOOT DH0:MBOOTSYS) (for microNOVA)

or

BOOT DP1:BOOTSYS) (for NOVA)

MASTER DEVICE RELEASED

DOS REV 3.00
DATE (M/D/Y)?

25. Type in the date again; for example:

9 1 78)

TIME (H:M:S)?

26. Type in the time; for example:

15 10)

The starter system invokes the CLI, which issues the prompt:

R

The diskette has been released and the starter system is now running from the hard disk. The starter system is stored under the filename MBOOTSYS.SV; its overlays are in file MBOOTSYS.OL (BOOTSYS.SV and BOOTSYS.OL for NOVA systems).

Loading the Utilities

Now, you need to copy the DOS utility files from the UTILITIES diskette to your hard disk.

27. Remove MY STARTER DISKETTE or the DG STARTER diskette from DP0 and store it safely. Insert the DG-supplied UTILITIES diskette in drive DP0. Don't cover the write-protect hole.

28. Initialize the UTILITIES diskette and copy the files over by typing:

```
INIT DP0)
WARNING: DISKETTE WRITE PROTECTED
R
LOAD/V DP0:UTILITIES)
.
. (The CLI verifies files copied.)
.
R
```

29. Release the DG UTILITIES diskette by typing:

```
RELEASE DP0)
R
```

Remove the DG UTILITIES diskette from DP0 and store it safely.

30. Turn the diskette drive(s) OFF. On a NOVA system, dial 0 on the hard-disk thumbwheel and 1 on the diskette drive that was 0. This makes the cartridge disk's name "DP0", and the first diskette drive's name "DP1"; if you have a second diskette drive, it remains "DP2". A microNOVA hard-disk cartridge remains "DH0" and the diskette drives remain "DP0" and "DP1".

Your starter system, SYSGEN libraries, and utilities (explained in Table 2-2) are complete on the disk cartridge. You're done with the preparation, and you're ready to generate a tailored DOS system. This will be MUCH easier than what you've done already. If you want to generate a tailored system now, go to Chapter 5.

If you want to rest for a while, type:

```
RELEASE DH0) (for microNOVA)
```

or

```
RELEASE DP0) (for NOVA)
```

The RELEASE command terminates DOS operations. DOS displays a sign-off message:

```
MASTER DEVICE RELEASED
```

and halts. Later, you'll need to bring up the starter system (MBOOTSYS or BOOTSYS) to generate your tailored system. You'll use the normal program-load sequence, which is covered at the beginning of Chapter 5.

Table 2-4 summarizes the steps you take to run DOSINIT, install the bootstrap root, and install the starter system. When you have a DOS system running, you need not execute all these steps to ready a new disk or diskette for use; instead you can use the CLI command BOOT DOSINIT) to run DOSINIT or BOOT BOOT) to install a bootstrap root.

Table 2-4. Installing the Starter System on a Cartridge Disk

1. Turn system console on and place it ON-LINE. Set uppercase mode if this applies; press VIEW MODE switch for a DASHER console.
2. For NOVA systems, dial 1 on hard disk drive selector, 0 on diskette drive, 2 on other diskette drive (if any). All systems: disk cartridge in place, power switch ON, LOAD/READY switch to READY, READY light on.
3. Turn diskette drive ON; find appropriate DG-supplied STARTER diskette and insert it in diskette drive DP0. Close drive door.
4. For microNOVA, turn computer power to RUN and follow program-load steps:
 - a. With hand-held console, press RESET, CLR D, enter 33, press PR LOAD.
 - b. With console debug, type 33L).
 - c. With CPU program load, press rocker switch to PL/START.
5. For NOVA, turn the computer power switch to ON, and execute program load steps:
 - a. With automatic program load, set switches to 100033 octal (switches 0, 11, 12, 14, 15 up, the rest down). Lift RESET, then PROGRAM LOAD.
 - b. Without automatic program load, execute step 5 as described earlier in full.
6. *FILENAME? DOSINIT)*
7. *DOSINIT REV x.xx
DISK DRIVE MODEL NUMBER?*
8. If you have two diskette drives, continue; if not, go to step 9, but follow instructions PERFECTLY.
 - a. Tape write-protect hole on blank Data General diskette, attach label which says MY STARTER DISKETTE, place in DP1 (microNOVA) or DP2 (NOVA), and close door.
 - b. 6038) (for microNOVA)
6030) (for NOVA)

DISK UNIT?
 - c. DP1) (for microNOVA)
DP2) (for NOVA)
 - d. *COMMAND? FULL)*

FULL INIT DESTROYS ANY PREVIOUS
 - e. *DO YOU REALLY WANT A FULL INIT? YES)*

****PATTERN # 1 (125252) ****

FULL INIT COMPLETE
 - f. *COMMAND? COPY)*

*COPY DISKETTE IS ON MP1 (or DP2 for NOVA)
NOW TELL ME ABOUT THE ORIGINAL DISKETTE
DISK DRIVE MODEL NUMBER?*
 - g. 6038) (for microNOVA)
6030) (for NOVA)

Table 2-4. Installing the Starter System on a Cartridge Disk (continued)

8. h. *DISK UNIT?* DP0)
I AM ABOUT TO COPY MP0 TO MP1 (DP0 TO DP2 on NOVA)
- i. *IS THIS CORRECT?* YES)
- (pause)
*I HAVE FINISHED MAKING YOUR COPY
COMMAND?*
- j. Remove original DG diskette from slot DP0, and replace it with the copy (from DP1 or DP2). Store DG diskette safely.
- k. DISK)
- DOSINITREV x.xx*
9. *DISK DRIVE MODEL NUMBER?* 6095) (for microNOVA)
6045) (for NOVA)
10. *DISK UNIT?* DH0) (microNOVA)
DP1) (NOVA)
11. *COMMAND?* FULL)
- FULL INIT DESTROYS ANY PREVIOUS DISK/DISKETTE STRUCTURE.*
.....
- a. *DO YOU REALLY WANT A FULL INIT (YES OR NO)?* YES)
- b. *NUMBER OF PATTERNS TO RUN (1-5)?* 5)
- *** PATTERN NUMBER 1 (125252) ****
**** PATTERN NUMBER 2 (052525) ****
- *** ALL PATTERNS RUN ****
- c. *DO YOU WISH TO DECLARE ANY BAD BLOCKS BAD THAT
ARE NOT ALREADY IN THE BAD BLOCK TABLE?* NO)
- DEFAULT REMAP AREA IS 12 BLOCKS LONG
IT NEEDS TO BE AT LEAST nn BLOCKS LONG*
- d. *REMAP AREA SIZE (TYPE RETURN FOR DEFAULT)?*)
- DEFAULT FRAME SIZE IS 53
MIN IS 1 AND MAX IS 816*
- e. *DISK FRAME SIZE (TYPE RETURN FOR DEFAULT)?*)
- FULL INIT COMPLETE*
- f. *COMMAND?* DISK)
- DOSINITREV x.xx*
- g. *DISK DRIVE MODEL NUMBER?* 6095) (for microNOVA)
6045) (for NOVA)
- h. *DISK UNIT?* DH0F) (for microNOVA)
DP1F) (for NOVA)
- i. Execute steps 11 through 11e, then type STOP).

Table 2-4. Installing the Starter System on a Cartridge Disk (continued)

12. For microNOVA, execute step 4; for NOVA, execute step 5.

13. *FILENAME?* BOOT)

BOOT REV x.xx

14. *BOOTSTRAP DEVICE SPECIFIER?* DH0) (for microNOVA)
 DP1) (for NOVA)

15. *INSTALL BOOTSTRAP (Y OR N)?* Y

DONE.

16. *BOOTSTRAP DEVICE SPECIFIER?* DH0F)(for microNOVA)
 DP1F)(for NOVA)

17. *INSTALL BOOTSTRAP (Y OR N)?* Y

DONE.

18. *BOOTSTRAP DEVICE SPECIFIER?* DP0)

INSTALL BOOTSTRAP (Y OR N) N

19. *FILENAME?* MBOOTSYS) (for microNOVA)
 BOOTSYS) (for NOVA)

DOS REV 3.00

20. *DATE (M/D/Y)?* 9 1 78) (enter date)

21. *TIME (H:M:S)?* 15 05) (enter time)

R

22. INIT/F DH0) (for microNOVA)
MOVE/V DP0) (for NOVA)

R

23. MOVE/V DH0) (for microNOVA)
MOVE/V DP0) (for NOVA)

. (verification of files copied to cartridge)

R

24. BOOT DH0:MBOOTSYS) (for microNOVA)
BOOT DP0:BOOTSYS) (for NOVA)

MASTER DEVICE RELEASED

DOS REV 3.00

25. *DATE (M/D/Y)?* 9 1 78) (Enter date.)

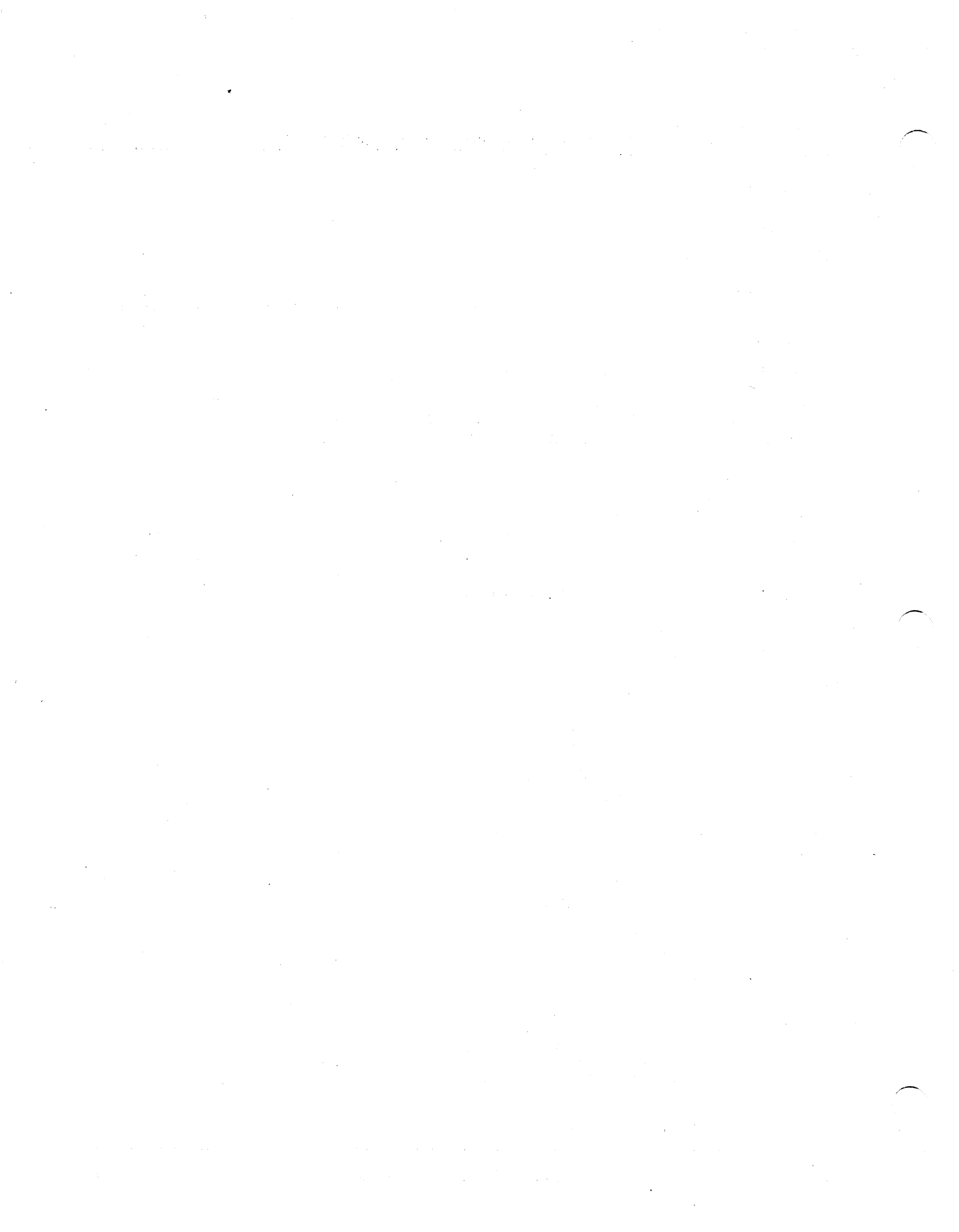
26. *TIME (H:M:S)?* 15 10) (Enter time.)

R

Table 2-4. Installing the Starter System on a Cartridge Disk (continued)

27. Remove MY STARTER DISKETTE or original DG STARTER diskette from DP0; insert DG UTILITIES diskette drive 0.
28. INIT DP0)
WARNING: DISKETTE WRITE PROTECTED
R
LOAD/V DP0:UTILITIES)
. (verification of files loaded onto cartridge)
R
29. RELEASE DP0)
R
Remove the DG utilities diskette from DP0; store safely.
30. Turn the diskette drive(s) OFF. For NOVA systems, dial 0 on hard-disk thumbwheel; dial 1 on diskette drive that was 0.

End of Chapter



Chapter 3

Preparing for System Generation with Diskette-based microNOVA Hardware

This chapter explains the steps you must execute before you generate your first DOS system on diskette-based microNOVA equipment.

We assume that you have the following hardware:

- microNOVA computer;
- diskette unit with two drives;
- system console -- teletypewriter or keyboard/display terminal.

You should have three (absolute minimum of two) properly-formatted blank diskettes (preferably Data General diskettes) to generate your first system.

Before you generate a DOS system, you prepare several blank diskettes using the DOS initializer program, DOSINIT.SV. (This is required procedure for *any* diskette you plan to use in your system.) Then, you install a *bootstrap root* program on these diskettes. Then you install the DOS starter system; the starter system allows you to load other programs, and to generate your tailored DOS system.

In this chapter, we tell you to prepare three diskettes with DOSINIT.SV. You'll be using one diskette to copy a Data General diskette, one for system generation, and one for your optimized system diskette. You *can* generate a system using only two blank diskettes if you don't want to set up the new system for optimum performance.

The procedures described in this chapter assume that your diskette subsystem contains two drives, and that it is connected to device code 33 octal, as explained below. (You can, of course, have up to four subsystems, but at least one dual-drive subsystem must be connected to device code 33 octal.)

Controller Device Code

Before your system can do anything, the diskette controller must be connected to the first device code, 33. The easiest way to check this is to skip to the "Running DOSINIT" section; then, as the text describes them, execute steps 1-5. If step 5 works as

described, your controller is properly wired, and you can ignore the following paragraphs. To check the controller connections, turn diskette power OFF, then open the clips at the side of the chassis and slide the diskette chassis out of its housing. Remove the flat metal cover (secured by four screws), and find the W-series jumper holes near the center of the PC board beneath the cover. There should be a connecting wire (jumper) between the following pairs of holes:

W5 W6 W8 W9

One jumper should connect the W5 holes, another jumper the W6 holes, and so on. There should *not* be a jumper between the following pairs of holes:

W7 W10

If the jumpers are not arranged this way, insert them as described. These jumpers select the first device code, 33.

Now, find holes W1 and W11, which are near the right front of the board. If the hole between jumper W1 and W11 is connected to W1, this makes the left-hand drive DP0 and the right-hand drive DP1. On the other hand, if the hole connects to W11, the right drive is DP0 and the left drive is DP1. You can choose the arrangement you want (a jumper to W1, which makes the left drive DP0, is conventional). If you change this jumper, be sure to label drives DP0 and DP1 properly.

After you verify (or correct) the jumpers, replace the metal lid, and slide the chassis back into its housing. When the jumpers are properly positioned, you need not disturb them again.

CPU Board

Read this section only if you have the CPU program load option (not the hand-held console or console debug options). To load programs, the jumpers on your microNOVA CPU control board must be set properly. As with the diskette controller board above, the easiest way to check this is simply to proceed and execute the steps under "Running DOSINIT"; if step 5 doesn't work as described and the jumpers are correct on the diskette board, you should check the jumpers on the CPU board. (Turn the power off first.)

Pull down the lever on the right-hand side of the computer housing, and swing the computer front panel out on its hinge. Locate the CPU board on the bottom left of the main chassis, and slide the board out of its slot. On this board, there are several groups of W-series jumpers. Find the largest group (W-12, W-15 series). There should be jumpers between these pairs of holes:

W12 W13 W15 W16

These, and no other jumpers, should be in. Now, locate the W-4 group of holes. Jumpers should connect these holes:

W4 W8

On another section of the board, jumper

W5

should be in. There should be no other W-series jumpers connected on the CPU board. If the jumpers are not arranged as described, fix them. You need not disturb them again. Jumper W10, which can later allow a system to restart automatically after a prolonged power failure, must not be in for SYSGEN. For more detail on jumpers, see the *microNOVA Computer Systems Technical Reference Manual* (014-000073).

Loading Programs

Before you can proceed, you must know how to load a program into your microNOVA's memory. This requires two steps. For the first step, you turn ON the diskette drive, then place a diskette in the left-hand diskette drive (DP0) and turn the diskette drive ON. For the second step, you manipulate controls that tell the microNOVA to begin the load.

Inserting a Diskette

Follow these steps to insert a diskette in a drive and prepare the drive for operation:

- Turn diskette power switch to ON. The POWER ON indicator will glow.
- Remove a diskette from its paper storage envelope. If you plan to write data to this diskette, cover the *write-protect* hole at the edge of the envelope with a piece of opaque tape. Data General supplies such tape with its diskettes. Wrap the tape over the edge so that both sides of the hole are covered. (In most cases, you will want to cover the write-protect hole because you cannot start DOS up from a diskette with an open hole.)
- Open the drive door by depressing the latch below the door.

- If there is no label on the inner envelope, affix one. Lay the diskette down with the write-protect hole facing away from you and apply the label as shown in Figure 3-1.

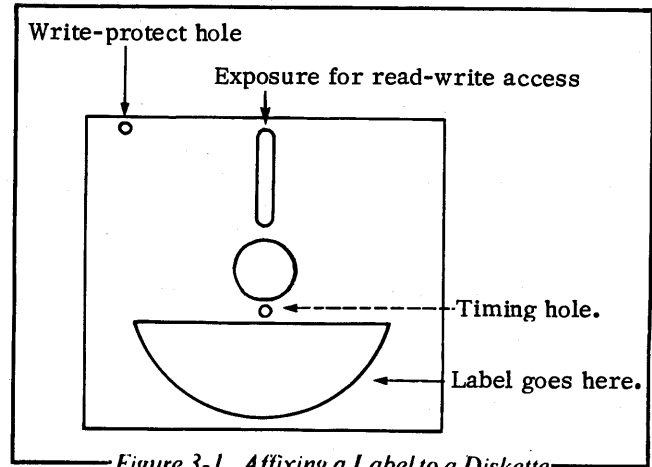


Figure 3-1. Affixing a Label to a Diskette

Don't cover the timing hole or read-write access exposure with the label. If you know what you'll be writing on the diskette, write this on the label *with a felt-tipped pen*. Never use anything else to write on a diskette. If you don't know exactly what you'll be storing on this diskette, leave the label blank and fill it in later, when you do know.

- Slide the diskette into the drive with the label on the envelope facing up, as shown in Figure 3-2. The diskette should slide in smoothly and come to a positive stop in the drive.

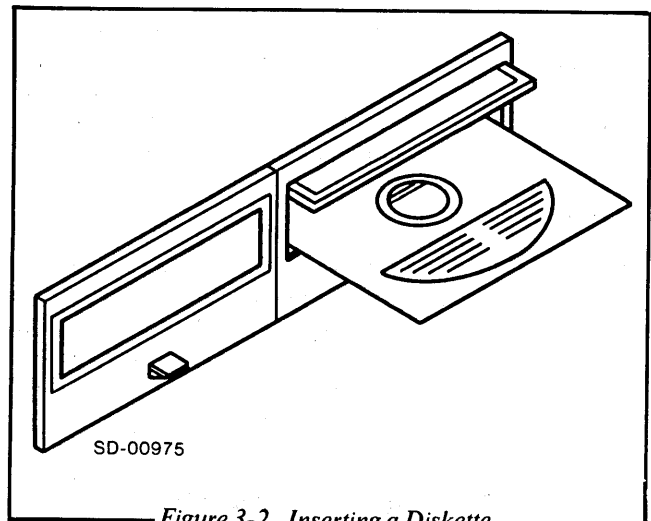


Figure 3-2. Inserting a Diskette

- Close the drive door so that it latches shut. The READY light will glow. If you left the write-protect hole open, the WRITE LOCK light will also glow.

