

**RT-11**

**June 1979**

**AD-C740B-14**

**THE  
SOFTWARE  
DISPATCH**

**digital**

# RT-11 SOFTWARE DISPATCH

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The RT-11 Software Dispatch complements the RT-11 V3B Software Dispatch Review. New and revised Software Product Descriptions, programming notes, software problems and solutions, and documentation corrections are published here. Much of the material is developed from Software Performance Report (SPR) answers significant to the general audience and is printed here to supplement the maintenance notebook (established by the Software Dispatch Review).

## PRODUCTS SUPPORTED in the RT-11 SOFTWARE DISPATCH

APL-11 V1	FORTRAN/RT-11 Extensions V1B	PEAK-11 V2
BASIC-11/RT-11 V2	FORTRAN/RT-11 LSI Extensions V1	PLOT 11/RT-11 V1.1
BASIC/RT Extensions V1	FORTRAN IV/RT-11 V2	RT-11/03 FORTRAN Extensions V1
COS-350/2780	GAMMA-11 F/B V2, V2C	REMOTE/RT-11 V1
CTS-300 V3, V4, V5	Industrial BASIC/RT-11 V1	RT-11 V3, V3B
CTS-300 DICAM V1	Lab Applications-11 V3	RT-11 (CTS-300)/LSI-11 2780 V2
CTS-300 DICAM II V1	LSP-11 V1	RT-11/2780 (CTS-300/ 2780) V2
CTS-300/DIS V1	MSB11 V1	SSP-11/RT-11 V1
DECnet/RT V1	MSB/FORTRAN IV V1	
FOCAL/RT-11 V1B	MU BASIC-11/RT-11 V1	
FORTRAN Graphics Package V1.1	PDL/RT-11 V1	

## DISTRIBUTION

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**Eleanor F. Hunter, Editor**  
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## SPR USER LETTER

The Dispatch **SPR User Letter** has been revised to reflect the new SPR form which has been available and has been in distribution for several months. This new SPR form can be readily identified by the priority section which uses a 1-5 numbering scheme rather than high, medium and low. These forms can be obtained from your local Digital office or SPR Center or by requesting them from SPR Administration.

### How To Make The Best Use Of The SPR Form

#### What We Can Do For you

1. Blank SPR forms are available upon request in the desired quantities through the SPR Administration (P.O. Box F) and your local office/SPR Center.
2. Copies of the SPR acknowledgement and answer are sent to the appropriate DIGITAL Office/SPR Center for their information.
3. Your local office is provided status for submitted SPRs upon request by contacting SPR Administration.
4. Information is provided to the pertinent District Software Managers on High Priority SPRs that are submitted by customers in their districts.
5. SPRs marked PROBLEM/Error will have a response for supported Category A and B products. These SPRs should refer to suspected deficiencies in the software.
6. SPRs marked SUGGESTION are forwarded to the pertinent software group for information purposes, and are responded to at their discretion.

#### What You Can Do For Us

1. Customer Name and Address and Problem Statement should always be typed or printed clearly.
2. An SPR should be submitted with only one problem on it. Putting more than one problem on an SPR can greatly lengthen the turn-around time.
3. WHENEVER POSSIBLE, SUBMIT AN SPR WITH ATTACHMENTS, SUCH AS MACHINE READABLE DATA, DETAILED INSTRUCTIONS ON HOW TO REPRODUCE THE PROBLEM, PROGRAM AND/OR DATA FILES, LISTINGS, AND CONSOLE LOG.
4. It would be most helpful to all concerned if problems with patches are reported as soon as possible.

CONT'D

5. For security SPRs, it is imperative that the DO NOT PUBLISH box be marked.
6. It would be helpful if tapes submitted with SPRs are labeled (track and density), and have a directory attached.
7. Should you ever receive an unacceptable SPR response, please contact us or the appropriate SPR Center so that the response may be addressed.
8. SPRs should not be used for problems concerning software policy, software distribution, or hardware. The local office should be contacted in these cases.

FMS-11 V01  
ARTS  
MCDEMO.MAC

Seq 2 0  
1 of 1

INCORRECT MCDEMO FILE TYPES (MG)

PROBLEM:

The file types (extensions) of the data files that MCDEMO creates are wrong.

SOLUTION:

Assign the logical names SRC and DK to devices as follows:

- 1) SRC specifies the device which contains a copy of the distributed ARTS source modules.
- 2) DK specifies the device on which temporary files will be created.

RESTRICTION

SRC must not be the same  
physical device as DK

Correct the source file MCDEMO.MAC, by typing the following:

```
.R EDIT
*ERSRC:MCDEMO.MAC<ESC>EWMCDemo.MAC<ESC><ESC>
*F.TITLE<ESC><ESC>
*A-2JI<TAB>;EDIT LEVEL 1<ESC>V<ESC><ESC>
.TITLE MCDEMO - FMS-11 Demonstration Subroutine ;EDIT LEVEL 1
*FDEMO:<ESC><ESC>
*FA$TID<ESC>FR5<ESC>-1DI3<ESC>V<ESC><ESC>
      MOVB A$TID(R3),R0 ;R0 = TASK IDENTIFICATION CODE
*EX<ESC><ESC>
```

Copy the altered file to the source disk SRC and delete the temporary copy by typing the following:

```
.COPY MCDEMO.MAC SRC:/PREDEL
.DELETE MCDEMO.MAC/NOQUERY
```

The updated version of MCDEMO may now be assembled and linked for execution under ARTS.

RT-11 Software Dispatch, June 1979

RT-11 V03-02  
MISCELLANEOUS  
SYSGEN.CND V01.46

Seq 4 R

1 of 1

ODD RING BUFFER SIZES CAUSE ASSEMBLY ERRORS (SPR 11-22180 CG)

There exists an undocumented restriction in SYSGEN. The values specified for the input and output ring buffer sizes must be even. If an odd value is specified, assembly errors will result.

NEW DEVICE RELEASE DOCUMENTATION, RT-11 V03B (JS)

This article summarizes the documentation for the new device release of RT-11 V03B. The device release adds RT-11 support for TU58 DECTape II cartridge and PDT-11/130 and PDT-11/150 Intelligent Terminals. These documents are included in all the software kits that require them. You need not order them separately.

RT-11 DOCUMENTATION DIRECTORY

This revision adds descriptions of the new RT-11 documents. The reading path flow chart is also expanded to include the new manuals.

