sgen-dos

utility program

digital

DEC-15-USGNA-A-D

P D P - 1 5

SGEN - DOS Utility Program

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PREFACE

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

Title	Manual Order Number (DEC-15-	Applies to Monitor: DOS	ADSS	B/F
DDT Utility Program	YWZB-DN1	✓	✓	✓
CHAIN & EXECUTE Utility Program	YWZB-DN2	✓	✓	✓
SGEN ADVANCED Monitor	YWZB-DN3		✓	
MTDUMP Utility Program	YWZB-DN4	✓	✓	
PATCH Utility Program	UPATA-A-D	✓	✓	✓
EDIT Utility Program	YWZB-DN6	✓	✓	✓
UPDATE Utility Program	YWZB-DN7	✓	✓	✓
LINKING LOADER	YWZB-DN8	✓	✓	✓
PIP ADVANCED Monitor	YWZB-DN9		✓	✓
SRCCOM Utility Program	YWZB-DN11	✓	✓	✓
SGEN DOS Monitor	USGNA-A-D	✓		
PIP DOS Monitor	UPIPA-A-D	✓		

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[1]. 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
$ { A RK -14 } (for system generation on RK Disk cartridge) { Required }
  { A DK -14 } (for system generation on RF DECdisk)        { ASSIGN   }
  { A DP -14 } (for system generation on RP Disk Pack)      { 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.

---

[1] Appendix A describes the DOSSAV program.

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 "$". For the Y/N/$ 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:

Teleprinter	Batching
Y	Y↵
N	N↵
$	$↵
Carriage RETURN or Left-arrow (←)	←↵

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 <u>not</u> 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.

Location	Value	Description
Ø	ØØØnnn	Pointer to first free entry in SGNBLK
1	ØØØØ17	Number of miscellaneous parameters
2	ØØØnnn	Size of .DAT plus size of .UFDT = (number of positive .DAT slots + 16)*2. (Initial value is 2Ø positive .DAT slots.)
3	ØØØnnn	Number of skips in Skip Chain.
4	2213ØØ	System device code.
5	nnnnnn	Original contents of .SCOM+4.
6	nnnnnn	Original contents of .SCOM+2Ø.
7	nnnnnn	Number of words per buffer (.SCOM+27).
1Ø	nnnnnn	Default number of buffers (.SCOM+26).
11	.SIXBT	Monitor Identification Code.
12	nnnnnn	Information on VT and CTRL X (.SCOM+33).
13	ØØØØØn	Default files protection code (.SCOM+54).
14	ØØnnnn	Size of the Resident Monitor Patch Area.
15	7777nn	Minus the number of clock ticks in a second (-74 for 6Ø hz, -62 for 5Ø hz)
16	Ønnnnn	Spooler area last block #.
17	ØØnnnn	Spooler area size.
2Ø	ØØØnnn	Device assignments for the .DAT (made by handler numbers). (Termination at 55 assumes $2Ø_8$ positive slots.)
.		
.		
55	ØØØnnn	
56	.SIXBT	UIC assignments for the .UFDT. (Termination at 113 assumes $2Ø_8$ positive slots.)
.		
.		
113	.SIXBT	
114	nnnnnn	Skip Chain Table (Negative skips in 1's complement.) (Termination at 145 assumes 32_8 skips in chain.)
.		
.		
.		
145	nnnnnn	
146	.SIXBT	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, 7Ønnnn complemented is Ø7nnnn.
.	.	
.	.	
.	.	
	.SIXBT	
	.SIXBT	
.	.	
.	.	
.	.SIXBT	
.	ØØØØØ3	
.	nnnnnn	
.	nnnnnn	
.	nnnnnn	
.	.SIXBT	
.	ØØØØØ1	
.	nnnnnn	
.	.	
.	.	
.	.	
344		SGNBLK ends at 344 in the DOS-15 RKØ5 system distributed by Digital Equipment Corporation.

Figure 1-1

SGNBLK for RKØ5 Based System

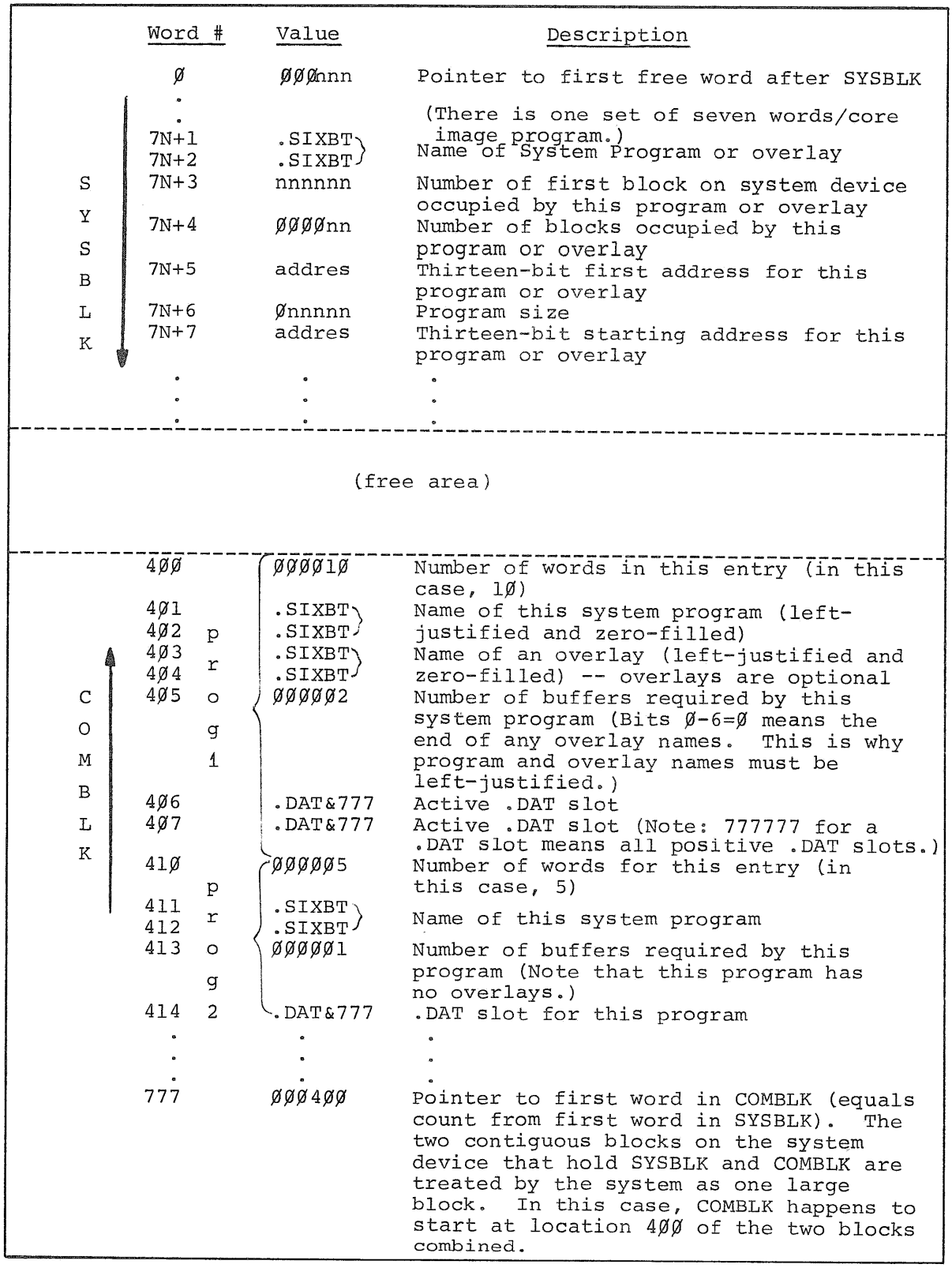

Figure 1-2

SYSBLK and COMBLK

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.

```
DOSGEN V3A000

        SYSTEM UPDATE ON DK0

A. ALTER SYSTEM PARAMETERS? (N) Y

        API? (N) Y

        33TTY? (N) Y

        LA30? (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

        LA30? (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
                                          For an RK05 system.
        PAGE MODE SYSTEM? (Y) Y

        60 CPS? (Y) Y
```

Figure 2-1

Section A Questions

2.1.3 LA3Ø? {(Y)/(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, CTP 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 40_8 words), (2) the Block List -- addresses of pre-allocated blocks (between 4 and 374_8 addresses, inclusive), and (3) the data buffer (400_8 words). Thus, buffers must be at least 444_8 words long.

