

GETTING STARTED WITH

BASIC/CAPS-11

DEC-11-OTBIA-B-D

**READ THIS
FIRST**

pdp11

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**GETTING STARTED WITH
BASIC/CAPS-11**

DEC-11-OTBIA-B-D



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The HOW TO OBTAIN SOFTWARE INFORMATION page, located at the back of this document, explains the various services available to DIGITAL software users.

The postage prepaid READER'S COMMENTS form on the last page of this document requests the user's critical evaluation to assist us in preparing future documentation.

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Dear Customer:

We would like to take this opportunity to introduce our product and services and offer suggestions for familiarizing yourself with your BASIC/CAPS-11 Software. Appendix A of this document provides an overview of the BASIC/CAPS-11 Software Package, while Appendix B contains a description of DIGITAL Software Services. Appendix C is the BASIC/CAPS-11 Demonstration Package, which contains instructions for building and demonstrating BASIC/CAPS-11.

Immediately upon receipt of your BASIC/CAPS-11 Software Kit (QJ910-AN), you should read this complete document, the BASIC-11 LANGUAGE REFERENCE MANUAL and the BASIC/CAPS USER'S MANUAL. Once familiar with the contents of these, the BASIC/CAPS-11 Demonstration Package should be exercised to allow familiarization with BASIC itself.

Included with your BASIC/CAPS-11 Software is the Software Performance Summary which lists any known software problems and solutions where available. This document should be inspected carefully, and any modifications to BASIC/CAPS-11 which affect your application should be made immediately.

Small Systems Software Marketing

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APPENDIX A

OVERVIEW OF BASIC/CAPS-11 SOFTWARE KIT

BASIC/CAPS-11 is distributed on cassette. Each kit contains the BASIC-11 LANGUAGE REFERENCE MANUAL (DEC-11-LIBBA-A-D) and the BASIC/CAPS USER'S MANUAL (DEC-11-LIBCA-A-D) and all the materials necessary to use BASIC/CAPS-11. The components of each package are inventoried on checklists attached to the outside of the kit. It is recommended that the Software Package contents be verified with the checklist. Any discrepancies should be reported to Digital's Software Distribution Center, Maynard, Massachusetts 01754.

The BASIC/CAPS-11 kit contains the following BASIC files:

<u>FILES</u>	<u>CASSETTE #</u>
CTLOAD.SYS	DEC-11-OTBAA-A-TC1
BASED.OVL	
BASEX.OVL	
BAS8K.SLO	
BASIC.SLO	
FTBLA.OBJ	
PROG2.OBJ	
PROG2.BAS	
FPMPEA.OBJ	
FPMPEI.OBJ	
FPMPPF.OBJ	
BASICR.OBJ	DEC-11-OTBAA-A-TC2
FPMP.OBJ	
BASICE.OBJ	
BASICX.OBJ	
BASICS.OBJ	
BASINT.OBJ	
FTBL.OBJ	
BASICH.OBJ	
BASING.OBJ	
FTBLG.OBJ	
PERVEG.OBJ	
GTNLPS.OBJ	
GTB.OBJ	
GTC.OBJ	

FILESCASSETTE #

BASRO.OBJ
FPMP.OBJ
BASE1.OBJ
BASE2.OBJ
BNOX.OBJ
BASSO.OBJ
BASHO.OBJ
BASPT.OBJ
BASINT.OBJ
FTBL.OBJ
PERPAR.PAL
PERVEC.PAL
BASINT.PAL
FTBL.PAL
BASINL.OBJ
FTBLL.OBJ
PERVEC.OBJ
LPS0.OBJ
LPS1.OBJ
LPS2.OBJ
LPS2C.OBJ
LPS3.OBJ
LPS4.OBJ

DEC-11-OTBAA-A-TC3

BASIC.SLO and BAS8K.SLO are running versions of BASIC/CAPS-11. BASIC.SLO is a version with all features enabled for users with at least 16K words of memory. BAS8K is a version of BASIC/CAPS-11 assembled without the alphanumeric string capability and the 'PRINT USING' statement, linked to overlay itself. It is intended for 8K users and users who want BASIC to occupy the minimal memory possible. BASIC can be started as described in the BASIC/CAPS-11 User's Manual (Sections 1.1.1 and 1.1.2).