The diskette drive is now ready to execute commands.

Program Load

To load any program from diskette, you must tell the CPU to read a short loader program from diskette into memory. The way you do this depends on your microNOVA hardware configuration. First, turn the microNOVA power key to RUN; then:

- If your microNOVA has a hand-held console, press the RESET key, then the CLR D key. Then, enter 33 in the display (press 3 twice); then, press the PR LOAD key.
- If you lack the hand-held console, but have the console debug interface to the terminal control board, type:

33L)

on the system console.
- If you have neither of the above, you must have the CPU program load option. Press the rocker switch on the front panel to the PL/START position (it will return to neutral afterward).

The appropriate procedure above reads a loader program into the microNOVA's memory; this loader then loads a larger loader program. The larger loader program asks what program you want, then uses your answer to load the desired program. You'll be using the system console until you are done with the desired program; then you'll repeat the loading steps above to load another program.

Figure 1-1 shows a microNOVA front panel with hand-held console and rocker switch from CPU program load.

Diskette Drive Numbers

All DOS operations, including SYSGEN, will be easier if you label your diskette drives. Often, the left drive is drive 0 (named DP0) and the right drive is drive 1 (DP1). Make up labels which say "DP0" and "DP1"; place label DP0 above the left slot and DP1 above the right slot. If this is wrong, step 5 below will tell you so; you can then switch the labels. If you have more than two drives, you can label the others later.

The System Diskettes

Data General supplies several system diskettes, each of which has several programs written on it. Table 3-1 shows the contents of the microNOVA diskette, which you'll be using in this chapter. (We show the UTILITIES diskette in Chapter 7 under "Loading the Utilities".) You may also have received additional DOS software on other diskettes. Check the Release Notice provided with your system for the numbers of these diskettes, and verify that the numbers on the diskettes themselves match these numbers.

Table 3-1. Content of Data General microNOVA or NOVA STARTER Diskette

Program Filename	Program(s) Purpose
DOSINIT.SV	A disk initializer that you must run on a disk or diskette before you can use it.
BOOT.SV	BOOT can either install a loader root program on disk or diskette or start up DOS from a disk or diskette.
MBOOTSYS.SV, MBOOTSYS.OL	Starter system save and overlay files on microNOVA STARTER diskette.
BOOTSYS.SV, BOOTSYS.OL	Starter system save and overlay files on NOVA STARTER diskette.
CLI.SV, CLI.OL, CLI.ER	The Command Line Interpreter (CLI) save, overlay, and error files. The CLI allows you to communicate with DOS from the console.
MDOSA.LB, MDOSC.LB, MDOSI.LB, MDOSO.LB	SYSGEN libraries on microNOVA STARTER diskette.
DOSA.LB, DOSB.LB, DOSC.LB, DOSI.LB, DOSO.LB	SYSGEN libraries on NOVA STARTER diskette. SYSGEN uses the SYSGEN libraries to build a tailored DOS system.
RLDR.SV, RLDR.OL	The relocatable loader files. SYSGEN uses the loader to build your DOS system from the library files.
SYSGEN.SV	This program asks you questions and uses your answers to build a tailored DOS system.
ALMSPD.SR	Source (parameter) file for Asynchronous Line Multiplexor (ALM) line configuration.
ALMSPD.RB	Assembled binary file for ALM. More about these ALM files later.

Running DOSINIT

Now, you're ready to proceed. Follow these steps:

1. Turn system console on and place it ON-LINE. If this is an upper/lowercase console, set it in ALPHA LOCK because some of the programs you'll be using don't accept lowercase letters. If your console is a DASHER, press the VIEW MODE rocker switch so you can easily verify what you've typed.
2. Tape the write-protect holes on three blank diskettes and affix labels to them as described earlier. (If you are not using certified Data General diskettes, you must run the appropriate diskette formatter program on these diskettes. See the diskette formatter listing, part number 096-000300, for operating instructions. This applies to all non-Data General diskettes you will use on the system.)

Using a felt-tipped pen, write on one of these diskette labels "MY STARTER DISKETTE" (or an equivalent name), and the date. On another label, write "MY BACKUP DISKETTE" and the date; on the third, write "MY SYSTEM DISKETTE" and the date.

3. Turn diskette drive ON. Insert the microNOVA STARTER diskette in the drive which you labeled DP0. Don't tape the write-protect hole on this diskette. When you close the drive door, the READY light should be lit.
4. Insert your MY STARTER DISKETTE in the right-hand drive (which you labeled DP1) and close the door. The DP1 READY light should be lit.
5. Turn the computer power switch to RUN (if it isn't already there), then follow the appropriate program load steps:
 - a. If you have the hand-held console, press the RESET key, then the CLR D key. Enter 33 in the display, then press the PR LOAD key. Go to step 6.
 - b. If you lack a hand-held console, but have the console debug option, type:

33L)

on the system console. Go to step 6.
 - c. If you lack the hand-held console and console debug option, press the front panel rocker switch to the PL/START position. Go to step 6.

6. The computer now reads program BOOT.SV from the starter diskette. BOOT.SV types out on the system console:

FILENAME?

(If nothing happens, open the diskette doors, swap the diskettes, and try step 5 again. If this works, your right drive is DP0 and left drive DP1. You can either switch the drive labels and proceed, or change the drive connector jumper as described earlier. If swapping the diskettes doesn't work, go back to the "Controller Device Code" section and check the hardware jumpers. If the jumpers are correct, try taping the right-protect hole on the DG diskette -- but follow instructions PERFECTLY.) Answer the question with DOSINIT's name:

DOSINIT)

7. BOOT.SV now reads DOSINIT.SV into memory. DOSINIT then announces itself and asks for the model number of your diskette drive:

DOSINIT REV x.xx (x.xx is the revision number.)

DISK DRIVE MODEL NUMBER?

Type 6038, the model number of your diskette drive:

6038)

If you give an invalid response, DOSINIT will type out an appropriate error message and repeat the question. If you make a typing mistake, press the RUBOUT key to erase characters one-by-one. On hardcopy consoles, RUBOUT echoes a backarrow for each character erased.

8. Now, DOSINIT types:

DISK UNIT?

which is a request for the mnemonic of the drive holding the blank diskette. This is DP1, so type:

DP1)

9. DOSINIT now requests a command, and you type FULL:

COMMAND? FULL)

With this, you request a full initialization of your disk. DOSINIT will ask for verification, then check the diskette for *bad blocks* (portions that will not

retain information). If does this by writing patterns to the diskette and reading them back. Follow the steps shown in Table 3-2, below. Each pattern takes about a minute to run, so don't be alarmed when you have to wait. If DOSINIT finds bad blocks on any diskette, you'll need to use another diskette.

(Label it first.) Later, you can run the formatter program on this diskette, then try DOSINIT on it again.

If the dialog varies from that shown in the table, consult Chapter 8 for recovery procedures.

Table 3-2. Creating MY STARTER DISKETTE and Initializing Three Blank Diskettes with DOSINIT.SV

9. *COMMAND?* FULL)

*FULL INIT DESTROYS ALL PREVIOUS DISKETTE STRUCTURE.
DOS INITIF MUST BE ISSUED AFTER FULL INIT.
DO YOU REALLY WANT A FULL INIT? (YES OR NO)*

a. Type: YES)

**** PATTERN # 1 (125252) ***
*** PATTERN # 2 (052525) ***
*** PATTERN # 3 (155555) ***
*** PATTERN # 4 (000000) ***
*** PATTERN # 5 (177777) ****

**** ALL PATTERNS RUN ****

FULL INIT COMPLETE

COMMAND?

b. Type: COPY)

*COPY DISKETTE IS ON DRIVE MP1
NOW TELL ME ABOUT THE ORIGINAL DISKETTE
DISK DRIVE MODEL NUMBER?*

c. Type: 6038)

DISK UNIT?

d. Type: DP0)

*I AM ABOUT TO COPY MP0 TO MP1 IS THIS CORRECT?
ANSWER (YES) TO CONTINUE (NO) TO STOP*

e. Type: YES)

DOSINIT now copies the DG STARTER diskette, which takes a few moments. Then it says:

*I HAVE FINISHED MAKING YOUR COPY
COMMAND?*

f. Remove the DG STARTER diskette from DP0, replace it in the envelope, and store it safely. Take your labeled MY STARTER DISKETTE from the other drive (DP1), insert it in drive DP0, and close the door to DP0.

Take the blank diskette which you labeled MY BACKUP DISKETTE, insert it in DP1, and close the door to DP1.

Table 3-2. Creating MY STARTER DISKETTE and Initializing Three Blank Diskettes with DOSINIT.SV (continued)

9. g. Type: FULL)

*FULL INIT DESTROYS ALL PREVIOUS ...
DOS INIT IF MUST BE DONE ...
DO YOU REALLY WANT A FULL INIT (YES OR NO)?*

h. Type: YES)

**** PATTERN # 1 (125252) ****

. (DOSINIT runs patterns.)

*FULL INIT COMPLETE
COMMAND?*

i. Remove MY BACKUP DISKETTE from DP1 and insert MY SYSTEM DISKETTE in DP1.

j. Type: FULL)

FULL INIT DESTROYS

k. *DO YOU REALLY WANT A FULL INIT? YES)*

. (DOSINIT runs patterns.)

*FULL INIT COMPLETE
COMMAND?*

l. Type: STOP)

Installing the Bootstrap Root

Next, you'll want to put the disk bootstrap root on your diskettes. Later, this will allow you to start up your DOS system from any of these diskettes. Your MY SYSTEM DISKETTE should still be in DP1.

10. Repeat the proper program load steps for your hardware:

- a. If you have a hand-held console, press the RESET key, then the CLR D key. Enter 33 in the display, then press PR LOAD. Go to step 11.
- b. If you lack the hand-held console, but have the console debug option, type:

33L)

on the system console. Go to step 11.

- c. If you lack both options above, you have CPU program load. Press the front panel rocker switch to PL/START position. Go to step 11.

11. This brings BOOT.SV into memory again; it asks for the filename of the program you want:

FILENAME?

Type BOOT, the filename of the bootstrap root installer.

BOOT)

12. This loads the installer, which asks:

BOOTSTRAP DEVICE SPECIFIER?

Respond with:

DP1)

for the diskette in DP1.

13. The installer then asks:

INSTALL BOOTSTRAP (Y OR N)?

Type:

Y

This writes the bootstrap root on the diskette, and BOOT says:

DONE.

BOOTSTRAP DEVICE SPECIFIER?

14. Remove MY SYSTEM DISKETTE from DP1 and insert MY BACKUP DISKETTE in DP1.

15. Type:

DP1)

INSTALL BOOTSTRAP (Y OR N)?

16. Type:

Y

DONE.

BOOTSTRAP DEVICE SPECIFIER?

Bringing Up the DOS Starter System

At this point, you're ready to bring up the DOS starter system. Your MY BACKUP DISKETTE should still be in DP1.

17. Force BOOT to ask FILENAME? by typing:

DP0)

INSTALL BOOTSTRAP (Y OR N)

Type:

N

18. BOOT now asks:

FILENAME?

Respond with the starter system name, MBOOTSYS:

MBOOTSYS)

BOOT now loads the starter system into the computer. This takes a few moments. The starter system announces itself and asks for the date:

MICRONOVA DOS REV 3.xx

DATE (M/D/Y)?

19. Enter the current date, in the format "month date year"; for example:

9 1 78)

Next, it asks for the time:

TIME (H:M:S)?

20. Type in the time, in the format "hours-in-24 minutes seconds". The seconds entry is optional; for example:

15 05)

MBOOTSYS now proceeds to invoke the Command Line Interpreter (CLI). When the CLI types its prompt letter:

R

MBOOTSYS is running from DP0.

21. MY BACKUP DISKETTE should still be in DP1. Make this diskette available to DOS by typing:

INIT/F DP1)

R

INIT/F writes a new file directory to the diskette. You must use this after running the DOSINIT FULL command on a diskette, but you should never use it on a diskette which holds valuable data because it effectively destroys all files on the diskette.

At this point, you're done with the preparation procedure. If you want to generate a tailored system now, go to Chapter 5.

If you want to rest for a while, type:

RELEASE DP0)

This terminates DOS operations. DOS displays a sign-off message:

MASTER DEVICE RELEASED

and halts. Later, you'll need to bring MBOOTSYS up again to generate your tailored system. You'll use the normal program-load sequence, covered at the beginning of Chapter 5.

Table 3-3 summarizes the steps you take to run DOSINIT, install bootstrap root, and install the starter system on diskette. When you have a DOS system running, you need not execute all these steps to ready a diskette; instead you can use the CLI command BOOT (DOSINIT) to run DOSINIT or BOOT BOOT) to install a bootstrap root.

Table 3-3. Preparing for SYSGEN on a Diskette-Based microNOVA Configuration

1. Turn system console on and place it ON-LINE. Set uppercase mode if this applies; press VIEW MODE switch for a DASHER console.
2. Tape write-protect holes on three diskettes; affix blank labels to them as described earlier.

With a felt-tipped pen, write MY STARTER DISKETTE on one of these labels, MY BACKUP DISKETTE on another label, and MY SYSTEM DISKETTE on a third.
3. Turn diskette drive ON; find the DG-supplied microNOVA STARTER diskette and insert it in drive DP0. Close drive door.
4. Insert MY STARTER DISKETTE from step 2 in the drive DP1. Close door.
5. Turn the computer power switch to RUN and follow program load steps:
 - a. With hand-held console, press RESET, CLR D, enter 33, press PR LOAD.
 - b. With console debug, type 33L).
 - c. With CPU program load, press rocker switch to PL/START.
6. *FILENAME?* DOSINIT)

*DOSINITREV*x.xx
7. *DISK DRIVE MODEL NUMBER?* 6038)
8. *DISK UNIT?* DP1)

Table 3-3. Preparing for SYSGEN on a Diskette-Based microNOVA Configuration (continued)

9. *COMMAND? FULL*)

*FULL INIT DESTROYS ANY PREVIOUS DISK/DISKETTE STRUCTURE
DOS INIT/F MUST BE ISSUED AFTER FULL INIT.*

a. *DO YOU REALLY WANT A FULL INIT? (YES OR NO) YES*)

****PATTERN # 1 (125252) ***
***PATTERN # 2 (052525) ***
***PATTERN # 3 (155555) ***
***PATTERN # 4 (000000) ***
PATTERN # 5 ((177777) *

**** ALL PATTERNS RUN ****

FULL INIT COMPLETE

b. *COMMAND? COPY*)

*COPY DISKETTE IS ON MP1
NOW TELL ME ABOUT THE ORIGINAL DISKETTE*

c. *DISK DRIVE MODEL NUMBER? 6038*)

d. *DISK UNIT? DP0*)

I AM ABOUT TO COPY MP0 TO MP1. IS THIS CORRECT?

e. *ANSWER (YES) TO CONTINUE (NO) TO STOP YES*)

(Pause for copying)

*I HAVE FINISHED MAKING YOUR COPY
COMMAND?*

f. Remove the DG STARTER diskette from DP0, replace it in the envelope, and store it safely. Move MY STARTER DISKETTE from DP1 to DP0. Insert blank MY BACKUP DISKETTE in DP1.

g. Type: FULL)

*FULL INIT DESTROYS ANY PREVIOUS
DOS INIT/F MUST BE DONE...*

h. *DO YOU REALLY WANT A FULL INIT (YES OR NO)? YES*)

****PATTERN # 1 (125252) ***
(DOSINIT runs patterns)*

*FULL INIT COMPLETE
COMMAND?*

i. Remove MY BACKUP DISKETTE from DP1 and insert MY SYSTEM DISKETTE in DP1.

j. Type: FULL)

FULL INIT DESTROYS...

Table 3-3. Preparing for SYSGEN on a Diskette-Based microNOVA Configuration (continued)

```
9. k. DO YOU REALLY WANT A FULL INIT? YES)

    ***PATTERN # 1 (125252) ***
    (patterns run)

    .

    FULL INIT COMPLETE

    l. COMMAND? STOP)

10. Program-load by executing step 5.

11. FILENAME? BOOT)

12. BOOTSTRAP DEVICE SPECIFIER? DP1)

13. INSTALL BOOTSTRAP (Y OR N)? Y

    DONE.
    BOOTSTRAP DEVICE SPECIFIER?

14. Remove MY SYSTEM DISKETTE from DP1; insert MY BACKUP DISKETTE in DP1.

15. Type: DP1)

16. INSTALL BOOTSTRAP (Y OR N)? Y

    DONE.
    BOOTSTRAP DEVICE SPECIFIER?

17. Type: DP0)

    INSTALL BOOTSTRAP (Y OR N)? N

18. FILENAME? MBOOTSYS)

    (pause)
    MICRONOVA DOS REV 3.xx

19. DATE (M/D/Y)? 9 1 78) (Enter date.)

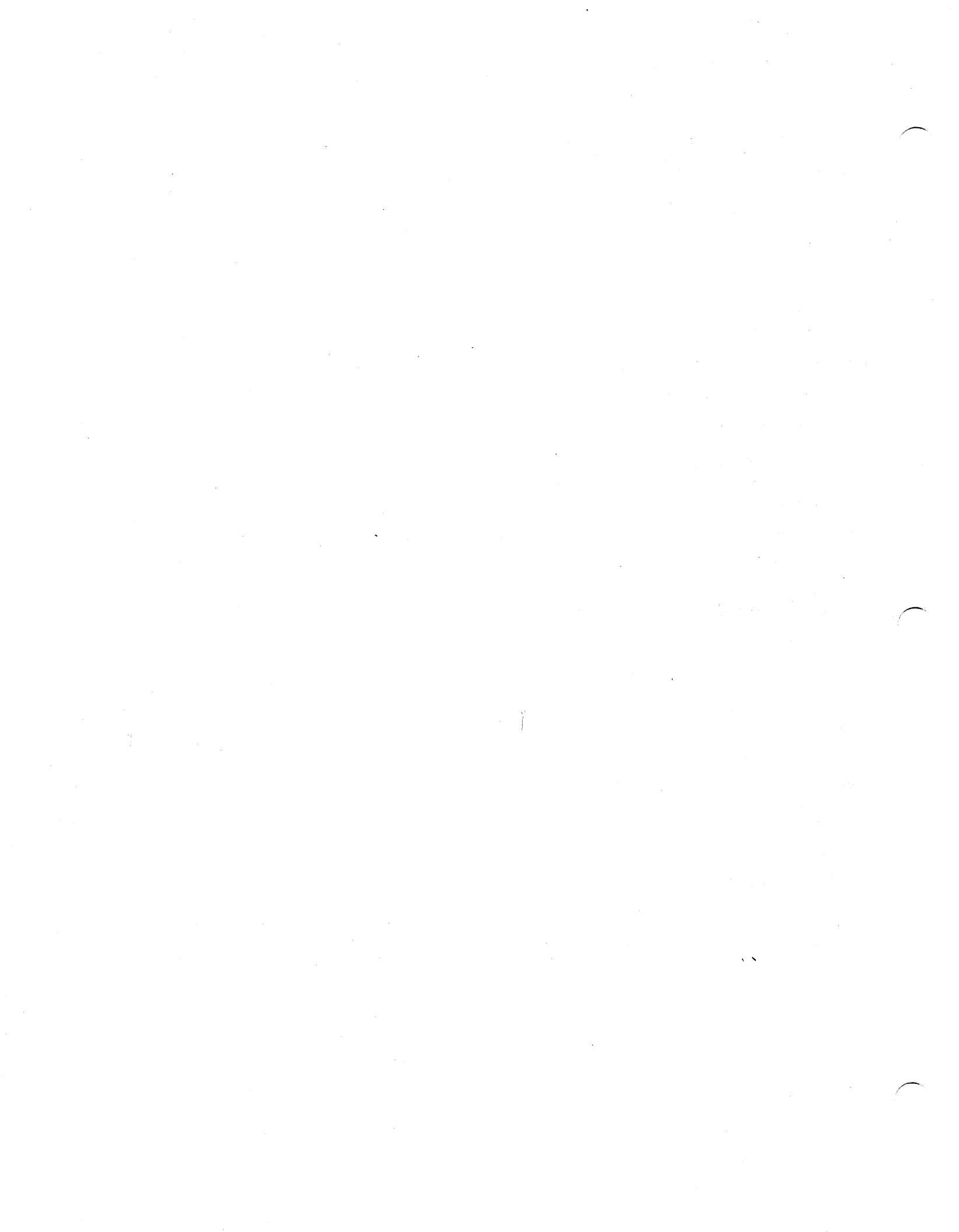
20. TIME (H:M:S)? 15 05) (Enter time.)

    R

21. Type: INIT/F DP1)

    R
```

End of Chapter



Chapter 4

Preparing for System Generation with Diskette-based NOVA Hardware

This chapter explains the steps you must execute before you generate your first DOS system on diskette-based NOVA equipment.

