RT-11

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# THE SOFTWARE DISPATCH

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# RT-11 SOFTWARE DISPATCH

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The RT-11 Software Dispatch complements the RT-11 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**
**BASIC-11/RT-11 V2**
**BASIC/RT Extensions V1**
**CTS-300 V5**
**DECnet/RT V1, V1.1**
**FOCAL/RT-11 V1B**
**FORTRAN Graphics Package V1.1**
**FORTRAN/RT-11 Extensions V2.1**
**FORTRAN IV/RT-11 V2, V2.1**
**GAMMA-11 F/B V2C, V3**
**Lab Applications-11 LIBRARY V3**
**LSP-11 V1**
**MSB11 V1**
**MSB/FORTRAN IV V1**
**MU BASIC-11/RT-11 V2**
**PLOT 11/RT-11 V1.1**
**RT-11 V3B, RT-11 V4**
**RT-11 (CTS-300) LSI-11 2780 V2**
**RT-11/2780 (CTS-300/2780) V2**
**SSP-11/RT-11 V1.1**

## DISTRIBUTION

The RT-11 Software Dispatch is directed to one software contact for each software product. No mailing will be made to addresses without a software contact name. **Address change requests should be sent to the nearest DIGITAL field office. Include the new address and mailing label from the most recently received publication.**

Software binary and sources are provided under licenses only. The standard Terms and Conditions, OEM Agreement, and/or Quantity Discount Agreement contain the licenses for all binaries other than DECsystem-10.

**Eleanor F. Hunter, Editor**
**Ann Owens, Associate Editor**

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# SPR USER LETTER

Submitted by Sheila Hatchell, 8/11 Administration

The Dispatch SPR User Letter has been revised to reflect the new SPR form which is now available. 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. STATUS FOR SUBMITTED SPRs IS PROVIDED UPON REQUEST.
4. SPRs marked PROBLEM/ERROR will have a response for DIGITAL SUPPORTED products. These SPRs should refer to suspected deficiencies in the software.
5. 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. Fill out the form completely either by typing or printing clearly. **PLEASE INCLUDE YOUR SOFTWARE SERVICE CUSTOMER NUMBER IN THE ADDRESS BOX.**
2. Limit only one problem per SPR form. Several problems on an SPR can lengthen the turnaround 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 helpful to all concerned if problems with patches are reported as soon as possible.
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. Complete the questionnaire that is supplied with each SPR answer. Your feedback is essential in monitoring the quality of our responses.
8. SPRs should not be used for problems concerning software policy, software distribution, or hardware. The local office should be contacted in these cases.

DECnet-RT V1.1
for RT-11 V4
NFT



## NFT INCORRECTLY ALLOCATES RT-11 QUEUE ELEMENTS (SPR 11-29222, WMD)

The DECnet-RT NFT utility will produce various error messages such as 'SYNTAX ERROR' if DECnet-RT is built with the XM monitor. This occurs because a QSET statement was attempting to use more RT-11 queue elememts than than were allocated for it. The result was that the command parsing tables tables were being corrupted. The following correction solves this problem by causing the QSET statement to use only those elements allocated for it. This correction should be applied even though the FB flavor of the monitor is to be used.

Note that all corrections must be made on a copy of the original distribution media. The PAT utility will corrupt the original object file if an error occurs during the application of the correction file. During the following procedure the pseudo device name KI: refers to the original distribution media and the pseudo device OU: refers to the media on which the correction is to be applied.

1) Copy the file NFT.OBJ from the distribution media to the media on which the correction will be applied:

```
COPY KI:NFT.OBJ OU:NFT.OBJ
```

2) Create the following file named NFT.PAT on the correction media:

```
        .TITLE NFT
        .IDENT /V01.11/
        .CSECT NFT
;
; NFTP01 - CAUSE NFT TO ALLOCATE PROPER NUMBER OF Q ELEMENTS
;
; *** BEGIN NFTP01 ***
;
X=.
.=X+6
        MOVB    #20.,R0             ; INDICATE 20. Q ELEMENTS
;
        .PSECT NFTP01
NFTP01::
;
; *** END NFTP01 ***
;
        .END
```

3) Assemble the correction file:

```
.MACRO/OBJECT:OU:NFT.POB OU:NFT.PAT
ERRORS DETECTED : 0
.
```

If any errors are detected, re-edit the file and re-assemble.

4) Apply the correction file:

```
.R PAT
*OU:NFT.NEW=OU:NFT.OBJ/C:4375,OU:NFT.POB/C:7612
.
```

If any errors are detected by PAT then verify that the entered checksums are correct and that the file NFT.PAT is correct. Go back to step one.

5) If the PAT program gives no errors then replace the original object with the corrected version of the object module and delete any extra files:

```
.COPY OU:NFT.NEW KI:NFT.OBJ
.DELETE/NOQUERY OU:NFT.NEW,OU:NFT.POB
.
```

6) The distribution device KI: now has the corrected file NFT.OBJ. The NFT utility must be re-built to include the corrected module. This can be achieved be assigning the proper psuedo devices specified during NETGEN (if any) and invoking the command file to re-build NFT:

```
.@NFTBLD
```

An alternative method is to re-run NETGEN as dirrected in the DECnet-RT V1.1 User's Guide chapter 13.

## FAL INCORRECTLY ALLOCATES RT-11 QUEUE ELEMEMTS (WMD)

The DECnet-RT FAL utility is allocating too many RT-11 queue elements from an internal queue element area. This can cause random problems especially if the XM flavor of the monitor is selected. This correction causes FAL to allocate the proper amount of queue elements from the internal queue element area. This correction should be applied even if the FB flavor of the monitor is to be used.

Note that all corrections must be made on a copy of the original distribution media. The PAT utility will corrupt the original object file if an error occurs during the application of the correction file. During the following procedure the pseudo device name KI: refers to the original distribution media and the pseudo device OU: refers to the media on which the correction is to be applied.

1) Copy the file FAL.OBJ from the distribution media to the media on which the correction will be applied:

```
COPY KI:FAL.OBJ OU:FAL.OBJ
```

2) Create the following file named FAL.PAT on the correction media:

```
        .TITLE FAL
        .IDENT /V01.11/
        .CSECT FAL
;
; FALP01 - CAUSE FAL TO ALLOCATE THE PROPER NUMBER OF Q ELEMENTS
;
; *** BEGIN FALP01 ***
;
X=.
.=X+162
        MOVB   #20.,R0        ; INDICATE 20. Q ELEMENTS
;
        .PSECT FALP01
FALP01::
;
; *** END FALP01 ***
;
        .END
```

3) Assemble the correction file:

```
.MACRO/OBJECT:OU:FAL.POB OU:FAL.PAT
ERRORS DETECTED : 0
.
```

If any errors are detected, re-edit the file and re-assemble.

4) Apply the correction file:

```
.R PAT
*OU:FAL.NEW=OU:FAL.OBJ/C:152736,OU:FAL.POB/C:10277
.
```

If any errors are detected by PAT then verify that the entered checksums are correct and that the file FAL.PAT is correct. Go back to step one.

5) If the PAT program gives no errors then replace the original object with the corrected version of the object module and delete any extra files:

```
.COPY OU:FAL.NEW KI:FAL.OBJ
.DELETE/NOQUERY OU:FAL.NEW,OU:FAL.POB
.
```

6) The distribution device KI: now has the corrected file FAL.OBJ. The FAL utility must be re-built to include the corrected module. This can be achieved be assigning the proper psuedo devices specified during NETGEN (if any) and invoking the command file to re-build FAL:

```
.@FALBLD
```

An alternative method is to re-run NETGEN as dirrected in the DECnet-RT V1.1 Users Guide chapter 13.

NOTES ON THE USE OF THE DECnet-RT FORTRAN INTERFACES (WMD)

The following notes apply to the useage of the FORTRAN NSP and FORTRAN DAP user interfaces in DECnet-RT V1.1 .

1) The FORTRAN group recommends that all FORTRAN users set the USR to no-swap. DECnet-RT requires this. If the USR is allowed to swap, several file related functions such as CLOSE will hang the user task. This is caused by the fact that if the USR is swapping, FORTRAN will wait for I/O to complete on all luns rather than the lun of interest, before performing the requested function. DECnet-RT is running asynchronously underneath the user task and always has I/O pending and hense the hang.

2) Remember that all non-DECnet luns must be accessed before opening the network. An assignment of the lun, or a lookup of a file is insufficient as these do not perform I/O on the lun.

3) All open files must be closed before issuing a NEXIT call. The NEXIT call is not the same as the EXIT call in respect to the closure of open files.

4) A FORTRAN read statement strips off the trailing carriage control from ASCII records and the FORTRAN write re-appends these characters before writing these records out. Remember this when a FORTRAN task is communicating to a MACRO task or vise versa.

5) FORTRAN users now may use either the threaded or the inline form of the compiler. The compiler restriction imposed under DECnet-RT V1.0 has now been lifted.