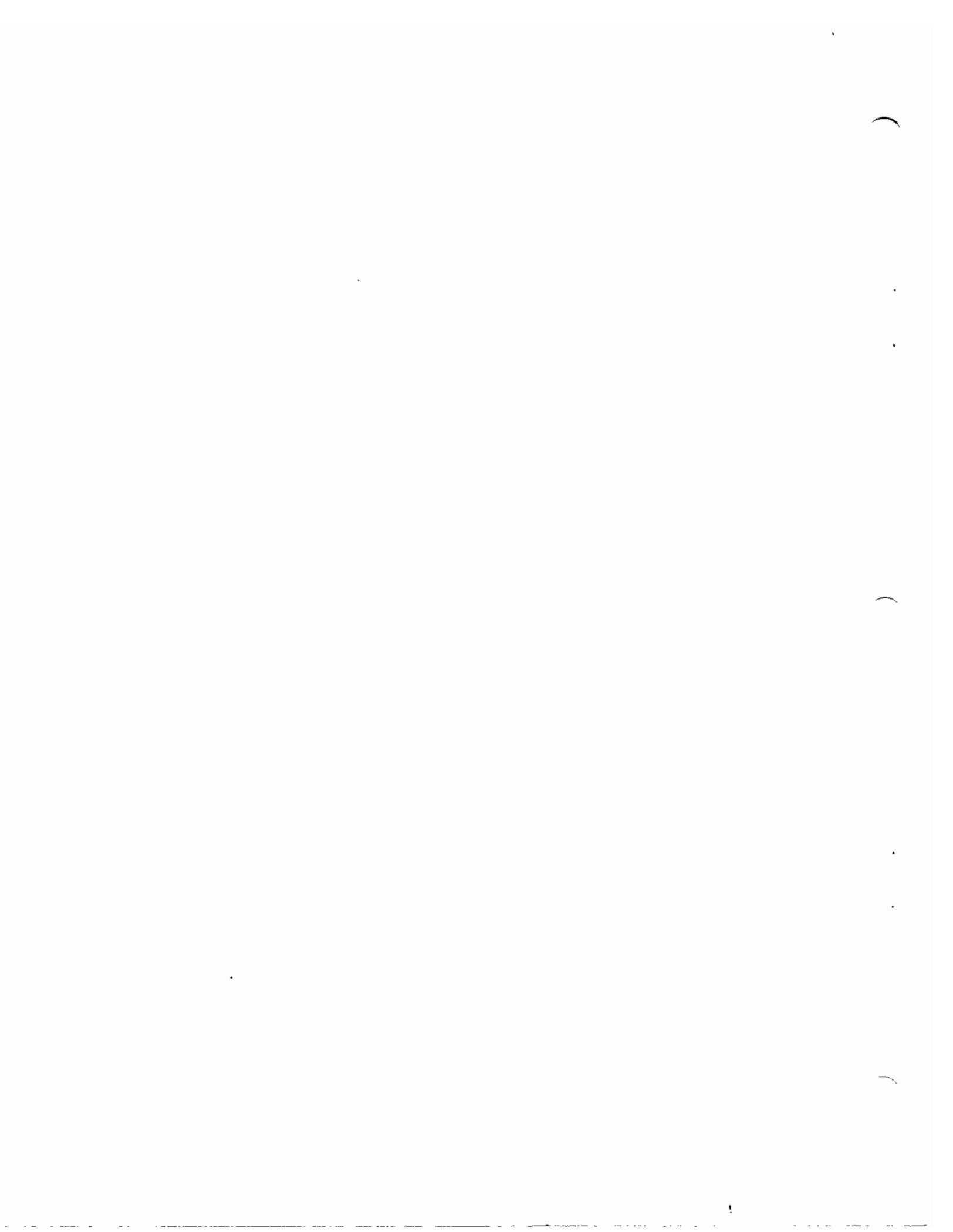
Instructions for building BASIC from the distribution kit can be found as part of the demonstration procedure that follows (Appendix C of this document).