The disk handlers do not use extra words in buffers longer than 1034_8. 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)/(N)}[1]

This asks whether the system is the RKØ5 based dual processor UNICHANNEL-15. DOSGEN uses 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", DOSGEN 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 Ø) 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.

[1] If the RKØ5 is not the system disk (UC15 option), then an "N" reply must be given to this question.

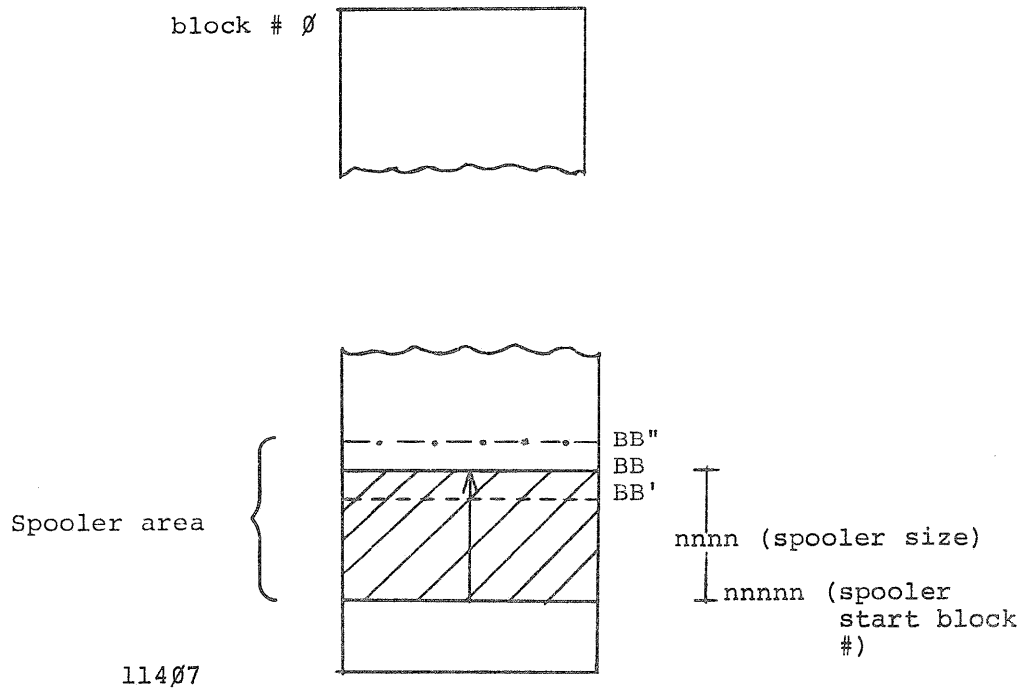

Figure 2-2
Spooler Start Block Area

Spooled data is stored starting from block BB (computed from the start block number and size).

Users who are <u>not</u> <u>familiar</u> with the disk file structure and Storage Allocation Table (SAT) should <u>not</u> 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:

Code = 1	Unprotected, with the exception that the file may not be deleted and the number of blocks may not change, if the directory is protected.
Code = 2	Write protected, if directory protected.
Code = 3	Read/Write protected, if directory protected.

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 $3\emptyset\emptyset\emptyset_8$) 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)
LK	LK35 Keyboard
LP	Line Printer (either LP15C or LP15F or LP11/LS11)
LT	LT15/LT19 Terminal Interface (Dummy Handler)
MT	MAGtape
PP	Paper Tape Punch (PC15)
PR	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)

```
B. ALTER I/O DEVICES OR HANDLERS? (N) Y

        DELETE DISCARDED HANDLERS? (Y) Y

        TO BE KEPT:

        PR? ($) $
        PP? ($) $
        DT? ($) $
        DK? ($) Y

        DKB? (Y) Y

        DKC? (Y) N

        NEW HANDLERS:

        >DKD

        >DKF

        >

        DSSF=707001? (Y) Y

        NEW SKIPS:

        >

        DP? ($) N

        MT? ($) N

        LP? ($) $
        CD? ($) N

        VP? ($) $
        VT? ($) N

        VW? ($) N

        LK? ($) N

        LT? ($) N
```

Figure 2-3

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 (DKA., RKA. or DPA.).

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 7Ønnnn.

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 information.

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:

```
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.

```
C. ADD NEW DEVICE? (N) Y

        DEVICE CODE[] AD

        NEW HANDLERS:

        >ADA

        >

        NEW SKIPS:

        >701301
                ("701301" ISN'T SYMBOL)
        >ADSF=701301

        >WCSF=701341

        >MSSF=701321

        >


C. ADD NEW DEVICE? (N) N

        MISSING HANDLERS:
        DKD.
        DKF.
        ADA.
```

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 <u>all</u> 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.

```
D. CHANGE SKIP CHAIN? (N) Y

        DISPLAY SKIP CHAIN? (Y) Y

        DEFAULT SKIP CHAIN ORDER:
        SPFAL
        DIDF
        DSSF
        DPSJ[1]
        MTSF
        SPDI
        WTSK
        SDDF
        CRSI
        CRSD
        LPSF
        CLSF
        RSF
        PSF
        KSF
        KSF1
        TSF
        DTEF
        DPSE
        MPSNE
        MPSK
        SPE
        KSF1[2]
        KSF2
        KSF3
        KSF4
        KSF5
        MSSF
        WCSF
        ADSF


        SKIP MNEMONICS IN ORDER:

        >ADSF

        >$SPFAL

        >$DIDF

        >WCSF

        >$DSSF

        >$DPSJ

        >MSSF

        >$MTSF

        >$SPDI

        >$WTSK

        >$SDDF

        >$CRSI

        >$CRSD

        >$LPSF

        >$CLSF

        >$RSF

        >$PSF

        >$KSF

        >$KSF1

        >$TSF

        >$DTEF

        >$DPSE

        >$MPSNE

        >$MPSK

        >$SPE
        >$KSF1

        >$KSF2

        >$KSF3

        >$KSF4

        >$KSF5

        >$
```

Figure 2-5

[1] for RKØ5 based UC15 systems RKSF will appear here before DPSJ.
[2] for RKØ5 based UC15 systems CDSF, LSSF and XYSF will appear here (in that order) before KSF1.