DECnet-RT V1.1
for RT-11 V4
MACRO User Interfaces

50.16.2 N
1 of 1

NOTES ON DECnet-RT MACRO PROGRAMMING (WMD)

The following notes apply to the useage of the MACRO NSP or the MACRO DAP user interfaces in DECnet-RT V1.1 .

1) User tasks must be careful about where the USR is allowed to swap. The USR must not be allowed to swap over any of the DECnet-RT routines as a high percentage of these routines operate at ast level. Consult the RT-11 Advanced Programmer's Guide on USR considerations.

2) User tasks using multiple levels of indirect should also be careful about the USR's location in memory. Even if the USR is set noswap it will move when new levels of indirect are entered. As a result it is recommended that all DECnet-RT routines be put at the highest possible addresses to allow the USR to move over non-ast user code if it is necessary.

3) When intermixing MACRO and FORTRAN DECnet tasks be aware that FORTRAN strips off carriage control during read operations and can add carriage control during write operations.

# RT-11 V4.0
# CUMULATIVE INDEX
# JUNE 1980

This is a complete listing of all articles for RT-11 V4.0 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!**

Unassigned articles are indicated: UNASSIGNED.

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.

+ = Articles appeared in the RT-11 Software Dispatch Review, March 1980.

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| USE OF COMPILE COMMAND | 35.3.6 N+ | Mar 80 |
| STRING MANIPULATION IN ASSEMBLY LANGUAGE ROUTINES | 35.3.7 N+ | Mar 80 |
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CTS-3ØØ V5
DIBOL
SUD VAØ5-ØØG
(PATCH 21)



LP: MAY PRINT UNWANTED CHARACTERS (LG)

Under Single-User DIBOL, when writing to the lineprinter it is possible for extraneous characters to be output as part of the last buffer when the DIBOL CLOSE statement is executed. The problem can occur if the PROC statement specifies a buffer size greater than two blocks.

Patch 21 prevents this from happening, and changes the version number of SUD to VAØ5-ØØH.

Using the editor, create the following source files. Name them as indicated in the comment line that begins each file. Then, to install the patch, follow the procedure shown following the source files.

CTS-3ØØ V5 Seq 15 M
DIBOL
SUD VAØ5-ØØG 2 of 2
(PATCH 21)

```
;P021.MAC

        .TITLE $IO
        .CSECT $IO

P021:
        .=      .+4570
        JMP     P021A
        .=      P021+6050
        JSR     PC,P021B
        .PSECT $P021
P021A:  BEQ     WB3
        ADD     40(R5),4(R1)
        JMP     P021+4576
WB3:    JMP     P021+4602
P021B:  CMPB    2(R3),#376
        BEQ     15$
        ASR     R0
15$:    SUB     R0,(R3)
        RTS     PC
        .END


;P021V1.MAC

        .TITLE  DIRT
        .CSECT  $DIRT

        .=      .+11103
        .ASCII  /H/

        .END



.MACRO P021,P021V1
ERRORS DETECTED:  0
ERRORS DETECTED:  0

.RENAME (IO,DIRT,DIBOL).OBJ *.OLD
 Files renamed:
DK:IO.OBJ       to DK:IO.OLD
DK:DIRT.OBJ     to DK:DIRT.OLD
DK:DIBOL.OBJ    to DK:DIBOL.OLD

.R PAT
*IO.OBJ=IO.OLD/C:177317,P021/C:020116

.R PAT
*DIRT.OBJ=DIRT.OLD/C:123711,P021V1/C:005254

.R LIBR
*DIBOL=DIBOL.OLD,IO/R,DIRT/R
*^C
```

DECnet-RT V1.1 50.9.1 M
for RT-11 V3B 1 of 2
NFT

NFT INCORRECTLY ALLOCATES RT-11 QUEUE ELEMENTS (SPR 11-29222, WMD)

The DECnet-RT NFT utility will produce various error messages such as 'SYNTAX ERROR' if DECnet-RT is built with the XM monitor. This occurs because a QSET statement was attempting to use more RT-11 queue elememts than than were allocated for it. The result was that the command parsing tables tables were being corrupted. The following correction solves this problem by causing the QSET statement to use only those elements allocated for it. This correction should be applied even though the FB flavor of the monitor is to be used.

Note that all corrections must be made on a copy of the original distribution media. The PAT utility will corrupt the original object file if an error occurs during the application of the correction file. During the following procedure the pseudo device name KI: refers to the original distribution media and the pseudo device OU: refers to the media on which the correction is to be applied.

1) Copy the file NFT.OBJ from the distribution media to the media on which the correction will be applied:

```
COPY KI:NFT.OBJ OU:NFT.OBJ
```

2) Create the following file named NFT.PAT on the correction media:

```
        .TITLE NFT
        .IDENT /V01.11/
        .CSECT NFT
;
; NFTP01 - CAUSE NFT TO ALLOCATE PROPER NUMBER OF Q ELEMENTS
;
; *** BEGIN NFTP01 ***
;
X=.
.=X+6
        MOVB   #20.,R0              ; INDICATE 20. Q ELEMENTS
;
        .PSECT NFTP01
NFTP01::
;
; *** END NFTP01 ***
;
        .END
```

3) Assemble the correction file:

```
.MACRO/OBJECT:OU:NFT.POB OU:NFT.PAT
ERRORS DETECTED : 0
.
```

If any errors are detected, re-edit the file and re-assemble.

4) Apply the correction file:

```
.R PAT
*OU:NFT.NEW=OU:NFT.OBJ/C:554,OU:NFT.POB/C:7612
.
```

If any errors are detected by PAT then verify that the entered checksums are correct and that the file NFT.PAT is correct. Go back to step one.

5) If the PAT program gives no errors then replace the original object with the corrected version of the object module and delete any extra files:

```
.COPY OU:NFT.NEW KI:NFT.OBJ
.DELETE/NOQUERY OU:NFT.NEW,OU:NFT.POB
.
```

6) The distribution device KI: now has the corrected file NFT.OBJ. The NFT utility must be re-built to include the corrected module. This can be achieved be assigning the proper psuedo devices specified during NETGEN (if any) and invoking the command file to re-build NFT:

```
.@NFTBLD
```

An alternative method is to re-run NETGEN as dirrected in the DECnet-RT V1.1 User's Guide chapter 13.

DECnet-RT V1.1 for RT-11 V3B
FAL



## FAL INCORRECTLY ALLOCATES RT-11 QUEUE ELEMEMTS (WMD)

The DECnet-RT FAL utility is allocating too many RT-11 queue elements from an internal queue element area. This can cause random problems especially if the XM flavor of the monitor is selected. This correction causes FAL to allocate the proper amount of queue elements from the internal queue element area. This correction should be applied even if the FB flavor of the monitor is to be used.

Note that all corrections must be made on a copy of the original distribution media. The PAT utility will corrupt the original object file if an error occurs during the application of the correction file. During the following procedure the pseudo device name KI: refers to the original distribution media and the pseudo device OU: refers to the media on which the correction is to be applied.

1) Copy the file FAL.OBJ from the distribution media to the media on which the correction will be applied:

```
COPY KI:FAL.OBJ OU:FAL.OBJ
```

2) Create the following file named FAL.PAT on the correction media:

```
        .TITLE FAL
        .IDENT /V01.11/
        .CSECT FAL
;
; FALP01 - CAUSE FAL TO ALLOCATE THE PROPER NUMBER OF Q ELEMENTS
;
; *** BEGIN FALP01 ***
;
X=.
.=X+162
        MOVB   #20.,R0        ; INDICATE 20. Q ELEMENTS
;
        .PSECT FALP01
FALP01::
;
; *** END FALP01 ***
;
        .END
```

3) Assemble the correction file:

```
.MACRO/OBJECT:OU:FAL.POB OU:FAL.PAT
ERRORS DETECTED : 0
.
```

If any errors are detected, re-edit the file and re-assemble.

4) Apply the correction file:

```
.R PAT
*OU:FAL.NEW=OU:FAL.OBJ/C:146662,OU:FAL.POB/C:10277
.
```

If any errors are detected by PAT then verify that the entered checksums are correct and that the file FAL.PAT is correct. Go back to step one.

5) If the PAT program gives no errors then replace the original object with the corrected version of the object module and delete any extra files:

```
.COPY OU:FAL.NEW KI:FAL.OBJ
.DELETE/NOQUERY OU:FAL.NEW,OU:FAL.POB
.
```

6) The distribution device KI: now has the corrected file FAL.OBJ. The FAL utility must be re-built to include the corrected module. This can be achieved be assigning the proper psuedo devices specified during NETGEN (if any) and invoking the command file to re-build FAL:

```
.@FALBLD
```

An alternative method is to re-run NETGEN as dirrected in the DECnet-RT V1.1 Users Guide chapter 13.