We assume that you have the following hardware:

- NOVA computer;
- diskette unit with two drives;
- system console -- teletypewriter or keyboard/display terminal.

You should have three (absolute minimum of two) properly-formatted blank diskettes (preferably Data General diskettes) to generate your first system.

Before you generate a DOS system, you prepare three blank diskettes using the DOS initializer program, DOSINIT.SV. This is required procedure for any diskette you plan to use in your system. Then, you install a bootstrap root on two of these diskettes. Then you install the DOS starter system; the starter system allows you to load other programs, and to generate your tailored DOS system.

In this chapter, we tell you to prepare three diskettes with DOSINIT.SV. You'll be using one diskette to copy a DG diskette, one for system generation, and one for your optimized system diskette. You *can* generate a system using only two blank diskettes if you don't want to set up the new system for optimum performance.

Controller Device Code

Before your system can do anything, the diskette controller must be connected to the first device code, 33 octal. The easiest way to check this is to skip to the "Running DOSINIT" section; then, as the text describes them, execute steps 1-5. If step 5 works as described, your controller is properly wired, and you can proceed. If nothing happens, the diskette controller may be wired to the second device code, 73. We'll tell you how to check this later.

Diskette Drive Numbers

Throughout this chapter, we assume that the numbers on your diskette drive selectors are 0 and 1. Therefore, you should dial 0 on the left thumbwheel and 1 on the right thumbwheel. Drive 0 is called "DP0"; drive 1 is called "DP1". If you have more than two drives, leave them OFF or dial 2 or 3 on them.

Loading Programs

Before you can proceed, you must know how to load a program into your computer's memory. This requires two steps. For the first step, you turn the diskette ON and insert a diskette in drive DP0. For the second step, you manipulate controls that tell the computer to begin the load.

Inserting a Diskette

Follow these steps to insert a diskette in a drive and prepare the drive for operation:

- Turn diskette power switch to ON. The POWER ON indicator will glow.
- Make sure the thumbwheel for the left hand drive is on 0; the right hand drive has number 1. Note that the two drives should never have the same number when they are ON and on-line. (This would confuse the system.)
- Remove a diskette from its paper storage envelope. If you plan to write data to this diskette, cover the write-protect hole at the edge of the envelope with a piece of opaque tape. Data General supplies such tape with its diskettes. Wrap the tape over the edge so that both sides of the hole are covered. (In most cases, you will want to cover the write-protect hole because you cannot start DOS up from a diskette with an open hole.)
- Open the drive door by depressing the latch below the door.

- If there is no label on the inner envelope, affix one. Lay the diskette down with the write-protect hole facing away from you and apply the label as shown in Figure 4-1.

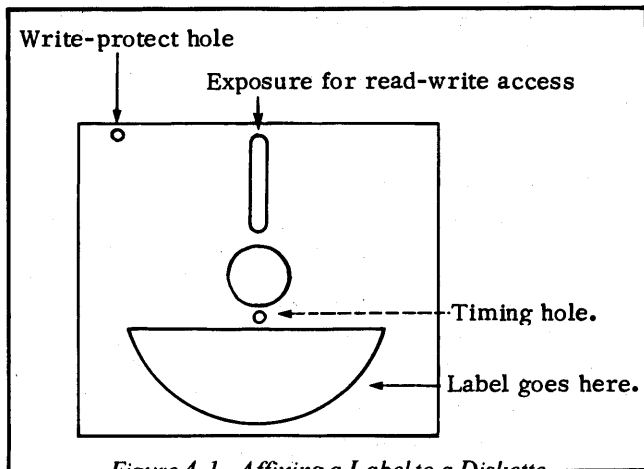


Figure 4-1. Affixing a Label to a Diskette

Don't cover the timing hole or read-write access exposure with the label. If you know what you'll be writing on the diskette, write this on the label *with a felt-tipped pen*. Never use anything else to write on a diskette. If you don't know exactly what you'll be storing on this diskette, leave the label blank and fill it in later, when you do know.

- Slide the diskette into the drive with the label on the envelope facing up, as shown in Figure 4-2. The diskette should slide in smoothly and come to a positive stop in the drive.

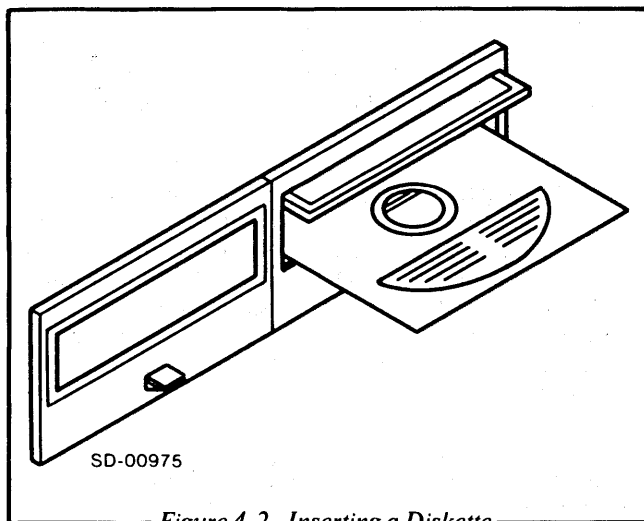


Figure 4-2. Inserting a Diskette

- Close the drive door so that it latches shut. The READY and TRACK0 lights will glow. If you left the write-protect hole open, the WRITE LOCK light will also glow.

To start up any program from diskette, the read-write head must be at TRACK0. If the TRACK0 light doesn't glow, open and shut the diskette door. This resets the read-write head to TRACK0.

The diskette drive is now ready to execute commands.

Loading Programs from Diskette

To load any program from diskette, you must tell the CPU to read a short loader program from diskette into memory. To do this, you'll use the switches on your computer's front panel. There are 16 toggle switches, numbered 0 through 15; these are the data switches and have two positions: up (on) and down (off). Other switches, like the RESET and PROGRAM LOAD switches, are center-neutral switches; you either lift them or depress them according to the command you want to give the machine.

First, turn the computer POWER key to ON; then

- If your machine has the automatic program load option, set its front panel data switches to 100033 octal (switches 0, 11, 12, 14 and 15 up, the rest down. Lift the RESET switch, then PROGRAM LOAD switch.
- If you lack automatic program load, execute the following steps:

Set the front panel data switches to 000376 octal (switches 8 through 14 up, the others down).

Lift the EXAMINE switch and, on a NOVA 3, hold it up; verify that the ADDRESS lights match the switch settings.

Set the data switches to 060133 octal (switches 1, 2, 9, 11, 12, 14 and 15 up, the others down).

Lift the DEPOSIT switch and hold it up (on a NOVA 3); verify that the lights match the switch settings.

Set the data switches to 000377 octal (switches 8 through 15 up, the others down).

Depress the DEPOSIT NEXT switch and hold it down (on a NOVA 3); verify that the lights match the switch settings.

Set the data switches to 000376 octal again (put down switch 15); lift and release the RESET switch, then the START switch.

The appropriate procedure above reads a loader program into the computer's memory; this loader then loads a larger loader program. The larger loader program asks what program you want, then uses your

answer to load the desired program. You'll be using the system console until you are done with the desired program; then you'll repeat the loading steps above to load another program.

For a picture of a NOVA computer front panel, see Figure 1-1.

The System Diskettes

Data General supplies several system diskettes, each of which has several programs written on it. Table 4-1

shows the contents of the STARTER diskette. You'll be using the NOVA STARTER diskette in this chapter. (We show the UTILITIES diskette in Chapter 7, under "Loading the Utilities".) You may also have received additional DOS software on other diskettes. Check the Release Notice provided with your system for the numbers of these diskettes, and verify that the numbers on the diskettes themselves match these numbers.

Table 4-1. Content of Data General microNOVA or NOVA STARTER Diskette

Program Filename	Program(s) Purpose
DOSINIT.SV	A disk initializer that you must run on a disk or diskette before you can use it.
BOOT.SV	BOOT can either install a loader root program on disk or diskette or start up DOS from a disk or diskette.
MBOOTSYS.SV, MBOOTSYS.OL	Starter system save and overlay files on microNOVA STARTER diskette.
BOOTSYS.SV, BOOTSYS.OL	Starter system save and overlay files on NOVA STARTER diskette.
CLI.SV, CLI.OL, CLI.ER	The Command Line Interpreter (CLI) save, overlay, and error files. The CLI allows you to communicate with DOS from the console.
MDOSA.LB, MDOSC.LB, MDOSI.LB, MDOSO.LB	SYSGEN libraries on microNOVA STARTER diskette.
DOSA.LB, DOSB.LB, DOSC.LB, DOSI.LB, DOSO.LB	SYSGEN libraries on NOVA STARTER diskette.
	SYSGEN uses the SYSGEN libraries to build a tailored DOS system.
RLDR.SV, RLDR.OL	The relocatable loader files. SYSGEN uses the loader to build your DOS system from the library files.
SYSGEN.SV	This program asks you questions and uses your answers to build a tailored DOS system.
ALMSPD.SR	Source (parameter) file for Asynchronous Line Multiplexor (ALM) line configuration.
ALMSPD.RB	Assembled binary file for ALM. More about these ALM files later.

Running DOSINIT

Now, you're ready to proceed. Follow these steps:

1. Turn your system console on and place it ON-LINE. If your system console is an upper/lowercase console, set it in ALPHA LOCK because one of the programs you'll be using doesn't accept lowercase letters. If this is a DASHER, press the VIEW MODE rocker switch so you can easily verify what you've typed.
2. Tape the write-protect holes on three blank diskettes and affix labels to them as described earlier. (If you are not using certified Data General diskettes, you must run the appropriate diskette formatter program on these diskettes. See the diskette formatter listing, part number 096-000300, for operating instructions. This applies to all non-Data General diskettes you will use on the system.)

Using a felt-tipped pen, write on one of these diskette labels "MY STARTER DISKETTE" (or equivalent name) and the date. On another label, write "MY BACKUP DISKETTE" and the date; on the third, write "MY SYSTEM DISKETTE" and the date.

3. Turn the diskette drive ON. Insert the NOVA STARTER diskette in drive DP0. Don't tape the write-protect hole on this diskette. When you close the drive door, the READY, TRACK0, and WRITE LOCK lights should be lit.
4. Insert your MY STARTER DISKETTE in drive DP1 and close the door. The READY and TRACK0 light should be lit for this drive.
5. Turn the computer power switch to ON (if it isn't already there), then follow the loading steps given earlier:

If you have automatic program load, make sure the data switches are set to 100033 octal (switches 1, 11, 12, 14, and 15 up, the others down). Lift the RESET switch, then the PROGRAM LOAD switch. Go to step 6.

If you lack automatic program load, execute the following steps:

- a. Set the front panel data switches to 000376 octal (switches 8 through 14 up, the others down).
- b. Lift the EXAMINE switch (hold it up on a NOVA 3); verify that the lights match the switch settings.
- c. Set the data switches to 060133 octal (switches 1, 2, 9, 11, 12, 14 and 15 up, the others down).

- d. Lift the DEPOSIT switch (hold it up on a NOVA 3); verify that the lights match the switch settings.
 - e. Set the data switches to 000377 octal (switches 8 through 15 up, the others down).
 - f. Depress the DEPOSIT NEXT switch (hold it down on a NOVA 3); verify that the lights match the switch settings.
 - g. Set the data switches to 000376 octal again (put switch 15 down); lift and release the RESET switch, then the START switch.
6. The computer now reads program BOOT.SV from the DG STARTER diskette. BOOT.SV types out on the system console:

FILENAME?

(If nothing happens, turn everything off, open and close both diskette doors and run through step 5 again. If this doesn't help, set data switch 10 up for step 5 -- or step 5c, without program load -- and try step 5 again. This selects device code 73 octal, the code of the second diskette controller.)

Answer the question with DOSINIT's filename.
Type:

DOSINIT)

7. BOOT.SV now reads DOSINIT.SV into memory. DOSINIT announces itself and asks for the model number of your diskette drive:

*DOSINIT REV*x.xx (x.xx is the
DISK DRIVE MODEL NUMBER? revision
 number.)

Type 6030, the model number of your diskette drive:

6030)

If you give an invalid response, DOSINIT will type out an appropriate error message and repeat the question. If you make a typing mistake, press the RUBOUT key to erase characters one-by-one. RUBOUT echoes a dash for each character erased.

8. Now, DOSINIT types:

DISK UNIT?

which is a request for the mnemonic of the drive holding the blank diskette. You want to initialize DP1, so type:

DP1)

9. DOSINIT now requests a command, and you type FULL:

COMMAND? FULL)

With this, you request a full initialization of your disk. DOSINIT will ask for verification, then check the diskette for *bad blocks* (portions that will not retain information). It does this by writing patterns to the diskette and reading them back. Follow the steps shown in Table 4-2, below. Each pattern takes about a minute to run, so don't be alarmed when you have to wait. If DOSINIT finds bad blocks on any diskette, you'll probably need to use another diskette. (Label it first.) Later, you can run the formatter program on this diskette, then try DOSINIT on it again.

If the dialog varies from that shown in the table, consult Chapter 8 for recovery procedures.

Table 4-2. Creating MY STARTER DISKETTE and Initializing Three Blank Diskettes with DOSINIT.SV

9. *COMMAND? FULL)*

*FULL INIT DESTROYS ALL PREVIOUS DISKETTE STRUCTURE.
DOS INIT/F MUST BE ISSUED AFTER FULL INIT.
DO YOU REALLY WANT A FULL INIT? (YES OR NO)*

- a. Type: YES)

**** PATTERN # 1 (125252) ***
*** PATTERN # 2 (052525) ***
*** PATTERN # 3 (155555) ***
*** PATTERN # 4 (000000) ***
*** PATTERN # 5 (177777) ****

**** ALL PATTERNS RUN ****

FULL INIT COMPLETE

COMMAND?

- b. Type: COPY)

*COPY DISKETTE IS ON DRIVE DP1
NOW TELL ME ABOUT THE ORIGINAL DISKETTE
DISK DRIVE MODEL NUMBER?*

- c. Type: 6030)

DISK UNIT?

- d. Type: DP0)

*I AM ABOUT TO COPY DP0 TO DP1. IS THIS CORRECT?
ANSWER (YES) TO CONTINUE (NO) TO STOP*

- e. Type: YES)

DOSINIT now copies the DG STARTER diskette, which takes a few moments. Then it says:

*I HAVE FINISHED MAKING YOUR COPY
COMMAND?*

- f. Remove the DG STARTER diskette from DP0, replace it in the envelope, and store it safely. Take your labeled MY STARTER DISKETTE from the other drive (DP1), insert it in drive DP0, and close the door to DP0.

Take the blank diskette which you labeled MY BACKUP DISKETTE, insert it in DP1, and close the door to DP1.

Table 4-2. Creating MY STARTER DISKETTE and Initializing Three Blank Diskettes with DOSINIT.SV (continued)

9. g. Type: FULL)
*FULL INIT DESTROYS ALL PREVIOUS...
DOS INIT/F MUST BE DONE...
DO YOU REALLY WANT A FULL INIT (YES OR NO)?*
- h. Type: YES)
****PATTERN # 1 (125252) ***
.
(DOSINIT runs patterns.)
.
FULL INIT COMPLETE
COMMAND?*
- i. Remove MY BACKUP DISKETTE from DP1 and insert MY SYSTEM DISKETTE in DP1.
- j. Type: FULL)
FULL INIT DESTROYS.....
- k. DO YOU REALLY WANT A FULL INIT? YES)
*.
(DOSINIT runs patterns.)
.
FULL INIT COMPLETE
COMMAND*
- l. Type: STOP)

Installing the Bootstrap Root

Next, you'll want to put the disk bootstrap root on your diskettes. Later, this will allow you to start up your DOS system from any of these diskettes. MY SYSTEM DISKETTE should still be in DP1.

10. If you have automatic program load, lift the RESET switch, then the PROGRAM LOAD switch. Go to step 11.

If you lack automatic program load, execute steps 5a through 5g, then come back to 11.

11. This brings BOOT.SV into memory again; it asks for the filename of the program you want:

FILENAME?

Type BOOT, the filename of the bootstrap root installer.

BOOT)

12. This loads the installer, which asks:

BOOTSTRAP DEVICE SPECIFIER?

Respond with:

DP1)

for the diskette in DP1.

13. The installer then asks:

INSTALL BOOTSTRAP (Y OR N)?

Type:

Y

This writes the bootstrap root on the diskette, and BOOT says:

*DONE.
BOOTSTRAP DEVICE SPECIFIER?*

14. Remove MY SYSTEM DISKETTE from DP1 and insert MY BACKUP DISKETTE in DP1.

15. Type:

DP1)

INSTALL BOOTSTRAP (Y OR N)?

16. Type:

Y

DONE.

BOOTSTRAP DEVICE SPECIFIER?

Bringing Up the DOS Starter System

At this point, you're ready to bring up the DOS starter system. Your MY BACKUP DISKETTE should still be in DP1.

17. Force BOOT to ask FILENAME? by typing:

DP0)

INSTALL BOOTSTRAP (Y OR N)?

Type:

N

18. BOOT now asks:

FILENAME?

Respond with the starter system name, **BOOTSYS**:

BOOTSYS)

BOOT now loads the starter system into the computer. This takes a few moments. The starter system announces itself and asks for the date:

NOVA DOS REV 3.xx

DATE (M/D/Y)?

19. Enter the current date, in the format "month date year"; for example:

9 1 78)

Next, it asks for the time:

TIME (H:M:S)?

20. Type in the time, in the format "hours-in-24 minutes seconds". The seconds entry is optional. For example:

15 05)

BOOTSYS now proceeds to invoke the Command Line Interpreter (CLI). When the CLI types its prompt letter:

R

BOOTSYS is running from DP0.

21. MY SYSTEM DISKETTE should still be in DP1. Make this disk available to DOS by typing:

INIT/F DP1)

R

INIT/F writes a new file directory to the diskette. You must use this after running the DOSINIT FULL command on a diskette, but you should never use it on a diskette which holds valuable data because it effectively destroys all files on the diskette.

At this point, you're done with the preparation procedure. If you want to generate a tailored system now, go to Chapter 5.

If you want to rest for a while, type:

RELEASE DP0)

This terminates DOS operations. DOS displays a sign-off message:

MASTER DEVICE RELEASED

and halts. Later, you'll need to bring BOOTSYS up again to generate your tailored system. You'll use the normal program-load sequence, covered at the beginning of Chapter 5.

Table 4-3 summarizes the steps you take to run DOSINIT, install a bootstrap root, and install the starter system on diskette. You may find this table handy whenever you want to install a bootstrap root, install the starter system, or run DOSINIT on diskette. When you have a DOS system running, you need not execute all these steps to ready a diskette; instead, you can use the CLI command **BOOT DOSINIT)** to run DOSINIT or **BOOT BOOT)** to install a bootstrap root.

Table 4-3. Preparing for SYSGEN on a Diskette-Based NOVA Configuration

1. Turn system console on and place it ON-LINE. Set uppercase mode if this applies; press VIEW MODE switch for a DASHER console.
2. Tape write-protect holes on three diskettes; affix blank labels to them as described earlier.

With a felt-tipped pen, write "MY STARTER DISKETTE" on one of these labels, "MY BACKUP DISKETTE" on another label, and "MY SYSTEM DISKETTE" on a third.

