

pdp11

MUMPS-11
Release Notes

Order No. DEC-11-MMGSA-B-D

digital

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PREFACE

Before using the MUMPS software, you should read and understand this manual and the associated documents listed below. Previous editions of the documents are included in parentheses for reference purposes.

<u>Introduction to MUMPS-11 Language</u>	AD-0188C-TC (DEC-11-MMLTA-C-D)
<u>MUMPS-11 Programmer's Guide</u>	DEC-11-MMPGA-E-D (DEC-11-MMPGA-D-D)
<u>MUMPS-11 Language Reference Manual</u>	DEC-11-MMLMA-D, DN1 (DEC-11-MMLMA-D-D)
<u>MUMPS-11 Operator's Guide</u>	DEC-11-MMOPA-E-D (DEC-11-MMOPA-D-D)
<u>MUMPS-11 Programmer's Reference Card</u>	DEC-11-MMPCA-D-D (DEC-11-MMPCA-C-D)

This manual and the MUMPS-11 Operator's Guide contains data essential to efficient installation of the software. It is important to read these materials carefully.

CHAPTER 1

OVERVIEW OF MUMPS-11 SOFTWARE KIT

The MUMPS-11 Software Kit is available on 7-track and 9-track magtapes and RK05 and RK06 disk cartridges. Each kit contains user documentation and materials necessary to build a MUMPS-11 system. Components of the MUMPS-11 software are inventoried on checklists attached to the outside of the kit. Verify the contents of the package by means of the checklist and report discrepancies or damage to a Digital field representative.

The MUMPS-11 System Software Kit for 7- or 9-track magtapes consists of the following:

- . MUMPS-11 System Builder (MSB) for creating the basic MUMPS-11 system.
- . The object modules for the MUMPS-11 operating system.
- . MUMPS-11 System Generator (SYSGEN) and the MUMPS-11 Library and System Utility Programs for building a user-tailored MUMPS-11 system.
- . MUMPS-11 Backup and Utility System (MBU) for permitting physical backup on any MUMPS-11 supported storage device.
- . Disk Save and Compress Utility Program (DSC) for creating the disk version of MSB.

The MUMPS-11 System Software Kit for RK05 and RK06 disks consists of the following:

- . MUMPS-11 System Builder (MSB) and the object modules for the MUMPS-11 operating system for creating the basic MUMPS-11 system.
- . MUMPS-11 System Generator (SYSGEN) and the MUMPS-11 Library and System Utility Programs for building a user-tailored MUMPS-11 system.

CHAPTER 2
DIGITAL SERVICES

Training

DIGITAL's Educational Services Group offers a variety of hardware and software courses as detailed in the Educational Courses Catalog (available from the Software Distribution Center). These courses teach basic MUMPS-11 programming and the use of MUMPS-11 software. "Hands on" training using the MUMPS-11 system is a valuable feature of these courses.

SPR System

MUMPS-11 users can report software problems, inadequacies, and suggestions for improvements via the SPR (Software Performance Report) system. (Documentation errors and inadequacies should be reported on the READER'S COMMENTS page at the end of each manual.) SPR's are acknowledged when received in Maynard, and an answer is published in the Digital Software News or Software Performance Summary.

Before sending an SPR to DIGITAL, make certain that the problem is reproducible. Then check the Software Performance Summary and its update to determine that a correction has not already been published. If the problem is new, fill out a Software Performance Report and send it to:

Software Communications
Post Office Box F
Maynard, Massachusetts 01754

The SPR should include as much documentation as possible to help describe and isolate the problem. It must include configuration information, software version numbers, and any examples, tapes, and listings that might be needed to investigate a problem or suggested change. In general, the response time is shortened when complete and accurate information is enclosed.

SPR's are also useful for reporting suggestions and comments on MUMPS-11. SPRs are monitored by DIGITAL management and are considered by the development groups when MUMPS-11 changes are made.

Blank SPR forms are included in software kits, and additional forms are available from the Software Distribution Center. Replacement forms are included with each answer.

DIGITAL SERVICES

Digital Software News for the PDP-11

Announcements of new and revised software as well as programming notes, software problems with their proposed solutions, and documentation corrections are published monthly in the Digital Software News. In order to receive this publication for one year, the users should consult their local DIGITAL sales office.