DECnet-RT V1.1
for RT-11 V3B
Fortran User Interfaces



NOTES ON THE USE OF THE DECnet-RT FORTRAN INTERFACES (WMD)

The following notes apply to the useage of the FORTRAN NSP and FORTRAN DAP user interfaces in DECnet-RT V1.1 .

1) The FORTRAN group recommends that all FORTRAN users set the USR to no-swap. DECnet-RT requires this. If the USR is allowed to swap, several file related functions such as CLOSE will hang the user task. This is caused by the fact that if the USR is swapping, FORTRAN will wait for I/O to complete on all luns rather than the lun of interest, before performing the requested function. DECnet-RT is running asynchronously underneath the user task and always has I/O pending and hense the hang.

2) Remember that all non-DECnet luns must be accessed before opening the network. An assignment of the lun, or a lookup of a file is insufficient as these do not perform I/O on the lun.

3) All open files must be closed before issuing a NEXIT call. The NEXIT call is not the same as the EXIT call in respect to the closure of open files.

4) A FORTRAN read statement strips off the trailing carriage control from ASCII records and the FORTRAN write re-appends these characters before writing these records out. Remember this when a FORTRAN task is communicating to a MACRO task or vise versa.

5) FORTRAN users now may use either the threaded or the inline form of the compiler. The compiler restriction imposed under DECnet-RT V1.0 has now been lifted.

DECnet-RT V1.1
for RT-11 V3B
MACRO User Interfaces



NOTES ON DECnet-RT MACRO PROGRAMMING (WMD)

The following notes apply to the useage of the MACRO NSP or the MACRO DAP user interfaces in DECnet-RT V1.1 .

1) User tasks must be careful about where the USR is allowed to swap. The USR must not be allowed to swap over any of the DECnet-RT routines as a high percentage of these routines operate at ast level. Consult the RT-11 Advanced Programmer's Guide on USR considerations.

2) User tasks using multiple levels of indirect should also be careful about the USR's location in memory. Even if the USR is set noswap it will move when new levels of indirect are entered. As a result it is recommended that all DECnet-RT routines be put at the highest possible addresses to allow the USR to move over non-ast user code if it is necessary.

3) When intermixing MACRO and FORTRAN DECnet tasks be aware that FORTRAN strips off carriage control during read operations and can add carriage control during write operations.

RT-11 VØ3B-ØØ Seq 16 M
SOURCE
TM.MAC 1 of 1
TJ.MAC

SHORT MAGTAPE READS IN XM (SPR 11-2Ø511A SD)

Short, multi-block magtape read requests in XM do not clear out the user buffer correctly. The following patch corrects the problem:

```
.R EDIT <RET>
*EBTM.MAC<ESC>RV<ESC><ESC>
; TM EDIT LEVEL 4.
*G4<ESC>-C5<ESC>V<ESC><ESC>
; TM EDIT LEVEL 5.
*FXBUMP:<ESC>V<ESC><ESC>
XBUMP:  ADD     #512.,OLDBA
*I      MOV     MTCQE,-(SP) <RET>
        ADD     #Q$PAR,@SP <RET>
        ADD     #1Ø,@(SP)+ <RET>
<ESC>-3A<ESC>4L<ESC><ESC>
XBUMP:  MOV     MTCQE,-(SP)
        ADD     #Q$PAR,@SP
        ADD     #1Ø,@(SP)+
        ADD     #512.,OLDBA
*EX<ESC><ESC>

.R EDIT <RET>
*EBTJ.MAC<ESC>RV<ESC><ESC>
; TJ EDIT LEVEL 4.
*G4<ESC>-C5<ESC>V<ESC><ESC>
; TJ EDIT LEVEL 5.
*FXBUMP:<ESC>V<ESC><ESC>
XBUMP:  ADD     #512.,OLDBA
*I      MOV     MTCQE,-(SP) <RET>
        ADD     #Q$PAR,@SP <RET>
        ADD     #1Ø,@(SP)+ <RET>
<ESC>-3A<ESC>4L<ESC><ESC>
XBUMP:  MOV     MTCQE,-(SP)
        ADD     #Q$PAR,@SP
        ADD     #1Ø,@(SP)+
        ADD     #512.,OLDBA
*EX<ESC><ESC>
```

NOTE

The magtape handlers can only be generated as described in "Distributed Magtape Handler Corrections (BD)", Seq Ø3M which was published in the RT-11 September 1978 Software Dispatch.

RT-11 VØ3B-ØØ Seq 17 M
SOURCE
TJ.MAC 1 of 1

MM HANDLER WRITELOCK ERRORS (SPR 11-28529 SD)

The MM magtape handler does not report writelock errors properly. The following source patch to TJ.MAC will correct the problem when the handler is reassembled, linked and installed.

```
.R EDIT <RET>
*EBTJ.MAC<ESC>RV<ESC><ESC>
; TJ EDIT LEVEL 5.
*G5<ESC>-C6<ESC>V<ESC><ESC>
; TJ EDIT LEVEL 6.
*FERWRIT:<ESC>V<ESC><ESC>
ERWRIT: TST     @#MTFC
*3A<ESC>V<ESC><ESC>
        BR      AB1
*I      BIT     #WRL,@#MTDS <RET>
        BEQ     AB1 <RET>
        MOV     #WRITELOK,R4 <RET>
<ESC>-3LL<ESC><ESC>
        BIT     #WRL,@#MTDS
        BEQ     AB1
        MOV     #WRITELOK,R4
        BR      AB1
*GNEF<ESC>V<ESC><ESC>
        BIT     #NEF,R4
*2AV<ESC><ESC>
        BIT     #WRL,R5
*4KV<ESC><ESC>
2$:     BIT     #INCVPE+PEFLRC+CORCRC+NSG,R4
*I      BR      NQ1 <RET>
<ESC>-2LL<ESC><ESC>
        BEQ     2$
        BR      NQ1
2$:     BIT     #INCVPE+PEFLRC+CORCRC+NSG,R4
*EX<ESC><ESC>
.
```

Note

The magtape handlers can only be generated as described in "Distributed Magtape Handler Corrections (BD)", Seq Ø3M which was published in the RT-11 September 1978 Software Dispatch.

RT-11 VØ3B-ØØ Seq 32 M
UTILITIES
BATCH.SAV VØ3.Ø3 1 of 2

SAVE/RESTORE OF TERMINAL I/O LOGGINC ACTION IN BATCH (SPR 11-27947 MG)

PROBLEM:

Logging action status (set by the BATCH directives TTYIN, TTYOUT, TTYIO and NOTTY) is not correctly saved during a $CALL. The following patches correct the errors in BATCH.SAV and BATCH.MAC.

NOTE: Due to the method of stacking and restoring the information needed, the logging action (TTYIN, TTYOUT, TTYIO or NOTTY) that is in effect at the time of the $CALL will be the default action in the $CALLed batch stream.

Patch to BATCH.SAV VØ3.Ø3:

```
.R PATCH<RET>

FILE NAME--
*BATCH.SAV/C<RET>
*612Ø;ØR
*Ø,442/ 177762  17776Ø<RET>
*Ø,13ØØ/        2Ø      22<RET>
*Ø,133Ø/        5311    4767<LF>
Ø,1332/ 1212Ø   15746<RET>
*Ø,173Ø2/       Ø       5311<LF>
Ø,173Ø4/        Ø       1212Ø<LF>
Ø,173Ø6/        Ø       1742Ø<LF>
Ø,1731Ø/        Ø       6Ø<LF>
Ø,17312/        Ø       2Ø7<RET>
*Ø,1526/        2Ø      22<RET>
*Ø,1552/        5211    4767<LF>
Ø,1554/ 1212Ø   15536<RET>
*Ø,17314/       Ø       5211<LF>
Ø,17316/        Ø       1212Ø<LF>
Ø,1732Ø/        Ø       12174<LF>
Ø,17322/        Ø       6Ø<LF>
Ø,17324/        Ø       2Ø7<RET>
*Ø,3734/        12774   24Ø<LF>
Ø,3736/ 4Ø1Ø6   4767<LF>
Ø,374Ø/ 6Ø      13364<RET>
*Ø,17326/       Ø       42774<LF>
Ø,1733Ø/        Ø       177376<LF>
Ø,17332/        Ø       6Ø<LF>
Ø,17334/        Ø       52774<LF>
Ø,17336/        Ø       4Ø1Ø6<LF>
```

RT-11 VØ3B-ØØ
UTILITIES
BATCH.SAV VØ3.Ø3

Seq 32 M

2 of 2

```
Ø,1734Ø/        Ø       6Ø<LF>
Ø,17342/        Ø       2Ø7<RET>
*Ø,1Ø52\        4Ø      1Ø1<RET>
*E

Checksum?       51145<RET>
```