3. Turn diskette drive ON; find the DG-supplied NOVA STARTER diskette and insert it in drive DP0. Close drive door.
4. Insert MY STARTER DISKETTE from step 2 in drive DP1. Close door.
5. Turn the computer power switch to ON and follow program load steps:
 - a. With automatic program load, set data switches to 100033 octal (switches 0, 11, 12, 14, and 15 up; the rest down). Lift the RESET switch, then the PROGRAM LOAD switch.
 - b. Without automatic program load, execute full step 5 earlier.

6. *FILENAME?* DOSINIT)

*DOSINITREV*x.xx

7. *DISK DRIVE MODEL NUMBER?* 6030)

8. *DISK UNIT?* DP1)

9. *COMMMAND?* FULL)

*FULL INIT DESTROYS ALL PREVIOUS DISK/DISKETTE STRUCTURE
DOS INIT/F MUST BE ISSUED AFTER FULL INIT.*

- a. *DO YOU REALLY WANT A FULL INIT? (YES OR NO) YES)*

**** PATTERN # 1 (125252) ****

**** PATTERN # 2 (052525) ****

**** PATTERN # 3 (155555) ****

**** PATTERN # 4 (000000) ****

**** PATTERN # 5 (177777) ****

**** ALL PATTERNS RUN ****

FULL INIT COMPLETE

- b. *COMMAND?* COPY)

*COPY DISKETTE IS ON DP1
NOW TELL ME ABOUT THE ORIGINAL DISKETTE*

- c. *DISK DRIVE MODEL NUMBER?* 6030)

- d. *DISK UNIT NAME?* DP0)

I AM ABOUT TO COPY DP0 TO DP1. IS THIS CORRECT?

Table 4-3. Preparing for SYSGEN on a Diskette-Based NOVA Configuration (continued)

9. e. ANSWER (YES) TO CONTINUE (NO) TO STOP YES)
(Pause for copying)
*I HAVE FINISHED MAKING YOUR COPY
COMMAND?*
- f. Remove the DG STARTER diskette from DP0, replace it in the envelope, and store it safely. Move MY STARTER DISKETTE from DP1 to DP0. Insert blank MY BACKUP DISKETTE in DP1.
- g. Type: FULL)
*FULL INIT DESTROYS ANY PREVIOUS....
DOS INIT/F MUST BE DONE...*
- h. DO YOU REALLY WANT A FULL INIT (YES OR NO)? YES)
**** PATTERN # 1 (125252) ***
. (DOSINIT runs patterns)
.
FULL INIT COMPLETE
COMMAND?*
- i. Remove MY BACKUP DISKETTE from DP1 and insert MY SYSTEM DISKETTE in DP1.
- j. Type: FULL)
FULL INIT DESTROYS...
- k. DO YOU REALLY WANT A FULL INIT? YES)
**** PATTERN # 1 (125252) ***
. (Patterns run)
.
FULL INIT COMPLETE*
- l. COMMAND? STOP)
10. Open and close DP0 door; then program-load by executing step 5.
11. FILENAME? BOOT)
12. BOOTSTRAP DEVICE SPECIFIER? DP1)
13. INSTALL BOOTSTRAP (YES OR NO)? Y
*DONE.
BOOTSTRAP DEVICE SPECIFIER?*
14. Remove MY SYSTEM DISKETTE from DP1; insert MY BACKUP DISKETTE in DP1.
15. Type: DP1)
16. INSTALL BOOTSTRAP (Y OR N)? Y
*DONE.
BOOTSTRAP DEVICE SPECIFIER?*

Table 4-3. Preparing for SYSGEN on a Diskette-Based NOVA Configuration (continued)

17. Type: DPO)

INSTALL BOOTSTRAP (Y OR N)? N

18. *FILENAME?* BOOTSYS)

(pause)

NOVA DOS REV 3.xx

19. *DATE (M/D/Y)?* 9 1 78) (Enter date.)

20. *TIME (H:M:S)?* 15 05) (Enter time.)

R

21. Type: INIT/F DP1)

R

End of Chapter

Chapter 5

Generating a Tailored DOS System

Your next task is to generate a tailored DOS system.

If the DOS starter system is running, skip to the next section. If the starter system is not running, bring it up by executing the program load steps. These are step 4 or 5 (for hard-disk systems) or 5 (for diskette systems) in the chapter you just read.

When BOOT asks *FILENAME?*, answer MBOOTSYS) (for microNOVA), or BOOTSYS) (for NOVA). Then type in the date and time.

System Generation

Now, if you are generating a hard-disk system, type:

```
SYSGEN□SYS.SV/S□SYS.SG/V□SYS.LM/L)
```

For a diskette-based system, you must tell SYSGEN to place the system files on DP1 (MY BACKUP DISKETTE) because DP0 (MY STARTER DISKETTE) doesn't have room for the new system and the system-generation files. Thus, for a diskette-based system, type:

```
SYSGEN□DP1:SYS.<SV/S□SG/V□LM/L>)
```

to instruct SYSGEN to put the system on DP1.

For either system, your command instructs SYSGEN to generate a new system under filename SYS.SV, with an overlay file under filename SYS.OL. SYSGEN will store the dialog file, which is your record of SYSGEN dialog, under SYS.SG, and the load map file, which you can use to patch the system, under SYS.LM.

You can choose any unique filename instead of SYS, perhaps one that identifies the new system; for example, SMALLSYS. Note that SYS is the default name for disk bootstrapping, and naming your system SYS can make starting it up easier. NEVER give a new system the name of an existing system; if you do, the old system will be deleted and replaced by the new one.

SYSGEN Dialog

After your SYSGEN command, program SYSGEN.SV starts executing and, after a brief pause, it asks you

questions about your hardware configuration and the software features you want. Some answers will be obvious, others less obvious, but we recommend general answers to the less obvious questions. If you are unsure whether a device is primary or secondary, then specify primary (0).

All of your answers to SYSGEN are numeric and in decimal, unless noted otherwise. If you default any answer by typing only), SYSGEN takes this as a "0" answer. Although bullets (●) identify the SYSGEN questions below, no bullets appear on your system console.

If you change your mind about the features you want, type CONTROL-A (hold down CTRL key, then press A). This interrupts SYSGEN and gives you the CLI R prompt, so you can give the SYSGEN command again.

SYSGEN first says:

```
DOS SYSGEN REV 3.xx  
VALID ANSWERS ARE IN PARENTHESES  
RESPOND ACCORDINGLY
```

- *CORE STORAGE (IN THOUSANDS OF WORDS 16-32)?*

Type in the amount of memory your computer has in multiples of 1,024 words. For example, if your system has 28,672 words, type in 28). If it has 32K words, type in 32).

You can generate a system for more memory than your current system has, but cannot run such a system on your current computer.

- *IS THE SYSTEM FOR A MICRONOVA (0=NO 1=YES)?*

To generate a microNOVA DOS system, answer 1); for a NOVA system, answer 0). If you specify a NOVA system, SYSGEN skips the next three questions.

If you answer 1) and specified 32K of storage, SYSGEN wants to know:

- **HAND HELD CONSOLE OR CONSOLE DEBUG PRESENT IN SYSTEM (0=NO 1=YES)?**

If you want the new system to support either of these microNOVA features, respond 1). Otherwise, answer 0). (For a 32K microNOVA system with either option, SYSGEN moves the system down to avoid the ROM memory used by the option.)

If you answered 1) to the last question or have less than 32K, SYSGEN asks:

- **USE STANDARD HAND HELD CONSOLE FUNCTIONS (0=NO 1=YES)?**

If you have a hand-held console, answer 1) to specify the DG interface between the console and the system. If you lack a hand-held console, or want to program the hand-held console via your own interrupt handler (defined with .IDEF), then answer 0).

For NOVA systems, SYSGEN now skips the next two questions.

- **NUMBER OF DISKETTE ENCLOSURES (0-4)?**

Answer with the number of diskette enclosures you want the new system to support. Each microNOVA enclosure can have one or two drives. The first enclosure, which you've been using up to this point, has drive DP0 and, if it has a second drive, DP1. This enclosure has device code 33 octal. The second enclosure, on device code 73 octal, has drive DP2 and, if it has a second drive, DP3. The third enclosure, on device code 30, has DP4 and, if it has a second drive, DP5. The fourth enclosure, on code 70, has drive DP6 and, if it has a second drive, DP7.

If you answer 0), the new system will support hard disks only; you will not be able to access diskettes from it.

If you specify one or more enclosures, SYSGEN asks how many drives each has:

- **NUMBER OF DRIVES FOR ENCLOSURE # 1 (1-2)?**

Respond with the number of drives in the first enclosure. If this system will run your current equipment, you must type at least 1).

If you specify more than one enclosure, SYSGEN asks this question for the second and each subsequent enclosure. SYSGEN now skips the next four questions.

- **NUMBER OF DISKETTE/CARTRIDGE DISK CONTROLLERS (1-2)**

SYSGEN asks this question and the next two for NOVA systems only. Each controller can handle up to four disk or diskette drives, in any combination. (Each dual-platter disk subsystem, and each diskette slot, is one drive.)

The primary controller, which you've been using up to now, is on device code 33 octal, and it can handle drives DP0, DP1, DP2, and DP3. If any of the drives is a hard disk, the fixed platter is DP0F, DP1F, DP2F, and/or DP3F. You select the disk number via the thumbwheel: "0" selects number 0, "1" selects number 1, and so on. The secondary controller, on device code 73 octal, handles DP4, DP5, DP6, and DP7, and, for hard-disk subsystems, DP4F, DP5F, DP6F and/or DP7F. On the second controller, you dial "0" to select DP4, "1" for DP5, etc.

Answer with the number of CONTROLLERS (not drives) you want the new system to support. You must type at least 1). If you answer 1), SYSGEN asks:

- **DEVICE PRIMARY ("0") OR SECONDARY ("1")?**

Answer 0) to specify the first controller, on device code 33 octal, if you want the system to support your current equipment. This is the controller you've been using up to this point.

- **NUMBER OF DRIVES FOR CONTROLLER # 1 (1-4)?**

Respond with the number of drives connected to the first controller. The controller treats each diskette drive (slot) and each dual-platter disk subsystem as one drive. If you want the new system to support your current equipment, you must type at least 2), because you have at least two drives (one diskette and one hard-disk subsystem, or, for diskette DOS, two diskettes).

If you want the new system to support only one diskette or dual-platter subsystem, type 1).

- **ARE ANY 6045 TYPE DISKS (0=NO 1=YES)?**

Reply 1) if you want the new system to support a hard-disk subsystem on the first controller (device code 33 octal). For hard-disk DOS, you must reply 1) if you want the new DOS system to support your current equipment. Answering 1) allows you to access the fixed platter on the subsystem and enables bad block remapping.

To generate a diskette-only DOS system, type 0).

If you specified two CARTRIDGE/DISK CONTROLLERS earlier, SYSGEN now asks *NUMBER OF DRIVES FOR CONTROLLER # 2* and *ARE ANY 6045 TYPE DISKS* for the second controller. Answer with the number of drives connected to the second controller, then specify whether any are 6045 disks.

Next, if the new system might support diskettes, SYSGEN asks:

- *SOFT ERROR REPORTING (0=NO 1=YES)?*

Soft error reporting pertains to diskettes only; thus you should consider answering 1) only if you plan to run diskettes on your system. If you select this feature, DOS will monitor soft errors on each diskette, note all errors in an error table on diskette, and report each error to the console. DOS requires an extra stack (described later) to record and report errors. IF YOU OMIT THIS FEATURE, DOS WILL IGNORE ALL SOFT ERRORS ON DISKETTES. If the new system will run diskettes, we recommend that you answer 1) (unless your memory requirements are very critical). Soft errors are described in the "Diskette Considerations" appendix of the *DOS Reference Manual*.

- *NUMBER OF 6095 DISK CONTROLLERS (0-2)?*

SYSGEN asks this question and the next for microNOVA systems only. Each microNOVA 6095 disk controller runs one dual-platter disk subsystem. For hard-disk DOS, if you want the new system to support your current equipment, you must answer at least 1). If you want the system to support two subsystems, answer 2).

For a diskette-only DOS system, answer 0).

You must specify at least one 6095 controller or one DISKETTE ENCLOSURE for microNOVA systems because DOS requires a diskette or disk to run. If you specify 0 diskettes and 0 disks, SYSGEN will restart.

If you have ONE 6095 disk controller, SYSGEN wants to know:

- *DEVICE PRIMARY ("0") OR SECONDARY ("1")?*

We assume that your disk subsystem is connected to the first controller, on device code 27 octal. If you want the system to run your current equipment, you must type 0). If the system will support a disk subsystem on the second controller ONLY (device code 67 octal), type 1).

- *ENTER BAD BLOCK POOL SIZE IN BLOCKS (0-512)?*

A DOS system that will run a hard disk needs a bad block pool in memory to pass over unusable disk storage. This pool must be large enough to accommodate all bad blocks found by DOSINIT. When you ran DOSINIT and defaulted the answer to *REMAP AREA SIZE?*, DOSINIT set up a pool of 12 blocks for each platter, and any number you enter here will be added to 12. Generally, you can default the answer by typing).

- *ENTER NUMBER OF STACKS (1-10)*

DOS uses a stack to handle disk accesses and system calls; the number you specify determines how many devices and system/task operations DOS can run concurrently. Each system call issued by a user program requires a stack; a TASK call does not. If you plan to write multitask programs and have each task issue system calls, each task will need a stack if tasks are to run concurrently. If a task issues a system call and no stack is free, the task must wait until one is free.

One stack is the minimum (two stacks if you specified soft error reporting on diskettes). Extended BASIC requires another stack; multiuser BASIC requires two additional stacks. For multitask applications, we recommend two stacks (three with soft error reporting on diskette); for single-task applications, one stack (two with diskettes). DOS automatically allots two extra system buffers for the fourth and each additional stack.

- *ENTER NUMBER OF EXTRA BUFFERS REQUIRED (0-32)*

DOS allots a minimum of six buffers, or two buffers per stack, whichever is greater. Extra buffers speed up the system by allowing disk data to remain in memory instead of being swapped out to disk. Each extra buffer takes an additional 270 words and reduces the amount of memory available for your programs by that much.

Block I/O operations (records read from, or written to disk in multiples of 256 words) do not require buffers. If you are unsure of how many extra buffers to specify, we suggest:

Memory Size:	For disk-based DOS, type:	For diskette-based DOS, type:
16K	0)	0)
28K	2)	4)
32K	4)	6)

● **MAXIMUM NUMBER OF SUB-DIRECTORIES ACCESSIBLE AT ONE TIME (0-32)?**

Each disk or diskette (like DH0 or DP1) is a directory; you can also create and use smaller directories within each. For this question, each smaller directory is called a sub-directory. You can address each sub-directory through the CLI or your programs as if it were a self-contained disk. The utility programs (assemblers, editors, etc.) do not need sub-directories.

DOS will not allow more than the number of sub-directories you specify here to be initialized at any moment, but you can always RELEASE one sub-directory to initialize another. Depending on the number of categories you will need for your disk files, good general answers range between 6 and 16.

● **ENTER NUMBER OF MAG TAPE DRIVES (0-8)**

For microNOVA systems, type 0). For NOVA systems, answer 1) only if you want the new system to support magnetic tape; otherwise answer 0). The magnetic tape controller, which can run up to eight drives, is on device code 22 octal. The drives have DOS names MT0 through MT7.

● **AUTO RESTART ON POWER FAIL (0=NO 1=YES)?**

For microNOVA systems, if you have this hardware option and a backup battery, answer 1). Otherwise, answer 0).

For NOVA systems, if you want this option, answer 1). If your computer has semiconductor memory, you need a backup battery for the option to work.

● **RTC PRIMARY ("0") SECONDARY ("1") OR INTERNAL ("2")?**

Most microNOVAs have an internal real-time clock; an external clock is available as an option. If you ordered an external RTC with your system, type 0); otherwise type 2). If your clock is internal, SYSGEN skips the next question.

For NOVA systems, you must specify either 0) or 1). The primary clock has device code 14 octal, the secondary clock has code 54 octal. Generally, your clock will be primary, so answer 0).

● **ENTER RTC FREQ (1=10HZ, 2=50HZ, 3=60HZ, 4=100HZ, 5=1000HZ)**

Unless you want a special frequency for programs you code yourself, answer 1) for a 10Hz clock. Extended BASIC expects either 10Hz or the microNOVA internal clock frequency. To synchronize with 50Hz AC power, type 2); to synchronize with 60Hz power, type 3).

● **PAPER TAPE READER (0=NO 1=YES)?**

If you specify a paper tape reader, it has device code 12 octal and DOS filename \$PTR.

● **PAPER TAPE PUNCH (0=NO 1=YES)?**

For microNOVA systems, type 0). For NOVA systems, type 1) if you want the new system to support a paper tape punch. The paper tape punch has device code 13 octal and DOS filename \$PTP.

● **ENTER NUMBER OF LPT (0-2)**

The first line printer has device code 17 octal and DOS filename \$LPT; the second printer has code 57 octal and filename \$LPT1. If you have one or two printers, SYSGEN asks one or both of the following questions, respectively:

● **ENTER COLUMN SIZE FOR DEVICE # 1 (80 OR 132)**

● **ENTER COLUMNS SIZE FOR DEVICE # 2 (80 OR 132)**

Answer with the column width of your line printer (80) or 132).

Next, SYSGEN asks:

● **CARD READER (0=NO 1=YES)?**

For microNOVA systems, type 0). For NOVA systems, type 1) if you want the new system to support a punched or mark-sense card reader. The reader has device code 16 octal and DOS filename \$CDR.

● **PLOTTER (0=NO 1=YES)?**

For microNOVA systems, type 0). For NOVA systems, type 1) if you want the DOS system to support an incremental plotter. The plotter has device code 15 octal and DOS filename \$PLT.

● **QTY (0=NO 1=YES)?**

Answer 0) for an ALM multiplexor or no multiplexor; SYSGEN will then skip the next six questions.

For microNOVA systems, answer 1) if you want to configure one or more type 4207 asynchronous interface boards as a multiplexor.

For NOVA systems, answer 1) if you have a model 6070 multiplexor. The multiplexed lines will have filenames QTY:0 through QTY:3 (or QTY:7) when the DOS system runs. For NOVA systems, SYSGEN skips the next three questions.

- **ENTER NUMBER OF ASYNCHRONOUS INTERFACE BOARDS TO BE USED AS A MULTIPLEXOR (1-8)**

Reply with the number of microNOVA boards you wish to use as a multiplexor. Each board provides one full-duplex line. The system console, \$TTO/\$TTI, cannot be included in the configured multiplexor. You can include the interface for \$TTO1/\$TTI1 in the multiplexor if you don't specify it later in SYSGEN (SECOND TTY? question).

SYSGEN now asks about the octal device codes associated with each board's receive and transmit function:

- **ENTER DEVICE CODES (OCTAL) FOR EACH LINE (1-76):
LINE # 0 RECEIVE?**

Enter the jumper-selected device code of the line 0 receiver. (see *microNOVA Computer Systems Technical Reference Manual* for more on jumper selection.)

LINE # 0 TRANSMIT?

Enter the device code of the line 0 transmitter.

SYSGEN repeats the previous two questions for each board you specified as a multiplexor. It cannot check for conflicts with other I/O device codes. DOS will report any conflicts when you bootstrap the new system. The lines you specify in these questions will have filenames QTY:0 through QTY:7 when the new system runs.

Now SYSGEN wants to know about the interrupt characters for your QTY lines:

- **USE DEFAULT QTY/ALM INTERRUPT CHARACTERS (0=NO 1=YES)**

The default interrupt characters for mux lines are CTRL-A and CTRL-C. If you want users of your lines to use these characters for interrupts, type 1); otherwise type 0). If you type 0), SYSGEN asks the next two questions:

- **FIRST CHARACTER (ASCII DECIMAL CODE OR 128=NONE)?**

Enter the interrupt character you want used instead of CTRL-A, in the decimal version of ASCII (e.g., 27 for ESC), or enter 128 to omit a first interrupt character.

- **SECOND CHARACTER (ASCII DECIMAL CODE OR 128=NONE)?**

Enter the interrupt character you want used instead of CTRL-C, in decimal ASCII, or enter 0 to omit a second interrupt character. SYSGEN now skips to the COLUMN SIZE FOR \$TTO question.