Software and Document Distribution

The PDP-11 Software Price List contains a complete list of programs and documents currently available. Item(s) may be ordered directly from the Software Distribution Center by using the Software Order Form enclosed in the Price List. As noted previously, new and revised software is announced via the Digital Software News.

DECUS

Digital Equipment Computers Users Society (DECUS) was established to advance the effective use of Digital Equipment Corporation's computers and peripheral equipment. It is a voluntary, nonprofit, users group supported by DIGITAL, whose objectives are to:

- . advance the art of computation through mutual education and interchange of ideas and information
- . establish standards and provide channels to facilitate the free exchange of computer programs among members
- . provide feedback to the manufacturer on equipment and programming needs

The Society sponsors technical symposia twice a year (Spring and Fall) in the United States, and once a year in Europe, Canada, and Australia. It maintains a Program Library and publishes a library catalog, a booklet on the proceedings of symposia, and a periodic newsletter (DECUSCOPE).

A DECUS-Europe organization was formed in 1970 to assist in the servicing of European members.

A user interested in joining DECUS must obtain and complete a registration form. Forms can be obtained from the nearest DIGITAL sales office or from the appropriate administrative office.

The main administrative office is located at Digital Equipment Corporation, Maynard, Massachusetts 01754, and all correspondence should be directed to the attention of the DECUS Executive Director.

The European Regional Administrative Office address is:

DECUS EUROPE
Digital Equipment Corporation International (Europe)
P. O. Box 340
1211 Geneva 26
Switzerland

DIGITAL SERVICES

MUG

The MUMPS User Group (MUG) is an organization of current and potential MUMPS users. Its major objective is to acquaint new and potential MUMPS users with the numerous applications of MUMPS. It also provides a forum for current MUMPS users to exchange information and remain abreast of new ideas in MUMPS development.

If you are interested in joining the MUMPS User Group or in obtaining additional information about the organization, please contact:

Dr. Joan Zimmerman
MUG
700 South Euclid Street
St. Louis, MO. 63110

Software Consulting Services

DIGITAL maintains a staff of programmers and consultants whose services are available to DIGITAL customers for a fee. Through DIGITAL's Software Consulting Services, customers have been able to reduce development costs and still obtain quality customized software. Areas of expertise include process control, data communications, data analysis, information retrieval, numerical control, direct digital control, typesetting, simulation, commercial data processing, and special purpose time sharing.

CHAPTER 3

NEW FEATURES OF VERSION 4B MUMPS-11

- . New hardware support is provided for the following disk systems:
 - RK11/RK05F - Up to 3 RK05F drives may be used in place of 2 RK05J drives and/or in combination with RK05J drives.
 - RH11/RS04 - Up to 8 RS04 drives may be used in MASSBUS configurations in place of the RF11 drive.
 - RK611/RK06 - Up to 8 RK06 drives may be used in any configuration that does not have RF11 or RS04 drives.
 - RH11/RP06 - Up to 4 RP06 drives may be used in place of 2 RP04 or RP05 drives and/or in combination with RP04 or RP05 drives.
- . New hardware support is provided for the DX-11 Multiplexer:
 - Up to six 8-line DZ-11's may be included in a configuration. They may be combined with DH-11's, providing that the total number of multiplexed lines does not exceed 48.
- . New hardware support is provided for the DM11-BB:
 - Support has been added for modem control on DH-11 multiplexers. This provides for a system maximum of 64 remote lines (16 lines on DL-11's and 48 on DH-11's or DZ-11's).
- . The following new software features are provided:
 - Support for VT52 ESCape sequence handling.
 - Addition of an X-ON, X-OFF scrolling feature.
- . A Backup and Utility System (MBU) is provided which allows saving or backing up of MUMPS disks:
 - Assembly language global save by global name, UCI, or system.
 - Labelling of disks.
 - Fast backup and restoring of MUMPS disks.
 - Formatting, bad block checking, and initializing of disks.
 - Image-mode copy facilities.