Patch to BATCH.MAC:

```
.R EDIT<RET>
*EBBATCH.MAC[1Ø3]<ESC><ESC>
*F.TITLE<ESC><ESC>
*A-2JI  ;EDIT LEVEL 1<ESC>V<ESC><ESC>
        .TITLE RT-11 BATCH VØ3.Ø3       ;EDIT LEVEL 1
*FSAVNUM<ESC><ESC>
*G1Ø<ESC>=C9.   ;ØØ1<ESC>V<ESC><ESC>
SAVNUM=9.       ;ØØ1
*FBEXIT<ESC><ESC>
*AI     NOTTYB=     4ØØ  ;ØØ1<RET>
<ESC>-2A3L<ESC><ESC>
        BEXIT=  1ØØØØØ
        NOTTYB=     4ØØ  ;ØØ1
        BGET=       2ØØ
*FVERID:<ESC><ESC>
*G3 /<ESC>=C3A/ ;ØØ1<ESC>V<ESC><ESC>
VERID:  .ASCIZ  /BATCH VØ3.Ø3A/ ;ØØ1
*FEOJSUB:<ESC><ESC>
*13AI.  MOV     @BATSW1(R4),(RØ)+       ;ØØ1<RET>
<ESC>-2A3L<ESC><ESC>
        MOV     (R1)+,(RØ)+
        MOV     @BATSW1(R4),(RØ)+       ;ØØ1
        ADD     #6,R1
*FSWTR1:<ESC><ESC>
*15AI   MOV     (R1)+,@BATSW1(R4)       ;ØØ1<RET>
<ESC>-2A3L<ESC><ESC>
        MOV     RØ,-(SP)
        MOV     (R1)+,@BATSW1(R4)       ;ØØ1
        ADD     #6,RØ
*FSWTR2:<ESC><ESC>
*KI     BIC     #^C<NOTTYB!HELP>,@BATSW1(R4)    ;ØØ1<RET>
        BIS     #SOURCE!DESTON!BSOURC!BDESTN,@BATSW1(R4) ;ØØ1<RET>
<ESC>-3A4L<ESC><ESC>
        JMP     EOJEOJ
SWTR2:  BIC     #^C<NOTTYB!HELP>,@BATSW1(R4)    ;ØØ1
        BIS     #SOURCE!DESTON!BSOURC!BDESTN,@BATSW1(R4) ;ØØ1
        BIT     #ABORT,(R4)
*EX<ESC><ESC>
```

The resultant version will be BATCH VØ3.Ø3A.

RT-11 V03B-00 Seq 33 M
UTILITIES
DIR V03.01B 1 of 1

CORRECTION TO PREVIOUS DIR PATCH (SPR 11-28224 MG)

PROBLEM:

The SOFTWARE DISPATCH article, DIR PROBLEM Seq 23 M (Feb 80), was in error.

The following mandatory patch corrects the problem. (NOTE: All previous patches must be applied before applying this one. User responses are underlined.)

Patch to DIR V03.01B:

```
.R PATCH<RET>

FILE NAME--
*DIR.SAV/C<RET>
*14356/ 101277  103277<RET>
*10547/  102    103<RET>
*E

Checksum?  75031<RET>
```

The resultant version is DIR V03.01C.

# RT-11 V3B
# CUMULATIVE INDEX
# JUNE 1980

This is a complete listing of all articles for RT-11 V4.0 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!

Unassigned articles are indicated: UNASSIGNED.

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.