UPDATE NO. 2 TO RT-11 SYSTEM RELEASE NOTES

This update adds DECTape II and PDT-11 information to the RT-11 System Release Notes.

RT-11/DECTAPE II INSTALLATION NOTES

This new manual describes procedures for installing:

- o RT-11 with DECTape II as the system device
- o RT-11 with disk as the system device and DECTape II as a storage device
- o DECTape II support in a previously installed RT-11 system

RT-11/PDT-11 INSTALLATION NOTES

This new manual describes procedures to:

- o Install RT-11 on a PDT-11/130 or PDT-11/150 processor
- o Create, on a previously installed RT-11 system, an RT-11 system to run on a PDT-11/130 or PDT-11/150 processor

RT-11 Software Dispatch, June 1979

RT-11 V03B-00  
MISCELLANEOUS  
SYSGEN.CND V02.11B

Seq 3 R

1 of 1

ODD RING BUFFER SIZES CAUSE ASSEMBLY ERRORS (SPR 11-22180 CG)

There exists an undocumented restriction in SYSGEN. The values specified for the input and output ring buffer sizes must be even. If an odd value is specified, assembly errors will result.

RT-11 Software Dispatch, June 1979

RT-11 V03B-00  
MISCELLANEOUS  
SYSTBL.CND

Seq 4 M

1 of 1

INCORRECT NULL HANDLER DEVICE IDENTIFIER (SPR 11-23233 JM)

System generation creates a device identifier of 24 for the null handler "NL" instead of 25. The following patch fixes this problem.

Patch to SYSTBL.CND:

```
.R EDIT <RET>
*EBSYSTBL.CND[26]<ESC>R<ESC><ESC>
*G0<ESC>-DI1<ESC>V<ESC><ESC>
;SYSTBL EDIT LEVEL 1
*2F24<ESC>V<ESC><ESC>
DEV      NL,24
*DI5<ESC>V<ESC><ESC>
DEV      NL,25
*EX<ESC><ESC>
```

.

There is no version number change after installing this patch.

RT-11 SOFTWARE DISPATCH  
CUMULATIVE INDEX  
JUNE 1979

This is a complete listing of all articles for current versions of RT-11 and related products. In the case of subordinate software, missing sequence numbers may pertain to problems unique to interaction with previous versions of the same product or other major operating systems.

**IMPORTANT!**

Retracted articles are indicated: RETRACTION.

Flags are currently being installed for all articles. The flags and definitions are as follows:

- M = Mandatory Patch. These patches correct errors in the software product. All users are required to apply these patches to maintain consistent "user level" unless the accompanying article specifies otherwise.
- F = Optional Feature Patch. These patches extend or configure functionality into the product. These functions will be treated as a supported part of the product for the duration of the current release and will be incorporated with any future release, unless otherwise stated.
- R = Restriction. These articles discuss areas that will not be patched in the current release because they require major modification or because they are not consistent with the design of the product. Restrictions, except those described as permanent, are reviewed and modified when possible as part of the normal release cycle.
- N = NOTE. These articles provide explanatory information that supplements the manual set and provide more detailed information about a program or package. They also provide procedural information to make it easier to use a program or package.

<u>Component</u>	<u>Sequence</u>	<u>Mon/Yr</u>
APL-11 V1		
APL.SAV PROGRAM PATCHES		
ERRONEOUS "DEFINITION ERROR" DURING FUNCTION EDITING	01 M	Nov 77
LOSS OF LOWER-CASE ON RE-ENTRY TO APL-11	02 M	Nov 77
APL WORKSPACE	03 R	Nov 77
"SYSTEM ERROR" S GENERATED BY NULL LINE ELEMENTS	04	Dec 77
INTERNAL MEMORY ALLOCATION PROBLEMS	05 M	Dec 77
ERROR FOR SCALAR RESULT OF DECODE OR INNER PRODUCT OPERATION	06 M	Feb 78
SYSTEM ERROR ON PARAMETER RETURN	07 M	May 78
BASIC-11/RT-11 V2		
RESEQUENCE PRODUCES AN INCORRECT PROGRAM UNDER CERTAIN CONDITIONS	01 M	Aug 78
PRINT USING	02 M	Jun 78
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TERMINAL MAY HANG	06 M	Jul 78
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SAVE DEV: AND REPLACE DEV:	08 M	Jul 78
SINGLE PRECISION HANG AND NUMERIC CONVERSION PROBLEM (PATCH F)	09 M	Aug 78
CONVERSION PROGRAM	10 M	Sep 78
OVERLAYING WHILE IN A SUBROUTINE	11 R	Nov 78
OPERATION OF CTRL/C, AND RCTRL/C AND SYS (6) FUNCTIONS AND THE CTRL/C COMMAND	12 N	Nov 78
BASIC-11/RT-11 V2 CONVERSION PROGRAM PATCH 1	13 M	Feb 79
OPERATION OF OLD, RUN, CHAIN AND OVERLAY WHEN THE SPECIFIED FILE IS NOT FOUND	14 N	Feb 79
CREATING AND ACCESSING VIRTUAL ARRAY FILES	15 N	Feb 79
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PRINT USING - PATCH A	17 M	Feb 79
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DOUBLE PRECISION HANG - PATCH D	20 M	Feb 79
SAVE dev: AND REPLACE dev: - PATCH E	21 M	Feb 79
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<u>Component</u>	<u>Sequence</u>	<u>Mon/Yr</u>
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SAMPLING AR11	03 M	Sep 77
"CLRD" AND "PUTD" ROUTINES	04 M	Nov 77
"SETR" AND "WAIT" COMBINATION MAY FAIL	05	Apr 78
BASIC/RT-11 EXTENSION BUILD PROCEDURE RESTRICTION	06 R	Mar 79
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LINE PRINTER PROBLEM AND PROBLEM WITH LARGE ISAM FILE	05 M	Jun 79
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<u>Component</u>	<u>Sequence</u>	<u>Mon/Yr</u>
REGISTER ALLOCATION - PATCH 8	09 M	Jun 79
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IADC AFTER RTS DOES NOT WORK	04 M	Oct 78
SUBROUTINE NAMING CONFLICT	05 N	Oct 78
PLOT55 DESCRIPTION	06 N	Oct 78
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#### FORTRAN/RT-11 EXTENSIONS V1B

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PROBLEMS WITH REGION OF INTEREST	08 M	Dec 78
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# Software Product Description

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**PRODUCT NAME: RT-11, Version 03B, Single-User Operating System**

**SPD 12.1.12**

## DESCRIPTION:

RT-11 is a disk-based single-user real time operating system designed for interactive program development and/or on-line applications on the PDP-11 or PDT-11. RT-11 supports both single job (SJ) and foreground/background (FB) modes of processing. In addition to a variety of system and program development utilities, RT-11 offers optional support of a number of high-level language processors, including FORTRAN IV, BASIC, FOCAL, and APL.