- **ALM ? (0=NO 1=YES)**

If you want the new system to support an Asynchronous Line Multiplexor (ALM), answer 1). If not, answer 0). If you answer 0), SYSGEN skips to the COLUMN SIZE FOR \$TTO? question.

If you specify an ALM, SYSGEN will use file ALMSPD.RB to set line characteristics for the ALM lines. For future systems, you can specify your own line characteristics by editing file ALMSPD.SR (using a text editor), then assembling ALMSPD.SR with the Macroassembler. The assembly produces a new ALMSPD.RB, which future SYSGENs will use to implement the line characteristics you want.

The ALM multiplexed lines will have DOS filenames QTY:0 through QTY:3 (or QTY:7) when the new system runs.

- **DEVICE PRIMARY (0) OR SECONDARY (1)?**

If your ALM is attached to device code 34 octal, answer 0); if it is attached to device code 44 octal, answer 1).

- **ALM CLOCK FREQUENCY? (0-3)**

The default frequency of the ALM clock is 0; you can specify either 0, 1, 2, or 3. This determines which clock will be used for "DEFAULT" by the device driver.

- **USE DEFAULT QTY/ALM INTERRUPT CHARACTERS (0=NO 1=YES)**

The default interrupt characters for mux lines are CTRL-A and CTRL-C. If you want users of your lines to use these characters for interrupts, type 1); otherwise type 0). If you type 0), SYSGEN asks the next two questions:

- **FIRST CHARACTER (ASCII DECIMAL CODE OR 128=NONE)?**

Enter the interrupt character you want used instead of CTRL-A, in the decimal version of ASCII (e.g., 27 for ESC), or enter 128 to omit a first interrupt character.

- **SECOND CHARACTER (ASCII DECIMAL CODE OR 128=NONE)?**

Enter the interrupt character you want used instead of CTRL-C, or enter 128 for no second interrupt character. This question ends the multiplexor series.

- **COLUMN SIZE FOR \$TTO (80 OR 132)?**

If you have a DASHER or other 132-character system console, answer 132); otherwise, answer 80).

- **SECOND TTY (0=NO 1=YES)?**

Answer 1) if you have a console connected to the second teletypewriter interface. This has device code 50 octal and filename \$TTI1 for input, and code 51 octal and filename \$TTO1 for output. If you answer 1), SYSGEN asks the about the column size of the second console:

- **COLUMN SIZE FOR \$TTO1 (80 OR 132)?**

Respond with 132) if the second console is a 132-column device; otherwise answer 80).

- **CORE DUMP FACILITY (0=NO 1=YES)?**

If the system comes down unexpectedly, the core dump program can copy memory to diskette or to the line printer. This can help identify the problem. You can also invoke the dump program yourself, as described in the "Exceptional Status" appendix of the *DOS Reference Manual*. The core dump feature requires about 300 memory locations when you run this DOS system.

The core dump question is the last in the SYSGEN dialog. SYSGEN now selects the modules for the new system from the SYSGEN libraries and tells the Relocatable Loader to create the new system. The whole process takes several minutes for hard-disk DOS and about 15 minutes for diskette-based DOS. Don't be alarmed at the delay. Soon, control will return to the CLI, which issues the prompt:

R

Your new system has been built. The next step depends on the kind of hardware you have. For sample SYSGEN dialogs, see Figure 5-1 through 5-4. These figures show sample SYSGENs for microNOVA hard disk, NOVA hard disk, microNOVA diskette, and NOVA diskette.

If you have a hard-disk system, continue to the next section; for diskette-based DOS, skip to section "Testing Your New System - Diskettes".

Testing Your New System - Hard Disks

The new system is stored on DH0 (microNOVA) or DP0 (NOVA) under the names SYS.SV and SYS.OL (or sysname.SV and sysname.OL if you specified a different sysname in the SYSGEN command).

To test the new system, type:

BOOT SYS) (or sysname instead of SYS)

MASTER DEVICE RELEASED

type DOS REV 3.00 (type is MICRONOVA or NOVA)
DATA (MIDIY)?

As you have done before, provide the date and time:

DATE (MIDIY)? 9 1 78)
TIME (H:M:S)? 15 55
R

The R prompt means that your tailored DOS is running. Skip to "The Next Steps", below. (If you receive an error message or if you don't receive the R prompt, bring up the starter system again (steps 4 and 19), then run through the SYSGEN sequence again. Use the same sysname.)

Testing Your New System - Diskettes

Before you can test your diskette-based system, you must give the diskette which holds it a CLI, DOSINIT.SV, and BOOT.SV. Type:

MOVE/V DP1 CLI.OL CLI.SV CLI.ER }
BOOT.SV DOSINIT.SV
CLI.OL

(CLI verifies files copied to DP1.)

R

(MOVE or LOAD commands from diskette take awhile to execute, so don't be alarmed at the delay.)

Now you're ready to start up your tailored system. Type:

BOOT DP1:SYS) (or sysname instead of SYS)
MASTER DEVICE RELEASED
DOS REV x.xx
DATE (MIDIY)?

As you have done before, provide the date and time:

DATE (MIDIY)? 9 1 78)
TIME (H:M:S)? 15 55)
R

The *R* prompt means that your tailored DOS is running. (If you receive an error message, or don't receive the *R* prompt, bring up the starter system again (steps 5 and 18), then run through the SYSGEN command again. Use the same sysname.)

Remove MY STARTER DISKETTE from DP0 and store it safely. This diskette has the starter system, SYSGEN.SV, the SYSGEN libraries, and a bootstrap mechanism on it, and you'll use it for future SYSGENs.

Note that you cannot bootstrap DOS from a write-protected diskette, so you may want to leave the tape on MY STARTER DISKETTE. If you remove the tape, replace it before you use the diskette again. There are two reasons for this. First, it allows you to bootstrap from the diskette; second, any files MOVED or copied (COPY) from a write-protected diskette automatically receive attributes APW. This means that when you MOVE or COPY a file from a write-protected diskette, the copy cannot be deleted or modified in any way. This rule applies to MY SYSTEM DISKETTE and to all user diskettes. (You can copy a file from such a diskette without assigning APW via the XFER command.)

The Next Steps

If you have a line printer, you can now print a copy of the SYSGEN dialog. (If you have a hardcopy console, you already have this.) Type:

```
PRINT SYS.SG)      (or sysname for SYS)
```

The load map, which gives the addresses where system modules will execute, is also stored on disk or diskette, under SYS.LM. This file will allow you to apply patches (disk updates which DG may supply in the future) to your system; you should retain it until you have determined that you need not patch the system.

Congratulations! You've completed the entire SYSGEN procedure. There are still a few things left to do -- and, once again, these depend on whether or not you have a disk- or diskette-based system. Before you proceed, you might want to read the next section, which tells you how much memory each DOS feature uses.

Then, if you have a disk-based system, go to Chapter 6, which tells you how to initialize the fixed disk and other essential things.

If you have a diskette-based system, go to Chapter 7, which tells you how to load the utilities you want, how to optimize your system, and other essential things.

How Much Memory Does DOS Use?

If your computer has limited memory, or if you want to create a system to run on a small computer, you may want to generate a DOS system that requires as little memory as possible. Table 5-1 shows each DOS feature and the amount of memory it requires when DOS runs. Take the skeletal DOS figure and add the amount for each feature you select at SYSGEN; the sum is the amount of memory this DOS system requires. On a microNOVA system with hand-held console or console debug, the ROM memory used by the option occupies the top 256 words of memory.

The numbers in the table may change; they were current when we printed this.

Table 5-1. DOS Rev. 3.00 Memory Requirements

Feature	Requirement in Words
Skeletal DOS, with 6 buffers	
microNOVA	5,803
NOVA	5,803
Hand-held console	59
First microNOVA diskette controller	537
Each subsequent microNOVA diskette controller	33
Each diskette drive	33
First NOVA disk/diskette controller	443
Each subsequent NOVA disk/diskette controller	33
Each disk/diskette drive	33
Soft error reporting	301
First microNOVA 6095 disk controller	347
Second microNOVA 6095 disk controller	96
Each disk drive	33
Bad block remapping (used for hard disks)	71
Stacks, per stack	259
Extra Buffers, each	270
Directories, each	33
Magnetic tape controller	481
Each tape drive	14
Auto restart	
microNOVA	180
NOVA	188
Real-time clock	0
Paper tape reader	103
Paper tape punch	94
Line printer (first)	82
Line printer (second)	69
QTY mux interface	
microNOVA Asynch. Bds.	796
NOVA (4060 mux)	754
ALM multiplexor	1,011
Second TTY	238
Core Dump Facility	
microNOVA	365
NOVA	353

```

DOS SYSGEN REV 3.00
VALID ANSWERS ARE IN PARENTHESES RESPOND ACCORDINGLY

CORE STORAGE (IN THOUSANDS OF WORDS 16-32) 32
IS THE SYSTEM FOR A MICRONOVA? (0=NO 1=YES) 1
  HAND HELD CONSOLE OR CONSOLE DEBUG PRESENT IN SYSTEM? (0=NO 1=YES) 1
  USE STANDARD HAND HELD CONSOLE FUNCTIONS? (0=NO 1=YES) 1
NUMBER OF DISKETTE ENCLOSURES (0-4) 1
  NUMBER OF DRIVES FOR ENCLOSURE #1(1-2) 2
  SOFT ERROR REPORTING? (0=NO 1=YES) 1
NUMBER OF 6095 DISK CONTROLLERS (0-2) ? 1
  DEVICE PRIMARY ("0") OR SECONDARY ("1") 0
  ENTER BAD BLOCK POOL SIZE IN BLOCKS (0-512) 0
ENTER NUMBER OF STACKS (1-10) 3
ENTER NUMBER OF EXTRA BUFFERS REQUIRED (0-32) 4
MAXIMUM NUMBER OF SUB-DIRECTORIES ACCESSIBLE AT ONE TIME (0-32) 10
ENTER NUMBER OF MAG TAPE DRIVES (0-8) 0
AUTO RESTART ON POWER FAIL? (0="NO" 1="YES") 0
RTC PRIMARY ("0") SECONDARY ("1") OR INTERNAL ("2")? 2
PAPER TAPE READER? ("0"=NO "1"=YES) 0
PAPER TAPE PUNCH? ("0"=NO "1"=YES) 0
ENTER NUMBER OF LPT(0-2) 0
CARD READER? ("0"=NO "1"=YES) 0
PLOTTER? ("0"=NO "1"=YES) 0
QTY? ("0"=NO "1"=YES) 0
ALM? ("0"=NO "1"=YES) 0
COLUMN SIZE FOR $TTO (80 OR 132) 132
SECOND TTY? ("0"=NO "1"=YES) 0
CORE DUMP FACILITY? ("0"=NO "1"=YES) 0

```

Figure 5-1. microNOVA Hard-disk SYSGEN Dialog

```

DOS SYSGEN REV 3.00
VALID ANSWERS ARE IN PARENTHESES RESPOND ACCORDINGLY

CORE STORAGE (IN THOUSANDS OF WORDS 16-32) 32
IS THE SYSTEM FOR A MICRONOVA? (0=NO 1=YES) 0
NUMBER OF DISKETTE/CARTRIDGE DISK CONTROLLERS (0-2) ? 1
  DEVICE PRIMARY ("0") OR SECONDARY ("1") 0
  NUMBER OF DRIVES FOR CONTROLLER #1 (1-4) 2
  ARE ANY 6045 TYPE DISKS (0=NO 1=YES) 1
  SOFT ERROR REPORTING? (0=NO 1=YES) 1
  ENTER BAD BLOCK POOL SIZE IN BLOCKS (0-512) 0
ENTER NUMBER OF STACKS (1-10) 3
ENTER NUMBER OF EXTRA BUFFERS REQUIRED (0-32) 4
MAXIMUM NUMBER OF SUB-DIRECTORIES ACCESSIBLE AT ONE TIME (0-32) 10
ENTER NUMBER OF MAG TAPE DRIVES (0-8) 0
AUTO RESTART ON POWER FAIL? (0="NO" 1="YES") 0
RTC PRIMARY ("0") SECONDARY ("1") OR INTERNAL ("2")? 0
  ENTER RTC FREQ (1=10HZ 2=50HZ 3=60HZ 4=100HZ 5=1000 HZ) 1
PAPER TAPE READER? ("0"=NO "1"=YES) 0
PAPER TAPE PUNCH? ("0"=NO "1"=YES) 0
ENTER NUMBER OF LPT(0-2) 0
CARD READER? ("0"=NO "1"=YES) 0
PLOTTER? ("0"=NO "1"=YES) 0
QTY? ("0"=NO "1"=YES) 0
ALM? ("0"=NO "1"=YES) 0
COLUMN SIZE FOR $TTO (80 OR 132) 132
SECOND TTY? ("0"=NO "1"=YES) 0
CORE DUMP FACILITY? ("0"=NO "1"=YES) 0

```

Figure 5-2. NOVA Hard-disk SYSGEN Dialog

```

DOS SYSGEN REV 3.00
VALID ANSWERS ARE IN PARENTHESES RESPOND ACCORDINGLY

CORE STORAGE (IN THOUSANDS OF WORDS 16-32) 32
IS THE SYSTEM FOR A MICRONOVA? (0=NO 1=YES) 1
  HAND HELD CONSOLE OR CONSOLE DEBUG PRESENT IN SYSTEM (0=NO 1=YES)? 1
  USE STANDARD HAND HELD CONSOLE FUNCTIONS? (0=NO 1=YES) 1
NUMBER OF DISKETTE ENCLOSURES (0-4) 1
  NUMBER OF DRIVES FOR ENCLOSURE #1(1-2) 2
  SOFT ERROR REPORTING? (0=NO 1=YES) 1
NUMBER OF 6095 DISK CONTROLLERS (0-2)? 0
ENTER NUMBER OF STACKS (1-10) 3
ENTER NUMBER OF EXTRA BUFFERS REQUIRED (0-32) 6
MAXIMUM NUMBER OF SUB-DIRECTORIES ACCESSIBLE AT ONE TIME (0-32) 6
ENTER NUMBER OF MAG TAPE DRIVES (0-8) 0
AUTO RESTART ON POWER FAIL? (0="NO" 1="YES") 0
RTC PRIMARY ("0") SECONDARY ("1") CR INTERNAL ("2")? 2
PAPER TAPE READER? ("0"=NO "1"=YES) 0
PAPER TAPE PUNCH? ("0"=NO "1"=YES) 0
ENTER NUMBER OF LPT(0-2) 0
CARD READER? ("0"=NO "1"=YES) 0
PLOTTER? ("0"=NO "1"=YES) 0
QTY? ("0"=NO "1"=YES) 0
ALM? ("0"=NO "1"=YES) 0
COLUMN SIZE FOR $TTO (80 OR 132) 132
SECOND TTY? ("0"=NO "1"=YES) 0
CORE DUMP FACILITY? ("0"=NO "1"=YES) 0

```

Figure 5-3. Diskette-based microNOVA SYSGEN Dialog

```

DCS SYSGEN REV 3.00
VALID ANSWERS ARE IN PARENTHESES RESPOND ACCORDINGLY

CORE STORAGE (IN THOUSANDS OF WORDS 16-32) 32
IS THE SYSTEM FOR A MICRONOVA? (0=NO 1=YES) 0
NUMBER OF DISKETTE/CARTRIDGE DISK CONTROLLERS(1-2) 1
  DEVICE PRIMARY("0") OR SECONDARY("1")? 0
  NUMBER OF DRIVES FOR CONTROLLER #1(1-4) 2
  ARE ANY 6045 TYPE DISKS? (0=NO 1=YES) 0
  SOFT ERROR REPORTING? (0=NO 1=YES) 1
ENTER NUMBER OF STACKS (1-10) 3
ENTER NUMBER OF EXTRA BUFFERS REQUIRED (0-32) 6
MAXIMUM NUMBER OF SUB-DIRECTORIES ACCESSIBLE AT ONE TIME (0-32) 6
ENTER NUMBER OF MAG TAPE DRIVES (0-8) 0
AUTO RESTART ON POWER FAIL? ("0"=NO "1"=YES) 0
RTC PRIMARY ("0") SECONDARY ("1") CR INTERNAL ("2")? 0
  ENTER RTC FREQ (1=10HZ 2=50HZ 3=60HZ 4=100HZ 5=1000HZ) 1
PAPER TAPE READER? ("0"=NO "1"=YES) 0
PAPER TAPE PUNCH? ("0"=NO "1"=YES) 0
ENTER NUMBER OF LPT(0-2) 0
CARD READER? ("0"=NO "1"=YES) 0
PLOTTER? ("0"=NO "1"=YES) 0
QTY? ("0"=NO "1"=YES) 0
ALM? ("0"=NO "1"=YES) 0
COLUMN SIZE FOR $TTO (80 OR 132) 132
SECOND TTY? ("0"=NO "1"=YES) 0
CORE DUMP FACILITY? ("0"=NO "1"=YES) 0

```

Figure 5-4. Diskette-based NOVA SYSGEN Dialog

End of Chapter



Chapter 6

Initializing the Fixed Disk and Running DOS on Your Hard-disk System

This chapter tells you how to make the fixed disk available to DOS; then it explains releasing and bootstrapping DOS, preparing blank diskettes, backing up your disk files, and generating other DOS systems.

Initializing the Fixed Disk

DOS and all the DG-supplied files are now on the cartridge disk. The next step is to make all the space on the fixed disk available to DOS and give it *BOOT.SV*. Type:

INIT/F DHOF) (for microNOVA)

or

INIT/F DPOF) (for NOVA)

R

MOVE/V DHOF BOOT.SV) (for microNOVA)

or

MOVE/V DPOF BOOT.SV) (for NOVA)

BOOT.SV

R

INIT/F writes a map and file directory to the fixed disk and allows DOS to access it. By writing a new file directory, it effectively destroys all existing files, so be VERY careful with it. Under normal operation, you will not need to INIT/F your hard disks again. The copy of *BOOT.SV* allows you to BOOT programs on the fixed disk.

Releasing the System

Before you shut off power to your equipment, you must always RELEASE the disk or diskette which holds the DOS system. You can release this master disk by name; e.g.,

RELEASE DH0) (DPO) for NOVA systems)

or you can use the CLI variable %MDIR%) which contains the name of the master directory; e.g.,

RELEASE %MDIR%)

After either command, the system will verify the release and shut down:

MASTER DEVICE RELEASED

You can flip the READY switch to LOAD, wait for the LOAD light, flip the power switch to OFF, remove diskettes (if any) from their drives, then turn OFF the diskette drive and other peripherals. If there are diskettes on your system, remove the diskettes from the drives before turning the drive OFF - but be sure you RELEASE them first.

If, for any reason, the system stops before the master device has been RELEASEd, the DOS system and map directories may be wrong when you next bring up the system. Several things can stop the system before normal RELEASE: hardware or software failure, power failure without power fail support options, your own error in a program, or if you turn off the computer or disk drive before releasing (RELEASE) the master device. Because crucial directories may be wrong after any of these things happen, we recommend that you fully initialize (INIT/F) all disks or diskettes that were initialized when the failure occurred. This means bringing up DOS on a backup cartridge or diskette and typing INIT/F to each disk(ette) that was initialized. INIT/F destroys all files on a disk(ette); so you should back up your files periodically, as described later in this chapter. By backing up your files, you minimize the amount of work that could be lost or destroyed by any kind of failure.

Bootstrapping

When you bootstrap, you instruct your computer to read the bootstrap root into memory from disk or diskette; the root then brings in program *BOOT.SV*. *BOOT.SV* in turn allows you to bring in a DOS system or a program like *DOSINIT* or the installer portion of *BOOT* itself. The disk (diskette) from which you bootstrap must be in drive DH0 (DPO) and it must have a copy of the bootstrap root and a copy of *BOOT.SV* on it. If it is a diskette, its write-protect hole must be covered if you want to bring up a DOS system. The bootstrap disk need not contain a DOS system or CLI.

On a microNOVA system, drives DH0/DH0F and DP0 are unchangeable; you can alter them only by changing hardware jumpers. Therefore, you must have the bootstrap disk(ette) in one of these devices. On a NOVA system, you can dial 0 on any diskette or disk drive and put the bootstrap disk(ette) in the drive dialed 0, but make sure that no other disk or diskette drive has 0 dialed.