CHAPTER 4

HELPFUL HINTS

MUMPS-11 users should always keep abreast of MUMPS-11 related notices published by DIGITAL. Changes published in the Software Performance Summary and the Digital Software News should be made as soon as possible to systems in use. In addition to frequent review of the above documents, the user should be aware of the following at installation time:

1. Chapters 2 and 3 of the MUMPS-11 Operator's Guide should be read and understood before any attempts are made at building the MUMPS-11 system.
2. During the SYSGEN process, the user will be asked to mount formatted, initialized disk packs. Therefore, prior to running SYSGEN, the user should format and initialize disks for each disk drive that is to be used in the MUMPS-11 system. The MUMPS Backup and Utility System (MBU) may be used to format all disks, with the exception of RK06's which are factory formatted. After formatting, all disks must be initialized with MBU. This initialization places the MUMPS bit maps onto the disk.

NOTE

If the initialization with MBU is not done, MUMPS SYSGEN will abort. MBU does the initializing and bad block checking (testing) that was formerly done by SYSGEN in Version 4A.

Bad block checking (MBU) should also be performed on each disk before being used in the MUMPS system. Bad block checking is done after the disk has been formatted, but before it has been initialized. For further information on MBU, see Appendix I in the MUMPS-11 Operator's Guide. The alternate procedure shown on page 7.1 of this document may also be used for formatting.

3. If a current SYSGEN is interrupted and a new SYSGEN is begun after the MUMPS utilities have been loaded onto the system disk, and the following conditions apply, the disk must be reinitialized with MBU before beginning the new SYSGEN:
 - a. A system merge is not being done to update the old MUMPS system.
 - b. The same disk pack is to be used for the new SYSGEN.

HELPFUL HINTS

If reinitialization with MBU is not done, a DBDGD error will be generated when SYSGEN attempts to load the MUMPS utilities. The reason for this is that some of the available blocks on the disk were used during the previous SYSGEN; but the in-core bit maps will indicate that all of the blocks on the disk are available.

4. Because of the new X-ON, X-OFF feature which has been added to MUMPS, the user may no longer use the CTRL S character in either UCI's or PAC's. The CTRL S character will cause output to the terminal to cease. For example, if a CTRL S is entered during the SYSGEN procedures as either a PAC or a UCI character, SYSGEN will halt.
5. During System Build, the following question is asked:

"IS YOUR COMPUTER A PDP-11/45 OR PDP-11/70?"

If a YES answer is given to this question, the following question is then asked:

"DOES YOUR COMPUTER HAVE A FLOATING POINT PROCESSOR?"

(If a NO answer is given to the first question, the floating-point processor question is not asked.)

If the processor being used is a PDP-11/34 with a floating-point processor, a YES answer to the PDP-11/34 or PDP-11/70 question must be given in order for the floating-point software to be included in the system.

6. When power is restored after a power failure, MUMPS-11 will now halt at location 26.

Because of the unpredictable state that might result from a power failure, MUMPS should always be reloaded after a power failure.

7. If an I/O error occurs during the loading of MUMPS, a message ("BOOT ERR") is output to the console. In the past, no error message was output and the machine simply halted in the bootstrap code.
8. If the user has an 80-column line printer, the following should be typed to MSB before the @BUILD command:

```
<SET /BUF=LP0:80
```

This will allow the MUMPS memory map to be printed in an 80-column format.

9. A layout of the DDB for the DMC-11 Communications Controller is included on the following page.

HELPFUL HINTS

Device Descriptor Buffer for DMC-11

Word (Decimal)	Location (Octal)	Contents
1-2	+0(8)	JSR R1, DMC ISR
3	+4(8)	Add of first control register in microprocessor.
4	+6(8)	Add of base buffer 128 words, assigned by SYSGEN.
5	+10(8)	Y = 0 Address of 256 word buffer assigned to the DMC. Y = 0 A buffer was not yet assigned.
6	+12(8)	\$A
7	+14(8)	Not Used
8	+16(8)	Low byte: status word High byte: CONDIO
9	+20(8)	Low byte: Flag Information
	Bit	
		0 Not used.
		1 Transmission buffer busy flag. A message is stored in the buffer and has not yet been transmitted.
		2 Message ready flag. A message has been received and is stored in the receiver buffer, awaiting read-in.
		3 to 6 Not used.
		7 DMC initialization flag. This flag is set if the DMC was initialized properly.
		High byte:
	Bit	
		0-1 Not used.
		2 0 = full duplex. 1 = half duplex.
		3 Used only if bit 2 is half duplex, then: 0 = primary station. 1 = secondary station.
		4-7 Not used.