Those files with the ".OBJ" extensions are the relocatable object modules which are linked together to form BASIC. They are used when customizing BASIC or adding assembly language functions. BASICR.OBJ, BASICE.OBJ, BASICX.OBJ, BASICS.OBJ and BASICH.OBJ are object modules for BASIC which have been assembled to include the alphanumeric string capability and the "PRINT USING" statement. BASRO.OBJ, BASE1.OBJ, BASE2.OBJ, BNOX.OBJ, BASSO.OBJ and BASHO.OBJ are object modules assembled without the optional string support, and without 'PRINT USING'. To build a BASIC with all features included follow the linking instructions in Section 5.2 of the CAPS-11 Addendum. To build a version of BASIC without string capability, follow the directions for building the 8K version. FPMP.OBJ is the floating point math package for BASIC. FPMPEA.OBJ, FPMPEI.OBJ and FPMPEP.OBJ are customized versions of that math package which support EAE, EIS and FPU hardware options, respectively. These versions may only be used with the BASIC files which support strings and require more than 8K words of memory.

To build a version of BASIC which uses one of these hardware options, use the corresponding version of the math package wherever FMP is called for in the build instructions. FTBLA.OBJ, PROG2.OBJ, and PROG2.BAS are small programs used in the BASIC/CAPS-11 System Demonstration Package.

In addition, there are other files supplied in your BASIC/CAPS-11 kit which constitute the support routines for special purpose devices. These routines can be linked with BASIC/CAPS and CALLED by BASIC programs. The support for the Laboratory Peripheral System (LPS-11) is provided on files labelled LPSx.OBJ. The LPS routines are described in Appendix D of the BASIC-11 LANGUAGE REFERENCE MANUAL and the linking instructions are in section B.1 of the BASIC/CAPS-11 USER'S MANUAL. The support for the Graphics display GT-40 (or GT-44) is provided in files labelled GTx.OBJ. The GT routines are described in Appendix C of the BASIC-11 LANGUAGE REFERENCE MANUAL and the linking instructions are described in Section B.2 of the BASIC/CAPS-11 USER'S MANUAL. Files labelled FTBLx.xxx, PERVEx.xxx, and BASINx.xxx, are to be linked with BASIC/CAPS whenever either the GT support or the LPS support is linked.

Finally, in addition to the Binary kit described above, BASIC/CAPS-11 Source Kits and Listing Kits are available at additional fees to assist in system development or modification.



APPENDIX B

SERVICES

Training

A variety of hardware and software courses are offered by DIGITAL'S Educational Services Groups as detailed in the Educational Courses Catalog (available from the Software Distribution Center). These courses are excellent vehicles for learning about both basic PDP-11 programming and the use of PDP-11 software. "Hands on" training using PDP-11 systems is a particularly valuable feature of most courses and seminars.

SPR System

What can you do when you spot software problems, have suggestions for new features, discover errors or inadequacies in DIGITAL'S software or documentation?

First, make sure you have a reproducible problem and that this problem is not already documented in the PDP-11 Small Systems Software Performance Summary. Then, fill out a Software Performance Report (SPR) and send it to your local DIGITAL office in care of the Software Secretary (if the SPR cannot be sent to the local office, it can be sent to DIGITAL's Software Communications Services, Maynard, Massachusetts 01754). You are then on the way to getting an individual answer, directing maintenance attention, and possibly initiating a software revision or document rewrite. Your input is recorded by DIGITAL EQUIPMENT CORP., receipt is acknowledged, and the SPR is sent to the appropriate maintainer to answer. Periodic reports are given to maintainers and management on the status of SPR activity.

All of this means your input is not lost or ignored, and you furnish valuable information for planning maintenance and development efforts.

SPR forms are appropriate to most DIGITAL software systems and their documentation. That includes all diagnostic (MAINDEC) software as well as system programs. You may obtain blank forms from the Software

Distribution Center. You receive blank forms in your software kits, and blank forms are sent with each answer. This service is guaranteed for one year after you receive your system.

You can help by sending in fully documented problem reports or well described suggestions. Be sure to give the full configuration and software version number, and send any examples, tapes, listings, etc., to back up your report. Think of what you would need as maintainer to investigate the problem or evaluate a suggested change.

Digital Software News for the PDP-11

Announcements of new and revised software as well as programming notes, software problems and proposed solutions, and documentation corrections are published monthly in the Digital Software News. Filling out the CAPS-11 registration form will assure you of receiving this publication for at least one year.