```
E. ALTER DEVICE PAPAMETERS? (N) Y

        7 CHANNEL MAGTAPE? (Y) N

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

        VT ON? (N) ←

        HALF ON? (N) Y
```

Figure 2-6

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

        # OF POSITIVE .DAT SLOTS[20] 15

        DISPLAY .DAT SLOTS? (Y) Y

        .DAT    DEVICE  UIC
        -15     DKA     UIC
        -14     DKA     UIC
        -13     DKA     UIC
        -12     TTA     UIC
        -11     DKA     UIC
        -10     TTA     UIC
        -7      DKL     SYS
        -6      DKA     UIC
        -5      NONE    UIC
        -4      DKA     UIC
        -3      TTA     UIC
        -2      TTA     UIC
        -1      DKA     SYS
        1       DKA     UIC
        2       DKA     UIC
        3       DKA     UIC
        4       TTA     UIC
        5       PPA     UIC
        6       PPA     UIC
        7       DTA1    UIC
        10      DTA2    UIC
        11      NONE    UIC
        12      NONE    UIC
        13      NONE    UIC
        14      NONE    UIC
        15      NONE    UIC

        NEW ASSIGNMENTS:

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

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

        >
```

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_8 .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 BNK 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 questions 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)[32K] 16K

        TO BE KEPT:

        DOS15? ($) $
        EDIT? ($) N

        EDITVP? ($) $
        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 ovrlay (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.

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.

```
H. ADD SYS PROG? (N) Y
        PROG NAME[ ] ADMON
        # OF BLOCKS[ ] 7
        OVERLAY NAME[ ] ADMON1
        # OF BLOCKS[ ] 3
        OVERLAY NAME[ ]
        BUFFS[0] 4
        .DAT SLOTS:
        >11,12,13,14,15
        >

H. ADD SYS PROG? (N) N

                MODIFYING SYSTEM(↑P,↑C IGNORED)

        DELETED HANDLERS:
        DKC.
        DPA.
        DPB.
        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 RPØ2 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
   CREF, MACRO's overlay for pass three
   CHAIN
   F4, the FORTRAN program for PDP-15 machines without floating point hardware
   DUMP
   DTCOPY
   PATCH
   UPDATE
   SRCCOM
   8TRAN
   89TRAN

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)
The DOS-15 User's Manual, DEC-15-ODUMA-B-D gives brief 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 LP15F 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 supplied by DEC, and describes the use of the routines contained 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 prcedure 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 installation 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 ($\tilde{=}$.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:

```
$PIP
>N␣{DK}␣{< PAG >}␣ (K)↵
   {DP}  {< BNK >}
   {RK}
```

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).

```
$A␣{DP}␣<PER>␣ -10↵   (For RF15 system: $A␣{DT}␣-10↵)
   {RK}                                  {MT}
$PATCH↵
>F4↵
>READR F4X9↵
>EXIT↵
```

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':

```
$PIP
>T␣ {DK|DP|RK} ␣ {<BNK>|<PAG>} ␣ .LIBR ␣BIN← {DT1|MT1} ␣ {.FPAG ␣ BIN | .FBNK ␣ BIN}
```

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

```
$A ␣ {DT1|MT1} ␣ -10↵
$PATCH↵
>F4↵
>READR FPF4X↵
>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 UFD 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:

```
$A␣(DP/RK)␣<PER>␣-10/(DK/DP/RK)␣(<PAG>/<BNK>)␣-14,-15↵  (for RF15 system:
                                                          $A␣(DT/MT)␣-10)
$UPDATE↵
>US↵↵
>I ROTATE↵
>I CIRCLE↵
>I VTPRIM↵
>I DYLDR↵
>I TRACK↵
>I LTORPB↵
>C↵
```

3.1.5 VP15 Point Plotting Display

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

```
$A␣(DP/RK)␣<PER>␣-10/(DK/DP/RK)␣(<PAG>/<BNK>)␣-14,-15    (for RF15 system
                                                          $A␣(DT/MT)␣-1Ø)
$UPDATE↵
>UPDATE Vnn↵
>US↵↵
>I VECTOR↵
>I FORT↵
>I NUVAL↵
>C↵
```

The user can transfer VPA.S BIN into IOS, UIC and rename it to VPA.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 PIREX 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 PIREX 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) toinclude or delete from PIREX for the following assembly parameters:[1,2]

      1) $RK=1ØØØØØ ;(RKØ5 disk)
      2) $LP=4ØØØØ ;(LP/LS/LV Printer)
      3) $CD=2ØØØØ ;(CR11 Card Reader)
      4) $PL=1ØØØØ ;(XY11 Plotter)

   b. Assemble the source with MAC11 to produce a new PIREX paper tape.

      Typing:

      $MAC11
      >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 (SPOL11) the following assembly parameter.

      1) $LP=4ØØØØ ;(RKØ5 disk)
      2) $CD=2ØØØØ ;(CR11 card reader)
      3) $PL=1ØØØØ ;(XY11 Plotter)

   b. Assemble the source with MAC11 to produce a new SPOL11 Paper tape.

      Typing:

      $MAC11
      >LB←SPOL11 XXX (ALT)

---

[1] Deleting a parameter deletes the device driver, adding a parameter includes the associated driver.
[2] The initial parameters are $RK and $LP.
[3] For more information on MAC11, see the MAC11 User's Manual (DEC-15-LMCMA-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.

```
$GLOAD
>←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 Option[1]

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.

[1]The UC-15 option is a non-spooled UC-15 package intended for use with systems utilizing an RPØ2 or RF15 as the primary system's disk.

The installation of the UC15 option is completely described in the "UC15 OPTION" Appendix in the UNICHANNEL-15 Software Manual (DEC-15-XUCMA-A-D).

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 UNICHANNEL 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.[1] 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.

---

[1] 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 177ØØ. 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:

```
 6ØØØØ for 4K local memory on the PDP-11
1ØØØØØ for 8K local memory on the PDP-11
12ØØØØ 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 RKØ5 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 342ØØ).

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    /Note that if DK is typed no
                           /unit number is requested.
TAPE DONE. MOUNT ANOTHER   /At this point,
                           /type 2 on the key-
2↵                         /board followed by  Carriage
                           /RETURN.
```

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

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

TAPE DONE, MOUNT ANOTHER   At this point, type 2 on the
                           teleprinter followed by a
2↵                         Carriage RETURN.
```

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?  Ø↵
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:  Ø6-JUN-73
TAPE DONE.  MOUNT ANOTHER  (The user mounted the next tape on
2↵                          unit number 2, then typed 2↵
                            to continue)
TAPE DONE.  MOUNT ANOTHER  (The user mounted the next tape on
3↵                          unit number 3, then typed 3↵
                            to continue)
TAPE DONE.  MOUNT ANOTHER  (The user mounted the next tape on
4↵                          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 #?  Ø↵
DATE CREATED:  Ø6-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[1]. 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

[1]SAT'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
2↵                                 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 O (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_8 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

```
DIRECTORY LISTING  (BNK)
   662 FREE BLKS
    13 USER FILES
   176 USER BLKS
DDT      BIN        13   22-MAR-74
EXERUN   BIN         3   22-MAR-74
FOCAL    BIN        22   22-MAR-74
.LIBR    BIN       107   26-MAR-74
.LOAD    BIN        11   22-MAR-74
INSALL   SRC         6   22-MAR-74
INSERR   SRC         7   22-MAR-74
INSTRC   BIN         1   22-MAR-74


DIRECTORY LISTING  (PAG)
   662 FREE BLKS
    13 USER FILES
   176 USER BLKS
DDT      BIN        13   22-MAR-74
EXERUN   BIN         3   22-MAR-74
FOCAL    BIN        22   22-MAR-74
.LIBR    BIN       107   26-MAR-74
.LOAD    BIN        11   22-MAR-74
INSALL   SRC         6   22-MAR-74
INSERR   SRC         7   22-MAR-74
INSTRC   BIN         1   22-MAR-74
```

```
    25-JUL-74
DIRECTORY LISTING  (IOS)
  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
DPB.    BIN       15  25-JUL-74
DPC.    BIN       10  25-JUL-74
DTA.    BIN       11  25-JUL-74
DTC.    BIN        3  25-JUL-74
DTD.    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
LTX.    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       16  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:

```
DIRECTORY LISTING  (PER)
   869 FREE BLKS
    31 USER FILES
  1431 USER BLKS
CD.DOS  XXX      105  19-MAR-74
CTRFLE  SRC        7  22-MAR-74
DOSBCD  XXX       49  23-APR-74
DYLOAD  BIN        2  19-MAR-74
FNEW    XXX       28  19-MAR-74
FORT    BIN        1  19-MAR-74
F4X0    BIN       55  26-MAR-74
LPA.00  BIN        3  19-MAR-74
LPA.15  XXX       32  19-MAR-74
LP.647  BIN        3  19-MAR-74
LTOPRS  BIN        1  19-MAR-74
NUVAL   BIN        1  19-MAR-74
ROTATE  SRC        3  22-MAR-74
TRACK   BIN        2  19-MAR-74
VECTOR  SRC        4  22-MAR-74
VPA.S   BIN        5  19-MAR-74
VTPRTM  BIN        7  19-MAR-74
LPU.    XXX       43  19-MAR-74
MACTMG  XXX       15  19-MAR-74
MACTNT  XXX       47  19-MAR-74
PIREV   XXX      319  22-APR-74
SPLTMG  XXX       13  19-MAR-74
SPOL11  E04      234  19-MAR-74
SPOL15  XXX       69  19-MAR-74
XYU.    XXX       66  19-MAR-74
```

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
>US←
>D FNEW
>I FNEW
>C
```

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 20_8 requires reassembly of FIOPS and .FLTB. These sources may be purchased from Digital Equipment Corporation. Assembly parameter for .FLTB is: FLTB=n≤77_8. Assembly parameter for FIOPS is: DKTBSZ=n≤77_8.