The emphasis in RT-11 is on efficient use of system resources, minimizing system requirements in the CPU and on the mass storage device, while maximizing system throughput. RT-11's ease of use is partially due to the system simplicity inherent in its restriction to a single or dual partition architecture.

The RT-11 operating system offers several configurations:

*The FB monitor* — allows two programs to operate: a foreground program and a background program. The real-time function is accomplished in the foreground, which generally has priority on system resources. Functions that do not have critical response time requirements, such as program development, are accomplished in the background, which operates whenever the foreground program cannot run. Within their priorities, both foreground and background are complete RT-11 systems with access to system capabilities. Although they operate independently, foreground and background can communicate through disk files and/or message transmission areas in memory.

*The FB monitor* — can support systems with greater than 56K bytes of memory. (When exercising this feature, the FB monitor is referred to as the XM monitor.) This feature is primarily provided for use by those optional high-level language processors that can automatically produce programs which can address areas of memory other than the lowest 56K bytes. The assembly language programmer can also take advantage of this feature for storing data arrays above the lowest 56K bytes of memory, or for loading code in other areas of memory. The linker builds programs only for the lowest 56K bytes of memory, however, it is the assembly language programmer's responsibility to provide base address relocation. The user must do a system generation to include XM support.

*The SJ monitor* — is for users not requiring FB operation or the additional FB features. SJ requires less memory and lower overhead. Should the user's requirements change, a properly written program that runs under the SJ monitor can be executed under the FB or XM monitor as a background program with no modifications.

RT-11 system features include:

*Ease of Use:* — RT-11 is designed for the single, interactive user. The English-language keyboard commands are easy to use and understand. The EXECUTE command, for example, allows transition from source to executing code with one statement. Indirect files allow command sequences to be stored and invoked repeatedly by the user.

*Contiguous File Structure:* — The RT-11 contiguous file structure incurs minimum file access overhead.

*Configuration Independence:* — The RT-11 system provides device-independent I/O programming. For example, at run time, the user can send output directly to a printer or write it to a disk file for later printing.

*Flexible Real Time I/O:* — RT-11 has been designed to satisfy a wide variety of input/output requirements by providing three modes of I/O operation:

- Synchronous I/O, where processing is suspended until the completion of the I/O event.
- Asynchronous I/O, where an I/O event is started, and processing continues until a user-defined point is reached. Processing is then suspended until the I/O event is completed.
- Event driven I/O, where an I/O event is started, and processing continues until the I/O event completes. Processing is then interrupted to service the completed I/O event.

*Low System Overhead:* — The RT-11 SJ monitor requires not more than 4.5K bytes of permanent memory to provide system control and I/O for the system device and the operator's terminal. FB operation adds not more than 4K bytes to this requirement.

RT-11's modular structure enables other functions to be swapped in as needed. On the other hand, if the program's memory requirements allow it, the complete monitor stays resident in memory to further increase system responsiveness.

*Ease of Expansion:* — The RT-11 system supports a

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wide range of PDP-11 peripherals. Beyond that, the modularity of the I/O system allows users with unique devices to interface them easily, merely by writing a device handler, storing it as a file, and installing it through a single keyboard command into the system.

When a new peripheral handler is added to an RT-11 system, all properly coded programs can immediately use the device without requiring additional coding or reassembly.

**Industry Compatible Magnetic Tape:** — RT-11 supports 7- or 9-track industry-compatible magtape with ANSI-compatible labels and fixed-length blocks.

**Indirect Command Files:** — A set of system commands can be strung together in an indirect command file so they can be executed through a single keyboard command. In addition, an indirect command file can be called automatically on system start-up.

**BATCH:** — RT-11 BATCH is a complete job control subsystem that provides batch-mode processing of user jobs in both the SJ and FB environments. BATCH processes job streams in the background partition, allowing real time or other user jobs to run in the foreground. RT-11 BATCH can be used in either SJ monitor configurations of 24K or more bytes of memory, or in any FB or XM configuration.

**FORTTRAN:** — The FORTRAN IV language compiler is available under separate license as an option, and RT-11 provides access to system services directly from a FORTRAN program. Routines are provided to perform direct file I/O, asynchronous FORTRAN subroutines, FORTRAN interrupt routines, and multiterminal support.

**HELP:** — The HELP command allows a user to access useful information about keyboard commands. This information can be modified to meet the user's need.

**Multiterminal Support:** — RT-11 is optionally able to support from 1 to 16 terminals (4 maximum on PDT-11, 8 maximum on LSI-11) in addition to the console terminal. These terminals can be addressed by specially written programs (or by optional software), and may be interfaced by (up to 8) DL11s, (1 or 2) DZ11s, (up to 8) DLV11s, or one (1) DZV11, but there can only be one "console terminal" (DL or DLV only) per system at any time. The foreground task may communicate with a terminal other than the one for the background task. Only RT-11 FB has multiterminal support. The multiterminal support allows dial-up remote users to be connected via Bell 103A-type modems. Leased lines are not supported by RT-11. RT-11 must be system generated for multiterminal support.

**System Generation:** — RT-11 is shipped already generated and ready to use. Users can do their own system generation (not included with DIGITAL installation). This is desirable for users who require special features (such as error logging, extended memory, or multiterminal support) or a system optimized for their application. A dual RX01 (or larger) disk, and 32K bytes of memory are required in order to generate a

custom RT-11 system. However, it is recommended that a user have at least 56K bytes of memory and an RK05 disk or larger to do a system generation. System generation is not supported on DECTape, TU58 DECTape II, or on the PDT-11/130. System generation on the PDT-11/150 series requires a dual floppy system and 60K bytes of memory.

**Error Logging:** — RT-11 optionally supports error logging to keep statistics on successful and unsuccessful transfers for each random access device. RT-11 must be system generated for error logging support.

RT-11 system programs include:

**EDIT:** — The RT-11 text editor is used to create and modify ASCII text files. Both character and line-oriented commands have been included, along with provisions for command interaction, editing macros, and file manipulation.