Software Distribution Center

A PDP-11 Software Price List is available from the Software Distribution Center and contains a complete list of programs and documents currently available. You may order any item(s) 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, non-profit users group supported by DIGITAL, whose objectives are to:

1. Advance the art of computation through mutual education and interchange of ideas and information.
2. Establish standards and provide channels to facilitate the free exchange of computer programs among members, and
3. Provide feedback to the manufacturer on equipment and programming needs.

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

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

The 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 is located at:

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

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 timesharing.

Registration

By completing and returning the registration form included in your kit, you are eligible to order replacement or additional copies of your software at the prevailing Software Distribution Center prices plus any handling or shipping charges. You must register to be eligible. Complete and mail the form to:

Digital Equipment Corporation
Software Distribution Center
Building 1-2
146 Main Street
Maynard, Massachusetts 01754



APPENDIX C

BASIC/CAPS-11 SYSTEM DEMONSTRATION PACKAGE

INTRODUCTION

This document provides the information needed to perform a simple demonstration of BASIC/CAPS-11. The steps described are intended to provide a user who is familiar with CAPS-11 but unfamiliar with BASIC, enough information to exercise BASIC.

This package assumes familiarity with the CAPS-11 Operating System. The user should be familiar with the contents of the CAPS-11 USER'S GUIDE and, the BASIC-11 LANGUAGE REFERENCE MANUAL and the BASIC/CAPS-11 USER'S MANUAL. New users should exercise the CAPS-11 System Demonstration package before exercising this BASIC/CAPS-11 Demonstration package.

The programs that are required in the demonstration of BASIC/CAPS-11 are labeled PROG2.OBJ and PROG2.BAS. These programs are supplied as part of the BASIC/CAPS kit.

Read the following general instructions, then proceed to Step 1. Instructions for operating any of the CAPS-11 supported devices with which you are unfamiliar can be found in Chapter 1 of the CAPS-11 USER'S GUIDE.

NOTE

The responses listed in the demonstration do not occur immediately, but are printed when the appropriate cassette operation has completed.

If user errors occur within a section, go back to the beginning of that particular section.

User typing errors may be corrected using the standard CAPS-11 input editing techniques (RUBOUT and ↑U).

In case of errors which are not explained in this document please refer to the CAPS-11 User's Manual (DEC-11-OTUGA-A-D).

User programs which use both the line printer and terminal for output should print a blank line on the Teletype¹ after opening the line printer for output. (If this is not done, the user's first Teletype output statement may have its print columns off by 1 space). For example:

```
10 OPEN 'LP:' FOR OUTPUT AS FILE 2
20 PRINT
30 .
   .
   .
```

Conventions, abbreviations and standards used:

1. All numbers are listed in octal unless otherwise indicated.
2. The following abbreviations are used:

CTRL	- CONTROL key
CR	- RETURN key
LF	- LINE FEED key
TT	- Terminal keyboard and printer
PR	- High speed paper tape reader
PP	- High speed paper tape punch
LP	- Line printer
CT	- Cassette tape

¹Teletype is a registered trademark of the Teletype Corporation.

3. <CR> or <LF> indicates that the RETURN or LINE FEED key should be typed at that place in the dialogue.
4. <ALT> indicates that the ALTMODE (or ESCAPE) key should be typed at that place in the dialogue.
5. Text enclosed in square brackets, [], is a comment, do not type any such text.
6. CTRL/X indicates that the CONTROL key should be depressed and held down while another key, "x", is also depressed.
7. <TAB> indicates that a horizontal tab should be typed.
8. On LT33 and LT35 Teletype terminals, special characters that are produced by holding down one key and depressing another are:

↑	SHIFT/N
\	SHIFT/L
[SHIFT/K
]	SHIFT/M
<TAB>	CTRL/I

9. The sample terminal dialogue provided in this document contains version numbers where they would normally appear. The version numbers given may not be identical to those typed by your system; this should not be considered a system or user error.

The following are instructions for building and demonstrating BASIC/CAPS-11. They include making a copy of the BASIC master cassette, and a sample linking of BASIC with an assembly language subroutine, PROG2.OBJ. PROG2.OBJ is a user function to count the number of bits set in the floating accumulator. This program has to be linked with the BASIC object modules to form the BASIC load module, BASICD.SLO. When this demonstration is complete, there will be a new cassette with BASICD.SLO. BASICD.SLO will be the special version of BASIC generated for the purposes of this demonstration, which includes an additional user function (BITS).

