sgen-dos
utility program
digital
SGEN - DOS Utility Program

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This manual describes the DOS-15 System Generator Utility Program, DOSGEN, and gives other information needed by the System Manager for installation and maintenance of the DOS-15 system.

In the preparation of this manual, it was assumed that the reader is familiar with the Disk Operating System (DOS-15), including its Monitor, and the several Utility Programs -- especially PIP, PATCH, and UPDATE. The DOS USER'S MANUAL (DEC-15-ODUMA-B-D) describes the general operating procedures for DOS-15.

PDP-15 UTILITY PROGRAMS

The PDP-15 Utility Programs manual is comprised of a set of individual manuals, each of which describes the operation and use of a PDP-15 Utility program. The set of manuals which make up the Utility Programs manual are listed in an Applications Guide located on the following page; the Guide also lists the order number of each manual and indicates the currently available monitor systems under which the program will operate. Individual utility manuals may be ordered by referencing the titles and order numbers specified in the Applications Guide.

Chapters 1 and 2 of this manual describe DOSGEN and its use. Chapter 3 describes the general sequence of operations to be followed when using DOSGEN. It is recommended that the user read the entire manual before installing DOS-15.
## APPLICATION GUIDE

### PDP-15 UTILITY PROGRAM MANUALS

PDP-15 Utility Program Manuals and the Application of Each

<table>
<thead>
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<th>Manual</th>
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</thead>
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<tr>
<td></td>
<td>Order Number</td>
<td>DOS</td>
</tr>
<tr>
<td></td>
<td>(DEC-15-</td>
<td></td>
</tr>
<tr>
<td>DDT Utility Program</td>
<td>YWZB-DN1</td>
<td>✓</td>
</tr>
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<td>CHAIN &amp; EXECUTE Utility Program</td>
<td>YWZB-DN2</td>
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</tr>
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<td>SGEN ADVANCED Monitor</td>
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<td>✓</td>
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<td>MTDUMP Utility Program</td>
<td>YWZB-DN4</td>
<td>✓</td>
</tr>
<tr>
<td>PATCH Utility Program</td>
<td>UPATA-A-D</td>
<td>✓</td>
</tr>
<tr>
<td>EDIT Utility Program</td>
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<td>✓</td>
</tr>
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<td>UPDATE Utility Program</td>
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<td>LINKING LOADER</td>
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<td>✓</td>
</tr>
<tr>
<td>PIP ADVANCED Monitor</td>
<td>YWZB-DN9</td>
<td>✓</td>
</tr>
<tr>
<td>SRCCOM Utility Program</td>
<td>YWZB-DN11</td>
<td>✓</td>
</tr>
<tr>
<td>SGEN DOS Monitor</td>
<td>USGNA-A-D</td>
<td>✓</td>
</tr>
<tr>
<td>PIP DOS Monitor</td>
<td>UPIPA-A-D</td>
<td>✓</td>
</tr>
</tbody>
</table>
CHAPTER 1
USING DOSGEN

1.1 CONTEXT

The DOS System Generator, DOSGEN Vnn, allows the system manager to modify an existing DOS system to suit the needs of a particular installation. DOSGEN does not create a system, but modifies an existing one. The DOS disk-restore DECTapes or magtape that Digital Equipment Corporation distributes will produce a working Disk Operating System when restored to the disk via the DOSSAV program. The system manager can initiate a system generation operation in order to tailor this basic system to his own needs by issuing the following series of commands to the DOS Monitor:

$MICLOG SYS Required System Manager Password for the basic system
\[\begin{array}{l}
A RK -14 \text{ (for system generation on RK Disk cartridge)} \\
A DK -14 \text{ (for system generation on RF DECdisk)} \\
A DP -14 \text{ (for system generation on RP Disk Pack)}
\end{array}\] Required ASSIGN statement

$SGEN Load command for DOSGEN

When DOSGEN is loaded, it automatically starts an interactive SGEN procedure. Once system generation is complete, the system manager should save the changed system via the DOSSAV program. He should always retain at least two copies of the system: the original tape(s) from DEC, and a copy of the new system.

When the system manager wishes to do a subsequent system generation, he should type the same command series given above, substituting the Monitor Identification Code which he supplied during the last system generation.

1.2 ORGANIZATION

DOSGEN is a single, core-image system program with no overlays. When loaded into core DOSGEN tests to ensure that the system owner is currently logged in and that the "A" handler of the RF DECdisk or RK Disk cartridge or RP Disk Pack is assigned to .DAT-14. DOSGEN exits if these requirements are not met. DOSGEN then types out its name, version number, and the device and unit number on which the new system will reside.

1Appendix A describes the DOSSAV program.

1-1
DOSGEN then proceeds with eight sequentially presented sets of questions that can modify three basic areas of the system: (1) system parameters, (2) I/O, and (3) system programs. The eight sets of questions are identified by the letters A through H. Each set is started by a key question that describes the drift of the questions in that particular set. Key questions start at the left margin, questions within a set are tabbed one stop (8 spaces) to the right.

The user can save time by refusing to consider questions in a particular set involving an area not to be modified. He can do this by responding to the key question of any set with a Carriage Return, which effects the acceptance of a set of default answers. This means that the parameters covered by the rejected set remain as in the previous system.

DOSGEN provides restart points which coincide with the beginning of each set of questions. In general, a CTRL P from the keyboard at any point before the end of the current set of questions causes a return to the start of the current set of questions, and the deletion of all answers previously supplied for the current set. Before the user terminates a particular set, he should then check all answers for that set. If he later finds a mistake after a set is completed, he must abort the operation and go through another complete system generation to correct the error. A CTRL C, at any time before the end of Section H, terminates the system generation, leaving the old system unchanged.

1.3 ANSWERS TO DOSGEN QUESTIONS

1.3.1 Teleprinter Command Mode

To save time, DOSGEN supplies a default answer in either parentheses or square brackets, with each question. The default answer always shows how the previous system looked or in some way indicates no change is required. A Carriage RETURN response indicates the user accepts the default answer. In the illustration of each question where the default may be more than one, this manual indicates the possibility with brackets ({}). Thus:

API \{ (Y) \} \\
   (N)
Y and N are 1-character answers for many of the Yes/No, On/Off class of questions. They are self-explanatory. In the case of some questions, however, a third 1-character choice is required. In such questions, the third choice implies "Yes, but ask me questions about the details of the subject." For example, Section B, which concerns devices and device handlers, first asks about each device, deferring questions about its handlers until necessary. Thus, the question:

PR? ($)

asks whether the user wants the Paper Tape Reader. "N" says "NO, delete the Paper Tape Reader and all of its handlers and skips from the system." Response "$$" or Carriage Return says, "YES, keep the Paper Tape Reader and all its handlers and skips as they are." Response "Y" says, "YES, keep the Paper Tape Reader, but ask me questions about its handlers and skips." ALT MODE alone is echoed "$", and substitutes for "$". For the Y/N/S type of question, which accepts a 1-character answer, a left arrow implies the default and gives a visible answer on the printout. (Carriage RETURN is not a printing character.)

Some questions cannot be answered by a simple yes/no multiple choice type of question; for example, the specification of the monitor identification code (MIC) (paragraph 2.1.4). For such questions the present value (or default) is supplied in square brackets rather than parentheses. The user may type a single carriage return to continue with the present value, or a new value followed by a carriage return. The exact form a new value must take is given in the paragraphs on the appropriate questions.

Some questions allow multiple answers; for example, "SKIP MNEMONICS IN ORDER" (paragraph 2.4.2). In such instances, the user may type several answers on one line, separating each answer from the next by a comma.

Other answers are explained in the relevant parts of Chapter 2.

1.3.2 DOSGEN Batching Command Mode

Like other DOS Monitor system programs, DOSGEN may be used in the DOS Batching Command Mode. In fact, some features have been added which make the batching process easier. These features are required for the following reason: For those answers whose defaults are specified in
parentheses, DOSGEN reads teleprinter input in Image Alphanumeric Mode. Hence, it does not require a Carriage RETURN to complete a .READ. System considerations, however, require that Batching Mode tapes or decks be in IOPS ASCII. This means that each line of input must be terminated by a Carriage RETURN. Since lines containing one Carriage RETURN only cannot be generated by the Editor, the default answer must always be specified by a left arrow (+). One-character answers in teleprinter mode have their Batching Mode equivalents as follows:

<table>
<thead>
<tr>
<th>Teleprinter</th>
<th>Batching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>Y,</td>
</tr>
<tr>
<td>N</td>
<td>N,</td>
</tr>
<tr>
<td>$</td>
<td>$,</td>
</tr>
<tr>
<td>Carriage RETURN</td>
<td>+,</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>Left-arrow (+)</td>
<td></td>
</tr>
</tbody>
</table>

All of the above types of answers go with questions where the default is specified in parentheses. In any case where the default is not specified in parentheses (i.e., no default, or one in brackets), the user should have xx..x) in the batching command string.

1.4 ERROR MESSAGES

DOSGEN checks all answers for syntax and acceptability to the DOS software. It also does some limited checking for acceptability within the current hardware configuration. Whenever DOSGEN finds a wrong answer, it types an error message two tabs to the right of the left hand margin (16 spaces in). DOSGEN does not check for multiple errors; any answers that follow an erroneous answer on the same line are not processed, and must be retyped.