**MACRO-11:** — With at least 24K bytes of memory, MACRO-11 provides full macro programming under RT-11. It has the facilities for maintaining and using a macro library on the RT-11 system device as well as CREF (Cross Reference) listing, conditional assembly directives, and pseudo operators. MACRO-11 offers the convenience of global symbols for linking object modules and extensive error diagnostics. MACRO-11 also runs in 16K byte configurations with limited performance and subset capability.

**LINKER:** — The RT-11 linker (LINK) converts the relocatable object modules produced by the assembler or optional compilers into a run-time format. Services performed by LINK include converting relative addresses to absolute addresses, linking global references among object modules, and initializing all parameters required by the monitor to run a program.

Overlays do not require any special instructions or function calls. The user designates an overlay structure at linker command time, and the linker automatically produces a runnable memory image with the desired overlays. While ease of use has been paramount, the power of the overlay system has not been compromised. The system allows any number of overlays in any number of memory areas, subject only to the memory size.

**PIP:** — The RT-11 peripheral interchange program (PIP) is a program that allows transfer of files (ASCII or binary) between any RT-11 supported devices. PIP also allows the user to rename and delete files.

**RESOURCE:** — The RT-11 Resource Program (RESOURCE) examines the currently running RT-11 system and displays useful information about the status of the monitor and the system configuration.

**LIBRARIAN:** — The RT-11 librarian (LIBR) creates and maintains libraries of commonly used object module subroutines and assembly language macro definitions. The linker uses object libraries (as specified by the user) to resolve undefined external symbols.

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**ODT:** — The on-line debugging technique utility (ODT) aids in debugging assembled and linked object programs interactively. ODT has limited use when FB is supporting extended memory.

**DUP:** — The RT-11 device utility program (DUP) performs general utility functions in support of disk devices. Among DUP functions are initializing devices, scanning for bad blocks, and compressing data on a disk.

**DIRECT:** — The RT-11 directory program (DIR) is used to list the file directory for file-structured devices. DIR allows directory listing sorted by file name, file type, size, or position.

**UTILITIES:** — Several other program development utilities are provided. DUMP allows the contents of a file to be printed in various formats. SRCCOM is an ASCII file comparison program that helps locate the changes made in source files. FILEX allows transfer of RT-11 files to and from some other DIGITAL operating system environments. PATCH and PAT allow memory images and relocatable binary files to be permanently modified. FORMAT allows the user to format RK05 media.

#### MINIMUM HARDWARE REQUIRED:

- PDT-11/150 series with console terminal, dual floppy disk, at least 16K bytes of memory for single job, 32K bytes for foreground/background. A PDT-11/150 series with 60K bytes is required for SYSGEN.
- PDT-11/130 with console terminal and at least 16K bytes of memory for single job, 32K bytes for foreground/background.
- SYSGEN is not supported on PDT-11/130.

See Figure 1 for PDP-11 minimum hardware.

#### OPTIONAL HARDWARE:

- Additional memory to a system total of 56K bytes (60K bytes with MSV11-DD or PDT-11) for systems running the SJ monitor
- Additional memory to a system total of 248K bytes for systems running the FB monitor

#### NOTE:

Because of the complexity of memory mapping, use of this feature in assembly language is suggested for advanced programmers only. High level language use of this feature, however, takes no special skills.

The following options are available for LSI-11 based systems:

- 11/03 WC or WD writable control store
- DLV11-E asynchronous line unit (dial-up remote users only)
- DLV11-F or DLV11-J asynchronous line unit (remote terminal support provided for dial-up lines only)
- One DZV11 asynchronous 4-line multiplexer (32K bytes required) (remote terminal support provided for dial-up lines only)

- LAV11 line printer
- LPV11 line printer
- MSV11-DD memory with BDV11 Bootstrap (allows access of 60K bytes of memory using SJ or FB)
- RKV11 cartridge disk system
- RLV11 cartridge disk system
- RXV11 floppy disk system
- RXV21 floppy disk system
- TU58 DECTape II cartridge tape system

The following options are available for PDT-11 based systems:

- A system total of 60K bytes of memory
- DFT11-AB Cluster Controller (3 EIA ports)
- LA180-C or LA180-E line printer
- RXT01 Add-on floppy disk system (PDT-11/150 series only)

The following options are available for systems other than LSI-11 or PDT-11 based:

- AR11 analog real-time system (supported by FORTRAN extensions, FOCAL/RT-11, and LA-11 only)
- CR11 or CM11 card reader
- DL11 asynchronous single line unit (remote terminal support provided for dial-up lines only)
- DR11-K DIGITAL I/O option (supported by FORTRAN extensions only)
- DZ11 asynchronous 8-line multiplexer (32K bytes required) (remote terminal support provided for dial-up lines only)
- KK11-A cache memory for the PDP-11/34
- KW11-P programmable real-time clock
- LP11 or LS11 line printer
- LPS11 laboratory peripheral system (supported by FORTRAN extensions, FOCAL/RT-11, and LA-11 only)
- PC11 paper tape reader/punch
- RJS03 or RJS04 fixed-head disk
- RK11/RK05 disk cartridge system
- RK611/RK06 disk subsystem (32K bytes required)
- RK711/RK07 disk subsystem (32K bytes required)
- RL11 cartridge disk system (24K bytes required)
- RPR11/RP03 disk pack
- RX11 floppy disk system
- RX211 floppy disk system
- TC11 DECTape system
- TM11, TMA11, TMB11, TM02, or TM03 magnetic tape (24K bytes required for PIP operations)
- TU58 DECTape II cartridge tape system
- UNIBUS laboratory peripherals (AD11-K, AM11-K, AA11-K, and KW11-K) (supported by FORTRAN extensions only)
- VS60 display processor (graphics with FORTRAN graphics package)
- VT11A graphics display processor (graphics with FORTRAN, FOCAL/RT-11, LA, or FORTRAN graphics package)

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- VT55 DECgraphic scope (PLOT-55 subroutines included with RT-11)

**PREREQUISITE SOFTWARE:**

None

**OPTIONAL SOFTWARE:**

APL-11  
 BASIC-11/RT-11  
 DECnet/RT  
 FMS-11  
 FOCAL/RT-11  
 FORTRAN IV/RT-11  
 GAMMA-11 F/B  
 Lab Applications-11 Library  
 MU BASIC-11/RT-11  
 PLOT-11/RT-11

**TRAINING CREDITS:**

ONE (1) — Applies only to options that include support services. Consult the latest Educational Services Catalog at your local office for the available courses, course requirements, and guidelines.