1. Bootstrap a CAPS-11 system and enter the date. (See Section 3.1 of the CAPS-11 User's Guide for details).

Write-protect the BASIC/CAPS-11 cassette #1 (DEC-11-OTBAA-A-TC1) by placing the orange tabs on the cassette so that the holds are uncovered. Mount this cassette on unit 1.

Depress the rewind button on cassette unit 1.

Type: R PIP<CR>

Response: *

When the CAPS-11 system cassette has rewound, dismount it and mount a scratch cassette on unit 0, write enabled.

Type: 0:=1:<CR>

Response: *

Dismount the master BASIC cassette from unit 1. For the rest of this demonstration, use the copy of this cassette just made with PIP. (Copies of all the BASIC cassettes should eventually be made, and all the masters stored away.)

Dismount the copy of the master BASIC cassette from unit 0 and remount it on unit 1. Mount a scratch cassette write enabled on unit 0.

Type: 0:/Z

Response: *

Type: 0:CTLOAD.SYS=1:CTLOAD.SYS

Response: *

Type: 0:BASED.OVL=1:BASED.OVL

Response: *

Type: 0:BASEX.OVL=1:BASEX.OVL

Response: *

Type: 0:PROG2.BAS=1:PROG2.BAS

Dismount the copy of the BASIC cassette from unit 1. Mount the CAPS-11 system cassette on unit 1.

Type: CTRL/C

Response: ↑C

.

Type: R 1:LINK<CR>

Response: *

If your system has more than 8K of memory, GO TO STEP 3.

2. Type:

*BASICD.SLO=1:BASRO/P,FPMP/F,BASE1/F,BASE2/F,BNOX/F/B:400/C<CR>
,BASSO/F,BASINT/F,FTBLA/P,PROG2/F,BASHO/P,BASPT/F<CR>

Response: 1?

Dismount CAPS-11 system cassette from unit 1. Mount the BASIC OBJ cassette containing BASRO.OBJ on unit 1 write-locked. For the rest of this demonstration, when reference is made to "The BASIC OBJ Cassette", it means the cassette containing BASRO.OBJ

Type: <CR>

Response: 1?

GO TO STEP 4

3. Type:

*BASICD.SLO=1:BASICR/P,FPMP/F,BASICF/F,BASICX/F/B:400/C<CR>
,BASICS/F,BASINT/F,FTBLA/P,PROG2/F,BASICH/P<CR>

Response: 1?

Dismount CAPS-11 system cassette from unit 1. Mount the BASIC OBJ cassette containing BASICR.OBJ on unit 1, write-locked. For the rest of this demonstration, when reference is made to "The BASIC OBJ Cassette", it means the cassette containing BASICR.OBJ.

Type: <CR>

Response: 1?

4. Dismount BASIC OBJ cassette from unit 1. Mount cassette containing PROG2.OBJ on unit 1, write-locked.

Type: <CR>

Response: 1?

Dismount cassette containing PROG2.OBJ from unit 1, remount BASIC OBJ cassette on unit 1.

Type: <CR>
Response: TRANSFER ADDRESS: xxxxxxx
LOW LIMIT: xxxxxxx
HIGH LIMIT: xxxxxxx

PASS 2
1?

Type: <CR>
Response: 1?

Dismount BASIC OBJ cassette from unit 1. Mount cassette containing PROG2.OBJ on unit 1.

Type: <CR>
Response: 1?

Dismount cassette containing PROG2.OBJ from unit 1. Mount BASIC OBJ cassette on unit 1.

Type: <CR>
Response: *
Type: CTRL/C
Response: ↑C
.

The following instructions are for running a simple BASIC program, PROG2.BAS a program which accepts a number at the Teletype, then calls the user function BITS to count the bits that are set in the floating point representation of that number. The floating point representation of 5.0 is 40640,0 (octal) and the representation of -5 is 140640,0 (octal).

Type: R BASICD<CR>
Response: BASIC/CAPS V01-01
OPT FNS?