| Component | Sequence | Mon/Yr |
|---|---|---|
| SAVE .XXX & UNSAVE .XXX - PATCH G | 23 M | Feb 79 |
| NEW - PATCH H | 24 M | Feb 79 |
| STORAGE OF THE NULL CHARACTER IN STRING VARIABLES AND VIRTUAL STRING ARRAYS | 25 N | Feb 79 |
| USE OF COMPILE COMMAND | 26 N | Feb 79 |
| RESEQ - PATCH I | 27 M | Mar 79 |
| LISTNH /OLD - PATCH J | 28 M | Mar 79 |
| SYS(1) - PATCH K | 29 M | Mar 79 |
| CALL - PATCH L | 30 M | Mar 79 |
| DOUBLE PRECISION INTEGER VARIABLES - PATCH M | 31 M | May 79 |
| FILESIZE 0 - PATCH N | 32 M | May 79 |
| INTEGERS IN DOUBLE PRECISION BASIC-11 | 33 M | Jul 79 |
| REM STATEMENTS ON MULTI-STATEMENT LINES - PATCH O | 34 M | Jul 79 |
| STRING MANIPULATION IN ASSEMBLY LANGUAGE ROUTINES | 35 N | Aug 79 |
| MAXIMUM ARRAY SUBSCRIPT SIZE | 36 N | Aug 79 |
| **BASIC/RT-11 EXTENSIONS V1** | | |
| "IPK" SUBROUTINE | 01 M | Aug 77 |
| SAMPLING A/D CHANNEL NO. 15 | 02 R | Aug 77 |
| 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 |
| **CTS-300 V5** | | |
| **DECFORM** | | |
| TWO PROBLEMS WITH FOCOMP | 01 M | May 79 |
| **DIBOL** | | |
| TWO PROBLEMS: FILE CORRUPTION POSSIBILITY AND REPETITIVE I/O ERRORS | 01 M | Mar 79 |
| OPENING NON-STANDARD HANDLERS | 02 M | Apr 79 |
| ANOTHER FILE CORRUPTION POSSIBILITY | 03 M | Apr 79 |
| TWO PROBLEMS: OPENING 0 LENGTH FILE IN SUD AND OPENING LP IN I MODE | 04 M | Jun 79 |
| LINE PRINTER PROBLEM AND PROBLEM WITH LARGE ISAM FILE | 05 M | Jun 79 |
| I/O ERRORS AND PROBLEM WITH FMAC SUBROUTINE | 06 M | Jun 79 |
| ISAM FILE CORRUPTION | 07 M | Jun 79 |
| SHUFFLE CAUSES TRAP TO 4 | 08 M | Jul 79 |
| MISLEADING ERROR MESSAGES | 09 M | Aug 79 |
| ERRONEOUS I/O ERROR | 10 M | Aug 79 |
| TWO PROBLEMS WITH MULTI-VOLUME FILES | 11 M | Oct 79 |
| INCORRECT ERROR ON WRITING DUPLICATE FILE TO MAGTAPE | 12 M | Dec 79 |
| ACCEPT CAUSES ERRORS | 13 M | Mar 80 |
| I-O ERROR ON ISAM STORE/DELETE | 14 M | Mar 80 |
| LP: MAY PRINT UNWANTED CHARACTERS | 15 M | Jun 80 |
| **DICOMP** | | |
| DICOMP DISLIKES SOME COMMENTS | 01 M | Sep 79 |
| **ISMUTL** | | |
| REORG PROBLEMS DUE TO INSUFFICIENT SPACE ON DEVICE | 01 M | Feb 80 |
| **REDUCE** | | |
| HOW TO REDUCE PAINLESSLY | 01 N | Aug 79 |
| A REDUCING PROBLEM | 02 M | Dec 79 |
| **SORTM** | | |
| MERGE DOES NOT ACCEPT EMPTY FILES | 01 M | Apr 79 |
| MERGING ISAM FILES | 02 M | May 80 |
| **CTS-300 RDCP (2780/3780) V1.0** | | |
| SENDING OF TRANSPARENT DATA AND TRANSLATION OF DATA AFTER SENDING A TRANSPARENT FILE | 01 M | Jul 79 |
| SEND A TRANSPARENT FILE AFTER RECEIVING AN ASCII DATA FILE | 02 M | Oct 79 |
| AN ACK IS RECEIVED WHEN ENQ HAS ALREADY BEEN SENT | 03 M | Oct 79 |
| MISCELLANEOUS ERRORS | 04 M | Aug 79 |
| RDCP11 LOOP MAY OCCUR | 05 M | Oct 79 |
| ASCII TRANSMISSION OF A FILE | 06 M | Oct 79 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| **DECnet-RT V1** | | |
| **DAP** | | |
| DAP ROUTINES DO NOT ARBITRATE DAP SEGMENT SIZE PROPERLY | 07 M | Jan 79 |
| NOTES ON CHANGES TO DAP INTERFACE | 09 N | Feb 79 |
| CORRECT BUFFER POINTER ERROR | 16.11 M | May 79 |
| DAP ATTEMPTS TO SEND A MESSAGE TOO LONG | 17.7 M | Sep 79 |
| **DDCMP** | | |
| DDCMP LINE COUNTERS OVERFLOW TO ZERO | 01 O | Jul 78 |
| **DMC** | | |
| DMC LINE COUNTERS OVERFLOW TO ZERO | 01 O | Jul 78 |
| **DOCUMENTATION** | | |
| USER'S GUIDE DOCUMENTATION ERRORS | 2.1 N | Aug 79 |
| **FAL** | | |
| CORRECT FAL PROCESSING OF END OF STREAM MESSAGE | 01 M | Jan 79 |
| FAL INCORRECTLY ALLOCATES DISC SPACE FOR FILES | 02 M | Feb 79 |
| FAL INCORRECTLY HANDLES REMOTE FILE REQUESTS | 04 M | Feb 79 |
| TIMING DEPENDENCY IN RT TO RSTS FILE TRANSFERS | 17.5 M | Jul 79 |
| MRS FIELD NOT DEFAULTED PROPERLY | 17.6 M | Jul 79 |
| **FORTRAN INTERFACE** | | |
| DIFFERENCES IN RT AND RSX FORTRAN INTERFACE IMPLEMENTATIONS | 01 N | Jul 78 |
| USE OF THREADED AND INLINE FORTRAN COMPILER OPTIONS | 04 R | Jan 79 |
| FORTRAN REMOTE OPEN FOR WRITE MODIFIES FILE ATTRIBUTES | 05 N | Jan 79 |
| **MODEM CONTROL** | | |
| SUPPORT OF ASYNCHRONOUS HALF DUPLEX MODEMS | 01 R | Jul 78 |
| **NFARS** | | |
| DAP ROUTINES CHANGE MODE DURING FILE TRANSFER | 02 M | Feb 79 |
| CHECK FOR BLOCK MODE TRANSFER | 03 M | Feb 79 |
| DAP DEFAULTS DO NOT ALLOW RECORDS TO SPAN BLOCKS | 06 O | Jan 79 |
| ASCII FILE ACCESS TO VAX/RSX SYSTEMS | 08 M | Feb 79 |
| INVALID FILE TYPE SENT TO VAX IN ASCII TRANSFER | 10 M | Mar 79 |
| **NSP** | | |
| PROTOCOL VIOLATION IN NODE INITIALIZATION | 01 M | Jan 79 |
| **NFT** | | |
| NFT ASCII FILE TRANSFER TO VAX/RSX SYSTEMS | 03 M | Feb 79 |
| LOGICAL BLOCK NUMBERS NOW START AT ONE | 17.5 M | May 79 |
| **DECnet-RT V1.1** | | |
| **NFT** | | |
| NFT INCORRECTLY ALLOCATES RT-11 QUEUE ELEMENTS | 50.9.1 M | Jun 80 |
| **FAL** | | |
| FAL INCORRECTLY ALLOCATES RT-11 QUEUE ELEMENTS | 50.10.1 M | Jun 80 |
| **FORTRAN USER INTERFACES** | | |
| NOTES ON THE USE OF THE DECnet-RT FORTRAN INTERFACES | 50.16.1 N | Jun 80 |
| **MACRO USER INTERFACES** | | |
| NOTES ON DECnet-RT MACRO PROGRAMMING | 50.16.2 N | Jun 80 |
| **FEP-11, FORTRAN ENHANCEMENT PACKAGE (ALSO PERTAINS TO: RT-11/FORTRAN UPGRADE PACKAGE FOR MINC)** | | |
| FEP-11 INITIAL PROBLEMS, SOLUTIONS AND HINTS | 01 M | May 79 |
| PROBLEMS WITH IEEE-BUS SUBROUTINES | 02 M | Feb 80 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| **FMS-11 V1** | | |
| CONSOLE TERMINAL SPECIAL MODE BIT CLEARED | 01 M | Jun 79 |
| INCORRECT MCDEMO FILE TYPES | 02 O | Jun 79 |
| TSKINI INPUT BUFFER TOO SMALL | 03 M | Jun 79 |
| ARTS ERROR MESSAGES LACK '?' | 04 M | Jun 79 |
| HANDLER FETCH CORRUPTS FORM FILE ID | 05 M | Jul 79 |
| ZERO-FILLED FIELD VALIDATION PROBLEM | 06 M | Jul 79 |
| FILED VIDEO ATTRIBUTES PROBLEM | 07 M | Jul 79 |
| FRED ERROR MESSAGES LACK'?' | 08 M | Jul 79 |
| ERROR IN SCROLL FORWARD/BACKWARD CODE | 09 M | Jul 79 |
| ERROR IN EXIT SCROLLED AREA FORWARD CODE | 10 M | Jul 79 |
| ANNOUNCING FMS-11 FORMS MANAGEMENT SYSTEM | 11 F | Nov 79 |
| **FOCAL/RT-11 V1B** | | |
| FOR COMMAND WITHOUT AN ARGUMENT | 01 M | Oct 75 |
| OPERATE COMMAND CAUSES ERROR | 04 M | Aug 76 |
| FCLK ROUTINE GIVES INCORRECT TIME | 05 O | Aug 76 |
| "LIBRARY ASK" COMMAND | 06 O | Feb 77 |
| "/Z" SWITCH | 07 M | Aug 77 |
| @START NOT WORKING WHEN DOWN-LINE LOADING | 08 M | Mar 78 |
| LIBRARIES FROM FOCAL SOURCE DISK MUST BE REFORMATTED | 09 N | Aug 78 |
| CLOCK PROBLEM FOR PAPER TAPE (STAND-ALONE) FOCAL USERS | 10 M | Nov 78 |
| **FORTRAN GRAPHICS PACKAGE, V1.1** | | |
| **DECGRAPHIC** | | |
| NMBR SUBROUTINE IN DECgraphic | 01 R | JAN 79 |
| **FORTRAN/RT-11 EXTENSIONS V1** | | |
| RUNNING PROGRAM WITH "SETR" | 01 M | Oct 78 |
| IBEF NOT PROPERLY DECREMENTED | 02 R | Oct 78 |
| LPS DEVICE CONFLICT CAUSED BY CALL SETR AFTER CALL RTS | 03 R | Oct 78 |
| IADC AFTER RTS DOES NOT WORK | 04 M | Oct 78 |
| SUBROUTINE NAMING CONFLICT | 05 N | Oct 78 |
| PLOT55 DESCRIPTION | 06 N | Oct 78 |
| ILLEGAL MEMORY REFERENCE ERROR | 07 M | Oct 78 |
| DEVICE CONFLICT ERROR | 08 R | Oct 78 |
| TWO PROBLEMS WITH THE RT-11/FORTRAN GRAPHICS EXTENSIONS | 09 M | Oct 78 |
| **FORTRAN/RT-11 EXTENSIONS V1B** | | |
| FORTRAN CRASHES AFTER RUNNING PROGRAM WITH "SETR" | 01 M | Oct 78 |
| TWO PROBLEMS WITH THE RT-11/FORTRAN GRAPHICS EXTENSIONS | 02 M | Oct 78 |
| NEGATIVE INTENSITY | 03 N | Nov 78 |
| PROGRAM TERMINATION ERROR USING RT-11 F/B | 04 R | Apr 79 |
| **FORTRAN/RT-11 EXTENSIONS V2.1** | | |
| FORTRAN CRASHES AFTER RUNNING PROGRAM WITH "SETR" | 01 M | Mar 79 |
| TWO PROBLEMS WITH THE RT-11/FORTRAN GRAPHICS EXTENSIONS | 02 M | Mar 79 |
| NEGATIVE INTENSITY | 03 N | Mar 79 |
| **FORTRAN IV/RT-11 V2** | | |
| **COMPILER** | | |
| DISPOSE = 'KEEP' OPTION | 01 R | Jan 79 |
| CRASH DUMPS | 02 N | Jan 79 |
| SYNTAX ERRORS IN SOURCE PROGRAM MAY CAUSE COMPILER TO ABORT | 03 M | Jan 79 |
| SIMRT | 04 M | Jan 79 |
| SIMRT CONTINUED | 05 M | Jan 79 |
| KNOWN FORTRAN IV V2 BUGS | 06 N | Jan 79 |
| USE OF THE FIND STATEMENT | 07 M | Jan 79 |
| RAISING COMPLEX NUMBERS | 08 M | Jan 79 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| EXTRA CHARACTERS MAY RESULT IN COMPILER TRAPPING | 09 M | Jan 79 |
| TRANSMITTING ASCII DATA | 10 R | Jan 79 |
| IN-LINE CODE | 11 N | Jan 79 |
| ERRORS OCCUR WITH NO DO LOOP | 12 M | Jan 79 |
| FORTRAN "ACCEPT" STATEMENT | 13 R | Jan 79 |