HELPFUL HINTS

Device Descriptor Buffer for DMC-11 (Cont.)

Word (Decimal)	Location (Octal)	Contents
10-12	+26 (8)	Not used.
13	+30 (8)	Low byte: Partition size needed. (0=standard size) High byte: Index into UCI table.
14	+32 (8)	Program name (3 bytes).
15	+34 (8)	
16	+36 (8)	Low byte: CCR - # of characters received. High byte: CCT - # of characters transmitted.

NOTE

A half duplex line must have one primary station and one secondary station. The only difference between the two is in the length of time spent before retransmitting in case of errors.

10. For installation with RP06 disks, MUMPS treats an RP06 like two logical RP04 disks. This means that when using a unit number to calculate a MUMPS block number for certain utilities or for use in a View command, the logical to physical unit number mapping must be considered. See Section I.6.2 in the MUMPS-11 Operator's Guide for further information.
11. The MUMPS system provides support for the CR11 card reader. The card reader allows the use of either 026 or 029 encoded Hollerith cards. The type of encoding (026 or 029) can be specified by the application program or indicated by special control codes punched onto Hollerith cards. These special indicator cards are then placed in front of the encoded card deck. The following MUMPS-supported control codes can be used:

CONTROL	MEANING
12-2-4-8	Use 026 encoding
12-0-2-4-6-8	Use 029 encoding
12-11-0-1-6-7-8-9	Indicate End-of-file

The control code should be placed in the first column of an indicator card, one control code to a card. If one of these special codes is encountered, the rest of the card will be ignored. It is suggested that this code also be placed in the last column of the indicator card. Inasmuch as these punches are physically symmetrical, placing the punch at both

HELPFUL HINTS

ends of the indicator card will avoid errors caused by loading the wrong end of the card into the reader.

These control codes are fully compatible with the control codes used by other DIGITAL software systems.

The End-of-File indicator card causes the read to be terminated with a null string and the \$A system variable set to 0.01. In all cases of a successful read, the \$A system variable is set to 0. In the event of an error, the \$A system variable is set equal to the card reader status register. Information concerning the bit patterns of this register is available in the PDP-11 Peripherals Handbook.

The Assign command allows an optional single argument. The argument value specifies a default mode of operation to the card-reader driver. These codes are shown below.

VALUE	MEANING
none	use existing mode
0	029 code, remove trailing blanks
1	029 code, leave trailing blanks
2	026 code, remove trailing blanks
3	026 code, leave trailing blanks

12. Many additional utilities have been added to MUMPS-11 Version 4B, as shown below by the Fast Directory of your UCI. Any utilities that are not documented in the MUMPS-11 manuals are not supported by Digital Equipment Corporation. These extra utilities have been included for your examination and possible use. However, if you do not wish to use a certain utility, it is recommended that you delete it from the manager's area (UCI #1). Please note that some of these new utilities require more than 2K word partitions.

FAST DIRECTORY OF YOUR UCI

%AF	%C	%CL	%CO	%D	%DC	%FB	%FD
%FX	%G1	%G2	%GA	%GB	%GD	%GF	%GK
%GL	%GN	%GP	%GR	%GS	%GT	%GU	%GV
%HG	%IC	%IO	%IU	%JD	%LH	%LI	%LR
%MU	%OD	%OP	%PD	%PI	%PK	%PL	%PS
%PU	%QS	%R5	%RA	%RC	%RD	%RN	%RP
%SW	%T	%TC	%TD	%TI	%TP	%TW	%UP
%XR	%XS	ANB	BCS	BLK	BND	CKO	CKI
CLC	CTK	DAT	DBT	DCB	DDB	DMP	HRD
IA	KIL	KTR	KTS	MBP	MDM	MMD	MOD
MSD	MSP	MSU	MTC	MUX	MXX	MXZ	ODT
PAF	PBV	QIT	RKC	RS9	RSJ	RSP	RST
SD1	SD2	SD3	SDP	SG1	SG2	SG3	SG4
SG5	SG6	SG7	SG8	SIF	SS	SSD	SSX
STU	STY	TAL	TIM	TP1	TP2	TP3	TP4
TP5	TP6	TP7	TP8	TP9	UCI	UTL	YAE

HELPFUL HINTS

The base address of a terminal's DDB for devices 64-111 is found as follows:

DDB Address = ((TRM-64)+32) + base

where: TRM = Terminal's device number

base = Base address of DDB's for multiplexers
(contained in SYSTAB+134 of the system table).