If the BASIC/CAPS version message is not printed, but instead the computer halts with the RUN light off, then a write error occurred during the linking of BASICD.SLO. Go back to step 1 and re-link BASICD.SLO.

TYPE <CR>
Response: USER FNS LOADED
TERM?

If your terminal is a Teletype or parallel LA30 DECwriter, GO TO STEP 6.

If your terminal is a serial LA30 DECwriter, GO TO STEP 5.

If your terminal is a VT05

Type: 2<CR>

GO TO STEP 7

5. Type: 1<CR>

GO TO STEP 7

6. Type: <CR>

7. Response: DATE:

The DATE request enters the specified date to the system. This date is assigned to new directory entries.

Type: dd-mmm-yy <CR>

Where dd-mmm-yy is the day, month and year; dd is a decimal number in the range 1-31; mmm is the first three characters of the name of the month; and yy is the last two digits of the year in the range 73-79. For example 11-MAR-74 is a valid response to the DATE request.

Response: READY

Type: OLD PROG2<CR>

Response: READY

Type: RUN<CR>

Response: PROG2 DD-MMM-YY BASIC/CAPS V01-01

?

Type: 5.0<CR>

Response: 4
?

Type: -5<CR>

Response: 5
?

Type: CTRL/C

Response: ↑C

STOP AT LINE 25

READY

BASIC/CAPS-11 may be run in immediate mode. Statements without line numbers are executed as soon as they are entered. (For 8K users, response to immediate mode is slightly slower, due to overlaying from cassette.)

Type: FOR I=1 TO 5\PRINT I,SQR(I)\NEXT I<CR>

Response: 1 1
2 1.41421
3 1.73205
4 2
5 2.23607

Type:

PRINT "END OF BASIC/CAPS-11 DEMONSTRATION" <CR>

Response:

END OF BASIC/CAPS-11 DEMONSTRATION

Type: CTRL/C

Response: ↑C
STOP
READY

Type: CTRL/C

Response: ↑C
REBOOT?

Set switch register to 0. Mount CAPS-11 system on unit 0.

Type: Y<CR>

Response: .

HOW TO OBTAIN SOFTWARE INFORMATION

SOFTWARE NEWSLETTERS, MAILING LIST

The Software Communications Group, located at corporate headquarters in Maynard, publishes newsletters and Software Performance Summaries (SPS) for the various Digital products. Newsletters are published monthly, and contain announcements of new and revised software, programming notes, software problems and solutions, and documentation corrections. Software Performance Summaries are a collection of existing problems and solutions for a given software system, and are published periodically. For information on the distribution of these documents and how to get on the software newsletter mailing list, write to:

Software Communications
P. O. Box F
Maynard, Massachusetts 01754

SOFTWARE PROBLEMS

Questions or problems relating to Digital's software should be reported to a Software Support Specialist. A specialist is located in each Digital Sales Office in the United States. In Europe, software problem reporting centers are in the following cities.

Reading, England	Milan, Italy
Paris, France	Solna, Sweden
The Hague, Holland	Geneva, Switzerland
Tel Aviv, Israel	Munich, West Germany

Software Problem Report (SPR) forms are available from the specialists or from the Software Distribution Centers cited below.

PROGRAMS AND MANUALS

Software and manuals should be ordered by title and order number. In the United States, send orders to the nearest distribution center.