1.5 OPERATION

When DOSGEN starts operation, it saves an image of the three parameter blocks from the system device plus the Storage Allocation Table. These blocks contain the old image of the three system information blocks: SGNBLK, SYSBLK and COMBLK. SGNBLK contains information about the default settings of key .SCOM registers, the .DAT and .UFDT, plus an ordered skip chain, the names of all the handlers, and certain information about the devices that the system recognizes. Together, SYSBLK and COMBLK occupy two contiguous blocks on the system device. They describe the system programs. Figure 1-1, SGNBLK, and Figure 1-2, SYSBLK and COMBLK, illustrate the contents of these information blocks.
<table>
<thead>
<tr>
<th>Location</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>000nn</td>
<td>Pointer to first free entry in SGNBLK</td>
</tr>
<tr>
<td>1</td>
<td>00017</td>
<td>Number of miscellaneous parameters</td>
</tr>
<tr>
<td>2</td>
<td>000nn</td>
<td>Size of .DAT plus size of .UFDT = (number of positive .DAT slots + 16)*2. (Initial value is 20 positive .DAT slots.)</td>
</tr>
<tr>
<td>3</td>
<td>000nn</td>
<td>Number of skips in Skip Chain.</td>
</tr>
<tr>
<td>4</td>
<td>221300</td>
<td>System device code.</td>
</tr>
<tr>
<td>5</td>
<td>nnnnn</td>
<td>Original contents of .SCOM+4.</td>
</tr>
<tr>
<td>6</td>
<td>nnnnn</td>
<td>Original contents of .SCOM+20.</td>
</tr>
<tr>
<td>7</td>
<td>nnnnn</td>
<td>Number of words per buffer (.SCOM+27).</td>
</tr>
<tr>
<td>10</td>
<td>nnnnn</td>
<td>Default number of buffers (.SCOM+26).</td>
</tr>
<tr>
<td>12</td>
<td>nnnnn</td>
<td>Information on VT and CTRL X (.SCOM+33).</td>
</tr>
<tr>
<td>13</td>
<td>00000n</td>
<td>Default files protection code (.SCOM+54).</td>
</tr>
<tr>
<td>14</td>
<td>000nnn</td>
<td>Size of the Resident Monitor Patch Area.</td>
</tr>
<tr>
<td>15</td>
<td>7777nn</td>
<td>Minus the number of clock ticks in a second (-74 for 60 Hz, -62 for 50 Hz)</td>
</tr>
<tr>
<td>16</td>
<td>nnnnn</td>
<td>Spooler area last block #.</td>
</tr>
<tr>
<td>17</td>
<td>nnnnn</td>
<td>Spooler area size.</td>
</tr>
<tr>
<td>20</td>
<td>000nn</td>
<td>Device assignments for the .DAT (made by handler numbers). (Termination at 55 assumes 208 positive slots.)</td>
</tr>
<tr>
<td>55</td>
<td>000nn</td>
<td>.SIXBT</td>
</tr>
<tr>
<td>56</td>
<td>.SIXBT</td>
<td>UIC assignments for the .UFDT. (Termination at 113 assumes 208 positive slots.)</td>
</tr>
<tr>
<td>113</td>
<td>.SIXBT</td>
<td>Skip Chain Table (Negative skips in 1's complement.) (Termination at 145 assumes 328 skips in chain.)</td>
</tr>
<tr>
<td>145</td>
<td>nnnnn</td>
<td>.SIXBT</td>
</tr>
<tr>
<td>146</td>
<td>.SIXBT</td>
<td>The last part of the SGNBLK is the Device Handler-Skip IOT Table. Each entry starts with the .SIXBT representations of all handlers for a particular device. (First two characters equal device code, for all handlers.) Zeroes in the first six bits of a word indicates the end of the handler names, and says that the rest of the word contains the number of skips for this entry's device. The skip IOT's follow immediately. As above, 1's complement skips indicate negative skips. Note, however, the confusing fact that a 1's complement of a skip IOT is a positive number. Thus, 70nnnn complemented is 07nnnn.</td>
</tr>
<tr>
<td>344</td>
<td></td>
<td>SGNBLK ends at 344 in the DOS-15 RK5 system distributed by Digital Equipment Corporation.</td>
</tr>
<tr>
<td>Word #</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------</td>
<td>-------------</td>
</tr>
<tr>
<td>Ø</td>
<td>0000nn</td>
<td>Pointer to first free word after SYSBLK (There is one set of seven words/core image program.)</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>Name of System Program or overlay</td>
</tr>
<tr>
<td>7N+1</td>
<td>.SIXBT</td>
<td>Number of first block on system device occupied by this program or overlay</td>
</tr>
<tr>
<td>7N+2</td>
<td>.SIXBT</td>
<td>Number of blocks occupied by this program or overlay</td>
</tr>
<tr>
<td>7N+3</td>
<td>nnnnnn</td>
<td>Thirteen-bit first address for this program or overlay</td>
</tr>
<tr>
<td>7N+4</td>
<td>0000nn</td>
<td>Program size</td>
</tr>
<tr>
<td>7N+5</td>
<td>address</td>
<td>Thirteen-bit starting address for this program or overlay</td>
</tr>
<tr>
<td>7N+6</td>
<td>0nnnnn</td>
<td></td>
</tr>
<tr>
<td>7N+7</td>
<td>address</td>
<td></td>
</tr>
</tbody>
</table>

(free area)

| 4ØØ    | 000000 | Number of words in this entry (in this case, 10) |
| 4Ø1    | .SIXBT | Name of this system program (left-justified and zero-filled) |
| 4Ø2    | p      | Name of an overlay (left-justified and zero-filled) -- overlays are optional |
| 4Ø3    | r      | |
| 4Ø4    | o      | Number of buffers required by this system program (Bits Ø-6=Ø means the end of any overlay names. This is why program and overlay names must be left-justified.) |
| 4Ø5    | g      | |
| 4Ø6    | .DAT&777 | Active .DAT slot |
| 4Ø7    | .DAT&777 | Active .DAT slot (Note: 7777777 for a .DAT slot means all positive .DAT slots.) |
| 41Ø    | 000005 | Number of words for this entry (in this case, 5) |
| 411    | p      | Name of this system program |
| 412    | .SIXBT | Number of buffers required by this program (Note that this program has no overlays.) |
| 413    | o      | 000001 |
| 414    | g      | .DAT&777 | .DAT slot for this program |
| ...    | ...   | |
| 777    | 000400 | Pointer to first word in COMBLK (equals count from first word in SYSBLK). The two contiguous blocks on the system device that hold SYSBLK and COMBLK are treated by the system as one large block. In this case, COMBLK happens to start at location 4ØØ of the two blocks combined. |

Figure 1-2

SYSBLK and COMBLK

1-6
Appendix D contains listings of these information blocks, as supplied by DEC.

Most of DOSGEN's operations consist of building new images of SGNBLK, COMBLK and SYSBLK and the Storage Allocation Table. On completion of the last set of questions (the "H" set), the DOSGEN disallows commands from the teleprinter, writes out the new system block images, and deletes any discarded handlers from the IOS User File Directory. (Up to that point, the current system has remained unchanged.) It is up to the user to insert added handlers and system programs. Handlers can be added via PIP. PATCH can be used to add core-image system programs for which DOSGEN has allocated space.
CHAPTER 2
DETAILED DESCRIPTION OF OPERATION

This section describes the options available to the DOSGEN user, and explains some of the planning necessary for determining an optimum configuration for a particular installation. Each first order (2-digit) paragraph denotes a new set of questions. Each second order (3-digit) paragraph presents an individual question and a description of its meaning and use.

2.1 A. ALTER SYSTEM PARAMETERS? (N)

The "A" section defines those system parameters that do not fall under I/O or system program categories. Some are default parameters which can be modified by commands to the Nonresident Monitor. Others can only be modified by DOSGEN. Figure 2-1, Section A Questions, illustrates this section.

2.1.1 API? (Y) (N)

This asks whether API is available on the system, and whether the user wishes the default to be API on or off. A "Y" response makes "API ON" the default condition. An "N" answer makes "API OFF" the default. The Nonresident Monitor's API ON/OFF command can change the state of API temporarily.

2.1.2 33TTY? (Y) (N)

This asks which keyboard (KSR-33 or KSR-35) is usually available for command inputs. The Resident Monitor's teleprinter handler handles both machines with no modification. It simply needs to know which console it is talking to. An "N" response makes the Model 35 keyboard the default machine. A "Y" response makes Model 33 the default. The Nonresident Monitor's 33TTY command can change the default temporarily. The KSR-33 MODE causes the TTA handler to simulate the TAB function on the KSR-33 and LA30 Teleprinter. Use of an LA30 for the console device requires that KSR-33 mode be on; i.e. a "Y" response is required.

2-1
DOSGEN V3A000

SYSTEM UPDATE ON DK0

A ALTER SYSTEM PARAMETERS? (N) Y
API? (N) Y
33TTY? (N) Y
L30? (N) N
MIC[SYS] FOO
DEFAULT # BUFFERS[3] 4
# WORDS/BUFFER[500] 475
UC15 CONFIG? (N) N
EXTRA 4K? (N) N
DEFAULT FILES PROTECTION CODE[2] 1
RESIDENT PATCH AREA SIZE[0] 1200
PAGE MODE SYSTEM? (N) N
60 CPS? (Y) Y  For an RF15 or RP02 system.

DOSGEN V3A000

SYSTEM UPDATE ON RK0

A ALTER SYSTEM PARAMETERS? (N) Y
API? (Y) Y
33TTY? (Y) Y
L30? (Y) Y
MIC[SYS] XYZ
DEFAULT # BUFFERS[3] 4
# WORDS/BUFFER[500] 525
UC15 CONFIG? (Y)
SPOOLER START BLK # [11207]
SPOOLER SIZE [5006] 4000
EXTRA 4K? (N) Y
DEFAULT FILES PROTECTION CODE[2] 1
RESIDENT PATCH AREA SIZE[0] 1200
PAGE MODE SYSTEM? (Y) Y
60 CPS? (Y) Y  For an RK05 system.

Figure 2-1

Section A Questions

2-2
2.1.3 LA3Ø? \( \{ \text{Y} \} \{ \text{N} \} \)

This question asks if the system has a 3Ø CPS, LA3Ø as the console device. An "N" response makes the Model 35 keyboard the default console device. A "Y" response makes 3Ø CPS, LA3Ø the default. The Non-resident Monitor's LA3Ø command can change the default temporarily. LA3Ø mode causes the TTA handler to insert several Null characters after a CARRIAGE RETURN to improve LA30 Timing on output. LA3Ø mode and KSR-33 mode (paragraph 2.1.2) are totally independent; both must be on ("Y" responses) for an LA3Ø console device.

2.1.4 MIC [mic]

This question prints the current Monitor Identification Code (MIC) in square brackets. A Carriage Return entry retains the old MIC. If the user wishes to change the current MIC, he should type exactly three printing characters, followed by a Carriage Return. If possible, the user should avoid MIC codes that equal User Identification Codes (UIC's) current to the system. In particular, he must avoid the following UIC's: ???, PAG, BNK, IOS, CTF and SCR. DOSGEN does not accept non-printing characters as part of an MIC.

2.1.5 DEFAULT # BUFFERS[n]

This command requests a default number of buffers to be allocated for user programs and non-core image system programs. The number in square brackets is the old number. If the user wishes to retain the old default number, he should type a Carriage Return. DOSGEN accepts any set of six or fewer octal digits followed by a Carriage Return as the octal number. The Master Tapes which Digital Equipment Corporation distributes indicate three (3) as a default number. The user must consider the trade-off of the available core in his installation (systems with little memory might need a smaller number of buffers) versus the convenience of a large number of buffers.

This parameter does not affect core-image system programs, which always get as many buffers as they need. Users whose programs need a different number of buffers may use the BUFFS Nonresident Monitor command to allocate the exact number of buffers needed.
2.1.6 # WORDS/BUFFER [nnn]

This requests the number of words per buffer, and prints the old number (in octal) in square brackets. A decision regarding an efficient size for the buffers requires some knowledge of the disk handlers which use them. The handlers break buffers from the pool into three parts: (1) File Information (about 40₈ words), (2) the Block List -- addresses of pre-allocated blocks (between 4 and 374₈ addresses, inclusive), and (3) the data buffer (400₈ words). Thus, buffers must be at least 444₈ words long.

The disk handlers do not use extra words in buffers longer than 1034₈. This, therefore, may be an upper limit on buffer size, unless other programs need more space in their buffers. The larger the Block List -- that is, the larger the buffer -- the faster is the output. Smaller Block Lists may give more efficient allocation of disk space, and certainly save core.

Any number typed is interpreted as an octal number.

2.1.7 UC15 CONFIG? \{(Y)\}¹

This asks whether the system is the RKØ5 based dual processor UNICONTROL-15. DOSEG turns this information to determine if further questioning is necessary.

If the answer to this question is "Y" the following two questions are asked. If the answer is "N", DOSEG does not ask the following two questions and skips to item 2.1.8.

2.1.7.1 SPOOLER START BLK. # [nnnnn]

This requests the spooler area starting block number on the RK disk and prints the current number in square brackets. Normally the end portion (based on block numbers) of the RK disk (currently only unit 6) is pre-allocated for the SPOOLER. This area is defined by the spooler area start block number and the spooler size in blocks, as indicated by the shaded area in Figure 2-2.