With a bootstrap disk in DH0 or disk(ette) in DP0, follow the program load steps (which should be familiar to you by now). With an upper/lowercase console, either press the SHIFT key or use the ALPHA LOCK key because BOOT.SV doesn't accept lowercase letters.

microNOVA systems:

- If your computer has a hand-held console, press RESET, CLR D, enter 100027 (33 for diskette) in the display, then press PR LOAD.
- If you lack the hand-held console, but have the console debug feature, type 100027L) (33L) for diskette on the system console).
- If you lack both hand-held console and console debug feature, then you have the CPU program load option. Press the front panel rocker switch to PL/START.

NOVA systems:

- If your machine has the automatic program load option, set its front panel data switches to 100033 octal (switches 0, 11, 12, 14 and 15 up, the rest down). Lift the RESET switch, then the PROGRAM LOAD switch.
- If you lack automatic program load, execute the following steps:

Set the front panel data switches to 000376 octal (switches 8 through 14 up, the others down).

Lift the EXAMINE switch, hold it up, and verify that the ADDRESS lights match the switch settings.

Set the data switches to 060133 octal (switches 1, 2, 9, 11, 12, 14 and 15 up, the others down).

Lift the DEPOSIT switch and hold it up; verify that the lights match the switch settings.

Set the data switches to 000377 octal (switches 8 through 15 up, the others down).

Depress the DEPOSIT NEXT switch and hold it down; verify that the lights match the switch settings.

Set the data switches to 000376 octal again (put down switch 15); lift and release the RESET switch, then the START switch.

The proper program load sequence reads BOOT.SV into memory, and it asks:

FILENAME?

Respond with the name of the DOS system or program you want to execute. If this system or program is not on the bootstrap disk, you must precede the name with a directory specifier, like DH0F: or DP1:.

If BOOT.SV can find the program you specify, it will load this program and execute it. If the program is a DOS system, it will ask date/time questions and then invoke its CLI. (If you have the microNOVA CPU program load option, you can have BOOT.SV invoke a system automatically by inserting jumper W10 in the board, as described in Chapter 6 of the *DOS Reference Manual*.)

For a normal bootstrap example, assume that you have an appropriate disk in DH0 (DP0 for NOVA systems) and want to bring up a DOS system named SYS on this disk. After executing the program load steps, you'd exchange the following dialog with BOOT and the system:

```
FILENAME? SYS)
type DOSREVx.xx
DATE (M/D/Y)? 9 18 78) TIME (H:M:S)? 16 22)
R
```

Actually, SYS is the default name, so you could have typed simply), you need not have typed a name at all. For another example, assume that the DOS system is named MYSYS and it is on the fixed disk: DH0F on a microNOVA system, DP0F on a NOVA system. You'd type:

```
DH0F:MYSYS) (DP0F:MYSYS)
```

in response to the *FILENAME?* question.

BOOT Command

You can bootstrap from a running system with the CLI BOOT command. The BOOT command releases the current system, then brings up the new system just as if you executed the program load steps. The disk which holds the desired system must have a bootstrap root

and a copy of `BOOT.SV` on it, and it must be initialized (`INIT` command). For example:

```
INIT DP1)
R
BOOT DP1:SMALLSYS)
MASTER DEVICE RELEASED
type DOS REV x.xx
DATE (M/D/Y)? 9 20 78)
TIME (H:M:S)? 9 55)
R
```

BOOTing is more useful when you have more than one DOS system and you want to switch among them according to your application. You can also `BOOT` stand-alone programs like `DOSINIT` or `BOOT` itself.

There is a variation of the `BOOT` command in which you type only the name of the disk(ette) which holds the desired program; `BOOT` then asks `FILENAME?` and you answer with the name of the system or program you want. For example:

```
BOOT DP0)
MASTER DEVICE RELEASED
FILENAME? DOSINIT)
DOSINIT REV x.xx
```

Preparing Blank Diskettes

If you want to use diskettes on your system, you must prepare each one with `DOSINIT` and type `INIT/F` to it from `DOS`. For convenience, we suggest that you also install a bootstrap root on it and give it a copy of `BOOT.SV`.

If a diskette is not a Data General diskette, you must format it before you can run `DOSINIT` on it. See the formatter listing, part number 096-000300, for instructions.

For a DG diskette or any properly formatted non-DG diskette, follow these instructions:

- Tape the write-protect hole on the blank diskette, turn on the diskette drive, and insert the diskette in a drive slot (DP0 or DP1 will do).
- If `DOS` is running, type `BOOT DOSINIT`). If `DOS` is not running, execute the program load steps described under "Bootstrapping". Type `DOSINIT`) when `BOOT` asks `FILENAME?`

- Exchange the following dialog with `DOSINIT`:

```
DOSINIT REV x.xx
DISK DRIVE MODEL NUMBER? 6038) (for
                                microNOVA)
                                6030) (for
                                NOVA)
```

```
DISK UNIT? DP0) (or DP1, if diskette, is in DP1)
```

```
COMMAND? FULL)
```

```
FULL INIT DESTROYS...
DO YOU REALLY WANT A FULL INIT? YES)
```

```
*** PATTERN # 1 (125252) ***
```

```
FULL INIT COMPLETE
```

```
COMMAND?
```

- To initialize another diskette, remove the diskette from its drive and insert the next one. (It's very convenient to have initialized diskettes around, and you may want to do several in one session.) Again, type `FULL`) and `YES`). When you're done with `DOSINIT`, type `STOP`).
- Execute the program load steps again, but respond `BOOT`) to the `FILENAME?` question.

```
BOOT REV x.xx
BOOTSTRAP DEVICE SPECIFIER? DP0) (or
DP1)
```

```
INSTALL BOOTSTRAP (Y OR N) Y
```

```
DONE.
```

```
BOOTSTRAP DEVICE SPECIFIER?
```

- Remove the diskette from the drive and insert another `DOSINIT`-initialized diskette, if any. Again, type `DP0`) (or `DP1`)) and `Y`, and repeat until you've installed roots on all initialized diskettes. Then, type `DP0`) (or `DP1`)) to `BOOT`, and answer `N` to make it ask for a `FILENAME?`

- Bring up your tailored DOS system; then type:

```
INIT/F DP0) (or DP1)
R
MOVE/V DP0 BOOT.SV) (or DP1)
BOOT.SV
R
RELEASE DP0) (or DP1)
R
```

- Remove the diskette from DP0 (or DP1) and insert another initialized diskette with bootstrap root in DP0 (or DP1). Repeat the INIT/F sequence until you have done all the diskettes. Label each diskette READY or some equivalent name.

These steps provide you with ready diskettes from which you can bootstrap any DOS system or program.

If you plan to use diskettes extensively or are developing programs for use on a diskette-based system, be aware that there are major differences between your hard-disk system and a diskette-based system. Most of these concern storage space and access speed. For more on this, read "Managing Diskette Space" and "System Speed" in Chapter 7.

Backing Up Your Files

It's simple prudence to create and save backup copies of the source files and data files you create under DOS. You can back up files by date or name with the CLI command MOVE or DUMP. One procedure might be to back up new or modified files each day to diskette via MOVE or DUMP with the local /A switch and to MOVE or

DUMP all files each week. For diskettes, you can use the CLI COPY command, or you can bring up DOSINIT and use DOSINIT's COPY or DUPLICATE command. We describe DOSINIT commands in Chapter 8.

Generating other DOS Systems

To generate other DOS systems, you can simply type the SYSGEN with a unique filename, as described in the CLI manual.

Generally, any hard-disk microNOVA system will run on a diskette-based microNOVA configuration, and any hard-disk NOVA system will run on a diskette based NOVA configuration. This depends on the memory available in the target system and the diskette drivers selected at SYSGEN. To run a system on a similar machine, you can copy a system save (.SV) and overlay (.OL) file, CLI.SV, CLI.OL, CLI.ER, and BOOT.SV to a properly-prepared diskette, and then try it. A microNOVA system, however, will NOT run on a NOVA, or vice-versa, under any circumstances because the SYSGEN library files from which the code is taken differ. But you CAN generate a diskette-based NOVA system on a hard-disk microNOVA, or vice-versa, by installing the proper bootstrap root and making sure that SYSGEN uses the proper sysgen libraries, as described next.

Generating a Diskette-Based DOS System to Run on a Different Machine

To do this, operate from a user directory. Bring up your DOS system following the procedure shown in Table 6-1.

Table 6-1. Generating a Diskette-Based DOS System to Run on a Different Machine

If your tailored DOS is not running, bootstrap it. Then type the following commands:

```
CDIR OTHERDIR)    (or equivalent directory name)
R
DIR OTHERDIR)
R
LINK RLDR.SV/2; LINK RLDR.OL/2)
R
LINK SYSGEN.SV/2)
R
```

Get the DG-supplied STARTER diskette for the target computer type (NOVA STARTER if your SYSGEN machine is a microNOVA, and vice-versa). Put this STARTER diskette in diskette drive DP0. Type:

```
DIR DP0)
WARNING: DISK WRITE PROTECTED
R
MOVE/V OTHERDIR -DOS-.LB
. (library names copied to the OTHERDIR directory)
R
RELEASE DP0)
R
```

Remove the diskette from DP0.

Now get a blank diskette, tape the write-protect hole, and put it in DP0. Run DOSINIT on it, but when DOSINIT asks *DISK DRIVE MODEL NUMBER?*, answer 6030) if the target system is a NOVA system; answer 6038) if the target system is a microNOVA system. Then run a FULL command on the diskette. Bring up DOS and type:

```
INIT/F DP0)
R
MOVE/V DP0 BOOT.SV)
R
DIR OTHERDIR)
R
SYSGEN DP0:OTHERSYS.<SV/S SG/V LM/L >)
```

Proceed with SYSGEN for the different machine, as described in Chapter 5. The system will be placed on the diskette in DP0 under OTHERSYS.SV and OTHERSYS.OL with dialog file and load map as previously described. (You can use any legal filename instead of OTHERSYS.)

```
R
DIR %MDIR%
R
MOVE/V DP0 CLI.OL CLI.ER CLI.SV)
. (Verification)
R
RELEASE DP0)
R
```

Now take the OTHERSYS diskette from DP0 and the DG STARTER diskette to the different system. Insert the STARTER diskette in diskette drive 0 of the target system and program-load it as described in "Bootstrapping" earlier. When BOOT asks *FILENAME?*, type BOOT). When BOOT asks *BOOTSTRAP DEVICE SPECIFIER?*, remove the STARTER diskette from DP0 and insert the OTHERSYS diskette in DP0. Type DP0), then Y. This installs the appropriate bootstrap root on OTHERSYS.

Now, type DP0), then N to make BOOT ask *FILENAME?* Answer with OTHERSYS) to the *FILENAME?* query. The system should run. Later, you may want to put user programs or utilities on the OTHERSYS diskette from your main system via the MOVE command.

End of Chapter



Chapter 7

Loading the Utilities, Optimizing Your System, and Running DOS

This chapter tells you how to load the DOS utilities you need, create an optimized system diskette, release and bootstrap DOS, manage diskette space, and generate a DOS system to run on a different machine. It assumes that you have your tailored DOS system running on the diskette in DP1 -- MY BACKUP DISKETTE.

Loading the Utilities

It's time to load some utilities onto your system diskette. (You cannot use these programs on the DG UTILITIES diskette; you must LOAD them onto another diskette first.)

The utilities will not all fit on your system diskette, but you may not need them all anyway. If you want more

utilities than will fit, you can LOAD them onto another diskette later, then use them from this diskette.

You can use the DISK) command at any time to discover how much space you have left; at this point, a substantial number of the original 608 blocks should be left on MY BACKUP DISKETTE. For example:

```
DISK)
LEFT: 394 USED: 214
R
```

Now, find the DG UTILITIES diskette, leave write-protect hole open, and insert it in drive DP0. Table 7-1 shows the utility programs in it; you may want to read this table before proceeding.

Table 7-1. Content of Data General DOS UTILITIES System Diskette

Program Filename	Program Purpose
EDIT.SV	Text Editor (separate manual provided).
EDIT.RB	Text Editor relocatable binary file.
MEDIT.SV	Multiterminal Text Editor.
NSPEED.SV	Super (text) Editor (manual provided).
SPEED.ER	SuperEditor error message text file.
ASM.SV	Extended assembler (manual provided).
XREF.SV	Extended assembler cross-reference generator.
MAC.SV	Macroassembler (manual provided).
MACXR.SV	Cross-reference generator.
MBID.SR	microNOVA Basic Instruction Definitions (All of these "-.SR" files are used primarily to build the Macroassembler permanent symbol file, MAC.PS.)
NBID.SR	NOVA Basic Instruction Definitions.
NSID.SR	NOVA Stack Instruction Definitions.
FPID.SR	NOVA Floating-Point Instruction Definitions.
OSID.SR	Operating System (DOS) Instruction Definitions.

Table 7-1. Content of Data General DOS UTILITIES System Diskette (continued)

Program Filename	Program Purpose
NFPID.SR	NOVA 3 hardware Floating-Point Instruction Definitions.
NSKID.SR	NOVA Skip Instruction Definitions.
PARU.SR	User Parameter Definitions File (printed in Appendix E).
RFPI.RB	Floating-point Interpreter relocatable binary file (manual provided).
LFE.SV	Library File Editor (manual provided).
SEEDIT.SV	Symbolic File Editor (manual provided).
OEDIT.SV	Octal File Editor (manual provided).
DSKED.SV	Disk Editor, runs without DOS (manual provided).
IDEB.RB	Interrupts-off debugger (debugger manual provided).
COPY.SV	Diskette-to-diskette copy program (described in CLI manual).
PATCH.SV	Patch Installation Program (described in CLI manual).
ENPAT.SV	Patch File Creation program (also described in CLI manual).
RLDR.SV	Extended Relocatable Loader program file (manual provided).
RLDR.OL	Relocatable Loader overlay file.
SYS.LB	System library, contains tasking code, buffered I/O package, debugger (described in this manual, RLDR, and debugger manuals).
SYS5.LB	Old (pre-rev 2.00) version of SYS.LB.
FDUMP.SV	Fast disk dump program (described in CLI manual).
FLOAD.SV	Fast disk load program (also described in CLI manual).
PROM.SV	Programmable-ROM (PROM) utility program to program microNOVA PROM boards.
MICROBOOT.SV	microNOVA bootstrap installer program.

Now, initialize the UTILITIES diskette by typing:

```
INIT DPO)
WARNING: DISK WRITE PROTECTED
R
```

If you want, you can list the filenames in this diskette without loading them by typing `LOAD/N DPO:UTILITIES`). But to save time, you might simply choose the ones you want from the table, then `LOAD` them for real.

The essential utilities that you'll need for almost any application are the Extended Relocatable Loader (RLDR.OL and RLDR.SV) and the system library (SYS.LB). You already have `DOSINIT.SV` and `BOOT.SV`.

The system source files (those which end with the .SR extension) are required by the Macroassembler (MAC files) to build its permanent symbol table file (MAC.PS). MAC is a large utility, with its required .PS file, and you may not want to load it now. If you omit it,

you can also omit the .SR files. Later, if you want MAC, you can LOAD the MAC files and .SR files onto another diskette, build MAC.PS, then MOVE all MAC files (including MAC.PS) to a system diskette. For a moderate assembly-language application, you might choose the Text Editor (EDIT.SV) or the SuperEditor (NSPEED.SV and SPEED.ER), the Extended Assembler (ASM.SV and XREF.SV), and a disk file editor (SEdit.SV or OEDIT.SV). You also need the utilities described as essential above. You might also want the CLI copy utility (COPY.SV).

For a FORTRAN application, you'll need a text editor, the Extended Assembler, the FORTRAN IV compiler, and the FORTRAN IV libraries (supplied on another diskette). You also need the utilities described as essential above. To merge the FORTRAN libraries (needed only once), you might want the library file editor (LFE.SV). You might also want the CLI copy program, COPY.SV.

For an Extended BASIC application, you'll need the BASIC programs and interpreter (supplied on another diskette). You may need the utilities described as essential above to generate your BASIC system -- and you may need to devote one DOS system diskette (without utilities) to BASIC System Generation because the BASIC SYSGEN libraries require a lot of space. You might want the CLI program, COPY.SV, on your BASIC/DOS system diskette.

For the last word on required files, consult the Release Notice listing supplied with your software or, for FORTRAN, your language reference manual.

When you have decided on the utilities you want, type:

```
LOAD/V DPO:UTILITIES utility-filename-and-extension...})
utility-filename-and-extension...)
```

The CLI will verify each program loaded. When you get the R prompt back, type DISK) again to check the amount of disk space remaining; remember that you'll probably want to put SOME user files on your system diskette. If you get a *FILE SPACE EXHAUSTED* error message, at least you'll know what utilities were loaded, so that you can LOAD them onto another diskette later. After you have loaded a utility, you can check its space requirements with the LIST/E/A filename-and-extension command.

For example:

```
DISK)
LEFT: 394 USED: 214 (More than half the space on MY BACKUP DISKETTE remains.)

R
LOAD/V DPO:UTILITIES RLDR.<OL SV> |) (Load files.)
ASM.SV XREF.SV COPY.SV |)
NSPEED.SV SPEED.ER SYS.LB|) (Verification.)
RLDR.OL
RLDR.SV
```

```
R
DISK)
LEFT: 200 USED: 408 (Your own answer might differ.)
```

When you have finished loading the utilities, type:

```
RELEASE DPO)
R
Remove the DG UTILITIES diskette from drive DP0 and store it safely. Your tailored DOS system is complete. Now's the time to configure it for maximum speed by moving its files to MY SYSTEM DISKETTE (which has been gathering dust for the past hour or so). Get MY SYSTEM DISKETTE and insert it in DP0. Type:
```

```
INIT/F DPO)
R
MOVE/V DPO SYS.OL CLI.<OL ER>;|)
MOVE/V DPO <CLI BOOT SYS>.SV/N;|)
MOVE/V DPO CLI.SV BOOT.SV SYS.SV)

(The CLI verifies files copied to DP1. Ignore the FILE ALREADY EXISTS messages.)

R
```

This procedure places essential overlay files where DOS can access them quickly; we describe it further later in this chapter.

Now, test the system on MY SYSTEM DISKETTE by typing:

```
BOOT DPO:SYS) (or sysname)
  MASTER DEVICE RELEASED
MICRONOVA DOS REV x.xx
DATE (M/D/Y) ? 9 1 78) (Enter date.)
TIME (H:M:S) ? 16 10) (Enter time.)
R
```

Congratulations! You now have an efficient system diskette, a less efficient (but usable) backup diskette, and a system-generation diskette. You can remove MY BACKUP DISKETTE from DP1 and store it safely. (Some time in the future, you might want to copy the efficient system diskette to it with the DOSINIT COPY command, as described later.)

Later, whenever you bring up your DOS system, you'll always place MY SYSTEM DISKETTE in drive DP0.

At this point, you have completed the entire SYSGEN procedure. If you want to experiment with DOS for awhile, you can use either *Learning to Use Your RDOS/DOS System* or the *CLI User's Manual*.

Releasing the System

Before you shut off power to your equipment, you must always RELEASE the diskette which holds the DOS system. You can release this master diskette by name; e.g.,

```
RELEASE DPO)
```

or you can use the CLI variable %MDIR%, which contains the name of the master directory; e.g.,

```
RELEASE %MDIR%)
```

After either command, the system will verify the release and shut down:

```
MASTER DEVICE RELEASED
```

You can now remove the diskette(s) and shut off power to the diskette drive, computer, and other peripherals.

If, for any reason, the system stops before the master device has been RELEASEd, the DOS system and map directories may be wrong when you next bring up the system. Several things can stop the system before normal RELEASE: hardware or software failure, power failure without power fail support options, your own error in a program, or if you turn off the computer or diskette drive before releasing (RELEASE) the master device.