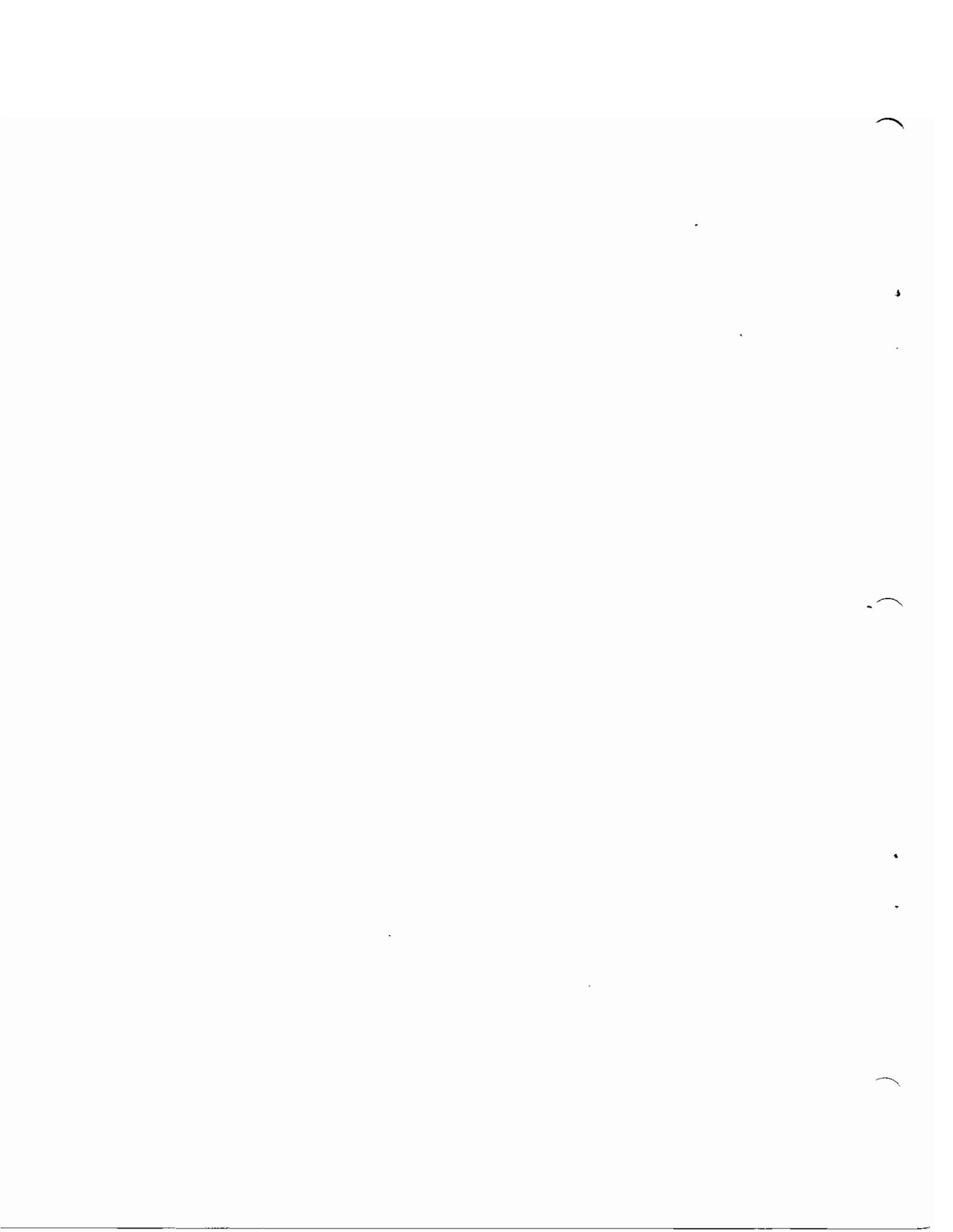
Digital Equipment Corporation Software Distribution Center 146 Main Street Maynard, Massachusetts 01754	Digital Equipment Corporation Software Distribution Center 1400 Terra Bella Mountain View, California 94043
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Outside of the United States, orders should be directed to the nearest Digital Field Sales Office or representative.

USERS SOCIETY

DECUS, Digital Equipment Computer Users Society, maintains a user exchange center for user-written programs and technical application information. A catalog of existing programs is available. The society publishes a periodical, DECUSCOPE, and holds technical seminars in the United States, Canada, Europe, and Australia. For information on the society and membership application forms, write to:

DECUS Digital Equipment Corporation 146 Main Street Maynard, Massachusetts 01754	DECUS EUROPE Digital Equipment Corporation (Europe) P.O. Box 340 1211 Geneva 26 Switzerland
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READER'S COMMENTS

NOTE: This form is for document comments only. Problems with software should be reported on a Software Problem Report (SPR) form (see the HOW TO OBTAIN SOFTWARE INFORMATION page).

Did you find errors in this manual? If so, specify by page.

Did you find this manual understandable, usable, and well-organized? Please make suggestions for improvement.

Is there sufficient documentation on associated system programs required for use of the software described in this manual? If not, what material is missing and where should it be placed?

Please indicate the type of user/reader that you most nearly represent.