¹If the RKØ5 is not the system disk (UC15 option), then an "N" reply must be given to this question.
Users who are not familiar with the disk file structure and Storage Allocation Table (SAT) should not change this starting block number for the following reason: The current system is built for the maximum possible size of spooler area. As a result the only possible change in size is a reduction of it. This facility is provided by reducing the value of the spooler size only. Values of BB like BB" (resulting from a smaller value of the start block # with no change in the spooler size) are illegal unless the SAT blocks are suitable updated (new blocks pre-allocated) to reflect this change.

For users who are familiar with the disk file structure and the SAT block this provides the facility for changing the location of the spooler area on the disk.
2.1.7.2 SPOOLER SIZE [nnnn]

This requests the spooler area size (in block numbers) on the disk and prints the current size in square brackets. All users are provided with the facility of reducing the spooler area (to free space on disk) by reducing this size. Figure 2-2 illustrates an instance where this is done to result in a new value of BB, BB'. DOSGEN deallocates the disk blocks between BB and BB'.

The smallest legal value of the spooler size is 64 if spooling of data is still desired. Users are warned that as the spooler size is reduced the system is generally slowed down if data is being spooled. This is because spooling of data normally occurs at a much faster rate than the de-spooling of data and, as a result, after a certain period of time, the entire spooler area is full of spooled data. The spooler then temporarily halts spooling operations until disk blocks are freed by de-spooling of data.

The entire spooler area can be completely freed if spooling is not desired.

2.1.8 EXTRA 4K? \{(Y)\} \{(N)\}

For systems with an odd number of memory pages, a "Y" answer allows the loaders to use the highest page in memory. For systems with no extra 4K page, the user should type "N".

2.1.9 DEFAULT FILES PROTECTION CODE [n]

This requests the default file protection code, and prints the old code in square brackets. The possible codes and their meanings are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unprotected, with the exception that the file may not be deleted and the number of blocks may not change, if the directory is protected.</td>
</tr>
<tr>
<td>2</td>
<td>Write protected, if directory protected.</td>
</tr>
<tr>
<td>3</td>
<td>Read/Write protected, if directory protected.</td>
</tr>
</tbody>
</table>
DOSGEN accepts any 1-digit octal number, but the numbers 0, 4, 5, 6, and 7 are meaningless in this system.

The default protection code for User File Directories is always 1, protected, and may not be changed by DOSGEN.

A user may temporarily change the default protection by means of the Nonresident Monitor Command PROTECT.

2.1.10 RESIDENT PATCH AREA SIZE [nnn]

This requests the Resident Monitor's Patch area size and prints the old number in square brackets. The Resident Monitor's Patch Area is a number of reserved registers (no bigger than $3000_8$) located just above the Resident Monitor. The System Loader does not refresh it, except on Bootstrap loads, restarts, and any of the QFILE GET commands. The area may be used for patching the system or for communication among several programs in different core loads.

DOSGEN interprets any number typed as an octal number. The digits 8 and 9, therefore, are not accepted.

2.1.11 PAGE MODE SYSTEM? {Y} {N}

This requests the default addressing mode. A "Y" response makes page addressing the default mode. An "N" response makes bank mode the default. Users may temporarily change the mode via the PAGE ON/OFF or BANK ON/OFF Nonresident Monitor commands.

2.1.12 60 CPS? {Y} {N}

This requests the line frequency at the installation. Installations with 60hz line frequency require a "Y" answer; those with 50hz require an "N" response.
2.2 B. ALTER I/O DEVICES OR HANDLERS? (N)

This set of questions allows the user to delete or retain devices and all their handlers, and allows a third option of retaining the reference to the device, and then retaining, deleting or adding handlers and skips for a particular device. The printout given in Figure 2-3 illustrates the use of this section.

Section B refers to all devices currently in the system by a 2-character device code. The device codes for those device handlers included in the Master Tapes supplied by the Digital Equipment Corporation are:

| CD   | Card Reader (CR03B or CR15 or CR11) |
| DK   | RF15 Disk Control                  |
| DP   | RP15 Disk Pack Control             |
| DT   | DECTape (TC15 DECTape Control)     |
| DK   | DECTape (TC15 DECTape Control)     |
| KA   | DECTape (TC15 DECTape Control)     |
| LP   | Line Printer (either LP15C or LP15F or LP11/LS11) |
| LT   | LT15/LT19 Terminal Interface (Dummy Handler) |
| MT   | MAGtape                             |
| PP   | Paper Tape Punch (PC15)            |
| PP   | Paper Tape Reader (PC15)           |
| RK   | RK05 Disk Cartridge Control        |
| VP   | VP Point Plotting Display          |
| VT   | VT15 Graphic Display Console       |
| VW   | Writing Tablet                     |
| XY   | XY11 Plotter                       |

(TT, which means teleprinter, is not included in this set of questions, because DOS uses the teleprinter as a console command device.)

The device handler names used in Section B are printed as 3-character names. In reality, handler names are four characters long, but this section truncates the last character, a period (.). The first two characters must be the 2-character device code for the handler's device. The third character must be alphabetic.

DOSGEN starts this set of questions by asking whether the user wishes to delete discarded handlers from IOS. Deletion saves space on the system device.

DOSGEN then begins asking key questions for each device currently on the system:

XX? ($) (where XX stands for any device code)
For RKØ5 based UC15 system RK and XY are also included.
If the user answers with a Carriage Return or "$", DOSGEN retains the device and all its skips and handlers as they were in the previous system. If the user answers "N", DOSGEN deletes all information about that device and its handlers, and all its skips from the Skip Chain. (Deletion of handlers from the handler UFD, IOS, does not occur until the termination of Section H.)

If the user answers "Y", DOSGEN asks specific questions about the handlers and skips for the device in question.

2.2.1 XXX? (Y)

(where XXX stands for any handler name)

DOSGEN asks this question for each handler the device has in IOS. A "Y" response retains the handler; an "N" response deletes it.

NOTE

DOSGEN does not allow the user to delete the "A" handler for the system device (DRA., RRA. or DFA.).

2.2.2 NEW HANDLERS:

When DOSGEN has asked a question for each of the device handlers currently in IOS, it asks whether the user wishes to add any new handlers. It makes no sense to "add" a handler name which has just been deleted. If the user wishes to change a handler, he may use PIP to transfer a new one to IOS. PIP automatically deletes the old one if the user transfers a new one with the same name. New handler names should follow the rules outlined in paragraph 2.2. When the user has no more handlers to add, he should simply type a Carriage Return.

Adding handler names only makes them "logically" present. The user must call PIP to transfer the handlers to the IOS UFD, in order to make handlers physically present. DOSGEN warns the user about missing handlers at the end of Section C. File names for handlers in IOS must have the same name as the handler global and the entry point label and a "BIN" extension (e.g., .GLOBL DKA., DKA., DAC CALP, or DKA. BIN).
2.2.3 OLD SKIPS

Presumably, the user changes old skips only in the case where they were incorrectly inserted. In any case, after the user has indicated he has no more handlers to add for the current device, DOSGEN prints the skips for this device that are in SGNBLK (whether or not these skips are in the skip chain). DOSGEN prints skips in the following format:

```
devskp = nnnnnn? (Y)
```

A Carriage RETURN or "Y" accepts the old skip; an "N" deletes the skip.

2.2.4 NEW SKIPS:

When DOSGEN has exhausted the skips for the current device as they were in the old system, it requests any new skips. New skips should be typed in the following format:

```
devskp = nnnnnn
```

where devskp has no more than six characters, and nnnnnn is a legitimate device skip. DOSGEN performs the following tests to determine if a skip is legitimate:

1) Must be IOT. I.e., must be of the form 7%nnnn.

2) Bit 14 must be zero -- the skip may not clear the accumulator.

3) The low order octal digit must be a 1 -- it must be a skip IOT and not some other kind. This check may be overridden by the user by typing "Y" to the question:

```
devskp=nnnnnn IS NOT A STANDARD SKIP IOT.
DO YOU WISH IT ACCEPTED? (N)
```

Any other answer causes the skip to be ignored.

If a skip is rejected for any of the above reasons, DOSGEN re-prompts with the ">" symbol which requests another skip.

Users should not insert skips (IOT's) which can in any way modify the contents of the accumulator. Such IOT's will cause serious, timing-dependent bugs in DOS-15. For similar reasons users are also cautioned
against using skip IOT's which in any way modify device status inform-

When the user types a Carriage RETURN after the ">", DOSGEN proceeds
to the next device. Negative skips (that is, those which skip on
"OFF", not "ON") should be preceded by a minus sign (-), to indicate
that they are negative:

\[ \text{devskp} = -nnnnnn \]

2.3 C. ADD NEW DEVICE? (N)

When DOSGEN has finished with Section B, it asks whether the user
wishes to add a new device. Section C differs from other sections
in that restarts (CTRL P) only delete information added for the
current device.

That is, if the user adds devices AA, BB, and CC, but types CTRL P
during the CC operation, DOSGEN returns to a point just after the
completion of the BB device insertion.

When the user has no more devices to add -- that is, when he answers
the key question with an "N" or Carriage Return, DOSGEN reminds him
of all the handlers he has added to the system, but which are not
yet present in IOS. He can add them later, via PIP. The printout
shown in Figure 2-4 illustrates the use of this Section.

2.3.1 DEVICE CODE [ ]

Here, the user may type any two alphameric characters that DOSGEN
cannot interpret as an octal number. It is recommended, however,
that the user give only alphabetic characters, as any numerals might
be confused with a unit number. DOSGEN does not accept any input
other than two alphameric characters. There is no default for this
question; DOSGEN assumes that if the user answered the Section C
question with a "Y", he has a device code to add. DOSGEN makes no
assumption about which device it is.
Figure 2-4
2.3.2 NEW HANDLERS:

Here, the user should add all the handlers he will use for the new device. The names should follow the rules for handler names outlined in paragraph 2.2 with the exception that the user must not type the final period (.)

2.3.3 NEW SKIPS:

The new skips for the device should follow the format outlined in Paragraph 2.2.4 DOSGEN adds all new skips to the end of the Skip Chain. The user may change the order of the Skip Chain in Section D.

When the user has no more skips to add, DOSGEN repeats the key question for Section C.

C. ADD NEW DEVICE? (N)

If the user has another new device, he may add it now.
2.4 D. CHANGE SKIP CHAIN?  (N)

When the user has responded to the key question for Section C with an "N" or a Carriage Return, DOSGEN proceeds to Section D, which allows the user to change the Skip Chain order and delete skips. The user may not add any skips in this section. The printout of Figure 2-5 illustrates the uses of this section.

2.4.1 DISPLAY SKIP CHAIN?  (Y)

In most instances, the user wishes to see all skip mnemonics and acronyms in the old system, plus those he has just added. If he answers "Y" or Carriage Return, DOSGEN types:  DEFAULT SKIP CHAIN ORDER, followed by the old Skip Chain with new skips at the end.

2.4.2 SKIP MNEMONICS IN ORDER:

Users have two basic options for this part: accept the whole chain as is, or retype the entire chain, in a new order. The user may type a single Carriage RETURN in response to the "SKIP MNEMONICS IN ORDER:" question, and obtain the old chain order, with any new skips at the end of the chain. If he types any mnemonic, however, he must account for all of the skips. When the user responds to DOSGEN's request for the next skip (> ) with an ALT MODE, DOSGEN types "$" and the first skip in the old chain that has not already been selected. When the user responds to the ">" with a Carriage RETURN, DOSGEN deletes all unlisted skips, freezes the new order, and continues on to Section E.