CHAPTER 5

PATCHING INSTRUCTIONS

The following problems have been found and corrected for Version 4B. If one applies to your system, the patch should be installed as indicated below. Users installing patches to MUMPS-11 should observe the following rules:

- . All numbers listed in patches are in octal.
- . All symbols enclosed in square brackets in the patches are obtained from the load map when the system was generated.
- . MINI-ODT may be used to insert code into the patch area, but should not be used to insert code within the EXEC itself. EXEC locations should be changed through the CPU switches. In general this is not an absolute requirement, but some of the patches modify code that is run as a result of using MINI-ODT.
- . After patching MUMPS (and making sure the patches were entered correctly by running with them), save the MUMPS-11 core image. This can best be done by running 'MSP' under the managers UCI and modifying the basic system parameters. This method will ensure that the system is in a quiescent state before generating the instructions for saving the core image.

1. RK06 Distribution

Any user building from an RK06 distribution kit will have to make the following patch to their basic system. This patch should be made after booting the system from the MSB disk, and before starting the SYSGEN procedures.

NOTE

If this patch is not installed in the system, MUMPS will be unable to access the SYSGEN and Utilities disk; a DKSER or NOPGM error will be issued.

To install the patch, put MUMPS in ODT mode and proceed as follows:

- a. Examine location 1210(8).
- b. Examine, in byte mode, the location pointed to by 1210; change that location plus three, from 001 to 040.
- c. The following example illustrates this procedure:

PATCHING INSTRUCTIONS

1210/ 002076
B2076/ 115
002077/ 107
002100/ 122
002101/ 001/40
B2101/ 040

NOTE

This patch only applies to systems being built from RK06 kits.

2. %PS, %PL - Saving to SDP Area

%PS and %PL do not work correctly when saving to an SDP area. The following procedure should be executed to correct this problem. (Carriage returns are indicated by the sign.)

```
L %PL  
  
M 1.25:/N"/N "/  
  
A 63 P 256,1024  
  
F %PL  
  
E  
  
L %PS  
  
M 1.11:/U/UNT/  
  
M 3.55:/"(/"@(/  
  
M 3.55/@" A "@(UNT+59) G 3.8//  
  
A 63 P 256,1024  
  
F %PS
```

3. Correction to %LR

- a. In systems which use \$M and may have global data in floating-point format, the following step is required to restore floating-point nodes. In systems that do not use \$M, this step is required to bypass the floating-point restoring process:

```
1.32 R !,"DO YOU HAVE THE $M FUNCTION IN YOUR SYSTEM?",  
A,! I A="N" A 46,63 P 256,1024 K G 1.48
```

- b. Change Step 6.85 to be Step 6.86.
- c. Add the following Step:

```
6.85 I '$D(Z) A 0 T !,"ERROR-FLOATING POINT DATA  
ENCOUNTERED WHEN NOT EXPECTED" H
```

PATCHING INSTRUCTIONS

4. Modifying Function Dispatch Table

This patch is to be used only if you did not include the \$M function in your system. The address of [PATCH] (location reserved at assembly and link edit time) is found in the load map generated by the MUMPS-11 System Build. The symbol name is PATCH in module SYSDEF.

Location	Old	New
EVALN + 4422	0	[PATCH]
PATCH	0	104735

5. Modifying DMC-11 Parameters

Step number 3.28 must be changed in program YAE to read as follows:

```
3.28 V T1D:T1C,T1D+2:193,T1D+4:T1C,T1D+6:192
```

6. System Greater than 28K

The following patches should be inserted for systems greater than 28K:

a. With EAE-

Location	Old	New
SYSTAB+5744	11267	11237
+5746	0	[PATCH]
+5750	16722	13722
+5752	0	[PATCH]

b. With EIS-

Location	Old	New
SYSTAB+5726	11267	11237
+5730	0	[PATCH]
+5732	16722	13722
+5734	0	[PATCH]

where [PATCH] is the address of an unused location in the patch area.