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
LPU.	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

```
SYSBLK 213      SYSBLK DOS15

                        /
                        /COPYRIGHT 1971,72,73 DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS.
                        /
                        /EDIT  #010     9-22-71
                        /       011     S.KRISH 5-OCT-73        UC15 CTL 'Q' + TKB UPDATE
                        /       012     SK      11-FEB-74       V3A UPDATE
                        /       013     SK      23-JUL-74       V3A000 UPDATE
                        /
                        /       PARAMETERS:     RF15 SYSTEM     NONE
                        /                       RP02 SYSTEM     RP02
                        /                       RK05 SYSTEM     RK05
                        /
                        /       SYSBLK (SYSTEM BLOCKS #34 AND 35(8)) CONTAINS THE PARAMETERS FOR
                        /LOADING ALL THE CORE IMAGE FILES (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 16100(8).  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:
                        /       WD1,WD2         .SIXBT  'NAME'
                        /       WD3             FIRST BLOCK # (FB)
                        /       WD4             # OF BLOCKS OCCUPIED (NB)
                        /       WD5             FIRST ADDRESS (FA) (13 BITS)
                        /       WD6             PROGRAM SIZE (PS) (HIGHEST ADDRESS - FA+1)
                        /       WD7             START ADDRESS (SA) (13 BITS)
                        /
                                .ABS
000000                          .LOC    0
000000  000233          SYSBLK  END-.           /POINTER TO FIRST FREE WORD OF SYSBLK
                                .EJECT
```

```
                        /
                        /       THE FOLLOWING THREE ENTRIES ARE FIXED IN SYSBLK AND CAN NEVER
                        /BE DELETED.  THEY REPRESENT THE BASIC SYS FILE CUSPS TO RUN THE
                        /SYSTEM AND THE CONTROL Q AREA.
                        /
00001   220523          SE1     .SIXBT  'RESMON'
00002   151716
00003   000000                  0
00004   000040                  40
00005   000100                  100
00006   017400                  17400
00007   000000                  0
                        /
00010   562331          SE2     .SIXBT  '.SYSLD'
00011   231404
00012   000040                  40
00013   000013                  13
00014   011000                  11000
00015   005100                  5100
00016   011000                  11000
                        /
00017   362101          SE3     .SIXBT  'AQAREA'
00020   220501
                                .IFUND  RP02
                                .IFUND  RK05
00021   000101                  101
                                .ENDC
                                .ENDC
                                .IFDEF  RP02
                                117030
                                .ENDC
                                .IFDEF  RK05
                                1120/
                                .ENDC
00022   000200                  200
00023   000005                  5
00024   077773                  77773
00025   000000                  0
```

```
00026   041723      SE4     .SIXBT  'DOS15'
00027   615500
00030   000727              727
00031   000024              24
                            .IFUND  RK05
00032   004531              4531
00033   011347              11347
00034   005101              5101
                            .ENDC
                            .IFDEF  RK05
                            4320
                            11550
                            4710

                            .ENDC
                            .EJECT

                    /
                    /       THIS ENTRY BEGINS THE DELETEABLE CORE IMAGE CUSPS
                    /
00035   066400      SE5     .SIXBT  'F4@@'
00036   000000
00037   000101              101
00040   000036              36
00041   001150              1150
00042   016467              16467
00043   001277              1277
                    /
00044   201120      SE6     .SIXBT  'PIP@'
00045   000000
00046   000137              137
00047   000035              35
00050   002004              2004
00051   015575              15575
00052   002147              2147
                    /
00053   150103      SE7     .SIXBT  'MACRO'
00054   221700
00055   000174              174
00056   000033              33
00057   002530              2530
00060   015106              15106
00061   002530              2530
                            .EJECT
```

```
                        /
00062   032205          SE10    .SIXBT  'CREF'
00063   060000
00064   000054                  54
00065   000005                  5
00066   015600                  15600
00067   002012                  2012
00070   015601                  15601
                        /
00071   230705          SE11    .SIXBT  'SGEN'
00072   160000
00073   000227                  227
00074   000022                  22
00075   005312                  5312
00076   010611                  10611
00077   005355                  5355
                        /
00100   031001          SE12    .SIXBT  'CHAIN'
00101   111600
00102   000251                  251
00103   000022                  22
00104   007200                  7200
00105   010412                  10412
00106   007200                  7200
                        /
00107   050411          SE13    .SIXBT  'EDITVT'
00110   242624
00111   000273                  273
00112   000017                  17
00113   010130                  10130
00114   006773                  6773
00115   010406                  10406
                        /
00116   050411          SE14    .SIXBT  'EDITVP'
00117   242620
00120   000312                  312
00121   000017                  17
00122   010121                  10121
00123   006755                  6755
00124   010402                  10402
```

```
00125   050411      SE15    .SIXBT  'EDIT'
00126   240000
00127   000331              331
00130   000015              15
00131   011135              11135
00132   006007              6007
00133   011404              11404
00134   252004      SE16    .SIXBT  'UPDATE'
00135   012405
00136   000346              346
00137   000013              13
00140   012370              12370
00141   005247              5247
00142   012371              12371
                    /
00143   232203      SE17    .SIXBT  'SRCCOM'
00144   031715
00145   000361              361
00146   000013              13
00147   012635              12635
00150   005002              5002
00151   012740              12740
                    /
00152   152404      SE20    .SIXBT  'MTDUMP'
00153   251520
00154   000374              374
00155   000012              12
00156   013121              13121
00157   004460              4460
00160   013212              13212
                    /
00161   702422      SE21    .SIXBT  'BTRAN'
00162   011600
00163   000406              406
00164   000011              11
00165   013550              13550
00166   004031              4031
00167   013632              13632
                    /
```

```
00170   707124      SE22    .SIXBT  '89TRAN'
00171   220116
00172   000417              417
00173   000011              11
00174   013522              13522
00175   004057              4057
00176   013604              13604
                    /
00177   200124      SE23    .SIXBT  'PATCH'
00200   031000
00201   000430              430
00202   000010              10
00203   012700              12700
00204   003470              3470
00205   012700              12700
                    /
00206   042515      SE24    .SIXBT  'DUMP'
00207   200000
00210   000440              440
00211   000005              5
00212   015300              15300
00213   002350              2350
00214   015300              15300
                    /
00215   242403      SE25    .SIXBT  'DTCOPY'
00216   172031
00217   000445              445
00220   000003              3
00221   016660              16660
00222   000757              757
00223   016677              16677
                    /
00224   210611      SE26    .SIXBT  'QFILE'
00225   140500
00226   000062              62
00227   000002              2
00230   017041              17041
00231   000437              437
00232   017045              17045
                    /
                            .IFDEF RK05
```

```
                /
SE27            .SIXBT  'SPOOL'
                451
                45
                1
                4000
                3500
SE30            .SIXBT  'MAC11'
                516
                40
                1
                17625
                17500
                .ENDC
000233          END.
                .TITLE  COMBLK DOS15
                /
                /
                /       COMBLK CONTAINS INFORMATION THE SYSTEM LOADER, THE
                /NON-RESIDENT MONITOR, AND SYSTEM GENERATOR NEED TO REMEMBER
                /ABOUT CURRENT SYS FILE CUSPS.
                /THE LAST LOCATION IN SYSBLK CONTAINS THE
                /UNRELOCATED ADDRESS OF THE FIRST ENTRY IN COMBLK.  THE
                /REMAINDER OF COMBLK CONSISTS OF VARIABLE LENGTH ENTRIES ASSOCIATED
                /WITH SYS FILE CUSPS (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 CUSP 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 CUSP 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 CUSP.
                /       (5) THE REMAINDER OF THE COMBLK ENTRY CONTAINS THE ACTIVE
                /           .DAT SLOT NUMBERS FOR THE CUSP WITH BITS 0-8 ZEROED
```

```
                        /           (EXCEPT THAT -1 INDICATES THAT ALL POSITIVE .DAT SLOTS
                        /           ARE TO BE LOADED).
                        /
                        /THE SYSTEM GENERATOR ADDS CUSPS TO COMBLK BY MAKING THEM THE NEW
                        /FIRST ENTRY.  IN THIS WAY SYSBLK AND COMBLK BUILD TOWARD THE CENTER.
                        /
                                .IFUND RK05
00610                           .LOC    610
                                .ENDC
                                .IFDEF RK05
                                .LOC    574
                                .ENDC
                        /
00610   000005          E1      E3-E1
00611   041723                  .SIXBT  'DOS15'
00612   516500
00613   000001                  1
00614   000766                  -12&777
                                .EJECT
00615   000007          E3      E4-E3
00616   050411                  .SIXBT  'EDIT'
00617   240000
00620   000002                  2               /# OF BUFFERS REQ FOR EDIT.
00621   000763                  -15&777
00622   000764                  -14&777
00623   000770                  -10&777
                        /
00624   000010          E4      E4A-E4
00625   050411                  .SIXBT  'EDITVP'
00626   242620
00627   000002                  2               /# OF BUFFERS REQ FOR EDITVP.
00630   000763                  -15&777
00631   000764                  -14&777
00632   000770                  -10&777
00633   000010                  10
                        /
00634   000007          E4A     E5-.
00635   050411                  .SIXBT  'EDITVT'
00636   242624
00637   000002                  2
00640   000763                  -15&777
00641   000764                  -14&777
00642   000770                  -10&777
                        /
```

```
00643   000005      E5      E6-E5
00644   201120              .SIXBT  'PIP@'
00645   200200
00646   000004              4               /# OF BUFFERS REQ FOR PIP.
00647   777777              -1              /ALL POSITIVE .DAT SLOTS
                    /
00650   000013      E6      E7-E6
00651   150103              .SIXBT  'MACRO'
00652   221700
00653   032205              .SIXBT  'CREF'
00654   060000
00655   000003              3
00656   000764              -14&777
00657   000765              -13&777
00660   000766              -12&777
00661   000767              -11&777
00662   000770              -10&777
                    /
00663   000010      E7      E8-E7
00664   031001              .SIXBT  'CHAIN'
00665   111600
00666   000003              3
00667   000772              -6&777
00670   000773              -5&777
00671   000774              -4&777
00672   000777              -1&777
                            .EJECT
00673   000007      E8      E9-E8
00674   066400              .SIXBT  'F4@@'
00675   000000
00676   000003              3
00677   000765              -13&777
00700   000766              -12&777
00701   000767              -11&777
                    /
00702   000006      E9      E10-E9
00703   042515              .SIXBT  'DUMP'
00704   200000
00705   000002              2
00706   000764              -14&777
00707   000766              -12&777
```

```
00710   000006      E10     E11-E10
00711   242403              .SIXBT  'DTCOPY'
00712   172031
00713   000002              2
00714   000763              -15&777
00715   000764              -14&777
                    /
00716   000006      E11     E12-E11
00717   200124              .SIXBT  'PATCH'
00720   231000
00721   000002              2
00722   000764              -14&777
00723   000770              -10&777
                    /
00724   000016      E12     E13-E12
00725   252004              .SIXBT  'UPDATE'
00726   012405
00727   000004              4
00730   000763              -15&777
00731   000764              -14&777
00732   000766              -12&777
00733   000770              -10&777
                    /
00734   000007      E13     E13A-E13
00735   232203              .SIXBT  'SRCCOM'
00736   031715
00737   000003              3
00740   000763              -15&777
00741   000764              -14&777
00742   000766              -12&777
                            .EJECT

00743   000006      E13A    E13B-.
00744   702422              .SIXBT  '8TRAN'
00745   011600
00746   000002              2
00747   000763              -15&777
00750   000764              -14&777
00751   000006      E13B    E13C-.
00752   707124              .SIXBT  '89TRAN'
00753   220116
```

```
00754   000002                  2
00755   000763                  -15&777
00756   000764                  -14&777
00757   000006          E13C    E13D=.
00760   152404                  .SIXBT  'MTDUMP'
00761   251520
00762   000002                  2
00763   000001                  1
00764   000003                  3
00765   000005          E13D    E14=.
00766   210611                  .SIXBT  'QFILE'
00767   140500
00770   000001                  1
00771   000764                  -14&777
                        /
00772   000005          E14     E15=.
00773   230705                  .SIXBT  'SGEN'
00774   160000
00775   000001                  1
00776   000764                  -14&777
        000777          E15=.
                                .IFDEF RK05
                                E16=.
                                .SIXBT  'MAC11'
                                2
                                -12&777
                                -11&777
                        E16=.
                                E17=.
                                .SIXBT  'SPOOL'
                                2
                                -11&777
                                -5&777
                        E17=.
                                .ENDC
00777   000610          COMBLK  E1=SYSBLK               /POINTER TO THE FIRST ENTRY IN COMBLK
        000000                  .END
    SIZE=01000      NO ERROR LINES
```