**FORTRAN IV/RT-11 V2.1**

| | | |
|---|---|---|
| FORTRAN IV V2.1 MAINTENANCE RELEASE | 01 N | Dec 78 |
| PATCH 1 | 02 M | Feb 79 |
| PATCH 2 | 03 M | Feb 79 |
| PATCH 3 | 04 M | Feb 79 |
| PATCH 4 | 05 M | Sep 79 |
| CARRIAGE CONTROL OPTION - PATCH 5 | 06 M | May 79 |
| OPEN FAILURE WITH TYPE='OLD' - PATCH 6 | 07 M | Sep 79 |
| FORTRAN LIBRARY FUNCTION ERRTST - PATCH 7 | 08 M | Aug 79 |
| REGISTER ALLOCATION - PATCH 8 | 09 M | Sep 79 |
| SMALLER EXECUTION-TIME PROGRAMS | 10 N | Jun 79 |
| FORTRAN OTS - PATCH 9 | 11 M | Sep 79 |
| I/O FROM A FORTRAN COMPLETION ROUTINE - PATCH 10 | 12 M | Aug 79 |
| FORTRAN FAILS TO COMPILE DO-LOOPS - PATCH 11 | 13 M | Aug 79 |
| CALL CLOSE (FORTRAN LIBRARY SUBROUTINE) - PATCH 12 | 14 M | Aug 79 |
| UNFORMATTED BYTE I/O - PATCH 13 | 15 F | Aug 79 |
| LIST DIRECTED INPUT ERRORS - PATCH 14 | 16 M | Aug 79 |
| DISP='DELETE' OPTION - PATCH 15 | 17 M | Aug 79 |
| FORMATTED RECORD OUTPUT - PATCH 16 | 18 M | Aug 79 |
| COMMON SUBEXPRESSION OPTIMIZATION - PATCH 17 | 19 M | Aug 79 |
| CALL ASSIGN CARRIAGE CONTROL - PATCH 18 | 20 M | Aug 79 |
| NON-PLAS VIRTUAL ARRAY INITIALIZATION - PATCH 19 | 21 M | Aug 79 |
| BYTE COMPARISON AND COMMON SUBEXPRESSION OPTIMIZATION - PATCH 20 | 22 M | Aug 79 |
| DIRECT ACCESS READ - PATCH 21 | 23 M | Aug 79 |
| COMPLEX VARIABLE TO CONSTANT COMPARISON - PATCH 22 | 24 M | Aug 79 |

**GAMMA-11 F/B V2**

| | | |
|---|---|---|
| DATA ANALYSIS PROGRAM | 01 M | Feb 79 |
| STUDY PROGRAM DISPLAYS TOO MANY INDEX LINES PER PAGE | 02 M | Feb 77 |
| BASIC AND FOCAL | 03 M | Feb 77 |
| BACKGROUND PROGRAM CAN HANG THE FOREGROUND TERMINAL | 04 M | Feb 77 |
| CNTL/C UNDER SINGLE JOB MONITOR | 05 M | Feb 77 |
| CROSSHAIRS FAIL TO APPEAR IN SLICE | 06 M | Feb 77 |
| UNDOCUMENTED PROGRAMS | 07 N | Mar 77 |
| FORTRAN SUPPORT INCORRECTLY CONVERTS DATA AND TIME OF INQUISITION | 08 M | May 77 |
| "RS" COMMAND IS INCORRECTLY | 09 N | Jun 77 |