Two warnings are in order: (1) Negative skips should be at the end of the chain. Illegal interrupts may otherwise occur when the peripheral device is down. (No standard DOS devices have negative skips.) (2) Beware of changing the relative order of the chain, as supplied by DEC. For instance, the clock interrupt must come before the printer.

2.5 E. ALTER DEVICE PARAMETERS?  (N)

2.5.1 7-CHANNEL MAGTAPE  {(Y)}  

(N)

The user should choose the proper default. "N" gives 9-channel. The printout for this section is shown in Figure 2-6.
Figure 2-5

1 for RKS5 based UC15 systems RKSF will appear here before DPSJ.
2 for RKS5 based UC15 systems CDSF, LSSF and XYSF will appear here (in that order) before KSFl.
**E. ALTER DEVICES PARAMETERS? (N) Y**

7 CHANNEL MAGTAPE? (Y) N

LINE PRINTER LINE SIZE(80, 120, OR 132)(80) 120

VT ON? (N) -

HALF ON? (N) Y

---

**F. ALTER DAT SLOTS? (N) Y**

# OF POSITIVE DAT SLOTS[20] 15

DISPLAY DAT SLOTS? (Y) Y

<table>
<thead>
<tr>
<th>#</th>
<th>DAT</th>
<th>DEVICE</th>
<th>UIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>TTA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>TTA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>DKL</td>
<td>SYS</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>NONE</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>TTA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>TTA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>DKA</td>
<td>SYS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>DKA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>PPA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>DPA</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>NONE</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>NONE</td>
<td>UIC</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>NONE</td>
<td>UIC</td>
<td></td>
</tr>
</tbody>
</table>

NEW ASSIGNMENTS:

> A AD 11, 12, 13, 14, 15

> A <ABC> 1/CDE/ <CDE> 2

---

Figure 2-6

Figure 2-7
2.5.2 LINE PRINTER SIZE (80, 120, OR 132) [nnn]

Acceptable responses to this question are 80, 120, or 132, or a Carriage Return. A Carriage Return retains the old line size, printed in square brackets.

2.5.3 VT ON: [Y] [N]

This requests the default setting for the CTRL X option. A "Y" makes VT ON the default. An "N" makes VT OFF the default. DOSGEN does not ask this question or the next one if the VT is not on the system.

2.5.4 HALF ON? [Y] [N]

This requests the default setting for the half-screen setting for the CTRL X option. An "N" response makes HALF OFF the default. A "Y" response makes HALF ON the default.

2.6 F. ALTER .DAT SLOTS? (N)

This section allows the user to alter the number of .DAT slots, which is a permanent change to the system (until the next System Generation), and to make the default assignments to both the .DAT slots and the .UFDT slots. The operator may temporarily change the assignments via the ASSIGN (A) command to the Nonresident Monitor. (See Figure 2-7.)

2.6.1 # OF POSITIVE .DAT SLOTS [nn]

This asks the number of positive .DAT slots for the new system, and indicates the old number in square brackets. The number of negative .DAT slots is fixed at 15. DOSGEN accepts any octal number from 1 to 77, inclusive. Each .DAT slot adds two registers to the size of the Resident Monitor and two parameters to SGNBLK -- one for the .DAT slot entry, and one for the .UFDT entry. Users with a great deal of core should still be careful about too many .DAT slots. That might cause SGNBLK overflow and an abort from the system generation. Further, OTS users must reassemble FIOPS and .FLTB in order to use more than 20 .DAT slots. See Appendix C.

2.6.2 DISPLAY .DAT SLOTS (Y)

If the user wishes to change any assignments, he may request their current assignments by answering "Y" or Carriage Return. This has the effect of a REQUEST command to the Nonresident Monitor.
2.6.3 NEW ASSIGNMENTS:

The user may make new default assignments to the .DAT and/or .UFDT by using the same ASSIGN (A) commands he would use to the Nonresident Monitor. When the user has no more new assignments, he should type Carriage Return when DOSGEN types a new angle bracket (>). UIC in a .UFDT slot means the UIC currently logged in is given to that .UFDT slot. SYS in a .UFDT slot means either BKD or PAG will be assigned to that slot by the loaders (depending on the addressing mode of the load). Any other three letters are retained unless changed via an ASSIGN command.

2.7 G. CHANGE SYS FILES? (N)

With the exception of the first question, which refers to the size of the +QAREA, this refers to the core-image system programs currently listed in SYSBLK and COMBLK. This section allows no additions. The printout given in Figure 2-8 illustrates the use of this section.

2.7.1 +Q AREA SIZE (NONE,16K,20K,24K,28K,32K) [nn]

DOSGEN does not ask this question for Disk Pack or Disk Cartridge systems -- they always receive 32K.

This question allows the DECdisk user to set the +Q AREA size. Users with an RF disk system device may wish to delete the +Q AREA. In that case, they should type NONE, in response to this question. The Resident Monitor does not allow dumps to a +Q AREA on the RF disk that is smaller than the current core size, or to a nonexistent area. The user should therefore avoid having an area which is smaller than his core size -- it would simply waste space. "K*" must follow the number 16, 20, 24, 28, or 32.

If the user needs to make the +Q AREA larger, DOSGEN tries to find enough contiguous free blocks to hold the new one. If this proves impossible, special steps may need to be taken. Refer to paragraph 2.7.2.2 for those steps.
G. CHANGE SYS FILES? (N) Y

+Q AREA SIZE(NONE, 16K, 20K, 24K, 28K, 32K) 16K

TO BE KEPT:

DOS15? ($) $
EDIT? ($) N
EDITUP? ($) $
EDITVT? ($) N

PIP? ($) $
MACRO? ($) $
CHAIN? ($) $
F4? ($) $
DUMP? ($) $
DTCOPY? ($) $
PATCH? ($) $
UPDATE? ($) $
SPCCOM? ($) N

8TRAN? ($) N
89TRAN? ($) N
MTDUMP? ($) N
QFILE? ($) $
SGEN? ($) $

Figure 2-8

for RK05 based UC15 systems DOSGEN will type:

MAC11($)  
SPOOL($)  

after SGEN ($).
2.7.2 TC BE KEPT:

syspro? ($)

After the $Q AREA size has been defined, DOSGEN asks questions about each core-image system program currently on the system, in the order that it finds them in COMBLK. A response of "$" or Carriage Return instructs DOSGEN to retain all information about the last-named system program. A response of "Y" instructs DOSGEN to retain the program's name in SYSBLK and COMBLK, but implies that the user wishes to change some of the information about the program, as listed in SYSBLK and COMBLK. An "N" deletes the program from the system. DOSGEN does not allow DOS15 to be deleted.

2.7.2.1 overlay (Y) (where "ovrlay" is the name of any currently listed overlay)

If the user responds to a system program name with a "Y", DOSGEN first lists each of the program's overlays, if any. These are Yes/No answers.

A "Y" or Carriage Return response retains that overlay, and an "N" response deletes it.

2.7.2.2 OVERLAY NAME []

If the user wishes to add any overlays to the current system program, he should type the names at this point. DOSGEN rejects names which are more than six characters long, or are the same as any Nonresident Monitor or PATCH command. If the named overlay is already listed in SYSBLK, DOSGEN requests the next overlay. If not, DOSGEN requests:

2.7.2.3 # OF BLOCKS []

The user should type the number of blocks required for the new system program. If the number is legal, DOSGEN tests whether there are as many contiguous free blocks on the system device as are necessary to hold the new overlay. DOSGEN starts testing at block 0 of the system device, and stops as soon as it finds enough blocks. DOSGEN then updates its image of the Storage Allocation Table (SAT) to indicate that those blocks are occupied.

2-21
Note that when disk space is tight, and the user wishes to add several system programs and overlays, DOSGEN may not allocate disk space efficiently. In an extreme case, the user may need to first transfer the BNK and PAG UFD's (or even all of IOS, except the system device's "A" handler) off the disk via PIP, and then do one pass through DOSGEN to delete all unwanted system programs. Then the user must do enough succeeding passes to ensure that system programs are added in order of size, with the largest first. Finally, the user should transfer the BNK and PAG UFD's back, via PIP. This allows the UFD files, which need not be in contiguous blocks, to use the noncontiguous blocks.

Ordinarily, the procedure outlined in Chapter 3 should be sufficient to free all necessary disk space.

NOTE

New overlays or system programs must run in Bank Mode. Use CHAIN for Page Mode programs.

2.7.2.4 BUFFS [nn]

This question indicates the number of buffers previously allocated for this system program, and asks whether the user wishes to change the number. DOSGEN does not check whether the number of buffers allocated is compatible with the program. That is the user's responsibility.

2.7.2.5 .DAT SLOT nn? (Y)

After the user has indicated the number of buffers for this program, DOSGEN asks him to check the .DAT slots required. It first lists the old ones. If the user types Y or Carriage Return, DOSGEN retains the listed .DAT slot. An "N" deletes the listed .DAT slot.

2.7.2.6 .DAT SLOTS

After checking the old .DAT slots, the user should add any new ones the program needs. The .DAT slots added must be legal, as determined in Section F. All positive .DAT slots may be obtained by typing "ALL". If the user has added an overlay, he should add any .DAT slots needed by the overlay but not listed by DOSGEN for the system program.
2.8 H. ADD SYS PROG? (N)

This section allows users to add the names of new core-image system programs and their overlays to SYSBLK and COMBLK. Restarts in this section delete only the current system program, just as they do for new devices, Section C.

The printout given in Figure 2-9 illustrates the use of this section.

2.8.1 PROG NAME []

Names must conform to the rules for system program names outlined in paragraph 2.7.2.2. There is no default for this question.

2.8.2 # OF BLOCKS []

This question works just like that for overlays, described in paragraph 2.7.2.2. There is no default for this question.

2.8.3 OVERLAY NAME []

Any overlay names must conform to the rules for system program names outlined in Paragraph 2.7.2.2. If the overlay name is not already listed in SYSBLK, DOSGEN requests:

# OF BLOCKS []

2.8.4 BUFFS [0]

The user should enter the octal number of buffers needed for the new system program.

2.8.5 .DAT SLOTS:

The user should list the octal numbers of all .DAT slots needed by the new system program, or any of its overlays. The response "ALL\)" obtains all positive .DAT slots.

After the user has entered all necessary .DAT slots, he should type a Carriage Return in response to the ">" symbol typed by DOSGEN. This returns him to the start of Section H.

2-23
H. ADD SYS PROG? (N) Y
    PROG NAME[] ADMON
    # OF BLOCKS[] 7
    OVERLAY NAME[] ADMON
    # OF BLOCKS[] 3
    OVERLAY NAME[]
    RUFFS[0] 4
    DAT SLOTS:
    >11,12,13,14,15
    >

H. ADD SYS PROG? (N) N

MODIFYING SYSTEM(*P,*C IGNORED)

DELETED HANDLERS:
DKC.
DPA.
DPR.
DPC.
MTA.
MTC.
MTF.
CDR.
VTA.
VWA.
LKA.