7. Numeric Interpretation of a String Datatype

Executing the following command will produce the maximum MUMPS number rather than issuing a MXNUM error and crashing the job, as was the case in Version 3.

```
<T 43876543  
21474836.47
```

In Version 4, the numeric interpretation of a string was modified to prevent user input numbers (string datatype) which were too large from crashing a job. When data is input from a terminal, checking is normally performed to ensure that the data is within a permissible range. A very common and serious problem formerly occurred when the user typed a number which was too large to be represented in a fixed

PATCHING INSTRUCTIONS

decimal numeric datatype: the job would crash whenever the range check was performed. As a result, the programmer had to take considerable pains to ensure that the input string could be represented as a number so that he could then write code that the user could not crash.

In Version 4, a string whose numeric interpretation is too large (either positive or negative) to be represented as a number, will be interpreted as the largest possible positive or negative number. Thus, programs will not crash because of the numeric comparison of a permissible range with a very large numeric string input, and the program's range check can now reject the data and reask the question.

Note that arithmetic calculations which attempt to create a number that is too large (positive or negative) will crash the job. It is only the numeric interpretation of a string datatype that has been affected.

If you would rather have your job crash when converting a numeric string which is too large, then you may install the following patch to the UTIL module.

The address in UTIL for this patch is dependent on the presence of EAE, EIS, or FPP in the system:

Address = (UTIL) + 2766 for machines with EIS
Address = (UTIL) + 2742 for machines with EAE
Address = (UTIL) + 1636 for machines with FPP

LOCATION	OLD	NEW	CODE
Address + 0	012711	005726	TST (SP)+
Address + 2	077777	012604	MOV (SP)+,R4
Address + 4	012761	(MXNUM)	MXNUM
Address + 6	177777	240	NOP
Address + 10	2	240	NOP
Address + 12	742	240	NOP

IMPORTANT WARNINGS AND RESTRICTIONS

It is very important to note that only 64 decimal (100 octal) words of patch space are generated into MUMPS-11 V4B systems. Therefore it will not always be possible to install all of the patches in any one system. When installing patches remember to account for other patches which may have already used part of the patch space.

8. Disk Block Tally Error

The Disk Block Tally program (DBT) makes an error in tallying RK05 disks. If you have RK05 disks in your system, this modification should be made before running DBT.

```
E K
M 2.15:/7.71/7.71*100
M 2.50:/7.71/7.71*100
F DBT
```

PATCHING INSTRUCTIONS

9. MBU Disk Copy

When copying from one disk to another using MBU's COPY command, MBU can crash if the disk being copied to has an error on it. The following patch will correct this problem. Because this patch is being made only to the running in-core system rather than to the disk image, it must be installed each time MBU is booted and a copy operation is done.

- a. Boot MBU (see Appendix of MUMPS-11 Operators Guide, Section I.7)
- b. After MBU identifies itself and prompts with: COMMAND, halt the processor by lowering the HALT switch or by hitting CNTRL and HALT SS buttons simultaneously.

- c. Change the following locations:

Location	Old	New
66566	12746	4737
66570	xxxxx	070576
66572	167	401

where xxxxx indicates that the content of this location varies.

- d. Restart the processor by raising the HALT switch and hitting the CONT switch, or by hitting the CNTRL and CONT buttons simultaneously.

CHAPTER 6

SYSTEM DEMONSTRATION PACKAGE

The system demonstration package is a group of eight separate demonstration programs (TP1 through TP8) designed to assist the system manager in verifying the integrity of the MUMPS-11 operating system and language. These programs are particularly useful for verifying the system after a SYSGEN session or after field service hardware or software maintenance.

As shown in Table 4-1, each program performs a group of tests related to a specific aspect of the system or language. The tests can be run either singly or in any desired combination. The TP7 program automatically runs all programs in the test package, except TP5 and TP6. The system test package serves as a first-level check to assure that a MUMPS hardware/software system is operational. It should be run when a system is installed and the output should be saved for subsequent checks if the system seems to be malfunctioning.