COMBLK	00777	260	429*	
END	000233	61	259*	
E1	00613	300*	300	429
E10	00713	357	363*	363
E11	00716	363	369*	369
E12	00724	369	375*	375
E13	00734	375	383*	383
E13A	00743	383	390*	
E13B	00751	390	395*	
E13C	00757	395	400*	
E13D	00765	400	405*	
E14	00772	405	410*	
E15	000777	410	414*	
E3	00615	300	305*	305
E4	00624	305	312*	312
E4A	00634	312	320*	
E5	00643	320	327*	327
E6	00650	327	332*	332
E7	00663	332	342*	342
E8	00673	342	350*	350
E9	00702	350	357*	357
SE1	00001	68*		
SE10	00062	138*		
SE11	00071	145*		
SE12	00100	152*		
SE13	00107	159*		
SE14	00116	166*		
SE15	00125	173*		
SE16	00134	181*		
SE17	00143	188*		
SE2	00010	75*		
SE20	00152	195*		
SE21	00161	202*		
SE22	00170	209*		
SE23	00177	216*		
SE24	00206	223*		
SE25	00215	230*		
SE26	00224	237*		
SE3	00017	82*		
SE4	00026	99*		
SE5	00035	116*		
SE6	00044	123*		
SE7	00053	130*		
SYSBLK	00000	1	61*	429

```
                        .TITLE  SGNBLK DOS15
                       /
                       /
                       /                FIRST PRINTING, FEBRUARY 1974
                       /
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                       / CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED
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                       /
                       /
                        .EJECT
```

```
                        /
                        /COPYRIGHT 1971,72,73 DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASS.
                        /
                        /EDIT #010      XXXX    6-OCT-71
                        /EDIT #014      S.KRISH 17-SEP-73       UC15 GENERAL FIXUP
                        /EDIT #015      S.KRISH 25-SEP-73       UC15 SYSDEV CODE BUG FIX
                        /EDIT #016      S.KRISH 10-OCT-73       SPOOLER START BLK # CHANGE TO
                        /                                       11207 TO PERMIT CTL 'Q'
                        /EDIT #017      S.ROOT  13-OCT-73       FIX RKSF FROM 706121 TO 706101
                        /EDIT #018      S.KRISH 15-OCT-73       NO LPU,CDU & XYU, BOSS15 PERMITS
                        /                                       ONLY ONE LP & CD HANDLER IN
                        /                                       SYSTEM CALLED LPA & CDB !!!!!
                        /     #019      15-JUL-74 BY ED GARDNER FIX DEVICE SKIP MNEMONICS TO AGREE
                        /                                       WITH THOSE IN 15 USERS HANDBOOK.
                        /                                       INSERT STUFF FOR LTX, DUMMY HANDLER.
                        /     #020      22-JUL-74 BY ED GARDNER REDUCE NUMBER OF LT19 SKIPS FROM
                        /                                       16 LINES TO 5 LINES SO SGNBLK WILL
                        /                                       FIT IN ONE DISK BLOCK.
                        /
                        /       SGNBLK (SYSTEM BLOCK #36(8)) CONTAINS ALL THE SYSTEM PARAMETERS
                        /NOT ASSOCIATED DIRECTLY WITH SYS FILE CUSPS.  THE BULK OF SGNBLK
                        /IS CONCERNED WITH I/O (.DAT SLOTS, .UFD SLOTS, SKIP CHAIN ORDER, HANDLERS,
                        /SKIP IOT NUMBERS AND MNEMONICS).  THE FIRST FEW REGISTERS OF SGNBLK
                        /HOLD SUCH IMPORTANT SYSTEM PARAMETERS AS THE SYSTEM DEVICE,
                        / .SCOM+4 CONTENTS, ETC.  SGNBLK IS PART OF THE
                        /SYSTEM LOADER AND NON-RESIDENT MONITOR AND STARTS AT LOCATION
                        /17100(8).  THE FIRST
                        /WORD IN SGNBLK POINTS TO THE UNRELOCATED ADDRESS OF THE FIRST FREE
                        /WORD IN THE BLOCK.  THE NEXT ENTRY IS AN OFFSET WORD INDICATING
                        /THE TOTAL LENGTH (INCLUDING ITSELF) OF THE MISCELLANEOUS
                        /SYSTEM PARAMETER TABLE TO FOLLOW.  THIS TABLE INCLUDES THE SIZE OF
                        /THE .DAT SLOT TABLE AND THE SIZE OF THE SKIP CHAIN TABLE.  THE END
                        /OF THE HANDLER AND SKIP IOT TABLE IS THE FIRST FREE ENTRY OF THE BLOCK.
                        /
                                .ABS
                                .LOC    17100
17100                   SGNBLK  SGEND=17100             /POINTER TO FIRST FREE ENTRY IN SGNBLK
                                .EJECT
```

```
                                .IFUND RK05
                                .IFDEF  RP02
                        SYSDEV=17
                                .ENDC
                                .IFUND  RP02
                 000014         SYSDEV=14
                                .ENDC
                                .ENDC
                                .IFDEF RK05
                        SYSDEV=33
                                .ENDC
                        /
                        /BASIC SYSTEM PARAMETERS
                        /
 17101  000015         NOPAR   SGNDAT-.        /NUMBER OF MISCELLANEOUS PARAMETERS
 17102  000074         NODAT   SGNSKP-SGNDAT   /(NUMBER OF POSITIVE .DAT SLOTS + 16)*2
                                                /EQUALS SIZE OF .DAT SLOT TABLE AND .UFD TABLE
 17103  000033         NOSKP   SGNTAB-SGNSKP   /NUMBER OF SKIPS IN THE SKIP CHAIN
                 017104         SDEV1=.                 /SYSTEM DEVICE CODE
                                .IFUND RK05
                                .IFDEF  RP02
                                .SIXBT  /DP/
                                .ENDC
                                .IFUND  RP02
 17104  041300                  .SIXBT  /DK/
                                .ENDC
                                .ENDC
                                .IFDEF RK05
                                .SIXBT  /RK/
                                .ENDC
 17105  300500         SCOM4   300500          /ORIGINAL CONTENTS OF .SCOM+4
 17106  000000         SCOM20  0               /ORIGINAL CONTENTS OF .SCOM+20
 17107  000500         X1      500             /NUMBER OF DATA REGISTERS PER OPEN FILE ON MASS
                                                /STORAGE (.SCOM+27)
 17110  000003         FILES   3               /DEFAULT NUMBER OF FILES TO BE OPEN AT SAME TIME (.SCOM+26)
                                                /FOR USE WITH THE LINKING LOADER AND EXECUTE
 17111  233123         MIC     .SIXBT  'SYS'           /THE MONITOR IDENTIFICATION CODE
 17112  000000         SCOM33  0                       /^X INFORMATION (.SCOM+33)
 17113  000002         PROTCT  2                       /DEFAULT PROTECTION CODE FOR FILES (.SCOM+54)
                                                        / 1     READ/WRITE (WITH RANDOM ACCESS)
                                                        / 2     READ/NO WRITE
                                                        / 3     NO READ/NO WRITE
 17114  000000         PCHSZ   0               /SIZE OF THE RESIDENT MONITOR PATCH AREA
 17115  777704         CLKCON  -74             /-# OF TICKS IN A SECOND (-74 FOR
                                .IFDEF  RK05
                        SCOM76  11207           /SPOOLER AREA START BLOCK #
                        SCOM77  5006            /SPOOLER AREA SIZE
                                .ENDC
                                                /60 CPS AND -62 FOR 50 CPS)
                        /
```

```
                                        .TITLE  .DAT SLOTS TABLE
                                /
                                /       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 NON).
                                /TTA IS 1 ETC.  THE CONSTANT 100000 INDICATES A FIXED OR ILLEGAL
                                /.DAT SLOT.  THESE SLOTS ARE NOT SET BY SGEN.
                                /
17116   000014          SGNDAT  $YSDEV          /-15
17117   000014                  $YSDEV          /-14
17120   000014                  $YSDEV          /-13
17121   000001                  1               /-12
17122   000014                  $YSDEV          /-11
17123   000001                  1               /-10
17124   100000                  100000          /-7
17125   000014                  $YSDEV          /-6
17126   000000                  0               /-5
17127   000014                  $YSDEV          /-4