Because crucial directories may be wrong after any of these things happen, we recommend that you fully initialize (INIT/F) all diskettes that were initialized when the failure occurred. This means bringing up DOS on a backup diskette and then typing INIT/F to each diskette that was initialized. INIT/F destroys all files on the diskette; so you should back up your diskettes periodically, using either the DOSINIT or CLI COPY commands, or the CLI MOVE or DUMP commands. One procedure might be to back up new or modified files each day via MOVE or DUMP with the local /A switch, and to COPY entire diskettes each week. By backing up your files, you minimize the amount of work that could be lost or destroyed by any kind of failure.

Bootstrapping

When you bootstrap, you instruct your computer to read the bootstrap root from diskette; the root then brings in BOOT.SV, which allows you to bring in a DOS system or program like DOSINIT or the installer portion of BOOT itself. The diskette from which you bootstrap must be on the first drive of the first controller (generally DP0) and it must have a copy of the bootstrap root and a copy of BOOT.SV on it. Its write-protect hole must be covered if you want to bring up a DOS system. It need not contain a DOS system or CLI.

With such a diskette in DP0, follow the program load steps (which should be familiar to you by now). With an upper/lowercase console, either press the SHIFT key or use the ALPHA LOCK key, because BOOT.SV doesn't accept lowercase letters.

- If your computer has a hand-held console, press RESET, CLR D, enter 33 in the display, then press PR LOAD.
- If you lack the hand-held console, but have the console debug feature, type 33L) on the system console.
- If you lack both hand-held console and console debug feature, then you have the CPU program load option. Press the front panel rocker switch to PL/START.

The proper sequence reads BOOT.SV into memory, and it asks:

```
FILENAME?
```

Respond with the name of the DOS system or program you want to execute. If this system or program is not on the diskette in DP0, you must precede the name with a directory specifier, like DP1:

If BOOT.SV can find the program you specify, it will load this program and execute it. If the program is a DOS system, it will ask date/time questions and then invoke its CLI. (If you have the CPU program load option, you can have BOOT.SV invoke a system automatically by inserting jumper W10 in the board, as described in Chapter 6 of the *DOS Reference Manual*.)

For a normal bootstrap example, assume that you have an appropriate diskette in DP0 and want to bring up a DOS system named SYS on DP0. After executing the program load steps, you'd exchange the following dialog with BOOT and the system:

```
FILENAME? SYS)
DOSREVx.xx
DATE (M/D/Y) ? 9 1 78)
TIME (H:M:S) ? 16 22)
R
```

Actually, SYS is the default name, so you could have typed simply); you need not have typed a name at all. For another example, assume that the DOS system is named MYSYS, and that it is on DP1. You'd type:

```
DP1:MYSYS)
```

in response to the *FILENAME?* question.

Actually, after you read the bootstrap program in from DP0, you can move diskettes around before you answer the *FILENAME?* query. Assume that, for some reason, you want to have a diskette with pure data (no bootstrap program or root) in DP0. Insert your system diskette in DP0, and execute the program load steps. Then, when BOOT asks:

```
FILENAME?
```

Remove the system diskette from DP0, place it in DP1, and type:

```
DP1:SYS) (or sysname)
```

The system comes up on DP1, and you can then insert the pure data diskette in DP0 and INIT it.

BOOT Command

As you saw above, you can bootstrap from a running system with the CLI BOOT command. The BOOT command releases the current system, then brings up the new system just as if you executed the program load steps. The diskette which holds the desired system

must have a bootstrap root and a copy of BOOT.SV on it. For example:

```
BOOT DP1:SMALLSYS)
  MASTER DEVICE RELEASED
  DOSREVx.xx
  DATE (M/D/Y) ? 11 20 78)
  TIME (H:M:S) ? 9 55)
R
```

BOOTing is more useful when you have more than one DOS system and you want to switch among them according to your application. You can also BOOT stand-alone programs like DOSINIT or BOOT itself.

There is a variation of the BOOT command in which you type only the name of the diskette which holds the desired program; BOOT then asks *FILENAME?* and you answer with the name of the system or program you want. For example:

```
BOOT DP0)
  MASTER DEVICE RELEASED
  FILENAME? DOSINIT)
  DOSINITREVx.xx
  DISK DRIVE MODEL NUMBER?
```

Managing Diskette Space

Generally, the most severe problem you'll encounter while running DOS is diskette space. This section shows you some ways to use diskette space most efficiently.

The Link Entry

The link entry allows you to access a file from any user directory as if there were a copy of it in the current directory. Each link costs virtually nothing in file space. For example, assume that you want to write and compile a FORTRAN IV program. Also assume that DP0, your system diskette, contains all files you need to do this. These files are:

NSPEED.SV	SuperEditor.
SPEED.ER	Editor error interpreter.
FORT.SV	FORTTRAN IV interface.
FIV.SV	FORTTRAN IV compiler.
ASM.SV	Extended assembler.
FORT.LB	Four FORTRAN IV libraries, merged with the LFE utility.
RLDR.SV	Relocatable Loader.
RLDR.OL	Loader overlay file.
SYS.LB	System Library.

You also have a system, CLI, and other files on your system diskette; let's assume that there are 40 or so blocks left on it. This is not enough space for efficient compilation and loading. You place a new diskette (prepared by DOSINIT FULL command) in DP1, and make it into a program-development diskette by typing the commands shown in Figure 7-1. The first and last DISK commands in the figure show dramatically how links can save space.

As the figure shows, you can write, compile, and load a FORTRAN IV program on DP1 with nearly 600 blocks of space to play with.

Listing File

Many CLI and utility program commands allow you to specify a listing file with the local /L switch. If you decide that you want a listing, don't specify a disk file for it (this would use disk space). Instead, specify a paper listing with local /L. If your system console is a hardcopy terminal, insert its output name (\$TTO) with local /L; for example:

```
ASM MYFILE FILE1 $TTO/L)
```

If you have a line printer, specify its name with local /L; for example:

```
ASM MYFILE FILE1 $LPT/L)
```

Depending on the speed of your console printer, you MAY want to store listing files on disk for later printing and DELETE them after printing.

Moving Files

Almost all files in DOS are randomly-organized, which makes them fairly easy to copy onto diskette with MOVE and LOAD commands. DOS can copy random files in blocks, placing each block wherever it finds space on diskette.

Contiguous files, however, must be in one piece. All overlay files (those with .OL extensions) are contiguous; thus when you copy a program that has an overlay file, you should copy the overlay file first; for example:

```
MOVE/V DP1 CLI.<OL SV ER>)
```

DOS is more likely to find space for CLI.OL on DP1 before, not after, it has copied CLI.SV and CLI.ER. Both CLI.SV and CLI.ER are random files.

INIT/F DP1)	Create new file directory on DP1.
R	
DIR DP1; DISK)	Semicolon allows you to put multiple commands on one line.
LEFT: 593 USED: 15	Plenty of space left.
R	
LINK NSPEED.SV %MDIR%:NSPEED.SV)	Create link to NSPEED in master directory (specified by %MDIR%; here, you could have typed DP0 instead of %MDIR%).
R	
LINK SPEED. ER %MDIR%:SPEED.ER)	Continue linking.
R	
LINK ASM.SV %MDIR%:ASM.SV)	And so on....
R	
LINK	
LINK RLDR.OL %MDIR%:RLDR.OL)	The last link.
R	
DISK)	
LEFT: 593 USED: 15	
R	

Figure 7-1. Using Link Entries to Save Space

File Housecleaning

If you are low on diskette space, it's very important to DELETE all files which you don't really need. You can MOVE such files to a storage diskette if you want to keep them.

After you have built a program and it works, you can DELETE its intermediate relocatable binary file. Relocatable binary filenames have the extension .RB.

Note that the DELETE command won't work on any file you have MOVEd or copied (COPY) from a write-protected diskette (not true for DISK-format diskettes provided by DG). This is a good reason for keeping write-protect holes covered (another is that DOS won't let you bootstrap from a write-protected diskette). If you do copy one or more files from a write-locked diskette with the MOVE or COPY commands, the copy will receive the file attributes APW, which mean that you can never modify or delete it. To get rid of it, you'll have to run DOSINIT or INIT/F the diskette, either of these destroy all other files as well.

You can copy a file from a write-locked diskette without giving the copy APW attributes, if you use the XFER command. For example, to copy MYFILE.SR (an ASCII source file) from write-locked DP1 to DP0, you'd get to DP1 (DIR DP1), then type:

```
XFER/A MYFILE.SR DP0:MYFILE.SR)
```

See the *CLI User's Manual* for more on XFER.

Backing Up Your Files

It's simple prudence to create and save backup copies of the source files and data files you create under DOS. You can back up files by date or name with the CLI command MOVE or DUMP; or you can copy all files with the CLI command COPY (see *CLI Manual*). Alternatively, you can bring up DOSINIT and use DOSINIT's COPY or DUPLICATE command. The DOSINIT commands are described later in this chapter.

System Speed

DOS will run most efficiently if you place the system and CLI overlay files near the outside "edge" of the diskette (near track 0). You did this earlier when you copied your system and utilities to MY SYSTEM DISKETTE; you can do it at any time in the future by following the general MOVE format shown earlier. For example, run DOSINIT on a blank diskette and install a

bootstrap root on it (or simply use MY BACKUP DISKETTE). Place the destination diskette in DP1 and bring up DOS on the diskette you want to optimize in DP0. Then, type:

```
INIT/F DP1 )  
R  
MOVE/V DP1 SYS.OL CLI.<OL ER>;↑)  
MOVE/V DP1 <CLI SYS BOOT>.SV/N;↑)  
MOVE/V DP1 <CLI SYS BOOT>.SV)
```

R

Now BOOT the system on DP1 to test it; that's all you need do. (If you plan to use primarily BASIC, MOVE files BASIC.OL and BASIC.SW immediately after CLI.ER.)

Generating other DOS Systems

To generate other DOS systems, you can simply insert your MY STARTER DISKETTE in DP0, and bring up DOS as described under "Bootstrapping" above. When BOOT asks *FILENAME?*, type MBOOTSYS) (for microNOVA) or BOOTSYS) (for NOVA) to bring up the starter system.

Put a prepared diskette (on which you have run the DOSINIT FULL command, installed a bootstrap root, and typed INIT/F from DOS) in DP1. Then type:

```
SYSGEN DP1:sysname.<SV/S SG/V LM/L >)
```

You must generate a new system on another diskette, because there isn't room on MY STARTER DISKETTE for it. After SYSGEN is done, give the new system a CLI and BOOT.SV by typing MOVE/V DP1 CLI.<OL ER SV> BOOT.SV). Then BOOT the new system.

Generating a System to Run on a Different Machine

A microNOVA system will not run on a NOVA computer, and vice-versa, because the system libraries from which the code is taken differ.

You can, however, create a NOVA system diskette on your microNOVA system, and vice-versa, with a little effort. Table 7-2 shows you how to do this. In either case, we assume that your target system has only one diskette drive; if it has two drives, follow the procedure shown for the target system in Chapter 3 or 4, then run SYSGEN as shown in Chapter 5 for the target system.

Table 7-2. Generating a System to Run on a Different Machine

- Put MY SYSTEM DISKETTE in DP0. Label a new, blank diskette OTHERSYS, tape the write-protect hole, and insert in DP1. Bring up DOSINIT via steps 5-9 (given earlier). When DOSINIT asks *DISK DRIVE MODEL NUMBER?*, type in the model number for the TARGET system. The microNOVA model number is 6038), the NOVA number is 6030). Now, answer DP1) and run a FULL command on the OTHERSYS diskette.
- Install a bootstrap on DP1 as in steps 10-13 in your "Preparing" chapter.
- Bring up the system on DP0; then type INIT/F DP1).
- Copy the system, the CLI, and BOOT to OTHERSYS:

```
MOVE/V DP1 SYS.<OL SV> CLI.<OL SV ER> |)  
BOOT.SV)
```
- Bring up the system on DP1 (BOOT DP1:SYS)). Remove the diskette from DP0 and insert the Data General STARTER diskette for your TARGET system in DP0.
- Load the your target system SYSGEN libraries by typing:

```
DIR DP0)  
R  
MOVE/V DP1-.LB)  
. (files copied to DP1)  
.R  
RELEASE DP0)
```
- Remove the DG STARTER diskette from DP0; insert MY STARTER DISKETTE in DP0. Bring up the system on DP0 (BOOT DP0:SYS)).
- Now, make room on DP1 (OTHERSYS) and link to the required files:

```
DIR DP1)  
R  
DELETE SYS.-)  
R  
LINK RLDR.(SV,OL) %MDIR%:RLDR.(SV,OL)  
R  
LINK SYSGEN.SV %MDIR%:SYSGEN.SV  
R
```
- Now, generate the TARGET system on OTHERSYS:

```
SYSGEN OTHERSYS.<SV/S SG/V LM/L>)
```

(You can use any unique filename instead of OTHERSYS.)
- When SYSGEN is done, RELEASE DP0).
- Take the DG STARTER diskette for the TARGET system and your OTHERSYS diskette to your target system. Insert the DG STARTER diskette, program load it on the TARGET system, then answer BOOT) to the *FILENAME?* query.
- When the console asks *BOOTSTRAP DEVICE SPECIFER?*, remove the DG STARTER diskette and insert your OTHERSYS system diskette. Type DP0), then answer Y to the next question. This installs a target system bootstrap on the OTHERSYS diskette.
- Now, program load the OTHERSYS diskette on the target system; it should run.

End of Chapter

Chapter 8

The DOSINIT Initializer

Before you put any files on a disk or diskette, you must first initialize it with the Initializer Program, DOSINIT.SV. This applies to any disk(ette) you plan to use on your system.

After you run the DOSINIT FULL command, be sure to type the INIT/F command to the new disk(ette) when DOS is running. INIT/F writes a new file directory to the disk(ette) and allows you to use it. Naturally, you should *never* INIT/F a disk(ette) that holds valuable data.

DOSINIT runs as a stand-alone program which you read into the computer from the STARTER diskette or from any disk via the BOOT command. Once you have read DOSINIT into memory, it will run until you STOP it. You can remove the diskette from which you read it in, and it will continue to run happily for as long as you want to use it. This is true for all stand-alone programs.

When it runs, DOSINIT asks you several questions and you supply the correct answers. If you make a typing mistake, press RUBOUT to delete characters one-by-one; DOSINIT will echo a dash (-) for each character erased.

Initial Dialog

After you read DOSINIT into the computer, it says:

```
DOSINIT REV x.xx  
DISK DRIVE MODEL NUMBER?
```

For a hard disk, respond with:

6095) (for microNOVA)

or

6045) (for NOVA)

For a diskette, respond with:

6038) (for microNOVA)

or

6030) (for NOVA)

If you give an invalid response, DOSINIT says:

UNKNOWN DRIVE TYPE

and repeats the question.

DOSINIT next needs to know the logical name of the drive that holds your disk or diskette:

DISK UNIT?

Respond with the drive identifier, as determined by the controller device code and drive which holds the disk(ette). You can initialize in any drive in the system.

Controller
Device Code

Hard disks - microNOVA

First (27) DH0 or DH0F
Second (67) DH1 or DH1F

Hard disks - NOVA

First (33) DP0, DP0F, DP1, DP1F,
DP2, DP2F, DP3, DP3F

Second (73) DP4, DP4F, DP5, DP5F,
DP6, DP6F, DP7, DP7F

Diskettes - microNOVA

First (33) DP0 or DP1
Second (73) DP2 or DP3
Third (30) DP4 or DP5
Fourth (70) DP6 or DP7

Diskettes - NOVA

First (33) DP0, DP1, DP2, or DP3
Second (73) DP4, DP5, DP6, or DP7

These logical names also apply when you're running under DOS.

If you give an illegal response, DOSINIT says:

ILLEGAL DISK UNIT DECLARATION

and repeats the question.

After you correctly identify the diskette, DOSINIT recalibrates the disk or diskette; it then requests a command:

COMMAND?

DOSINIT is now ready to execute one of the following functions:

- FULL)** Runs patterns on disk or diskette to check for bad blocks; sets frame size. Required for all new disk(ette)s. **DESTROYS EXISTING FILES.**
- PARTIAL)** Hard disk **ONLY.** Inspects disk for bad blocks and enters any it finds in bad block table. Does not destroy files.
- VERIFY)** Inspects the disk or diskette for bad blocks but does not destroy any files on it. On disk, identical to **PARTIAL.**
- LIST)** Describes the disk(ette) type and gives bad block information.
- DISK)** Restarts DOSINIT program at the **DISK UNIT** query.
- COPY)** Diskette only. Copies a standard diskette to another diskette; zeroes soft error count on destination diskette.
- DUPLICATE)** Diskette only. Copies any diskette to another diskette; does not change soft error count.
- FRAME)** Hard disk **ONLY.** Defines frame size for DOS system directory (**SYS.DR**).
- REMAP)** Hard disk **ONLY.** Establishes a new remap area for bad accounting information; requires **INIT/F** afterward.
- ENTER)** Hard disk **ONLY.** Enters bad block information in the bad block table.
- STOP)** Halts the computer.

If you enter anything other than a DOSINIT command, it says:

UNKNOWN COMMAND - COMMANDS ARE FULL, VERIFY PARTIAL, LIST, FRAME, REMAP, ENTER, COPY, DUPLICATE, DISK, STOP

If you enter a disk-only command for a diskette, DOSINIT says:

THIS COMMAND MAY NOT BE USED ON DOS DISKETTES

If you enter a **FULL**, **REMAP**, or **FRAME** command, DOSINIT gives you a chance to abort before it executes because any of these require an **INIT/F** from DOS, which, by writing a virgin file directory to the disk(ette), effectively destroys all files on it.

If DOSINIT has never initialized the disk, you can use only the **FULL** command (and **DUPLICATE** on a diskette). If you try another command on such a disk or diskette, DOSINIT says:

**INVALID DISK ID BLOCK ...
ABORTING OPERATION DUE TO FATAL ERROR(S)**

You must therefore fully initialize the disk or diskette with **FULL**). DOSINIT thus forces you to run patterns on all disk(ette)s you plan to use for data storage on your system. (**DUPLICATE**, which can copy a nonstandard-format diskette, is an exception.)

After the dialog for each command (except **STOP**), DOSINIT will repeat the request:

COMMAND?

for another command on the current disk(ette), so you must type **DISK**) if you want to process a different one.

FULL Command

When you type **FULL**, DOSINIT fully initializes the disk or diskette. It writes five patterns, in blocks of 256 words each, to each disk block; then it read-checks the blocks against the original pattern. If DOSINIT cannot read-check that pattern on a block, it gives you a bad block error message. DOS can run on a **DISK** with bad blocks, but it cannot run on a **DISKETTE** with even one bad block; nor can you use such a diskette for data storage.

The patterns for each 16-bit word in each block are:

Pattern number:	Bit configuration:	Octal Value:
1	1010101010101010	125252
2	0101010101010101	052525
3	1101101101101101	155555
4	0000000000000000	000000
5	1111111111111111	177777

For a hard disk, DOSINIT allows you to specify a number of patterns. We recommend that you run all

five to check thoroughly for bad blocks. DOSINIT places the locations of any bad blocks it finds in a bad block table (called a REMAP area) on the disk, and it allows you to specify disk FRAME size (explained under FRAME command).

For a diskette, DOSINIT gives you no options at all: it runs all five patterns, tolerates no bad blocks, and sets a frame size of five.

For a hard disk, a sample FULL dialog is:

DOSINITREV x.xx
DISK DRIVE MODEL NUMBER? 6095) (for
microNOVA) 6045) (for NOVA)

DISK UNIT? DH0) (microNOVA) or
DP1) (NOVA)

COMMAND? FULL)

FULL INIT DESTROYS ANY PREVIOUS
DISK/DISKETTE STRUCTURE
DOS INIT/F MUST BE ISSUED AFTER FULL INIT.
DO YOU REALLY WANT A FULL INIT? (YES OR
NO) YES)

NUMBER OF PATTERNS TO RUN (1-5)? 5)

***PATTERN # 1 (125252) ***
***PATTERN # 2 (052525) ***
***PATTERN # 3 (155555) ***
***PATTERN # 4 (000000) ***
***PATTERN # 5 (177777) ***

*** ALL PATTERNS RUN ***

DO YOU WISH TO DECLARE ANY BLOCKS BAD
THAT
ARE NOT ALREADY IN THE BAD BLOCK TABLE?
NO)

DEFAULT REMAP AREA SIZE IS 12 BLOCKS LONG
IT NEEDS TO BE AT LEAST n BLOCKS LONG

REMAP AREA SIZE (TYPE RETURN FOR
DEFAULT)?)