**GAMMA-11 F/B V2C**

| | | |
|---|---|---|
| GATED LIST MODE IMAGES | 01 O | Sep 78 |
| TU16 SUPPORT | 02 M | Sep 78 |
| PROBLEMS WITH PLAYBACK BUFFER COMMENTS AND FLOOD CORRECTIONS | 03 M | Oct 78 |
| STATIC FOREGROUND ACQUISITION FAILS ON RK06 OR RL01 SYSTEMS | 04 M | Oct 78 |
| DYNAMIC CURVE CALCULATIONS MAY FAIL | 05 M | Dec 79 |
| RK06, 7 AND RL01 FOREGROUND ACQUISITIONS PROBLEMS | 06 M | Dec 78 |
| PROBLEMS WITH FLOOD CORRECTIONS | 07 M | Dec 78 |
| PROBLEMS WITH REGION OF INTEREST | 08 M | Dec 78 |
| KW11-P REAL-TIME CLOCK INCORRECTLY INITIALIZED | 09 M | Dec 78 |
| GAMMA-11 V2C NCV11 REAL-TIME CLOCK CAN BE DISABLED | 10 M | Dec 78 |
| KW11-P REAL-TIME CLOCK RUNS TOO FAST DURING GSA STUDIES | 11 M | Dec 78 |
| BUILDING AN RL01 GAMMA-11 V2C SYSTEM | 12 M | Dec 78 |
| PREDEFINED GATED LIST MODE STUDIES | 13 M | Dec 78 |
| GATED LIST MODE DATA ACQUISITION SET-UP | 14 M | Dec 78 |
| PROBLEMS WITH MAGTAPE DISTRIBUTION | 15 N | Dec 78 |
| SUBROUTINE 'GMXG' GENERATES ILLEGAL ADDRESS MESSAGE | 16 F | Jul 79 |
| FGAMMA/BGAMMA RACE CONDITION | 17 M | Feb 79 |
| DELAYED START LIST MODE STUDIES | 18 M | Feb 79 |
| FORMATTING GATED LIST MODE STUDIES | 19 M | Feb 79 |
| SLICE PROBLEMS | 20 M | Feb 79 |
| DOUBLE INTERPOLATION OF 64 X 64 MATRIX DATA | 21 M | Feb 79 |
| GAMMA-11 AND RT-11 DATE ROLLOVER | 22 M | Feb 79 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| PROBLEMS WITH PATIENT MONITOR AND GSA ADMIN BLOCKS | 23 M | Feb 79 |
| FOREGROUND GATED LIST MODE STUDIES FAIL | 24 M | Feb 79 |
| NCV11 JOYSTICK AND LIST MODE PROBLEMS | 25 M | May 79 |
| SYSTEM SUMMARY FOR RK07 DISKS | 26 O | May 79 |
| MORE PROBLEMS WITH FLOOD CORRECTION | 27 M | May 79 |
| TWO MINOR PROBLEMS WITH PLAYBACK BUFFERS | 28 M | May 79 |
| TRANSFER STUDY CAN CORRUPT A DISK DIRECTORY | 29 M | May 79 |
| FOUR FRAME MINIMUM FOR GSA STUDIES | 30 M | May 79 |
| GAMMA-11/BASIC PATCHES | 31 M | May 79 |
| CONTINUE ANALYSIS CA) OCCASIONALLY FAILS | 32 M | May 79 |
| ASCII STRING VARIABLE TABLE (FORTRAN AND BASIC) -- SUBROUTINE GPAR AND GPAW -- | 33 M | Jul 79 |
| GAMMA-11 SYSTEMS WITH RK07 AS A DEVICE | 34 M | Sep 79 |
| INVOKING AN RT-11 INDIRECT COMMAND FILE FROM GAMMA-11 | 35 O | Oct 79 |
| PROBLEM WITH ABORTING GAMMA-11 | 36 M | Oct 79 |
| PROBLEMS WITH FORTRAN SUBROUTINES 'GPFR' AND 'GPFW' | 37 F | Nov 79 |
| PROBLEMS WITH THE SAME COMMAND (S) IN RI | 38 M | Nov 79 |
| **GAMMA-11 F/B V2.4** | | |
| CONTINUE ANALYSIS (CA) OCCASIONALLY FAILS | 01 M | Oct 79 |
| GAMMA-11 SYSTEMS WITH RK07 DISKS AS A DEVICE | 02 M | Jan 80 |
| PROBLEM WITH ABORTING GAMMA-11 | 03 M | Oct 79 |
| PROBLEMS WITH FOUR BIT MAP ANALYSIS COMMANDS | 04 M | Oct 79 |
| PROBLEMS WITH FORTRAN SUBROUTINES 'GPFR' AND GPFW' | 05 F | Jan 80 |
| PROBLEMS WITH DATA ANALYSIS | 06 M | Jan 80 |
| PROBLEMS WITH DYNAMIC ACQUISTION ON RK05 GAMMA-11 | 07 M | Nov 79 |
| PROBLEMS WITH DATA ACQUISTION | 08 M | Nov 79 |
| TRANSFER STUDIES WITH MAGTAPE PROBLEM | 09 M | Nov 79 |
| **LABORATORY APPLICATIONS-11 V3** | | |
| A NEW MODULE TO ENHANCE DATA FLOW WITHIN LA-11 | 01 N | Oct 76 |
| **HISTO.MAC** | | |
| ACQUIRING AND PROCESSING HISTOGRAM DATA | 01 M | Sep 76 |
| **LABMAC.SML** | | |
| ERRONEOUS MACRO | 01 M | Sep 77 |
| INCLUDING LABMAC.SML IN SYSMAC.SML | 02 M | Mar 79 |
| **PEAK.MAC** | | |
| WIDE PEAKS | 01 M | Mar 76 |
| PEAK PROBLEMS AND CORRECTIONS | 02 M | Jul 76 |
| ARITHMETIC CORRECTION FOR PEAK AREA | 03 M | Dec 76 |
| MISSING PATCH IN RELEASE NOTES | 04 M | Oct 77 |
| **SPARTA** | | |
| LPS AND AR-11 VECTOR AND STATUS REGISTER | 01 N | Dec 75 |
| USING SPARTA AND FLOATING POINT BUFFERS | 02 N | Feb 76 |
| AR-11 TIMING PROBLEMS WITH ADSAM AND SPARTA | 03 O | Feb 76 |
| FFT SCALING CORRECTION | 04 M | Feb 76 |
| SCALE FACTOR CORRECTION FOR SPARTA COMMANDS FAC AND FCC | 05 M | Mar 76 |
| DATA DISPLAYS USING LA-11 | 06 N | Mar 76 |
| DATA PREPARATION FOR SPARTA COMMANDS FAC AND FCC | 07 N | Apr 76 |
| SPARTA CORRECTIONS FOR POINT-PLOT DISPLAY | 08 M | Apr 76 |
| ADDING COMMANDS TO SPARTA | 09 M | May 76 |
| CORRECTION FOR THE DPV COMMAND WITH POINT PLOT DISPLAY | 10 M | Jun 76 |
| GENERAL SUBROUTINE MODULE FOR EAE | 11 O | Jun 76 |
| INCORRECT PHASE ANGLE CALCULATION | 12 M | Oct 76 |
| "MOU" AND "MIN" COMMANDS CAN BE READ OUT AND IN CORRECTLY | 13 N | Jan 77 |
| MULTIPLE SYNCH PULSES | 14 M | Jan 77 |
| AUTO AND CROSS CORRELATION | 15 M | Jan 77 |
| ALLOCATING MORE THAN 16K BUFFERS IN SPARTA | 16 M | Feb 77 |
| A/D SAMPLING: FAST MODE | 17 M | Jul 77 |
| A/D SAMPLING: FAST MODE EXIT | 19 M | Mar 78 |
| SCALE FACTOR PRINT FOR THE FFT | 20 M | Jan 79 |
| **SWEEP.MAC** | | |
| SWEEP SAMPLING: FAST MODE | 01 M | Aug 77 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| **THRU** | | |
| HOW TO START DATA ACQUISITION WHEN CSTART EQUALS ZERO | 01 N | Jun 76 |
| MULTICHANNEL SINGLE RATE SCHMIT TRIGGER SWITCH BOUNCE | 02 M | Dec 76 |
| CONTINUOUS SAMPLING: CONDITIONAL ASSEMBLY ERRORS | 03 M | Jul 77 |
| CONTINUOUS SAMPLING: DMA WITH DUAL SAMPLE + HOLD | 04 M | Jul 77 |
| DOCUMENTATION CORRECTIONS | 05 M | Nov 77 |
| **LSP-11 V1** | | |
| PATCH NO. 1 - GENERAL CORRECTIONS NO. 1 | 01 M | Jun 79 |
| PATCH NO. 2 - PEAK CORRECTION NO. 1 | 02 M | Jun 79 |
| PATCH NO. 3 - PEAK CORRECTION NO. 2 | 03 M | Jun 79 |
| **LV11/RT-11 PLOTTING PACKAGE V2** | | |
| SUBROUTINE PLOT DOES NOT CORRECTLY REPRODUCT VT11 PICTURE | 01 M | Apr 78 |
| **MSB-11 V1.0** | | |
| MSB-11 SOFTWARE ON THE PDP-11/03 | 01 M | Jul 79 |
| **MU BASIC/RT-11 V1** | | |
| BUILDING MU BASIC/RT-11 UNDER RT-11 V2C | 01 | Feb 76 |
| REMOTE TERMINAL SUPPORT ON MODEMS | 02 | May 76 |
| OVERLAY... LINE WORKS INCORRECTLY | 03 | May 76 |
| USING IMMEDIATE MODE "GOSUBs" | 04 | Dec 76 |
| CLOCK LOSES TIME ON RT-11 WHEN RUNNING MU BASIC | 05 | Jul 77 |
| REM STATEMENTS | 06 | Feb 78 |
| ADDITIONAL FILES ON RELEASE KIT (MUB*.*) | 07 N | May 78 |
| **MU BASIC/RT-11 SYSTEM INSTALLATION GUIDE** | | |
| REPLACEMENT PAGES | 01 | Jan 77 |
| REPLACEMENT PAGES | 02 N | Jan 78 |
| REPLACEMENT PAGES | 03 N | Jan 78 |
| **MU BASIC-11/RT-11 V2** | | |
| MU BASIC-11/RT-11 V2 CONVERSION PROGRAM | 01 R | Nov 78 |
| OPERATION OF CTRL/C, RCTRLC AND SYS (6) FUNCTIONS AND THE CTRL/C COMMAND | 02 N | Nov 78 |
| MEMORY REQUIREMENTS OF OPTIONAL FUNCTIONS ETC. | 03 O | Nov 78 |
| MU BASIC-11/RT-11 V2 RELEASE NOTES AND INSTALLATION GUIDE CHANGES | 04 N | Dec 78 |
| ORDER OF COMMON STATEMENTS AT START OF MUCNFG.B00, MUCNF1.B00, MUCNF2.B00 | 05 M | Dec 78 |
| OPERATION OF OLD, RUN, CHAIN AND OVERLAY WHEN THE SPECIFIED FILE IS NOT FOUND | 06 N | Feb 79 |
| CREATING AND ACCESSING VIRTUAL ARRAY FILES | 07 N | Feb 79 |
| STORAGE OF THE NULL CHARACTER IN STRING VARIABLES AND VIRTUAL STRING ARRAYS | 08 N | Feb 79 |
| USE OF COMPILE COMMAND | 09 N | Feb 79 |
| MU BASIC-11/RT-11 V2 CONFIGURATION PROGRAM PATCH 1 | 10 O | Feb 79 |
| CHAINING WITH COMMON -PATCH A | 11 M | Feb 79 |
| VIRTUAL FILE I/O - PATCH B | 12 M | Feb 79 |
| SYS (1,n) FUNCTION - PATCH C | 13 M | Feb 79 |
| RESEQ - PATCH D | 14 M | Feb 79 |
| VALUES IN PATCHES A, B, C | 15 N | Feb 79 |
| LISTNH /OLD - PATCH E | 16 M | Mar 79 |
| CALL - PATCH F | 17 M | Mar 79 |
| MU BASIC-11 DEVICE INDEPENDENCE FOR INIT.B00 - SPECIIAL PATCH YY1 | 18 M | May 79 |
| DOUBLE PRECISION INTEGER VARIABLES - PATCH G | 19 M | May 79 |
| INPUT #/PRINT # - PATCH H | 20 M | May 79 |
| OLD OF A ZERO BLOCK FILE - PATCH I | 21 M | May 79 |
| ADDITION TO PATCH B - PATCH J | 22 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 1 | 23 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 2 | 24 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 3 | 25 M | May 79 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 4a | 26 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 4b | 27 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 4c | 28 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 5 | 29 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 6 | 30 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 7 | 31 M | May 79 |
| MU BASIC-11/RT-11 V2 PERFORMANCE IMPROVEMENT PATCH NO. 8 | 32 M | May 79 |
| DEVICE MNEMONIC PROBLEM - PATCH K | 33 M | Jul 79 |
| CLOSE - PATCH L | 34 M | Jul 79 |
| REM STATEMENTS ON MULTI-STATEMENT LINES | 35 M | Jul 79 |
| DEASSIGNING A TERMINAL - PATCH N | 36 M | Jul 79 |
| OVERLAYING THE ERROR MESSAGE MODULE - SPECIAL PATCH WW1 | 37 M | Jul 79 |
| UNEQUAL USER PARTITION SIZE ALLOCATION - SPECIAL PATCH XX1 | 38 M | Jul 79 |
| HOW TO CHANGE INIT.BOO's DEVICE AFTER INSTALLING SPECIAL PATCH YY1 | 39 M | Jul 79 |
| INTEGERS IN DOUBLE PRECISION MU BASIC-11 | 40 M | Jul 79 |
| STRING MANIPULATION IN ASSEMBLY LANGUAGE ROUTINES | 41 N | Aug 79 |
| SIZING MU BASIC-11 | 42 N | Aug 79 |
| ERROR IN TABLE 4-1 OF THE USER'S GUIDE | 43 N | Aug 79 |
| RESTRICTION OF USR RESIDENCY WHEN RUNNING IN FOREGROUND | 44 N | Aug 79 |
| NOTES ON PERFORMANCE PATCHES NO. 4a, NO. 4b, NO. 4c | 45 N | Aug 79 |
| MAXIMUM ARRAY SUBSCRIPT SIZE | 46 N | Aug 79 |
| ASSEMBLING SOURCE FILES (SOURCE LICENSE HOLDERS ONLY) | 47 M | Sep 79 |
| USE OF SYS (1,n) FUNCTION WHEN ',n' IS OMITTED | 48 M | Sep 79 |
| DISABLING CR/LF USING TTYSET - PATCH P | 49 M | Dec 79 |
| HANDLER FETCH ERROR MAY LEAD TO MONITOR FAULT - PATCH Q | 50 M | Jan 80 |
| **PDL/RT-11 V1B** | | |
| CLARIFICATION OF SEARCH FAILURE IN SUBROUTINE FIND | 01 N | Jul 78 |
| FIND SUBROUTINE | 02 R | Jul 78 |
| PATCHES TO PDL | 03 M | Jul 78 |
| SUBROUTINE QKGT | 04 M | Jul 78 |
| PDL SUBROUTINE 'RDAA' | 05 M | Sep 78 |
| PDL PEAK ALGORITHM WILL NOT RECOGNIZE VALID PEAKS | 06 M | Sep 78 |
| **PEAK-11 V1** | | |
| "MREPRT" AND "REPRT" GET CONFUSED | 01 M | Aug 78 |
| **REMOTE/RT-11 V1** | | |
| SCHEDULER DOES NOT PROPERLY SET PROCESSOR PRIORITY | 01 M | May 76 |
| NOEDIT- 0 HALTS | 02 M | May 76 |
| NUSERS=1 STAYS IN A FILE MESSAGE LOOP | 03 M | May 76 |
| INCORRECT SWAP AREA ALLOCATION FOR FOUR OR MORE USERS | 04 M | May 76 |
| REBOOT FROM SATELLITE DURING EDIT HANGS HOST | 05 M | Jun 76 |
| HARD ERROR ON LOOKUP IS FATAL | 06 M | Jun 76 |
| SECONDARY MODE PROGRAM LOAD FEATURE NOT COMPLETELY FUNCTIONAL | 07 M | Jun 76 |
| ONE SECOND TIMER FOR LINE TIMEOUTS IS SET INCORRECTLY | 08 M | Aug 76 |
| LINE FEEDS MAY CAUSE SYSTEM ERRORS--ASSEMBLY ERROR WITH DIAL AND NODDC | 09 M | Aug 76 |
| PROPER GENERATION OF REMOTE IS DEPENDENT ON MODULE ORDER | 10 M | Aug 76 |
| ASCII CODES 173 AND 174 DO NOT PRINT | 11 M | Aug 76 |
| IMPROPER FILLER HANDLING FOR VT05 | 12 O | Aug 76 |
| SYSTEM CRASHES IF RUN IN FOREGROUND WITHOUT /N | 13 O | Aug 76 |
| "UNSAVE" COMMAND CAUSES SYSTEM ERRORS | 14 M | Dec 76 |
| FLET WILL REMOVE MORE THAN ONE USER FROM THE WAIT QUEUE | 15 M | Dec 76 |
| STACK FOR USER THREE IMPROPERLY SET | 16 O | Dec 76 |
| SECONDARY MODE LOADS DO NOT OPERATE PROPERLY | 17 M | Jan 77 |
| @START COMMAND GIVEN ON TERMINAL WITHOUT SATELLITE CAUSES CRASH | 18 O | Jan 77 |
| "RTSIM" DOES NOT SUPPORT 50 Hz LINE CLOCK | 19 O | Jan 77 |
| CHANNEL ACTIVE ERROR | 20 M | Mar 77 |
| THREE WORDS LOST ON DOWNLINE LOAD | 21 M | Mar 77 |
| CSISPC NOT PROPERLY SIMULATED | 22 M | May 77 |
| EXCEEDING CHARACTERS PER LINE LIMIT | 23 M | Oct 77 |
| UNASSIGNED | 24 | XXX XX |
| @RE IN THE SATELLITE DOES NOT WORK | 25 R | Mar 78 |
| "HANG" CONDITIONS | 26 R | Apr 78 |
| UANSSIGNED | 27 | XXX XX |