17130   100000                  100000          /-3
17131   100000                  100000          /-2
17132   000014                  $YSDEV          /-1
17133   100000                  100000          /0
17134   000014                  $YSDEV          /1
17135   000014                  $YSDEV          /2
17136   000014                  $YSDEV          /3
17137   000001                  1               /4
17140   000002                  2               /5
17141   000004                  4               /6
17142   100007                  100007          /7
17143   200007                  200007          /10
17144   000000                  0               /11
17145   000000                  0               /12
17146   000000                  0               /13
17147   000000                  0               /14
17150   000000                  0               /15
17151   000000                  0               /16
17152   000000                  0               /17
17153   000000                  0               /20
                                /
```

```
                                        .TITLE  .UFD TABLE
                                /
                                /       .UFD TABLE IS IN 1 TO 1 CORRESPONDENCE WITH THE  .DAT SLOT
                                /TABLE.  AN ENTRY OF .SIXBT 'UIC' INDICATES THAT THE LOGIN
                                /UIC IS TO BE SUBSTITUTED FOR THE NAME UIC IN THE TABLE.  OTHERWISE
                                /THE CONTENTS OF EACH LOCATION WILL BE THE .SIXBT REPRESENTATION OF
                                /THE CORRESPONDING .UFD SLOT.
                                /
 17154   251103         SGNUFD  .SIXBT  'UIC'           /-15
 17155   251103                 .SIXBT  'UIC'           /-14
 17156   251103                 .SIXBT  'UIC'           /-13
 17157   251103                 .SIXBT  'UIC'           /-12
 17160   251103                 .SIXBT  'UIC'           /-11
 17161   251103                 .SIXBT  'UIC'           /-10
 17162   233123                 .SIXBT  'SYS'           /-7
 17163   251103                 .SIXBT  'UIC'           /-6
 17164   251103                 .SIXBT  'UIC'           /-5
 17165   251103                 .SIXBT  'UIC'           /-4
 17166   251103                 .SIXBT  'UIC'           /-3
 17167   251103                 .SIXBT  'UIC'           /-2
 17170   233123                 .SIXBT  'SYS'           /-1
 17171   233123                 .SIXBT  'SYS'           /0 MIC
 17172   251103                 .SIXBT  'UIC'           /1
 17173   251103                 .SIXBT  'UIC'           /2
 17174   251103                 .SIXBT  'UIC'           /3
 17175   251103                 .SIXBT  'UIC'           /4
 17176   251103                 .SIXBT  'UIC'           /5
 17177   251103                 .SIXBT  'UIC'           /6
 17200   251103                 .SIXBT  'UIC'           /7
 17201   251103                 .SIXBT  'UIC'           /10
 17202   251103                 .SIXBT  'UIC'           /11
 17203   251103                 .SIXBT  'UIC'           /12
 17204   251103                 .SIXBT  'UIC'           /13
 17205   251103                 .SIXBT  'UIC'           /14
 17206   251103                 .SIXBT  'UIC'           /15
 17207   251103                 .SIXBT  'UIC'           /16
 17210   251103                 .SIXBT  'UIC'           /17
 17211   251103                 .SIXBT  'UIC'           /20
                                /
```

```
                                        .TITLE  SKIP CHAIN TABLE
                                    /
                                    /       THE SKIP CHAIN TABLE LISTS THE SYSTEM SKIP IOTS IN ORDER
                                    /  A NEGATIVE SKIP APPEARS IN THE TABLE IN 1'S COMPLEMENT(POSITIVE).
                                    /NOT ALL THE SKIPS IN THE HANDLER-SKIP IOT TABLE NEED TO BE INCLUDED IN
                                    /THIS TABLE.  THE DONE COMMAND IN SGEN CAN BE USED TO TERMINATE
                                    /THE SKIP CHAIN BUILDING AT ANY SIZE.  THIS EFFECTIVELY DELETES THE
                                    /REMAINING, UNLISTED SKIPS FROM THE SKIP CHAIN.
                                    /
17212   703201          SGNSKP      703201  /SPFAL
17213   707601                      707601  /DTDF
                                    .IFUND  RB09
17214   707001                      707001  /DSSF
                                    .ENDC
                                    .IFDEF  RB09
                                    707121  /DSSF
                                    .ENDC
                                    .IFDEF  RK05
                                    706101  /RKSF
                                    .ENDC
17215   706341                      706341  /DPSJ
17216   707341                      707341  /MTSF
17217   703121                      703121  /SPDI
17220   703261                      703261  /WTSK
17221   700521                      700521  /SDDF
17222   706701                      706701  /CRSI
17223   706721                      706721  /CRSD
17224   706501                      706501  /LPSF
17225   700001                      700001  /CLSF
17226   700101                      700101  /RSF
17227   700201                      700201  /PSF
17230   700301                      700301  /KSF
17231   704101                      704101  /KSF1
17232   700401                      700401  /TSF
17233   707561                      707561  /DTEF
17234   706361                      706361  /DPSE
17235   701741                      701741  /MPSNE
17236   701701                      701701  /MPSK
17237   702701                      702701  /SPE
                                    .IFDEF  RK05
                                    706121  /CDSF
                                    706141  /LSSF
                                    706161  /XYSF
                                    .ENDC
17240   704101                      704101  /KSF1
17241   704121                      704121  /KSF2
17242   704141                      704141  /KSF3
17243   704161                      704161  /KSF4
17244   704301                      704301  /KSF5
```

```
                        .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 UNDERSTAND-
                /ING 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
                /           1 COMPUTER WORD.  THE END OF THE LIST IS DETERMINED
                /           BY A WORD WITH 0'S IN BITS 0-5 (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 SYMBOLICLY 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.
                /
17245   161716  SGNTAB  .SIXBT  'NON'           /DEV 0 HAND. 0
17246   000005          5                       /5 SKIPS
17247   031423          .SIXBT  'CLSF'          /CLOCK DONE
17250   060000
17251   700001          700001
17252   152023          .SIXBT  'MPSNE'         /NON-EXISTENT MEMORY REFERENCE
17253   160500
17254   701741          701741
17255   152023          .SIXBT  'MPSK'          /MEMORY PROTECT VIOLATION
17256   130000
17257   701701          701701
17260   232005          .SIXBT  'SPE0'          /MEMORY PARITY ERROR
17261   000000
17262   702701          702701
17263   232006          .SIXBT  'SPFAL'         /POWER FAIL
17264   011400
17265   703201          703201
                        .EJECT
```

```
17266   242401      DEV1    .SIXBT  'TTA'           /DEV1 HAND.1
17267   000002              2                       /2 SKIPS
17270   132306              .SIXBT  'KSF@'          /KEYBOARD DONE
17271   000000
17272   700301              700301
17273   242306              .SIXBT  'TSF@'          /TELEPRINTER DONE
17274   000000
17275   700401              700401
17276   202201      DEV2    .SIXBT  'PRA'           /DEV2 HAND.2
17277   202202              .SIXBT  'PRB'           /HAND.3
17300   000001              1                       /1 SKIP
17301   222306              .SIXBT  'RSF@'          /READER DONE
17302   000000
17303   700101              700101
17304   202001      DEV3    .SIXBT  'PPA'           /HAND.4
17305   202002              .SIXBT  'PPB'           /HAND.5
17306   202003              .SIXBT  'PPC'           /HAND.6
17307   000001              1                       /1 SKIP