SGEN COMPLETE

Figure 2-9
If the user types Carriage Return or "N" to the key question for Section H, DOSGEN disallows CTRL P or CTRL C, modifies the system, and returns to the monitor. At this point, the user must do a Bootstrap restart, in order to bring in the modified system.
CHAPTER 3
DOSGEN AND ITS CONTEXT

3.1 BUILDING DOS-15 FOR THE FIRST TIME

Digital Equipment Corporation supplies DOS-15 on disk restore tapes -- either one 7- or 9-track magnetic tape, or two DECTapes for RF15 and RP02 systems and eight DECTapes for RK05 systems. In addition, users with optional, Floating Point Hardware should obtain a tape with the Floating Point FORTRAN; and users with Object Time Systems or UNICHANNEL-15 hardware (for RF15 and RP02 based systems) should obtain a DECTape or magnetic tape and five paper tapes for PDP-11 and PDP-15 related software to accommodate those options. The disk restore tape(s) should be copied onto the system device via the DOSSAV program. Appendix A describes DOSSAV operation.

After the completion of a DOSSAV run from the DEC restore tapes to the system device (disk), the disk contains:

1. A working DOS-15 system
2. Completed images of three system information blocks:
   SGNBLK, SYSBLK, and COMBLK.
3. Core-image files of the following system programs:
   DOS15, the Nonresident Monitor
   RESMON, the Resident Monitor
   .SYSLD, the System Loader
   EDIT
   EDITVP
   EDITVT
   PIP
   QFILE
   MACRO
   CREP, MACRO's overlay for pass three
   CHAIN
   F4, the FORTRAN program for PDP-15 machines without floating point hardware
   DUMP
   DTCOPY
   PATCH
   UPDATE
   SRCCTCOM
   8TRAN
   89TRAN

3-1
MTDUMP

DOSGEN

and the following for RK05 based UC15 systems only

MAC11 (for 8K, PDP-11 local memory configuration)
SPOOL (for LP11/LS11 line printer and XY11 plotter)
descriptions of all these system programs.

4. Relocatable binary files in the IOS UFD. These files are
handlers for the following devices:

- RK05 Disk Cartridge Control (for RK05 based UC15 systems
  only)
- RF15 DECDisk Control
- RP15 Disk Pack Control
- PC15 High-Speed Paper Tape Reader and Punch Control
- VP15 Point Plotting Display
- VT15 Graphic Display Processor
- TC59 Magnetic Tape Control
- LP15C and LP15P Line Printers or LP11 and LS11 Line
  Printers (for RK05 based UC15 systems only)
- LK35 Keyboard
- TC15 DECTape Control
- CR03B Card Reader Control
- VW01 Writing Tablet
- XY11 Plotter (for RK05 based UC15 systems only)
- LT15/LT19 Terminal Interface (Dummy Handler)

Appendix B contains a listing of IOS, as supplied by the
Digital Equipment Corporation.

5. Relocatable binary files in the BNK and PAG UFD's. These
files are the relocatable system programs: EXECUTE, .LOAD,
FOCAL, and DDT, plus .LIBR, the system library. They load
in Bank and Page Mode systems, respectively. Appendix B
contains a listing of the BNK and PAG UFD's as supplied by
DEC.

6. Several source and binary files in the PER UFD. These files
are for optional peripherals not included in the majority
of the systems served by DOS-15, and for PDP-9 owners who
wish to use DOS-15. Appendix C lists the PER UFD, as sup-
plied by DEC, and describes the use of the routines con-
tained in PER. These files are supplied to RF15 systems
on a separate DECTape or magnetic tape.
7. A 32K CTRL Q Area.
8. SCR, the default UFD. SCR will be empty.

The above-mentioned files and information blocks fit on the smallest system device supported by DOS-15 (a single-platter RF15 DECDisk or a single drive RP02/RK05 disk). Part of the system generation process is designed to free the system device blocks occupied by unneeded handlers and system programs. This is especially important on a 1- or 2-platter DECDisk system or a 1-drive RK05 system to which the user intends to add his own system programs. The following procedure frees disk storage and sets up a new system in an orderly fashion:

NOTE
The user should be logged in under the Monitor Identification Code for all the following operations.

3.1.1 Preliminary DOSGEN Run

Call DOSGEN, set up the correct system parameters, and delete all undesired device handlers and system programs. Do not add any new handlers or programs. If a DECDisk system and the computer's main memory hold less than 32K words, reduce the CTRL Q area.

Users with neither an LT15 nor an LT19 terminal interface should delete the LT device handler (LTX.) and all its associated skips. Users with an LT15 or LT19 should delete skips which correspond to lines that do not exist on their system. Skip mnemonics are of the form KSFn, where n is a line number between 1 and 16 inclusive. Installations with an LT15 or LT19 should retain the LTX. handler and skips for any lines which are present regardless of whether or not the installation plans to use this equipment under DOS-15. (Exception -- users with only a single line who are keeping the LKA. LK35 keyboard handler with which to drive it should delete LTX. and all of its skips). Furthermore, the skips must be retained in the skip chain. In handling spurious interrupts (such as might be caused by accidentally striking a key on an LT19 keyboard) DOS-15 determines whether or not a particular line is present -- and thus whether an interrupt should be ignored or cause an error -- by whether or not a skip for that line is in the skip chain. The dummy handler LTX. is present solely for the purpose of
getting the appropriate skips into the skip chain -- any attempt to use
LTX. to perform any function will cause an IOPS6 error.

For similar reasons the VPA. device handler should be retained on in-
stallation with a VP15 regardless of whether or not the VP15 is going
to be used. If this is not done, spurious interrupts (caused by
depressing the VP15 erase button) may crash the system.

Users with a single drive RK05 system are recommended to reduce the
spooler area (as explained in section 2.1.7) if the spooled I/O
devices are not going to be used heavily. To give users an idea,
the current spooler size 5006 blocks (=.64 million words) can hold
approximately 20,000 cards or 132-column lines.

3.1.2 One Mode Addressing

Users who intend to have a Bank or Page mode system only should delete
the appropriate UFD:

\[
\begin{align*}
&\text{SPTP} \\
&\gg N \left( \begin{array} {c}
\text{DK} \\
\text{DP} \\
\text{RK}
\end{array} \right) \left( \begin{array} {c}
\text{< PAG >} \\
\text{< BNK >}
\end{array} \right) \gg (R)
\end{align*}
\]

3.1.3 FORTRAN Considerations

The user should next consider the system's FORTRAN capabilities. PDP-9
users should call PATCH, and replace F4 supplied with the system with
the binary file, F4X9, supplied in the PER UFD or separate tape,
mounted on unit '0' (for RF15 system).

\[
\begin{align*}
&\text{S} \left( \begin{array} {c}
\text{DP} \\
\text{RK}
\end{array} \right) \left( \begin{array} {c}
\text{< PER >} \\
\text{-10} \\
\text{-10}
\end{array} \right) \ (\text{For RF15 system: } \text{S}\left( \begin{array} {c}
\text{DT} \\
\text{MT}
\end{array} \right) \left( \begin{array} {c}
\text{-10} \\
\text{-10}
\end{array} \right)) \\
&\text{SPATCH} \gg \\
&\gg \text{F4} \gg \\
&\gg \text{READR} \ F4X9 \gg \\
&\gg \text{EXIT} \gg
\end{align*}
\]

PDP-15 users whose systems have the Floating Point Hardware should
replace the system libraries in BNK and PAG with the libraries found in
the extra DOS-15 Vnn Floating Point FORTRAN Option tape, DEC-15-ODFPA-
A-UB. Before doing so, however, the system manager should consider
whether FOCAL will be used at the installation. If so, he must make an Execute file out of FOCAL. (FOCAL has not been modified to take advantage of Floating Point Hardware, and uses non-Floating Point OTS routines.) If the user has his own FOCAL routines, he should add them to FNEW (see Appendix C).

$PAGE ON (or OFF, as desired)
$A SYS -4 (assign desired output UIC)
$CHAIN
::

>FOCAL (ALT MODE)
>(ALT MODE)

>FOCAL, FNEW (ALT MODE)
>(ALT MODE)

Then the system manager should replace the standard library with the Floating Point Library, found on the option tape mounted on unit '1':

$PI P
>TDK {<BNK>}{<PAG>} .LIBR .BIN+ {DTL}{MTL} {FPAG .BIN}

Users should then replace the F4. (FORTRAN) supplied as a system program with the one from the Floating Point Tape:

$A {DTL} {MTL} -10 )
$PATCH
>F4)
>READR FFP4X)
>EXIT)

3.1.4 Graphics

When the proper FORTRAN routines have been installed, the user with a VT15 Graphics Display Processor should add the Graphics routines in the PER UPD or separate tape (for RF15 systems) to the system libraries in BNK or PAG. Before doing this, CIRCLE and ROTATE should be assembled under the current F4 compiler to produce the binaries:
3.1.5 VP15 Point Plotting Display

The user with a VP15 Point Plotting Display should add the following routines to the libraries:

\[
\$A_{-10}^{\text{DP}} \times <\text{PER} \times -10 / \text{DK}_{\text{RP}} \times <\text{PAG} \times -14,-15> \quad \text{(for RF15 system)}
\]

\[
\$A_{-100}^{\text{MT}} \times -10
\]

The user can transfer VPAS BIN into IOS, UIC and rename it to VPAS.BIN.

3.1.6 Unichannel Based System Considerations

The MAC11 Assembler is delivered as an 8K (Local-11 memory) version. This version will not work on the 4K and 12K unichannels. Before altering FIREX or the spooler the proper MAC11 assembler must be installed. See the DOS Assembly Parameters manual (DEC-15-ODAPA-A-D) for the procedure to install a 4K or 12K MAC11.

The FIREX paper tape (DEC-15-XUCMA-A-D) is supplied in its initial configuration with RK and LP drivers.

The spooler, resident on disk under UIC PER, is configured for line printer (LP) only.
1. The following procedure permits reconfiguration of PIREX to produce a version compatible with a specific site's configuration.

   a. Under UIC PER, utilize the editor (EDIT) to include or delete from PIREX for the following assembly parameters:

      1) $RK=100000 ;(RK#5 disk)
      2) $LP=400000 ;(LP/LS/LV Printer)
      3) $CD=200000 ;(CR11 Card Reader)
      4) $PL=100000 ;(XY11 Plotter)

   b. Assemble the source with MACll to produce a new PIREX paper tape.

      Typing:

      $MACll
      >B+PIREX XXX (ALT)

      will cause the assembly of a new PIREX onto paper tape.³

2. To change the Spooler's configuration utilize the following procedure.

   a. Under UIC PER with Editor (EDIT) to include or delete from the Spooler (SPOLll) the following assembly parameter.

      1) $LP=400000 ;(RK#5 disk)
      2) $CD=200000 ;(CR11 card reader)
      3) $PL=100000 ;(XY11 Plotter)

   b. Assemble the source with MACll to produce a new SPOLll Paper tape.

      Typing:

      $MACll
      >LB+SPOLll XXX (ALT)

³Deleting a parameter deletes the device driver, adding a parameter includes the associated driver.

²The initial parameters are $RK and $LP.