DEFAULT FRAME SIZE IS 53
MIN IS 1 AND MAX IS 816
DISK FRAME SIZE (TYPE RETURN FOR
DEFAULT)?)

FULL INIT COMPLETE

COMMAND?

For a diskette, a sample dialog is:

DOSINITREV x.xx
DISK DRIVE MODEL NUMBER? 6038) (for
microNOVA)
6030) (for
NOVA)

DISK UNIT? DPO)

COMMAND? FULL)

FULL INIT DESTROYS ANY PREVIOUS
DISK/DISKETTE
STRUCTURE. DOS INIT/F MUST BE DONE ON DISK
AFTER COMMAND. DO YOU REALLY WANT A
FULL
INIT (YES OR NO)? YES)

***PATTERN # 1 (125252) ***
***PATTERN # 2 (052525) ***
***PATTERN # 3 (155555) ***
***PATTERN # 4 (000000) ***
***PATTERN # 5 (177777) ***

*** ALL PATTERNS RUN ***

FULL INIT COMPLETE

COMMAND?

DOSINIT may also type out error messages. These are:

Error Message	Take This Action
ILLEGAL NUMBER OF PATTERNS	Specify a number between 1 and 5.
CRITICAL DISK BLOCKS ARE BAD. DOS CANNOT BE BUILT, ABORTING	Reformat the disk.
TOO MANY DISK ERRORS TO COMPLETE.	Reformat the disk.
CHECKSUM ERROR ON BLOCK # bbbbbb UNIT MPn STATUS: DIA code DIB code DIC code ABORTING OPERATION DUE TO FATAL ERRORS	Diskette. Try command again. If error recurs, drive head may need cleaning, or diskette may need reformatting.
DRIVE UNSAFE # bbbbbb UNIT MPn	Diskette. The write-protect hole may be open. Tape it.
ONE OR MORE DISKETTE BLOCKS ARE BAD	Reformat the diskette; if this doesn't help, discard it.

PARTIAL Command

The PARTIAL command checks the disk for bad blocks and enters any new ones in the bad block table. If new ones overflow the bad block table, you must run FULL on the disk. PARTIAL does not destroy existing files. A typical sequence is:

COMMAND? PARTIAL)

***CHECKING FOR BAD BLOCKS ***

VERIFY COMPLETE

COMMAND?

If DOSINIT finds bad blocks, it identifies them in the form:

HEAD	SECTOR	CYLINDER / BAD	BLOCK
		NUMBER	
...
...

...

...

Error and status messages are:

Message	Take this action
UPDATING DISK FORMAT REV. NUMBER TO CURRENT	None.
NEW ERRORS FOUND ON DISK, UPDATING BAD BLOCK TABLE TO INCLUDE THEM.	None.
NOT ENOUGH ROOM FOR UPDATE SUGGEST FULL INIT.	Run FULL on disk.
CRITICAL DISK BLOCKS ARE BAD SUGGEST FULL INIT.	Run FULL on disk.

VERIFY Command

VERIFY instructs DOSINIT to check all blocks and to identify any bad blocks. DOSINIT does not write to the disk or diskette except to update the revision number (if needed). On disk, VERIFY is identical to PARTIAL.

A typical sequence is:

COMMAND? VERIFY)

***CHECKING FOR BAD BLOCKS ***

VERIFY COMPLETE

Error and status messages are:

Message	Take this action
UPDATING FORMAT REV. NUMBER TO CURRENT	None.
ERRORS FOUND ON DISKETTE	The diskette is going bad. COPY it.

If it finds bad blocks, DOSINIT identifies them the same way it does for PARTIAL.

LIST Command

LIST displays the disk or diskette drive type and any bad blocks which already exist on the disk(ette). It differs from PARTIAL and VERIFY in that it doesn't run a new check on it. For example, on a hard disk:

```
COMMAND? LIST)
6095 DISK DRIVE ON UNIT DH0F
FRAME SIZE = 53
REMAP AREA SIZE = 12
REMAP AREA START BLOCK NUMBER = 23064
THERE ARE NO BAD BLOCKS
```

(The frame size is decimal, the START BLOCK NUMBER octal.)

If there are bad blocks, DOSINIT identifies them the same way it does for PARTIAL.

For a diskette, sample dialog is:

```
COMMAND? LIST)
6030 DISK DRIVE ON UNIT DPI
FRAME SIZE = 5
THERE ARE NO BAD BLOCKS
```

DISK Command

DISK restarts DOSINIT at the query:

```
DOSINIT REV x.xx
DISK DRIVE MODEL NUMBER?
```

so you can work with a new disk or diskette.

COPY and DUPLICATE Commands (Diskette Only)

The COPY and DUPLICATE commands copy one diskette to another, thus require at least two diskette drives. You may have used COPY to copy the DG STARTER diskette when you prepared for SYSGEN. COPY and DUPLICATE are very similar, but they differ in two ways:

- COPY requires that both the source and destination diskettes be standard DOS-formatted diskettes. DUPLICATE doesn't care about the format of either diskette; you can use it to format nonstandard-diskettes.
- COPY zeroes the soft error table on the destination diskette, whereas DUPLICATE copies the table as is. (If you specified soft error reporting at SYSGEN, DOS records these errors in a table on diskette. If the error count reaches 30 octal for any track, DOS will not allow you to INIT the diskette. You must then copy the diskette with COPY, which zeroes the table on the copy; you can then INIT the copy. The DUPLICATE command does not zero the count, thus it cannot make a usable copy of such a diskette.)

Both COPY and DUPLICATE copy every file, directory, and the bootstrap root from the source diskette to the destination diskette. Both commands produce physical copies (aside from the soft error count). The CLI COPY command copies every file and directory, but not the bootstrap root; it produces a logical copy.

Both COPY and DUPLICATE ask you questions about the source and destination diskettes. COPY will not make the copy if you haven't run a FULL init on the destination diskette; DUPLICATE doesn't care about this. We recommend, however, that you run a FULL init on ALL diskettes you plan to use on your system to check for bad blocks. When DOSINIT starts up, it asks the *DISK DRIVE MODEL* number question, then the *DISK UNIT* question. Reply to the latter question with the drive which will hold the copy diskette. DOSINIT then requests a

COMMAND?

Unless you want to copy the diskette that holds DOSINIT, remove this diskette. Insert a blank diskette with the write-hole taped in the drive you specified above; then insert your original diskette in the other drive. Type:

COPY) or DUPLICATE)

DOSINIT then asks you about source and destination

drives, as shown in Table 8-1. Then it makes the copy and says:

I HAVE FINISHED MAKING YOUR COPY

If your command was COPY, DOSINIT then asks for a *COMMAND?*

If your command was DUPLICATE, DOSINIT asks:

ANOTHER COPY?

For another copy of the source diskette, type Y); for a copy of a different diskette, remove the source diskette, insert the new original diskette, and type Y). If you don't want another copy, type N); DOSINIT then asks:

COMMAND?

Table 8-1 summarizes the steps you take to copy to one or more diskettes.

Error messages you may get from COPY follow. (You might receive the "first" of these messages from DUPLICATE.)

Error message:	Take this action:
<i>DRIVE UNSAFE # bbbbbb UNIT MPn ABORTING OPERATION DUE TO FATAL ERRORS</i>	Cover the copy diskette's write-protect hole with tape. (Are you sure this is a blank diskette?)
<i>HARD ERROR ON ORIGINAL DISKETTE; I CAN'T COPY IT</i>	Swap the diskettes in the two drives, type DISK, select drives again, and type command again.
<i>COPY DISKETTE NOT INITIALIZED</i>	Do FULL), then COPY).
<i>INVALID DISK ID BLOCK ON UNIT MPn ABORTING OPERATION DUE TO FATAL ERRORS</i>	Do FULL), then COPY).
<i>WRITE ERROR ON COPY DISKETTE</i>	Reformat diskette, run FULL on it, then try again.

If you get a *HARD ERROR* message, DOSINIT will tell you about the bad block position as it does for the *PARTIAL* command.

Table 8-1. Copying a Diskette

1. Bring up DOSINIT from a system diskette via the BOOT command or program load steps.

2. *DOSINIT REV x.xx*
DISK DRIVE MODEL NUMBER? 6038) (microNOVA) 6030) (NOVA)

3. *DISK UNIT NAME? DP1)*

At this point, DP0 should hold the diskette you want to copy. If it does not, remove the diskette from slot DP0 and insert your original. Place the destination-diskette in DP1. If the destination-diskette has been initialized with DOSINIT, go to step 5. Otherwise, type:

4. *FULL)*

FULL INIT DESTROYS...
.....(YES OR NO)? YES)

**** PATTERN # 1 (125252) ****

FULL INIT COMPLETE
COMMAND?

5. *COPY) or DUPLICATE)*
COPY DISKETTE IS ON DP1
NOW TELL ME ABOUT THE ORIGINAL DISKETTE
DISK DRIVE MODEL NUMBER? 6038) (micro NOVA) 6030) (NOVA)
DISK UNIT NAME? DP0)
I AM ABOUT TO COPY DP0 TO DP1. IS THIS CORRECT?
ANSWER (YES) TO CONTINUE, (NO) TO STOP

6. *YES)*

7. *I HAVE FINISHED MAKING YOUR COPY*

8. For COPY, DOSINIT now asks:

COMMAND?

For DUPLICATE, it asks:

ANOTHER COPY?

For another copy of diskette in DP0, type Y), or insert new diskette in DP0 and type Y). Otherwise, type N).

To make another COPY of this diskette, remove the copy from DP1, insert another taped diskette in DP1, and execute steps 4-7 again.

To make another DUPLICATE, we recommend the same procedure as for COPY. You can type Y) to make another copy, or N) to return the *COMMAND?* query.

Remove the original from DP0 and the copy from DP1; store them safely.

FRAME Command

With FRAME, you can alter a disk's (but not diskette's) frame size. The frame size establishes the original number of disk blocks for the DOS system directory, SYS.DR. DOS runs most efficiently when all of your filenames for each user directory fit within one frame; response time slows considerably if DOS needs to examine overflow frames. If you will have many user directories with relatively few files in them, you may want a smaller frame than the default size. If you will have few user directories with many files in each, then you may want a larger frame size than the default. Generally, a good frame size is approximately one-tenth the number of files which will occupy any directory (user directory or global directory, like DP0) on the disk. The frame size should be a prime number.

Provide a frame size according to the following example:

COMMAND? FRAME)

COMMAND DESTROYS ANY PREVIOUS DOS DISK
STRUCTURE
DOS INITIF MUST BE DONE ON DISK AFTER
COMMAND
TYPE CONTROL-A NOW TO ABORT WITHOUT
LOSS

DEFAULT FRAME SIZE IS 53
MIN IS 1, AND MAX IS 816

DISK FRAME SIZE (TYPE RETURN FOR
DEFAULT)? 29)

COMMAND?

The one possible error message is:

ILLEGAL FRAME SIZE

Specify a number between the minimum and maximum.

REMAP Command

REMAP establishes a new bad block remap area on a hard disk; it requires full initialization. You must remap a part of a DOSINIT FULL command, and you may also want to REMAP if one of the disk blocks within the

remap area is bad. When you type:

REMAP)

DOSINIT gives you the *DESTROYS* warning:

COMMAND DESTROYS ANY PREVIOUS DOS DISK
STRUCTURE

.....
TYPE CONTROL-A NOW TO ABORT WITHOUT
LOSS

Then, DOSINIT asks:

DO YOU WISH TO DECLARE ANY BLOCKS BAD
THAT ARE
NOT ALREADY IN THE BAD BLOCK TABLE?

If you respond YES), DOSINIT asks for the

BAD BLOCK NUMBER (TYPE RETURN TO STOP)

Type in the physical bad block number (in octal), or the head, sector, and cylinder location, separated by commas. DOSINIT acknowledges your response with:

BAD BLOCK ENTERED
BAD BLOCK NUMBER (TYPE RETURN TO STOP)

Continue to enter bad blocks until you have specified them all. Then type only) to the BAD BLOCK NUMBER request, and DOSINIT will ask:

DO YOU WISH TO DECLARE ANY MORE BLOCKS
BAD? NO)

After you answer NO), DOSINIT tells you that the

DEFAULT REMAP AREA IS 12 BLOCKS LONG
IT NEEDS TO BE AT LEAST nn BLOCKS LONG

REMAP AREA SIZE (TYPE RETURN FOR
DEFAULT)?

when *nn* is the number of bad blocks found during the original FULL pattern run plus the number you declared in the BAD BLOCK series. Specify the new length in decimal (126 maximum) you want for the new remap area. You can type RETURN for the default, if you wish. The DOSINIT asks for the

REMAP AREA START BLOCK NUMBER (TYPE
RETURN
FOR DEFAULT)?

The default remap area is at the end (highest physical block numbers) of the disk, but if this section has bad blocks you may want to move it elsewhere. You can enter either the physical block number (in octal), or the head, sector, and cylinder location, separated by commas. You can reduce head positioning time very slightly by placing the remap area in the middle of the disk (somewhere around 11000 octal); however, you may not be able to create as many very large contiguous files.

Now, if you are remapping as part of a DOSINIT FULL command, it asks the FRAME questions described next, under FRAME. Otherwise, it asks.

COMMAND?

to accept your next request.

Errors messages you might receive from REMAP are:

Message	Take this action
<i>THERE IS NO CURRENT REMAP AREA, RUN FULL INIT TO ESTABLISH ONE.</i>	Respond FULL) to COMMAND?
<i>ILLEGAL DISK BLOCK NUMBER</i>	Correctly rekey your entry.
<i>DOS WILL NOT RUN WITH THIS BLOCK BAD, BLOCK NOT ACCEPTED</i>	Reformat the disk if this block is truly bad. (Blocks 0 through 5 cannot be bad for DOS to run.)
<i>BAD BLOCK LIST IS FULL, UNABLE TO ENTER ANY MORE BAD BLOCKS</i>	Remap again, enlarging the remap area size.
<i>NO ROOM FOR BAD BLOCK REMAP AREA DUE TO TOO MANY BAD BLOCKS - ABORTING</i>	Reformat disk and run FULL command on it.
<i>ILLEGAL REMAP AREA START BLOCK NUMBER</i>	Pick another area.
<i>BAD BLOCK CONTAINED IN REMAP AREA SPECIFIED, PLEASE SPECIFY ANOTHER AREA</i>	Pick an area with contiguous good blocks.

ENTER Command

ENTER allows you to manually enter bad blocks in the disk's bad block table, but it does not require a DOS INIT/F, and thus does not destroy all files. Normally,

DOSINIT identifies bad blocks on the original FULL command, or you can have it done with PARTIAL, or do it manually with REMAP. Any blocks you ENTER will be placed in the existing bad block table, but if the table overflows, you must run a REMAP or FULL on the disk to enlarge the table.

As with REMAP, enter blocks by physical number (octal), or by head, sector, and cylinder numbers, separated by commas, as in the following example:

COMMAND? ENTER)

BAD BLOCK NUMBER (TYPE RETURN TO STOP)
136)

BAD BLOCK ENTERED
BAD BLOCK NUMBER (TYPE RETURN TO STOP)
)

DO YOU WISH TO DECLARE ANY MORE BLOCKS
BAD? NO)

COMMAND?

Possible messages are:

Message	Take this action
<i>ILLEGAL DISK BLOCK NUMBER</i>	Correctly rekey your entry.
<i>DOS WILL NOT RUN WITH THIS BLOCK BAD, BLOCK NOT ACCEPTED</i>	Reformat the disk, if this block is truly bad. (Blocks 0 through 5 must be ok for DOS to run.)
<i>BAD BLOCK LIST IS FULL, UNABLE TO ENTER ANY MORE BAD BLOCKS.</i>	Run a REMAP or FULL to enlarge remap area size.
<i>BLOCK IS PART OF BAD BLOCK REMAP AREA, IT CAN ONLY BE DECLARED BAD USING FULL INIT OR REMAP.</i>	Try to REMAP to a different area; if this doesn't work, reformat the disk.

STOP Command

The STOP Command halts the computer. To restart DOSINIT on a microNOVA, press the CONT key (with hand-held console), CONTINUE rocker switch (with CPU program load), or type P) (with console debug). On a NOVA system, press the CONTINUE panel switch.

End of Chapter

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NOTE: The letter “f” means “and the following page”; “ff” means “and the following pages”. Capitalized entries indicate commands or acronyms.

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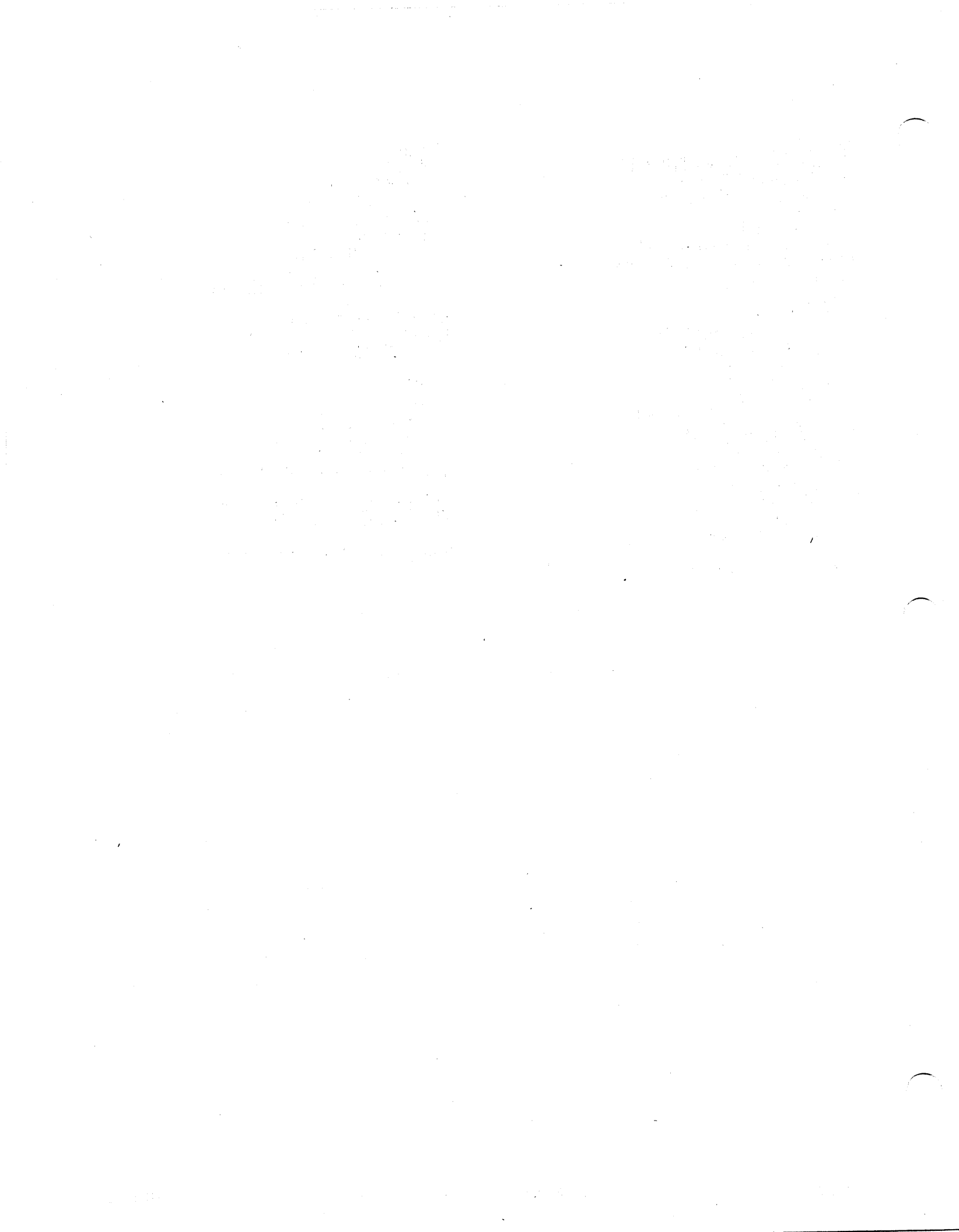
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