**SUPPORT CATEGORY:**

A — Software Support will be provided as stated in the Software Support Categories Addendum to this SPD.

**Growth Constraints:**

An update is the primary way in which DIGITAL provides corrected versions of a software product to users of that product. An RT-11 Version 03B update will be functionally the same product as RT-11 Version 03B, but it includes corrections to deficiencies discovered in this product and it may include enhancements. An enhancement is a capability not explicitly provided by this product or it is an improvement in stability or efficiency. The following items describe the growth constraints of an RT-11 Version 03B update.

1. The minimum hardware requirements for executing an RT-11 Version 03B update will not be greater than the minimum hardware requirements for the same device configurations supported by RT-11 Version 03B.
2. Permanent memory overhead in an RT-11 Version 03B update incurred to provide 1) system control for all non-optional functions, and 2) system device and operator's console terminal I/O for those devices supported by RT-11 Version 03B will not be greater than 4.5K bytes for the baseline single job monitor and not greater than 8.5K bytes for the baseline foreground/background monitor, where .5K of these figures represents the first 512 bytes of memory required for device and program control.
3. If an RT-11 Version 03B update includes enhancements to the RT-11 Version 03B monitor, the permanent memory overhead incurred for the enhanced monitor may be greater than the permanent memory overhead stated above. Use of the enhancements and the attendant memory required is optional.

4. Permanent system device storage requirements in an RT-11 Version 03B update for the single job monitor or the foreground/background monitor, including the non-optional system control functions, the system device handler, and the operator's console terminal support, will not be greater than 150 blocks. A block contains 512 bytes.
5. System programs provided in an RT-11 Version 03B update will execute in the same minimum hardware configurations specified for the functionally equivalent RT-11 Version 03B system programs. The system programs' resident memory requirements and/or execution characteristics can change.
6. Permanent system device storage requirements in an RT-11 Version 03B update for the system programs may be different from the requirements for the functionally equivalent RT-11 Version 03B programs.
7. An RT-11 Version 03B user program's execution speed can change when run under functionally equivalent conditions using an RT-11 Version 03B update, but best efforts will be applied to minimize degradation, if any.
8. If an RT-11 Version 03B update offers enhancements to RT-11 Version 03B to provide speed or space improvements, better internal consistency, improved reliability, or other enhancements, any of which affect the published specifications for program interfaces, the Update will include program conversion utilities and/or documented conversion procedures to protect the user software development investments. The conversion utilities and/or documented conversion procedures can include file or data conversion, source conversions or editing, program recompilation or reassembly, or relinking.
9. If an RT-11 Version 03B update includes enhancements to RT-11 Version 03B system error messages and/or command language, best efforts will be applied to minimize user inconvenience.

**ORDERING INFORMATION:**

All binary licensed software, including any subsequent updates, is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of the DIGITAL copyright notice and any DIGITAL proprietary notices on the software) only for use on such CPU. All source licensed software is furnished only under the terms and conditions of a separate Software Program Sources License Agreement between Purchaser and DIGITAL.

Options with no support services are only available after the purchase of one supported license. When a software license is ordered without support services, the category of support applicable to such software is Category C.

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A single-use license only option is a license to copy the software previously obtained under license, and use such software in accordance with DIGITAL's Standard Terms and Conditions of Sale. The category of support applicable to such copied software is Category C.

Source and/or listing options are only available after the purchase of at least one supported license and after a source license agreement is in effect.

Only TU58 and RX01 are bootable on the PDT system.

The following key (C, D, E, G, Q, R, T, X, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ013-AE = binaries on RK05 disk.

C = DEctape  
 D = 9-Track magtape (NRZI)  
 E = RK05 Disk cartridge  
 G = TU58 DEctape II cartridge  
 Q = RL01 Disk cartridge  
 R = Microfiche  
 T = RK06 Disk cartridge  
 X = RX02 Double density diskette  
 Y = RX01 Floppy diskette  
 Z = No hardware dependency

QJ013 -A— Single-use license, binaries, documentation, support services (media: C, D, E, G, Q, T, X, Y)

QJ013 -C— Single-use license, binaries, documentation, no support services (media: C, D, E, G, Q, T, X, Y)

QJ013 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

#### *Additional Hardware Support Options*

The following option is available as an add-on to an existing RT-11 single-use license. The add-on is to allow existing RT-11 V03B users to add support for the TU58 and PDT monitors to their systems.

QJ013 -T— Single-use license, binaries, documentation (media: G, Y)

This option is included in QJ013-AG, QJ013-CG, QJ013-AY and QJ013-CY.

#### *Source/Listing Options*

QJ013 -E— All sources (media: D, E, Q, T, X, Y)

QJ013 -F— Listings (media: R)

#### *Upgrade Options*

The following option is available as an upgrade kit from DOS/BATCH for use on the same single CPU on which DOS/BATCH is licensed. The license previously granted for DOS/BATCH shall be extended to cover this upgrade.

QJ260 -A— Single-use license for RT-11 and FORTRAN/RT-11, binaries, documentation, support services (media: C, E)

The following option is available as an upgrade kit from MSB11 for use on the same single CPU on which MSB11 is licensed. The license previously granted for MSB11 shall be extended to cover this upgrade.

QJE03 -A— Single-use license for RT-11 binaries, documentation, support services (media: Y)

#### *Update Options*

Users of RT-11 whose specified Support Category warranty has not expired may order under license the following software update for the then current media charge. The update is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ013 -W— RT-11 binaries, documentation, no support services (media: C, D, E, Q, T, X, Y)

Users of RT-11 whose specified Support Category warranty has expired may order under license the following software update at the then current charge for such update. The update is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ013 -H— RT-11 binaries, documentation, no support services (media: C, D, E, Q, T, X, Y)

QJ013 -H— Right to copy for single use (under existing license), no binaries, no documentation, no support services (media: Z)

#### *Source/Listing Update Options*

The following options are available to licensed users as updates to source/listing options. The update is distributed in source form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QJ013 -N— Sources update; requires RT-11 Version 3 or 03B for source assembly (media: D, E, T)

QJ013 -N— Listings update (media: R)

#### *Miscellaneous Options*

QJ013 -G— Documentation only (media: Z)

#### **ADDITIONAL SERVICES:**

QJ013 -S— Consulting Service (media: Z)