³For more information on MACll, see the MACll User's Manual (DEC-15-IMCMA-A-D).
will cause the assembly of a New SPOL11 onto paper tape and produce a listing.

c. Assemble SPLIMG XXX under MACRO-15 using the assembly SPOLSZ. (The value of the assembly parameter SPOLSZ may be found on about the fourth page of the SPOLSZ listing.)

d. Turn API OFF.

e. Place the new SPOL11 paper tape in the reader.

f. Using GLOAD run SPLIMG.

```
$LOAD
>+SPLIMG(ALT)
```

g. Assemble SPOL15 XXX using the SPOLSZ assembly parameter (See c above) and the FB assembly parameter. (Use PIP: L TT+RK (L) to acquire the FB parameter.)

h. Under the MICLOG Patch the new SPOL15 absolute binary into the SPOOL program.

```
$A RK <PER> -10
$PATCH
>SPOOL
>READ SPOL15
>EXIT
```

i. Reassemble the PDP-15 side handlers corresponding to the devices to be spooled. These are located under the PER UFD.

1. For those devices to be spooled do not use the NOSPL=Ø parameter.

2. For any device that is to be no longer spooled, use the NOSPL=Ø parameter.

3. See the DOS-15 Assembly Parameters Manual for any other relevant assembly parameters.

j. Transfer the newly assembled and suitably renamed DOS-15 handler binaries to the IOS UFD.

The updated spooler is now ready to run.

3.1.7 UNICHANNEL-15 Option¹

Users who have the UC15 optional hardware are supplied with a DOS-15 Vnn UC15 option tape, DEC-15-ODUCA-A-UC, containing the required software. This tape contains software to permit the RF or RP to be the system device. To use RK as the systems device users must obtain the RKØ5 disk restore tapes. In the following illustration to add the UC15 option software to the existing system, RP is the systems device.

¹The UC-15 option is a non-spooled UC-15 package intended for use with systems utilizing an RPØ2 or RP15 as the primary system's disk.

A summary of the required steps is provided for purposes of reference only:

1) Assemble the UC15 OPTION-RBOOT\(^1\) producing a new papertape.
2) Patch the special RESMON, DOSNRM, DOSBCD and SGNBLK RPA\(^1\) onto the system.
3) Load the supplied PIREX papertape using ABSL11.
4) REBOOT DOS-15 using the new UC15-RPBOOT\(^1\).
5) RUN SGEN to install MAC11\(^2\) as a system program.
6) Use patch to update FA, PS, SA for MAC11.
7) Assemble MACINT, MACIMG and load the MAC11 papertape.
8) Patch MACINT onto the system.
9) Tailor PIREX for your installation's configuration.
10) Assemble and move the UNICHSANNEL DOS-15 handlers into [IOS].
11) Run SGEN to install new devices (XY and RK) and new skips (LP and CD).
12) Load the tailored PIREX using ABSL11.
13) REBOOT DOS-15 using the UC15 OPTION-RPBOOT\(^1\) papertape.

\(^1\)Substitute RF for RP where appropriate.
\(^2\)Remember to reply "N" to the "UC15 Config?" question.
3.1.8 Source Files in PER UFD or Separate Tape (For RF15 Systems)

The user should next decide whether he needs any of the source files supplied in PER UFD or separate tape (for RF15 system). If so, he should assemble them via MACRO/MAC11. Appendix C describes the assembly parameters relevant to all the source files in PER. Appendix C also describes where in the system the assembled files should be inserted.

3.1.9 Second DOSGEN Run

The user should run through DOSGEN, to add any devices and system programs needed for the system.

3.1.10 PATCH

The user should call PATCH, to add any system programs for which DOSGEN has reserved space.

3.1.11 PIP

The user should call PIP, and transfer to IOS any handlers added to the system. The user should then save the PER UFD on a tape, if not already present, for future reference, and delete the PERUFD from the system in order to recoup space.

3.1.12 Copy the System

Finally, the user should make at least one copy of the new system, via the DOSSAV program.

3.2 USING DOSGEN AFTER THE FIRST TIME

The system manager may call DOSGEN at any time, in order to modify the system. Changes in system parameters, and deletion of devices, device handlers or system programs require no advance preparation. Addition of core-image system programs, however, may require some preliminary work with PIP.

Once device handlers have been transferred to IOS, they must be renamed, if necessary, to the names assigned in Sections B and C. The PIP "R" command will rename files.
Core image system programs and the spooler area must occupy contiguous blocks on the system device. A running system may have sufficient free blocks to accept a new core image file, but no set of contiguous, free blocks. In such an instance, the user will have to transfer files from any of the UFD's on the system device to another mass storage medium, and then run DOSGEN. After the DOSGEN run, PATCH can add the system files, and PIP can bring back the transferred UFD's. UFD's need not have contiguous disk storage.
APPENDIX A

DOSSAV OPERATING INSTRUCTIONS

DOSSAV is the save/restore system for DOS-15.

DOSSAV saves and restores to/from DECdisk, Disk Cartridges, Disk Packs, DECTape and magtape. A DECdisk system can be saved on and restored from DECTape, magtape, Disk Cartridge and Disk Pack. A Disk Pack or Disk Cartridge system can use DECTape and magtape.

Once loaded, DOSSAV asks for all necessary information, such as input and output device, unit numbers and, in the case of magtape, parity and density.

GENERAL INSTRUCTION:

The user must type a Carriage Return after all entries, including the character typed to restart after errors. For UC15 system, start up PIREX as indicated below.

To load PIREX, place the ABS11 paper tape in the PDP-15's paper tape reader. Place the ENABLE/HALT switch on the PDP-11 in the HALT position. Press the STOP and RESET switches on the PDP-15 simultaneously. Set the ADDRESS switches on the PDP-15 to 17738. Press the READIN switch on the PDP-15. When the readin operation is completed and the PDP-15 has halted, set the PDP-11 switch register to:

\[
600000 \text{ for 4K local memory on the PDP-11} \\
100000 \text{ for 8K local memory on the PDP-11} \\
120000 \text{ for 12K local memory on the PDP-11}
\]

and depress the PDP-11 LOAD ADDR switch, then set the ENABLE/HALT switch on the PDP-11 to ENABLE, and finally depress the PDP-11 START switch.

Remove ABS11 from the paper tape reader, and reload it with the PIREX paper tape. Press CONTINUE on the PDP-15. This will cause the ABS11 program (which has two segments: A PDP-11 segment, and a PDP-15 segment) to read in PIREX (which is a PDP-11 absolute binary tape) via the PDP-15 segment and load it into PDP-11 lower memory via the PDP-11 segment.
When the PIREX paper tape has been read in, the PDP-15 will halt, and the PDP-11 will be running PIREX. Remove the PIREX paper tape from the reader. At this point the UNICHANNEL Peripheral Processor has been loaded and is waiting for an I/O request from DOS-15.

A.1 RESTORING SYSTEMS

The following examples illustrate how to put the systems distributed by Digital on DECTape or magtape onto a DECdisk, Disk Pack or Disk Cartridge. The user responses are underlined. The RK65 based systems start up PIREX as described in GENERAL INSTRUCTION, above, before starting up DOSSAV. DOSSAV resides on a paper tape, which must be (HRM) loaded at 37720 (restart 34280).

1. To restore a DECdisk system from DECTape (1 of 2 on Unit 1 and 2 of 2 on Unit 2):

   DOSSAV Vnn
   INPUT DEVICE? DT
   UNIT NO? 1
   OUTPUT DEVICE? DK
   DATE CREATED: 06 Jun 73
   TAPE DONE. MOUNT ANOTHER
   /Note that if DK is typed no unit number is requested.
   /At this point, /type 2 on the key- /board followed by Carriage /RETURN.

2. To restore a DECdisk system from magtape (on Unit 0):

   DOSSAV Vnn
   INPUT DEVICE? MT
   UNIT NO? 0
   TRACK (7 OR 9)? 9
   DENSITY (2,5,8)? 5
   PARITY (E OR O)? 0
   OUTPUT DEVICE: DK
   DATE CREATED: 06-JUN-73

   NOTE
   All DOS-15 System Restore magtapes distributed by Digital are 800 BPI, odd parity. For 9 track units, DOSSAV assumes 880 BPI.

3. To restore a Disk Pack system from DECTape (1 of 2 on Unit 1 and 2 of 2 on Unit 2):

   DOSSAV Vnn
   INPUT DEVICE? DT
   UNIT NO? 1
   OUTPUT DEVICE? DP
   UNIT NO? 0
   DATE CREATED: 06-JUN-73
   TAPE DONE, MOUNT ANOTHER
   At this point, type 2 on the teleprinter followed by a Carriage RETURN.

A-2
4. To restore a Disk Pack system from magtape (on Unit 1):

DOSSAV Vnn
INPUT DEVICE? MT
UNIT NO? 1
TRACK (7 OR 9)? 7
DENSITY (2,5,8)? 8
PARITY (E OR O)? O
OUTPUT DEVICE? DP
UNIT NO? 0
DATE CREATED: 06-JUN-73

5. To restore a Disk Cartridge system from DECTapes on Units 1, 2, 3, and 4:

DOSSAV Vnn
INPUT DEVICE? DT
UNIT NO? 1
OUTPUT DEVICE? RK
UNIT NO? 0
DATE CREATED: 06-JUN-73
TAPE DONE. MOUNT ANOTHER 2 (The user mounted the next tape on unit number 2, then typed 2 to continue)
TAPE DONE. MOUNT ANOTHER 3 (The user mounted the next tape on unit number 3, then typed 3 to continue)
TAPE DONE. MOUNT ANOTHER 4 (The user mounted the next tape on unit number 4, then typed 4 to continue)

DOSSAV Vnn
INPUT DEVICE? (Operation complete)

6. To restore a Disk Cartridge from magtape Unit 1:

DOSSAV Vnn
INPUT DEVICE? MT
UNIT NO? 1
TRACK (7 OR 9)? 7
DENSITY (2,5,8)? 8
PARITY (E OR O)? O
OUTPUT DEVICE? RK
UNIT #? 0
DATE CREATED: 06-JUN-73

DOSSAV Vnn
INPUT DEVICE? (Operation complete)

It is possible to restore to the DECdisk a software system which was created for a machine smaller (different number of DECdisk platters) than the one being restored to. DOSSAV does all the necessary adjustments of the SAT's. Therefore, the restore tapes issued by Digital for a 1-platter system can be restored to any system. Note that this should only be done with the master tape(s) which have block 1775_8

1SAT's: Storage Allocation Tables - i.e., bit maps.
free. That block is needed during the restore for five or more DECDisk platters. It is not possible to restore a software system which is larger than the hardware. (For example, one cannot restore a 3-platter system onto a 1-platter configuration.)

The system can then be bootstrapped from the appropriate disk. See the DOS Keyboard Command Guide (DEC-15-ODKCA-A-D).

A.2 SAVING SYSTEMS

Once the user has tailored the system to his specific configuration, he will want to save that system for future restorations. To do that, simply reverse the procedure above. To illustrate, consider Example 1 above and the changes necessary to it to create a restore tape.

To save a DECDisk system to DECTape (on Units 1 and 2);

DOSSAV Vnn
INPUT DEVICE? DK
OUTPUT DEVICE? DT
UNIT No? 1
TAPE DONE. MOUNT ANOTHER

At this point, type 2 on the keyboard followed by a Carriage RETURN.

Note that DOSSAV allows for as many DECTapes and magtapes as are necessary to hold the system.