Table 6-1
System Demonstration Programs

Program Name	Description
TP1	MUMPS-11 Language Functions Test Verifies the operation of all functions in the language. (Creates ^A global)
TP2	System Timings Test Performs and reports timing measurements for arithmetic, global, and symbol table routines. (Creates ^A global)
TP3	MUMPS-11 Expression Evaluator Test Verifies the operation of all expression evaluating tasks. (Creates globals: ^A, ^B, ^C, ^D, ^E, ^T)
TP4	Line Printer/Terminal Test Verifies operation of the line printer or any specified terminal.
TP5	DECTape Test Verifies all DECTape functions and error conditions.
TP6	Magnetic Tape Test Verifies all magtape functions and error conditions.

SYSTEM DEMONSTRATION PACKAGE

Table 6-1 (Cont.)
System Demonstration Programs

Program Name	Description
TP7	System Exerciser Utility Runs all other test programs, except TP5 and TP6, and performs its own abbreviated magtape and DEctape tests.
TP8	Global Test Builds a test global (^A) to check global routine operation.

CHAPTER 7

INSTRUCTIONS FOR OPERATING PERIPHERAL UNITS

This chapter contains step-by-step instructions for operating some of the peripheral units supported by MUMPS-11 and for depositing the Bootstrap Loader. The instructions listed for the CPU operations include all MUMPS-supported machines with the exception of the PDP-11/34. For equivalent instructions for the PDP-11/34, see the KY11-LB Programmer's Maintenance Manual (EK-KY11L-MM-001).

1. Instructions for Mounting and Formatting the RK05 or RK06 Disk

a. To mount disk:

Set switch labeled RUN/LOAD to LOAD position.

Verify that the light labeled PWR is on.

Wait for the light labeled LOAD to come on.

Verify that the lights labeled RDY, ON CYL, FAULT, WT, and RD are off.

Open access door.

Insert cartridge.

Close access door.

Set switch labeled RUN/LOAD to the RUN position.

Wait for the light labeled RDY and ON CYL to come on.

Press switch label WT PROT and verify that the light labeled WT PROT goes on and off.

If the disk is to be left WRITE PROTECTED, press the WT PROT switch until the WT PROT light goes on, then leave it on. If the disk is to be WRITE ENABLED, press the WT PROT switch until the WT PROT light is off.

Verify that lights labeled FAULT, WT, and LOAD are off.

If the cartridge is new and has never been formatted, continue to the next step. If it has been in use with other software or diagnostics, the mounting procedure is finished.

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b. To format a disk:

Make certain that the disk to be formatted is mounted on Unit 0.¹ A disk cannot be formatted on any unit but 0 using the following procedure. Set the ENABLE/HALT switch to HALT to stop any previous program which may be running.

Deposit the following disk-formatting program into memory.

1. Set the starting address, 001000, in the Switch Register. (Set switch 9 to the up (1) position and all others to the down (0) position.)
2. Press the LOAD ADDR switch.
3. Set the proper contents from the table below in the Switch Register and lift the DEP switch.
4. Repeat Step 3 above until all the instructions have been deposited.

LOCATION	CONTENTS	PROCEDURE
001000	012737	Set switches 12, 10, 8, 7, 6, and 4 - 0 to the up (1) position.
001002	006003	Set switches 11, 10, 1, and 0 to the up (1) position. Set all others to the down (0) position.
001004	177404	Set switches 15 - 8 and 2 to the up (1) position. Set all others to the down (0) position.
001006	105737	Set switches 15, 11, 9 through 6, and 4 - 0 to the up (1) position. Set all others to the down (0) position.
001010	177404	Set switches 15 - 8 and 2 to the up (1) position. Set all others to the down (0) position.
001012	100375	Set switches 15, 7 - 2, and 0 to the up (1) position. Set all others to the down (0) position.
001014	000137	Set switches 6 and 4 - 0 to the up (1) position. Set all others to the down (0) position.
001016	001000	Set switch 9 to the up (1) position. Set all others to the down (0) position.