- Assembly language programmer
- Higher-level language programmer
- Occasional programmer (experienced)
- User with little programming experience
- Student programmer
- Non-programmer interested in computer concepts and capabilities

Name _____ Date _____

Organization _____

Street _____

City _____ State _____ Zip Code _____
or
Country

If you do not require a written reply, please check here.

-----**Fold Here**-----

-----**Do Not Tear - Fold Here and Staple**-----

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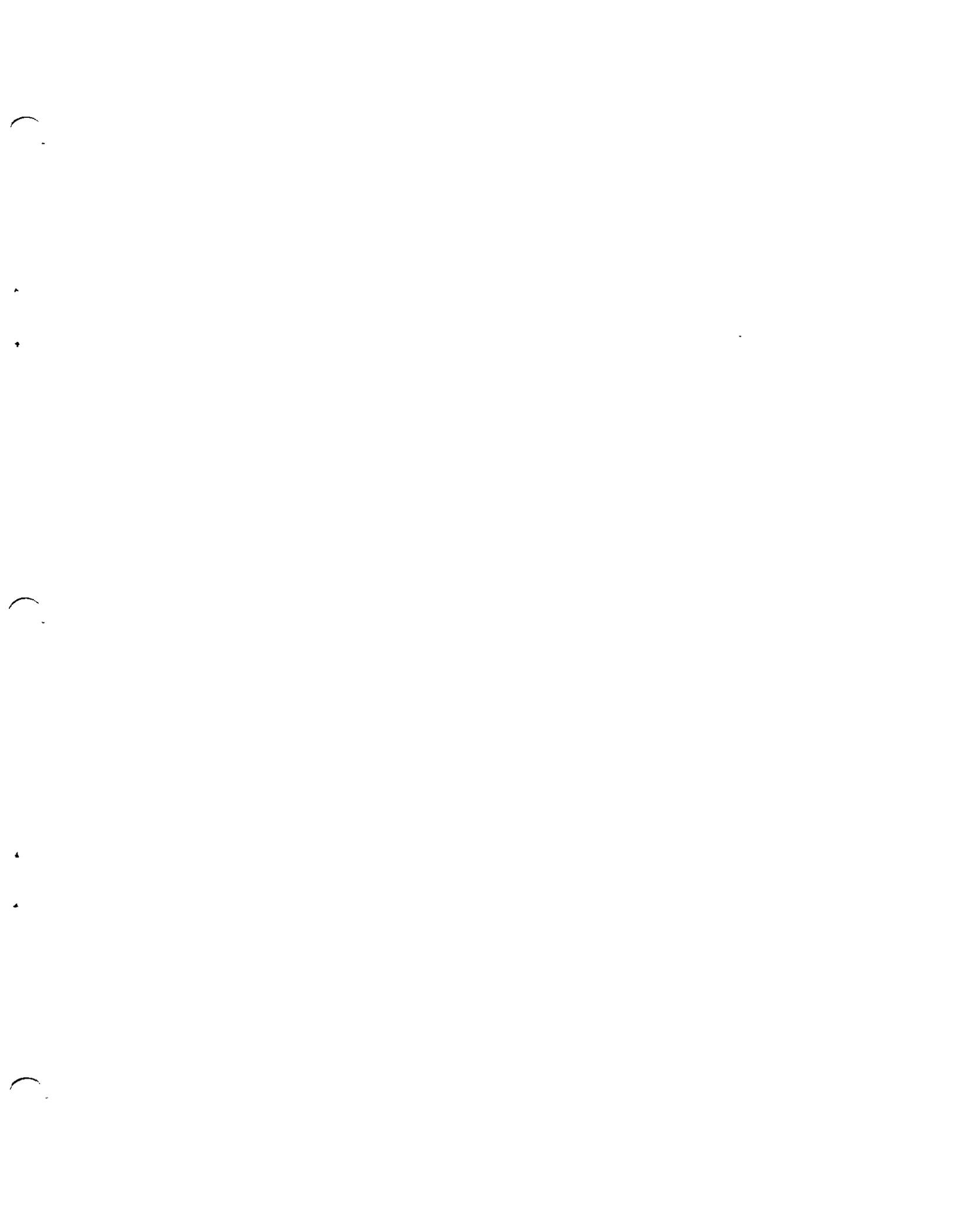
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