A.3 ERROR CONDITIONS AND MESSAGES

Recoverable errors during command string decoding: If a question is answered incorrectly, DOSSAV outputs an appropriate error message and then repeats the question. These error messages are:

ILLEGAL DEVICE An illegal device mnemonic was typed (something other than DP, DK, RK, DT, or MT) or an illegal combination of devices was typed (i.e., input = DT and output = MT).

BAD TRACK Something other than 7 or 9 was typed.

BAD DENSITY Something other than 2 (200), 5 (556), or 8 (800) was typed.

BAD PARITY Something other than E (even) or 0 (odd) was typed.

Recoverable errors during operations: If it is possible to recover from an error, DOSSAV attempts to do it. The error message is output to the console. After the problem has been corrected, any character on the keyboard followed by a Carriage RETURN resumes operation.
TAPE NOT READY
The DECTape or magtape unit is off line or not write enabled.

DISK NOT READY
DECdisk is write locked.

DISK PACK NOT READY
The Disk Pack or Disk Cartridge unit is not ready.

Unrecoverable errors: Primarily hardware errors, from which DOSSAV cannot recover. After the error message has been output, DOSSAV restarts. DOSSAV retries five times on parity error, before issuing an unrecoverable error message.

DECTAPE ERROR
MAGTAPE ERROR
DISK ERROR
DISK PACK ERROR
ATTEMPT TO RESTORE SYSTEM TO WRONG DISK
To protect users who have access to more than one type of disk and who may have several sets of restore tapes, all restore tapes are created with the mnemonic of the disk type in the first SAT. DOSSAV checks this code against the output device code. If they differ, this message is output.

BLK 1775 OCCUPIED. NO 2ND SAT CREATED
A DECDisk system created for 4 or fewer platters is restored to a machine with 5 or more platters and block 1775 is already used. Therefore, no second SAT is created. A master tape was not used to make the restore.

XX ERR IGN
where xx = DK or DP or RK.
This error is typed on the console, and the PDP-15 halts. This reports that "Read/Write check" errors occurred more than 12 time during a save or restore process. The bad block number is present in the PDP-15 AC. Users can continue the save or restore process by pressing the continue switch on the console of the machine.
A.4 TAPE STRUCTURE

The restore tapes are structured as follows: The first SAT of the system is the first block put on the tape. This SAT, which is never restored to the disk, has two words modified: word 2 contains the creation date (taken from .SCOM+47) and word 376 contains the device mnemonic (.SIXBT, right justified). All the occupied blocks referenced by this SAT are then put sequentially on the tape. The second SAT, if there is one, is then put on, and so on. This structure enables use of magtape, which is a sequential only device.

A.5 DOSSAV Restrictions

1. It is not possible to save or restore magtapes with even parity.

2. DOSSAV fails when two DECtapes are on line with the same unit number. It is necessary to restart under such circumstances
APPENDIX B

DIRECTORY LISTINGS: BNK, PAG AND IOS

<table>
<thead>
<tr>
<th>INSTRUMENT LISTING</th>
<th>(BNK)</th>
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</thead>
<tbody>
<tr>
<td>DATA</td>
<td>BYTES</td>
</tr>
<tr>
<td>FREE</td>
<td>SPACE</td>
</tr>
<tr>
<td>13 USER FILES</td>
<td></td>
</tr>
<tr>
<td>INSTRUMENT LISTING</td>
<td>(PAG)</td>
</tr>
<tr>
<td>DATA</td>
<td>BYTES</td>
</tr>
<tr>
<td>FREE</td>
<td>SPACE</td>
</tr>
<tr>
<td>19 USER FILES</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INSTRUMENT LISTING</th>
<th>(BNK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATA</td>
<td>BYTES</td>
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<tr>
<td>FREE</td>
<td>SPACE</td>
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<tr>
<td>19 USER FILES</td>
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<table>
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<th>LOCAL DATA</th>
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<th>SPACE</th>
</tr>
</thead>
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25-JUL-74
DIRECTORY LISTING
1242 FREE BLKS
36 USER FILES
273 USER BLKS

CDB  BIN  3  25-JUL-74
DKA  BIN  16 25-JUL-74
DKB  BIN  14 25-JUL-74
DKC  BIN  7  25-JUL-74
DPA  BIN  17 25-JUL-74
DPA  BIN  15 25-JUL-74
DPC  BIN  10 25-JUL-74
DTA  BIN  11 25-JUL-74
DTA  BIN  10 25-JUL-74
DTE  BIN  7  25-JUL-74
DTF  BIN  4  25-JUL-74
LKA  BIN  3  25-JUL-74
LPA  BIN  3  25-JUL-74
LTY  BIN  1  25-JUL-74
MTA  BIN  12 25-JUL-74
MTC  BIN  3  25-JUL-74
MTF  BIN  5  25-JUL-74
PPA  BIN  3  25-JUL-74
PPB  BIN  2  25-JUL-74
PPC  BIN  2  25-JUL-74
PRA  BIN  3  25-JUL-74
PRB  BIN  2  25-JUL-74
RKA  BIN  10 25-JUL-74
RKB  BIN  14 25-JUL-74
RKC  BIN  10 25-JUL-74
VPA  BIN  4  25-JUL-74
VTA  BIN  3  25-JUL-74
VWA  BIN  2  25-JUL-74
XYA  BIN  4  25-JUL-74

*Only for RKØ5/RK15 systems. CDB.BIN will be the CRØ3B, 
DEC Ø29 code handler for RF15 and RP15 systems while for RKØ5/RK15 
systems it will be the CR11, DEC Ø29 code unspooled handler 
LPA.BIN will be the LP15 handler for the RF15 and RP15 systems 
while for RKØ5/RK15 systems it will be the LP11/LS11 spooled 
handlers. XYA.BIN present in RKØ5/RF15 system will be the spooled 
version of the handler.
APPENDIX C

PER UFD AND SOURCE ASSEMBLY PARAMETERS

The following is a listing of the PER UFD:

<table>
<thead>
<tr>
<th>DIRECTORY LISTING</th>
<th>PER1</th>
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<tr>
<td>XX</td>
<td>7</td>
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<td>XX</td>
<td>22</td>
</tr>
<tr>
<td>XX</td>
<td>9</td>
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<tr>
<td>XX</td>
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<tr>
<td>XX</td>
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<tr>
<td>XX</td>
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<td>10-442-74</td>
</tr>
<tr>
<td>XX</td>
<td>10-442-74</td>
</tr>
</tbody>
</table>

PER contains—source files:

DOSBCD XXX
CD.DOS XXX
FNEW XXX
LPA.15 XXX

NOTE:

XXX is the current version number—see DOS Assembly Parameters document (DEC-15-ODAPA-A-D).

Those installations which have their own FOCAL routines may want to use EDIT's GET command to add their sources for FNEW. If these sources substitute for others already present, EDIT can delete the old routines. Once FNEW is completed, MACRO produces FNEW BIN on...
some device. Assign this device to .DAT -10. Then, the following commands to UPDATE delete the old FNEW, and insert the new one:

```
$UPDATE
UPDATE Vnn
>D FNEW2
>IFNEW1
>C2
```

The Assembly Parameters document (DEC-15-ODAPA-A-D) shows the assembly parameters that produce all the possible variations of binary files. Note that once assembled, programs put in the IOS UFD must be renamed. For example, the binary produced from assembling LPA.15 Ø48 is LPA.15 BIN. When this program is put in the IOS UFD, it must be renamed to LPA. BIN.

Any number of positive .DAT slots over 208 requires reassembly of FIOPS and .FLTB. These sources may be purchased from Digital Equipment Corporation. Assembly parameter for .FLTB is: FLTB=n<778. Assembly parameter for FIOPS is: DKTBSZ=n<778.

On RKØ5/RK15 the PER UIC, also contains the following source files:

| MACIMG XXX | 15 | 11-FEB-74 |
| MACINT XXX | 47 | 11-FEB-74 |
| PIREX XXX  | 313| 11-FEB-74 |
| SPLIMG XXX | 13 | 11-FEB-74 |
| SPOL11 XXX | 230| 11-FEB-74 |
| SPOL15 XXX | 62 | 11-FEB-74 |
| LPUL XXX   | 43 | 11-FEB-74 |
| XYU XXX    | 66 | 11-FEB-74 |

**NOTE**

XXX is the current version number—see DOS Assembly Parameters document (DEC-15-ODAPA-A-D).
APPENDIX D
SYSBLK AND SGNBLK LISTINGS

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EDIT #019
011 80KRISH 5-OCT-73 UC15 CTL 'G' + TKB UPDATE
012 SK 11-FEB-74 V3A UPDATE
013 SK 23-JUL-74 V3A0000 UPDATE

PARAMETERS:
RF15 SYSTEM NONE
RP02 SYSTEM RP02
RK05 SYSTEM RK05

SYSBLK (SYSTEM BLOCKS #34 AND 35(8)) CONTAINS THE PARAMETERS FOR
LOADING THE SYSTEM BLOCKS (SYS FILES) ON THE DOS15
SYSTEM EXCEPT FOR THE DATA FILES SGNBLK(#36)
AND SYSBLK. SYSBLK IS PART OF THE SYSTEM LOADER AND NON-RESIDENT MONITOR AND
STARTS AT LOCATION 161008(). THE ORDER OF ENTRIES IN SYSBLK IS
UNIMPORTANT EXCEPT FOR THE FIRST 3 PERMANENT ENTRIES. THIS TABLE IS USED BY
PATCH, SGEN, THE SYSTEM LOADER, AND THE NON-RESIDENT MONITOR.
THIS TABLE IS MODIFIED WHEN
NECESSARY BY SGEN AND PATCH. THE FIRST WORD OF SYSBLK CONTAINS
THE UNRELOCATED ADDRESS OF THE FIRST FREE WORD OF SYSBLK. THE
ENTRIES CONSIST OF 7 WORDS. THE FOLLOWING
DESCRIPTION APPLIES TO ALL 7 WORD ENTRIES:
W01, W02 "SIXBIT 'NAME'
W03 FIRST BLOCK # (FB)
W04 # OF BLOCKS OCCUPIED (NB)
W05 FIRST ADDRESS (FA) (13 BITS)
W06 PROGRAM SIZE (PS) (HIGHEST ADDRESS - FA+1)
W07 START ADDRESS (SA) (13 BITS)

ABS
LOC 0

SYSBLK END- 
EJECT

/POINTER TO FIRST FREE WORD OF SYSBLK
THE FOLLOWING THREE ENTRIES ARE FIXED IN SYSLK AND CAN NEVER BE DELETED. THEY REPRESENT THE BASIC SYS FILE CUSPS TO RUN THE SYSTEM AND THE CONTROL Q AREA.