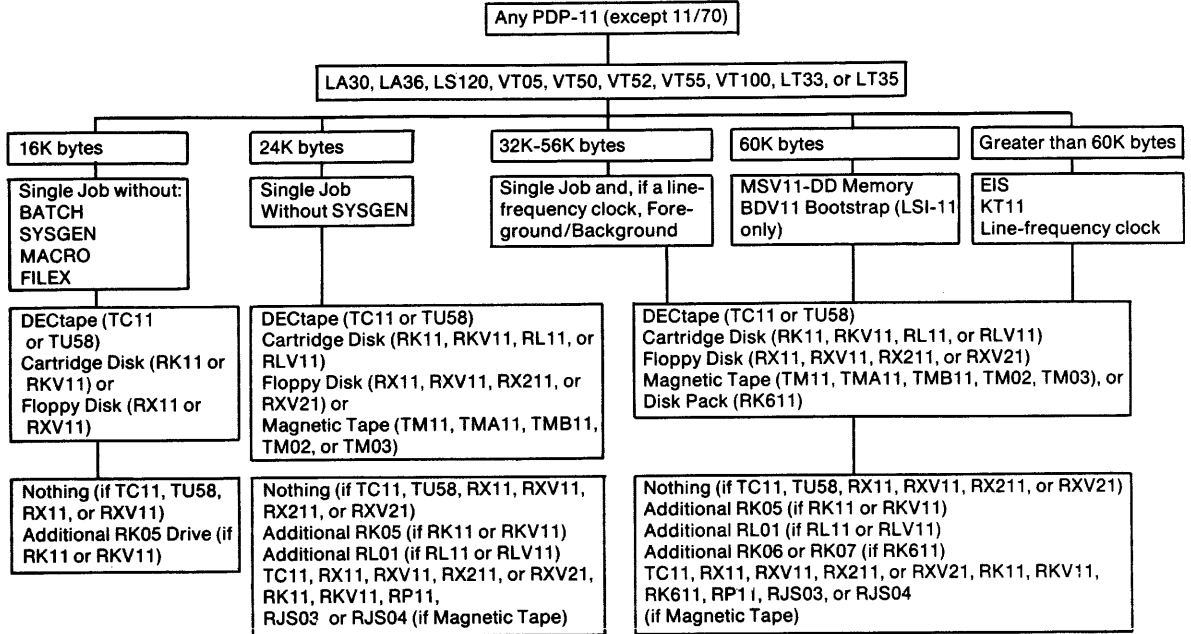
QJ013 -3— Binary Program Update Service for licensed RT-11 users (media: D, E, Q, T, Y)

QJ926 -3— Binary Program Update Service for licensed RT-11 and FORTRAN IV/RT-11 users (media: D, E, Q, T, Y)

QJ939 -3— Binary Program Update Service for licensed RT-11 and BASIC/RT-11 users (media: D, E, Q, T, Y)

QJ927 -3— Binary Program Update Service for licensed RT-11, FORTRAN IV/RT-11, and BASIC/RT-11 users (media: D, E, Q, T, Y)

FIGURE 1



# Software Product Description

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**PRODUCT NAME: BASIC-11/RT-11, Version 2.0**

**SPD 12.5.6**

**DESCRIPTION:**

BASIC is a conversational programming language developed at Dartmouth College that uses simple English-like statements and familiar mathematical notations to perform operations.

BASIC-11/RT-11 is an incremental, interactive, interpretive compiler operating under the RT-11 operating system.

BASIC-11/RT-11 features include:

- A variety of program manipulation commands including commands for saving, editing, running, and retrieving BASIC programs.
- Support for real, integer, double precision, and string data types.
- Immediate mode statements for debugging and desk calculator usage.
- Sequential data storage using the RT-11 file system.
- String capability, including string arrays and functions.
- Disk virtual arrays for string, integer, and real data types.
- Chaining with COMMON to accommodate large programs.
- CALL facility for invoking assembly language subroutines using a PDP-11 FORTRAN-compatible calling interface.
- Formatted output using the PRINT USING statement.

**MINIMUM HARDWARE REQUIRED:**

One of the following:

- Any valid RT-11 operating system configuration or a PDP-11. At least 32K bytes of memory are recommended for speed and support of all BASIC-11 features.
- Any valid RT-11 operating system on a PDT-11/150 series system configuration.
- Any valid RT-11 operating system on a PDT-11/130 system configuration.

**OPTIONAL HARDWARE:**

Supports any mass storage, unit record, or terminal device supported by RT-11, with the additions of:

- KE11-B Extended Arithmetic Element
- KE11-E Extended Instruction Set

- FP11 Floating Point Processor
- KE11-F or KEV11 Floating Point Instruction Set

**PREREQUISITE SOFTWARE:**

RT-11 Operating System, Version 03 or Version 03B

**OPTIONAL SOFTWARE:**

FMS-11, Version 1.0 on systems with at least 56K bytes of memory.

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

B — Software Support will be provided as stated in the Software Support Categories Addendum to this SPD.

**ORDERING INFORMATION:**

All binary licensed software, including any subsequent updates, is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of the DIGITAL copyright notice and any DIGITAL proprietary notices on the software) only for use on such CPU. All source licensed software is furnished only under the terms and conditions of a separate Software Program Sources License Agreement between Purchaser and DIGITAL.

Options with no support services are only available after the purchase of one supported license. When a software license is ordered without support services, the category of support applicable to such software is Category C.

A single-use license only option is a license to copy the software previously obtained under license, and use such software in accordance with DIGITAL's Standard Terms and Conditions of Sale. The category of support applicable to such copied software is Category C.

Source and/or listing options are only available after the purchase of at least one binary license and after a source license agreement is in effect.

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The following key (C, D, E, G, Q, R, T, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ913-AD = binaries on 9-Track magtape.