1. This procedure is only for RK05 disks. RK06 disks come factory formatted.

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Verify that the formatting program is properly in memory as follows:

5. Set the starting address in the Switch Register as in Step 1 above.
6. Press the LOAD ADDR switch.
7. Display the contents of that address in the Data Register by pressing the EXAM switch.
8. Compare the number in the Data Register with the value in the table above.
9. If they are the same, repeat Steps 7 and 8 above until all words have been examined.
10. If not the same, repeat Step 4 above.

Set the starting address in the Switch Register as in Step 1 above.

Press the LOAD ADDR switch.

Set the ENABLE/HALT switch to ENABLE.

Verify that the disk mounted in Unit 0 is the one to be formatted. If so, WRITE ENABLE Unit 0.

Press the start switch. Let the program execute for 60 seconds, then set the ENABLE/HALT switch to HALT to stop the program.

The disk is now formatted and ready for use.

- c. To dismount a disk:

Set the switch labeled RUN/LOAD to the LOAD position. Wait for the light labeled LOAD to come on. Open the access door and remove the disk cartridge.

2. Instruction for Loading the High-Speed Paper Tape Reader

- a. Raise the paper tape retainer cover.

Put the paper tape into the right-hand bin with the sprocket holes toward the machine. As the tape is unfolded, the printed side should be up, and the arrow marking should point from right to left.

Place several folds of blank tape through the reader and into the left bin.

Place the tape over the reader head with feed holes engaged in the teeth of the sprocket wheel.

Lower the retainer cover.

Set the OFF/ON switch on the reader to ON.

- b. Press the FEED button until leader is over the read head.

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3. Instructions for Mounting and Dismounting a DECTape
 - a. To mount a DECTape:

Place the DECTape on the left spindle with the label out.

Wind four turns onto an empty DECTape reel on the right spindle.

Set the REMOTE/OFF/LOCAL switch to LOCAL.

Press the -> switch for a few seconds to make sure the tape is properly mounted.

Dial the unit selector to the desired unit number.

Set the REMOTE/OFF/LOCAL switch to REMOTE.

If the tape is to be WRITE ENABLED, set the WRITE ENABLE/WRITE LOCK switch to WRITE ENABLE. If it is to be WRITE LOCKed (write protected), set the WRITE ENABLE/WRITE LOCK switch to WRITE LOCK.

The tape is now ready for use.
 - b. To dismount a DECTape:

Set the REMOTE/OFF/LOCAL switch to LOCAL.

Press the <- switch until the tape is completely off the right-hand spindle.

Set the REMOTE/OFF/LOCAL switch to OFF.

Remove the DECTape from the left-hand spindle.
4. Instructions for Loading Magtape
 - a. Apply power to the transport by depressing PWR ON switch.
 - b. Ensure the LOAD/BR REL switch is in the center position (this applies the brakes).
 - c. Place a write-enable ring in the groove on the file reel if data is to be written on the tape.

Ensure there is no ring in the groove if data on the tape is not to be erased or written over.
 - d. Mount the file reel onto the lower hub with the groove facing towards the back. Ensure that the reel is firmly seated against the flange of the hub.
 - e. Install the take-up reel (top) as described above.
 - f. Place LOAD/BR REL switch to the BR REL position.
 - g. Unwind tape from the file reel and thread the tape over the tape guides and head assembly.
 - h. Wind about five turns of tape onto the take-up reel.
 - i. Set the LOAD/BR REL switch to the LOAD position to draw tape into the vacuum columns.

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- j. Select FWD and press START to advance the tape to Load Point. When the BOT marker is sensed, tape motion stops, the FWD indicator goes out, and the LOAD PT indicator comes on.

NOTE

If tape motion continues for more than ten seconds, press STOP, select REV (reverse) and press START. The tape should move to the BOT marker (Load Point) before stopping.

5. Instructions for Unloading Magtape

- a. Press OFF-LINE switch if the transport has been operating in the on-line mode.
- b. Press STOP switch and select REW.
- c. Press the START switch. The tape should rewind until the BOT marker is reached.
- d. Press the LOAD/BR REL switch to release the brakes.
- e. Gently wind the file reel by hand in a counterclockwise direction until all of the tape is wound onto the reel.

NOTE

When winding the tape by hand, do not jerk the reel. This can stretch or compress the tape causing irreparable damage.

- f. Remove the file reel from the hub assembly.

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