SET1
"SIXBT 'RESMN'

SET2
"SIXDT 'SYSLD'

SET3
"SIXDT 'AQAREA'
"IFINT RP02
"IFINT RK05
101
"ENDC
"ENDC
"IFDEF RP02
17800
"ENDC
"IFDEF RK05
1120
"ENDC

200
5
77773
0
; This entry begins the deleteable core image cusps

; SE
; SIXBT 'DOS15'

; SE5
; SIXBT 'F401'

; SE6
; SIXBT 'PIPO1'

; SE7
; SIXBT 'MACRO'

; EJECT
<table>
<thead>
<tr>
<th>SE10</th>
<th>SIXBT 'CREF'</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>15600</td>
</tr>
<tr>
<td></td>
<td>2012</td>
</tr>
<tr>
<td></td>
<td>15601</td>
</tr>
<tr>
<td></td>
<td>230705</td>
</tr>
<tr>
<td></td>
<td>SE11 'SIXBT 'SGEN'</td>
</tr>
<tr>
<td></td>
<td>227</td>
</tr>
<tr>
<td></td>
<td>22</td>
</tr>
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<tr>
<td></td>
<td>10611</td>
</tr>
<tr>
<td></td>
<td>5355</td>
</tr>
<tr>
<td></td>
<td>31001</td>
</tr>
<tr>
<td></td>
<td>SE12 'SIXBT 'CHAIN'</td>
</tr>
<tr>
<td></td>
<td>251</td>
</tr>
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<td></td>
<td>22</td>
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<td>7200</td>
</tr>
<tr>
<td></td>
<td>05411</td>
</tr>
<tr>
<td></td>
<td>SE13 'SIXBT 'EDITVT'</td>
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</tr>
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<td>17</td>
</tr>
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<td>10406</td>
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<td>05411</td>
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<td>SE14 'SIXBT 'EDITVP'</td>
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<td>312</td>
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<td>17</td>
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<tr>
<td></td>
<td>6775</td>
</tr>
<tr>
<td></td>
<td>10402</td>
</tr>
</tbody>
</table>
COMBLK CONTAINS INFORMATION THE SYSTEM LOADER, THE
NON-RESIDENT MONITOR, AND SYSTEM GENERATOR NEED TO REMEMBER
ABOUT CURRENT SYS FILE CURSES.
The last location in SYSLK contains the
unallocated address of the first entry in COMBLK. The
remainder of COMBLK consists of variable length entries associated
with SYS FILE CURSES (CORE IMAGE SYSTEM PROGRAM FILES). Each
ENTRY IS OF THE FOLLOWING FORM:
(1) THE FIRST WORD IS AN OFFSET NUMBER INDICATING THE
NUMBER OF WORDS IN THE ENTRY INCLUDING THE OFFSET
WORD,
(2) THE NEXT TWO WORDS CONTAIN THE NAME OF THE CURSE IN SIXBT
IF THE NAME IS LESS THAN SIX CHARACTERS IN LENGTH, THE
TRAILING CHARACTER POSITIONS ARE ZEROED. THE FIRST
CHARACTER POSITION MUST BE NON-ZERO.
(3) IF THERE ARE ANY OVERLAY SEGMENTS, THEIR TWO WORD NAMES
ARE ENTERED AFTER THE FIRST NAME ABOVE (2).
(4) WHEN A WORD HAS 0's IN BIT POSITIONS 0-5, AND IT
IS RIGHT AFTER THE CURSE NAME OR AN OVERLAY NAME,
IT TERMINATES THE LIST OF SEGMENT NAMES. THE REMAINDER
OF THIS WORD CONTAINS THE DEFAULT VALUE FOR THE 'FILES'
COMMAND FOR THE CURSE.
(5) THE REMAINDER OF THE COMBLK ENTRY CONTAINS THE ACTIVE
DAT SLUT NUMBERS FOR THE CURSE WITH BITS 0-8 ZEROED
/ (EXCEPT THAT -1 INDICATES THAT ALL POSITIVE VAT SLOTS ARE TO BE LOADED).
/
/ THE SYSTEM GENERATOR ADDS LUSPS TO COMBLK BY MAKING THEM THE NEW FIRST ENTRY, IN THIS WAY SYSBLK AND COMBLK BUILD TOWARD THE CENTER.
/

```assembly
`IFUNO RK05
`LOC 610
`ENOG
`IFUFI RK05
`LOC 574
`ENOG

E1 E3=E1
`SIXBT 'DOS15'

1
-128777
`EJECT

E3 E4=E3
`SIXBT 'EDIT'

2
-158777
-148777
-108777

E4 E4A=E4
`SIXBT 'EDITVP'

2
-158777
-148777
-108777

10

E4A E5=
`SIXBT 'EDITVP'

158777
-148777
-108777````
<table>
<thead>
<tr>
<th>Address</th>
<th>Value</th>
<th>Description</th>
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<td>E6= E5</td>
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<td>00013</td>
<td>E6</td>
</tr>
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<tr>
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<td>00000</td>
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<tr>
<td>2079</td>
<td>00760</td>
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</tbody>
</table>

// Buffer requirements for PIP.
// All positive DAT slots.

// E8=E8
// SIXBY 'F400'
// E9=E9
// SIXBY 'DUMP'
// E10=E10
<table>
<thead>
<tr>
<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
<th>Column 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUMULK</td>
<td>268</td>
<td>429</td>
<td>307</td>
</tr>
<tr>
<td>END</td>
<td>258</td>
<td>363</td>
<td>260</td>
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<tr>
<td>E1</td>
<td>370</td>
<td>369</td>
<td>375</td>
</tr>
<tr>
<td>E10</td>
<td>375</td>
<td>383</td>
<td>375</td>
</tr>
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<td>380</td>
<td>390</td>
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</tr>
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<td>E13</td>
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</tr>
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<tr>
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FIRST PRINTING, FEBRUARY 1974

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'EJECT
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EDIT #010 XXXX 6-OCY-71
EDIT #014 S, KRI SH 17-SEP-73 UC15 GENERAL FIXUP
EDIT #015 S, KRI SH 25-SEP-73 UC15 SYSDEV CODE FIX
EDIT #016 S, KRI SH 10-OCY-73 SPOOLER START BLK # CHANGE TO 11207 TO PERMIT CTL 101

EDIT #017 S, ROOT 13-OCY-73 FIX RKSF FROM 706121 TO 706101
EDIT #018 S, KRI SH 15-OCY-73 NO LP, CDU & XYU. BOSS15 PERMITS ONLY ONE LP & CD HANDLER IN SYSTEM CALLED LPA & COD

#019 15-JUL-74 BY ED GARDNER FIX DEVICE SKIP MNEMONICS TO AGREE WITH THOSE IN 15 USERS HANDBOOK.

#020 22-JUL-74 BY ED GARDNER INSERT STUFF FOR LTX, DUMMY HANDLER.


ABS
LOC 17100
17100 000341 SGNBLK S, GEND=17100 EJECT

/POINTER TO FIRST FREE ENTRY IN SGNBLK
`IFUN D RK05
`IFDEF RP02
`SYSDEV=17
`ENDC
`IFDEF RP02
`ENDC
`IFDEF RK05
`SYSDEV=35
`ENDC

/* BASIC SYSTEM PARAMETERS */

17101 00015 NOPAR
17102 00074 NODAT
17103 00033 NOSKP
017104 SDEV1=*

17105 300500 SCOM4
17106 00000 SCOM0
17107 000500 X1 500
17110 00003 FILES
17111 233123 MIC
17112 00000 SCOM33
17113 00002 PROTECT
17114 00000 PCHSI
17115 777784 CLKCON
17116 12207 SCOM76
17117 5006 SCOM77
17118 60 CPS AND =62 FOR 50 CPS

/
This DAT slot table corresponds to the legal range of DAT slots with the maximum negative DAT slot set to -15 and the maximum positive DAT slot set to a system parameter not to exceed 77(8). The DAT slots are in the same form as before. The unit number is in bits 0-2 and the number of the handler right justified in bits 3-18. The handler number for the first handler in the device handler-skip IOT table is 0 (for the pseudo-handler none). TTA is 1 etc. The constant 100000 indicates a fixed or illegal DAT slot. These slots are not set by SGEN.
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**Note:** The table entries are likely related to some form of data representation or identifier, such as 'SGNFD', 'SIXBT', 'UIC', and values that are not immediately clear from the context provided.
TITLE DEVICE HANDLER-SKIP IOT TABLE

/ THE DEVICE HANDLER-SKIP IOT TABLE CONTAINS ALL THE HANDLER NAMES
/ AND SKIP IOT NUMBERS AND MNEMONICS FOR EACH I/O DEVICE KNOWN TO THE
/ SYSTEM. EVERY DEVICE HAS AN ENTRY IN THE TABLE, A HANDLER
/ NAME MUST BE EXACTLY 3 CHARACTERS IN LENGTH WITH THE LAST CHARACTER
/ NOT AN OCTAL DIGIT, THE DEVICE CODE FOR A DEVICE IS EXACTLY 2
/ CHARACTERS, THE FIRST 2 CHARACTERS OF EACH HANDLER NAME FOR A
/ DEVICE MUST BE THE DEVICE CODE. THIS FACT IS ESSENTIAL FOR UNDERSTANDING
/ THE FORMAT OF A DEVICE ENTRY, SINCE THE DEVICE CODE IS NEVER
/ STORED AS SUCH IN AN ENTRY, BUT IS INFERRED FROM THE DEVICE HANDLER
/ NAMES. THE TYPICAL ENTRY FOR A DEVICE IS THE FOLLOWING:
/ (1) THE FIRST WORDS OF AN ENTRY CONTAIN THE HANDLER NAMES
/ FOR A DEVICE IN \"SIXBT\", EACH HANDLER NAME IS DIFFERENT.
/ A 3 CHARACTER HANDLER NAME IN \"SIXBT\" NEATLY FITS INTO
/ A COMPUTER WORD. THE END OF THE LIST IS DETERMINED
/ BY A WORD WITH 0’S IN BITS 3-5 (FIRST CHARACTER POSITION).
/ (2) THE WORD THAT TERMINATED (1) CONTAINS THE NUMBER OF SKIP
/ IOTS FOR THE DEVICE. FOR EACH SKIP IOT 3 WORDS ARE IN THE
/ TABLE. THE FOLLOWING IS A REPRESENTATION OF THESE 3 WORDS:
/ (A) THE FIRST 2 WORDS ARE THE SKIP MNEMONIC USED FOR
/ REFERRING TO THE SKIP SYMBOLICALLY IN \"SIXBT\" WITH
/ TRAILING CHARACTER POSITIONS CONTAINING 0’s. THE
/ SKIP MNEMONIC MUST NOT EXCEED 6 CHARACTERS.
/ (B) THE LAST WORD ABOUT THE SKIP IS THE ACTUAL MACHINE
/ INSTRUCTION NUMBER FOR THE SKIP IOT. IF THE
/ SKIP IS NEGATIVE THIS NUMBER WILL BE 1’S COMPLEMENT
/ OF THE ACTUAL MACHINE INSTRUCTION (POSITIVE).
/ THE NEXT DEVICE ENTRY FOLLOWS THE LAST SKIP FOR THE PREVIOUS DEVICE.
/ A HANDLER MAY BE ENTERED WITHOUT ANY SKIPS, BUT NO DEVICES MAY BE
/ ENTERED WITHOUT AT LEAST ONE HANDLER NAME.

SGNTAB 'SIXBT' 'NON' /DEV 0 HAND, 0 5 /5 SKIPS
'SIXBT' 'CLSF' /CLOCK DONE

700001 'SIXBT' 'MPSNE' /NON-EXISTENT MEMORY REFERENCE
701741 'SIXBT' 'MPSK' /MEMORY PROTECT VIOLATION
701701 'SPE' /MEMORY PARITY ERROR
702701 'SIXBT' 'SPFAL' /POWER FAIL
703201 EJECT
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________________________________________________________________________
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