C = DECTape  
 D = 9-Track magtape (NRZI)  
 E = RK05 Disk cartridge  
 G = TU58 DECTape II cartridge  
 Q = RL01 Disk cartridge  
 R = Microfiche  
 T = RK06 Disk cartridge  
 Y = RX01 Floppy diskette  
 Z = No hardware dependency

QJ913 -A— Single-use license, binaries, documentation, support services (media: C, D, E, G, Q, T, Y)  
 QJ913 -C— Single-use license, binaries, documentation, no support services (media: C, D, E, G, Q, T, Y)  
 QJ913 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

#### *Source/Listing Options*

QJ913 -E— All sources (media: D, E, Q, T, Y)  
 QJ913 -F— Listings (media: R)

#### *Update Options*

Users of BASIC-11/RT-11, Version 1B, whose specified Support Category warranty has expired may order under license the following software update at the then current charge for such update. The update is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ913 -H— Binaries, documentation (media: C, D, E, G, Q, T, Y)  
 QJ913 -H— Right to copy for single user (under existing license), no binaries, no documentation, no support services (media: Z)

Users of BASIC-11/RT-11, Version 1B, whose specified Support Category warranty has not expired may order under license the following software update for the then current media charge. The update is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ913 -W— Binaries, documentation (media: C, D, E, G, Q, T, Y)

#### *Source/Listing Update Options*

The following options are available to licensed users as updates to source/listing options. The update is distributed in source form on the appropriate medium and includes no installation or other services unless specifically stated otherwise.

QJ913 -N— Sources update (media: D, E, T)

#### *Miscellaneous Options*

QJ913 -G— Documentation only kit (media: Z)

#### **ADDITIONAL SERVICES:**

None



# Software Product Description

**PRODUCT NAME:** RT<sup>2</sup>/PDT, Version 03B, Run-Time System for PDT-11

**SPD 12.13.1**

**DESCRIPTION:**

RT<sup>2</sup>/PDT, Version 03B is a subset of the RT-11 Real Time Operating System. It provides a Base-line Single Job (BL), Single-Job (SJ), or a Fore-ground/background (FB) execute-only environment on a PDT for applications that the user can develop on a full-scale RT-11 Version 03B system.

RT<sup>2</sup>/PDT allows the user to develop applications using the full power of the entire complement of RT-11 programming tools. The resultant software is licensed for use on a PDT system in a run-time only environment. It is the user's responsibility to transport the RT<sup>2</sup>/PDT system and user-developed software to the target PDT system.

An RT<sup>2</sup>/PDT Version 03B license allows the user to copy only the following RT-11 Version 03B modules as distributed in an RT-11, Version 03B kit from DIGITAL and to copy RT-11 03B monitors sysgened for use on the PDT.

MODULE	DESCRIPTION
PDMNSJ.BL	PDT-11 based base-line SJ monitor
PDMNSJ.SYS	PDT-11 based SJ monitor
PDMNFB.SYS	PDT-11 based FB monitor
LP.SYS	Line printer handler
TT.SYS	Terminal handler
SWAP.SYS	Monitor scratch blocks for system Utility Program
DIR.SAV	Directory listing program
DUP.SAV	Device Utility Program
PIP.SAV	Peripheral Interchange Program

Single-use licenses are available to operate BASIC-11/RT-11, FOCAL, APL, and FMS-11 run-time systems as optional software under RT<sup>2</sup>/PDT. Applications developed under FORTRAN IV/RT-11 may be copied under the RT<sup>2</sup>/PDT license, along with the FORTRAN IV OTS. The FORTRAN IV compiler cannot be used on RT<sup>2</sup>/PDT.

**MINIMUM HARDWARE REQUIRED:**

PDT-11/150 series system or a PDT-11/130 system with at least 16K bytes of memory. An RT-11, Version 03B system is required for developing applications software and building the RT<sup>2</sup>/PDT system.

**OPTIONAL HARDWARE:**

- A system total of 60K bytes of memory
- DFT11-AB Cluster Controller (3 EIA Ports)
- LA36 hardcopy terminal
- LA120 or LS120 hardcopy terminal
- LA180-C or LA180-E line printer
- RXT01 add-on floppy diskette (PDT-150 series only)
- VT52 or VT100 video terminal

**PREREQUISITE SOFTWARE:**

RT-11 Version 03B Operating System (with category A support) is required on the development system from which RT<sup>2</sup>/PDT is copied.

**OPTIONAL SOFTWARE:**

The following software can be used with RT<sup>2</sup>/PDT in a run-time environment.

- APL-11, Version 1
- BASIC-11/RT-11, Version 2
- FMS-11, Version 1.0 (components ARTS, FDV, and KED)
- FOCAL/RT-11, Version 1B

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

C — Software Support will be provided as stated in the Software Support Categories Addendum to this SPD.

**ORDERING INFORMATION:**

All binary licensed software, including any subsequent updates, is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions of Sale, which provide in part that the software and any part thereof may be used on only the single CPU on which the software is first installed, and may be copied, in whole or in part (with the proper inclusion of the DIGITAL copyright notice and any DIGITAL proprietary notices on the software) only for use on such CPU. All source licensed software is furnished only

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under the terms and conditions of a separate Software Program Sources License Agreement between Purchaser and DIGITAL.

A single-use license only option is a license to copy the software previously obtained under license, and use such software in accordance with DIGITAL's Standard Terms and Conditions of Sale. The category of support applicable to such copied software is Category C.

The following key (Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJV33-DZ = single-use license only.

Z = No hardware dependency

QJV33 -D— Single-use license only, no binaries, no documentation, no support services (media: Z) Minimum quantity: 50.

**ADDITIONAL SERVICES:**

None

# The Digital Equipment Computer Users Society



DECUS, the Digital Equipment Computer Users Society, was established in March of 1961 to advance the effective use of DIGITAL computers. It is a voluntary, not-for-profit users group, supported in part by Digital Equipment Corporation.

## OBJECTIVES

The objectives of the Society are to advance the effective utilization of computers, computer peripheral equipment, and software manufactured and marketed by Digital Equipment Corporation, by promoting the interchange of information concerning their uses; advance the art of computation through mutual education and exchange of ideas and information; establish standards and provide channels to facilitate the exchange of computer programs among DECUS members; provide feedback to the computer industry on equipment and software needs; and to reduce the duplication of development efforts.

## ACTIVITIES

### 1. SYMPOSIA

Symposia are held throughout the year in each of the DECUS Chapters. These meetings provide a forum for users of DIGITAL computers to meet with other users and with DIGITAL management, engineers, and Software Services and Field Service representatives. They are an opportunity for users to participate in DIGITAL Product Workshops and Product Planning feedback sessions. The technical papers and presentations from each symposium are published as DECUS Proceedings after each meeting and provide a permanent record of the meetings activities.

### 2. SPECIAL USER GROUPS

DECUS encourages subgrouping of users with common interests and/or geographical proximity.