17310   202306              .SIXBT  'PSF@'          /PUNCH DONE
17311   000000
17312   700201              700201
17313   042401      DEV4    .SIXBT  'DTA'           /HAND.7
17314   042403              .SIXBT  'DTC'           /HAND.10
17315   042404              .SIXBT  'DTD'           /HAND.11
17316   042405              .SIXBT  'DTE'           /HAND.12
17317   042406              .SIXBT  'DTF'           /HAND.13
17320   000002              2
17321   042404              .SIXBT  'DTDF'          /DECTAPE DONE
17322   060000
17323   707601              707601
17324   042405              .SIXBT  'DTEF'          /DECTAPE ERROR
17325   060000
17326   707561              707561
17327   041301      DEV5    .SIXBT  'DKA'           /HAND.14
17330   041302              .SIXBT  'DKB'           /HAND.15
17331   041303              .SIXBT  'DKC'           /HAND.16
17332   000001              1                       /1 SKIP
17333   042323              .SIXBT  'DSSF'          /DISK DONE
17334   060000
                            .IFUND  RB09
17335   707001              707001
                            .ENDC
                            .IFDEF  RB09
                            707121
                            .ENDC
                            .EJECT
```

```
                17336   042001      DEV6    .SIXBT  'DPA'           /HAND. 17
                17337   042002              .SIXBT  'DPB'           /HAND. 20
                17340   042003              .SIXBT  'DPC'           /HAND. 21
                17341   000002              2
                17342   042023              .SIXBT  'DPSJ'          /DISK DONE
                17343   120000
                17344   706341              706341
                17345   042023              .SIXBT  'DPSE'          /DISK ERROR
                17346   050000
                17347   706361              706361
                17350   152401      DEV7    .SIXBT  'MTA'           /HAND. 22
                17351   152403              .SIXBT  'MTC'           /HAND. 23
                17352   152406              .SIXBT  'MTF'           /HAND.24
                17353   000001              1                       /1 SKIP
                17354   152423              .SIXBT  'MTSF'          /MAGNETIC TAPE DONE ON ERROR
                17355   060000
                17356   707341              707341
                17357   142001      DEV10   .SIXBT  'LPA'           /HAND.25
                                            .IFUND  RK05
                17360   000001              1                       /1 SKIP
                                            .ENDC
                                            .IFDEF  RK05
                                            2
                                            .ENDC
                17361   142023              .SIXBT  'LPSF'          /LINE PRINTER DONE
                17362   060000
                17363   706501              706501
                                            .IFDEF  RK05
                                            .SIXBT  'LSSF'
                                            706141
                                            .ENDC
                17364   030402      DEV11   .SIXBT  'CDB'           /HAND.26
                                            .IFUND  RK05
                17365   000002              2                       /2 SKIPS
                                            .ENDC
                                            .IFDEF  RK05
                                            3
                                            .ENDC
                17366   032223              .SIXBT  'CRSI'          /CARD READER
                17367   110000
                17370   706701              706701
                17371   032223              .SIXBT  'CRSD'
                17372   040000
                17373   706721              706721
                                            .IFDEF  RK05
                                            .SIXBT  'CDSF'
                                            706121
                                            .ENDC
                17374   262001      DEV12   .SIXBT  'VPA'           /HAND.27
                17375   000001              1                       /1 SKIP
                17376   230404              .SIXBT  'SDDF'          /DISPLAY
                17377   060000
```

```
376          17400   700521                  700521
377          17401   262401      DEV13       .SIXBT  'VTA'           /HAND. 30; VT SCOPE DISPLAY
378          17402   000001                  1                        /1 SKIP; LIGHT PEN;PUSH BUTTON;
379          17403   232004                  .SIXBT  'SPDI'  /INTERNAL AND EXTERNAL STOP
             17404   110000
380          17405   703121                  703121                   /OR EDGE VIOLATION ON VT
381          17406   262701      DEV14       .SIXBT  'VWA'            /HAND. 31; WRITING TABLET
382          17407   000001                  1                        /1 SKIP
383          17410   272423                  .SIXBT  'WTSK'  /PEN CONTACT WITH TABLET
             17411   130000
384          17412   703261                  703261
385          17413   141301      DEV15       .SIXBT  'LKA'            /HAND. 32; VT KEYBOARD LK35
386          17414   000001                  1                        /1 SKIP
387          17415   132306                  .SIXBT  'KSF1'           /LK35 KEYBOARD DONE
             17416   610000
388          17417   704101                  704101
389                                          .IFDEF RK05
390                                  DEV16   .SIXBT  'RKA'            /(HAND. 33: RK05 DISK CARTRIDGE)
391                                          .SIXBT  'RKB'            /(HAND. 34)
392                                          .SIXBT  'RKC'            /(HAND. 35)
393                                          1
394                                          .SIXBT  'RKSF'
395                                          706101
396                                  DEV17   .SIXBT  'XYA'            /(HAND. 36: XY PLOTTER)
397                                          1
398                                          .SIXBT  'XYSF'
399                                          706161
400                                          .ENDC
401          17420   142430      DEV20       .SIXBT 'LTX'             /HAND. 37:  LT15/LT19 DUMMY HANDLER
402          17421   000005                  5
403          17422   132306                  .SIXBT 'KSF1'
             17423   610000
404          17424   704101                  704101
405          17425   132306                  .SIXBT 'KSF2'
             17426   620000
406          17427   704121                  704121
407          17430   132306                  .SIXBT 'KSF3'
             17431   630000
408          17432   704141                  704141
409          17433   132306                  .SIXBT 'KSF4'
             17434   640000
410          17435   704161                  704161
411          17436   132306                  .SIXBT 'KSF5'
             17437   650000
412          17440   704301                  704301
413                  017441      SGEND=.
414                  000000                  .END
                 SIZE=17441      NO ERROR LINES
```

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```
CLKCON  17115   109*
DEV1    17266   292*
DEV10   17357   345*
DEV11   17364   358*
DEV12   17374   373*
DEV13   17401   377*
DEV14   17406   381*
DEV15   17413   385*
DEV2    17276   298*
DEV20   17420   401*
DEV3    17304   303*
DEV4    17313   309*
DEV5    17327   319*
DEV6    17336   331*
DEV7    17350   339*
FILES   17110   100*
MIC     17111   102*
NODAT   17102    81*
NOPAR   17101    80*
NOSKP   17103    83*
PCHSZ   17114   108*
PROTCT  17113   104*
SCOM20  17106    97*
SCOM33  17112   103*
SCOM4   17105    96*
SDEV1  017104    84*
SGEND  017441    64    413*
SGNBLK  17100     1     64*
SGNDAT  17116    80     81    128*
SGNSKP  17212    81     83    207*
SGNTAB  17245    83    279*
SGNUFD  17154   167*
SYSDEV 000014    68*    71*    75*   128    129    130    132    135
                137    140    142   143    144
X1      17107    98*
```

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