Special Interest Groups (SIGs) promote the interchange of specialized information and have no geographical limitations. Specializations may be for application areas, subject areas (such as languages), or specific operating systems. A group of users must petition the Chapter Executive Board for recognition as a Special Interest Group. The group must have a chairman, and its organization must meet the guidelines of the Chapter Executive Board.

Examples of active SIGs are users of RSX-11, RSTS, RT-11 users, business system users, etc. For additional information, contact your Chapter Executive Secretary.

One of the most successful subgroupings are Local Users Groups (LUGs). There are numerous active LUGs in Australia, Canada, Europe, and the U.S. Local User Groups are basically geographic in nature; however, they may be geographic and specific as well.

The largest Special User Group is composed of users of the DECsystem-10 and DECsystem-20.

### 3. STANDARDS

DECUS promotes user activity in reviewing DIGITAL standards. Users are given the opportunity to comment on DIGITAL standards prior to their finalization.

### 4. PROGRAM LIBRARY

One of the major activities of the users group is the DECUS Program Library. The Library contains programs written and submitted by users and is maintained and operated separate from the Digital Software Distribution Center. A wide range of software is available, including languages, editors, numerical functions, utilities, display routines, and various other types of application software.

Library catalogs, updated periodically, contain descriptive abstracts and ordering information.

Information and forms for submitting programs to the Library may be obtained from local DECUS offices.

Programs are available to all members on a request basis. Orders for programs are made on DECUS Library Order Forms and directed to the local DECUS Chapter office. Information on the nominal service charge applied to most programs is published in the Library Catalogs.

As of January 1979, the Library contained approximately 1500 active software packages.

## MEMBERSHIP

Membership in DECUS is voluntary and is not subject to a membership fee. Members are invited to take an active interest in the Society by contributing to the Program Library, to DECUSCOPE, and by participating in its Special User Groups and symposia. There are two types of membership: Installation Membership and Associate Membership.

### INSTALLATION

An organization, institution, or individual that has purchased, leased, or has on order a computer manufactured by Digital Equipment Corporation is eligible for Installation Membership in DECUS. Membership status is acquired by submitting a written application to the appropriate Chapter Executive Secretary for approval by the Chapter Executive Board.

On acceptance of the application for membership, literature covering numerous DECUS services is sent to the Installation Delegate for reference and aid in maintaining active participation in the Society.

### ASSOCIATE

Any person, who is not an appointed Installation Delegate, who has a bona fide interest in DECUS is eligible for Associate Membership.

Like Installation Members, Associate Members receive DECUSCOPE, the Society's quarterly newsletter, automatically. They may receive other DECUS material on request. Written application indicating desire to join must be submitted to the appropriate Chapter Executive Secretary for approval by the Chapter Executive Board.

On acceptance of the application for membership, literature covering the numerous DECUS services is sent to the member for reference and to enable active participation in the Society.

---

To obtain a membership form for DECUS, please return this form to the appropriate Chapter office listed below.

NAME: \_\_\_\_\_

COMPANY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

CITY: \_\_\_\_\_

STATE/COUNTRY: \_\_\_\_\_ ZIP: \_\_\_\_\_

Membership form Requested (check one):

Installation

Associate

February 1979

I obtained this form from \_\_\_\_\_

### DECUS OFFICES

DECUS Australia  
P.O. Box 491  
Crows Nest, New South  
Wales 2065  
Australia

DECUS Canada  
P.O. Box 11500  
Ottawa, Ontario K2H 8K8  
Canada

DECUS Europe  
C.P. 510  
12, avenue des Morgines  
CH-1213 Petit-Lancy 1,  
Geneva, Switzerland

DECUS U.S. and  
Office of the Executive Director  
One Iron Way  
Marlboro, Massachusetts 01752  
USA

## SOFTWARE PROBLEMS OR ENHANCEMENTS

Questions, problems, and enhancements to DIGITAL software should be reported on a Software Performance Report (SPR) form and mailed to the SPR Center at one of the following DIGITAL Offices: (SPR forms are available from the SPR Center).

<u>AREAS COVERED</u>	<u>SPR CENTER</u>	<u>AREAS COVERED</u>	<u>SPR CENTER</u>
United Kingdom Middle East	DIGITAL EQUIPMENT CORP., Ltd. Fountain House, Butts Center RG1 7QN READING / England	United States, remainder of Far East, Africa, Latin America	Administrative Services Group, SWS P.O. Box F Maynard, MA 01754
Austria, Poland, Hungary, Rumania, East Germany, West Germany, Russia, Czechoslovakia, Bulgaria	DIGITAL EQUIPMENT CORP., Gmbh Wallensteinplatz 2 8 MUNICH 40 / Germany	Canada	Digital Equipment Canada P.O. Box 11500 Kanata Canada K2H 8K8 Ontario
Israel	DECSYS COMPUTERS, LTD. Yirmiyahou Street 4 TEL AVIV 63505 / Israel	Australia (Melbourne)	Digital Equipment Aust. Pty., LTD. 70-74 Park Street South Melbourne, Victoria Australia 3205
France	DIGITAL EQUIPMENT FRANCE Silic 225 18, rue Saarinen 94528 RUNGIS Cedex / France	Australia (Sydney)	Digital Equipment Aust. Pty., LTD. 123 - 125 Willoughby Road P.O. Box 491 Crows Nest NSW Australia 2065
Italy	DIGITAL EQUIPMENT SPA Viale Fulvio Testi 117 20092 CINISELLO/BALSAMO (Milan) Italy	Brazil	Digital Equipment Comercio Ind. Rua Batatais 429 Esq AL Campin 01423 Jardim Paulista Sao Paulo 0100 Brazil
Denmark	DIGITAL EQUIPMENT CORP. APS Kristineberg 3 2100 COPENHAGEN 0 / Denmark	Caribbean	De Latin America P.O. Box 11038 Fernando Juncos Sta. Santurce PR 00910
Finland	DIGITAL EQUIPMENT CORP. OY P.L. 16 02201 ESPOO 20 / Finland	Japan	Digital Equipment Corp., INTL 3rd Floor - Kowa Building 8-7 Sanban Cho Chiyoda Ku Tokyo 102 Japan
Norway	DIGITAL EQUIPMENT CORP. A/S Pottenmakerveien 8 OSLO 5 / Norway	New Zealand	Digital Equipment Corp., LTD Challenge House - 3 Wolfe Street P.O. Box 2471 Auckland New Zealand 10010
Sweden	DIGITAL EQUIPMENT CORP. A.B. Englundavagen 7 17124 SOLNA 1 / Sweden		
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