| Component | Sequence | Mon/Yr |
|---|---|---|
| USING KG-11 CRC CALCULATOR | 28 M | Aug 78 |
| PASTE CAUSES LINE DUPLICATION | 29 M | Aug 78 |
| "DAISY CHAIN" ARRANGEMENT IN RTSIM.MAC | 30 M | Aug 78 |
| OPTIONAL RMON IS OMITTED FROM RTS1M BY DEFINING NORMON=0 | 31 M | Oct 78 |
| DL-11 ERROR AND CRC ERROR IN HOST | 32 M | Oct 78 |

## RT-11 V3

**DOCUMENTATION**

| | | |
|---|---|---|
| TYPOGRAPHICAL ERRORS | 01 N | Mar 78 |
| ERROR IN FOREGROUND/BACKGROUND DEMONSTRATION | 02 M | Aug 78 |
| THE /LIST OPTION FOR THE DIBOL, FORTRAN, AND MACRO KEYBOARD MONITOR COMMANDS | 03 M | Nov 78 |

**EDIT**

| | | |
|---|---|---|
| EDIT DOES NOT OPERATE CORRECTLY UNDER XM MONITOR | 01 M | Mar 78 |

**MACRO**

| | | |
|---|---|---|
| .NARG FAILS WHEN AUTOMATIC LABEL GENERATION IS USED | 01 M | Apr 78 |

**MISCELLANEOUS**

| | | |
|---|---|---|
| GETSTR AND PUTSTR ROUTINES FOR IN-LINE CODE | 01 M | Jun 78 |
| ERROR IN THE CONCAT ROUTINE | 02 M | Jun 78 |
| ERROR IN MTATCH ROUTINE | 03 M | Nov 78 |
| ODD RING BUFFER SIZES CAUSE ASSEMBLY ERRORS | 04 R | Jun 79 |

**MONITOR**

| | | |
|---|---|---|
| INCORRECT IDENTIFIER IN .TWAIT REQUEST CAUSES PROBLEMS | 01 M | Mar 78 |
| .CHAIN, .EXIT FROM VIRTUAL JOB; USR MOVING INTO PAR1 AREA | 02 M | Apr 78 |
| PATCH TO INTERRUPT EXIT ROUTINE | 03 M | Apr 78 |
| IMPROPER HANDLING OF THE KW11-P CLOCK | 04 M | May 78 |
| SPECIFYING 50-CYCLE CLOCK SUPPORT DURING SYSGEN OPERATIONS | 05 M | Jun 78 |
| EDITORS AND V3B MONITORS | 06 M | Jun 78 |
| TYPING NON-ASCII FILES TO CONSOLE AFTER ISSUING A GTON HANGS THE SYSTEM | 07 M | Jun 78 |
| LINK/FRUN FAILS WHEN PROGRAM IS OVERLAYED AND USES LIBRARIES | 08 M | Jul 78 |
| MULTITERMINAL CORRECTIONS | 09 M | Aug 78 |
| PATCH TO XM ADDRESS CHECKING | 10 M | Aug 78 |
| FIXES FOR TWO FB/XM PROBLEMS | 11 M | Aug 78 |
| TERMINATING CONSOLE OUTPUT | 12 M | Aug 78 |
| ISSUING SEEKS TO DX HANDLER IN XM CAUSES RANDOM SYSTEM FAILURES | 13 M | Oct 78 |
| CERTAIN EXTENDED MEMORY REQUESTS CANNOT BE ISSUED FROM BOTH MAINLINE CODE AND COMPLETION ROUTINES | 14 M | Oct 78 |
| THE "RUN" AND "GET" MONITOR COMMANDS DO NOT CORRECTLY LOAD THE PORTION OF A PROGRAM THAT OVERLAYS KMON | 15 M | Oct 78 |
| DX SJ MONITOR BOOTSTRAP CORRECTIONS | 16 O | Oct 78 |
| TYPING CTRL/O TO THE CONSOLE TERMINAL SOMETIMES CRASHES | 17 M | Nov 78 |
| LINK CAUSES ODD MONITOR ADDRESS TRAP | 18 M | Nov 78 |
| CHAINING FROM A VIRTUAL JOB AND RELATED PROBLEMS | 19 M | Dec 78 |
| DIRECTORY CORRUPTION | 20 M | Dec 78 |
| FIXES FOR FB/XM PROBLEM IN V03.02 | 21 M | Apr 79 |
| CORRECTION TO "DIRECTORY CORRUPTION" PATCH | 22 M | May 79 |
| FLOPPY SYSGEN WITH KW11-P CLOCK | 23 M | May 79 |
| INPUT FILE LOST WHEN USING CSIGEN | 24 M | Jun 79 |

**SOURCES**

| | | |
|---|---|---|
| UNRESOLVED DIFFERENCES IN DEMOX1.MAC | 01 M | Aug 78 |
| DISTRIBUTED MAGTAPE HANDLER CORRECTIONS | 02 M | Sep 78 |
| MAGTAPE XM AND FSM CORRECTIONS | 03 M | May 79 |

**SYSTEM HANDLERS**

| | | |
|---|---|---|
| DM HANDLER CORRECTIONS | 01 M | Oct 78 |
| DM SYSTEM HANDLERS CORRECTIONS | 02 M | Dec 78 |
| DM HANDLER ERROR HANDLING CORRECTIONS | 03 M | Jan 79 |
| DM CTO AND SPFUN 376 CORRECTIONS | 04 M | May 79 |

**UTILITIES**

| | | |
|---|---|---|
| DUP DEFAULT FILE SIZE AND NULL FILE TYPES ARE INCORRECT | 01 M | Mar 78 |
| DIR MAY INCORRECTLY LIST DIRECTORIES OF MAGTAPES | 02 M | Mar 78 |
| /L OPTION TO PIP MAY CUASE SYSTEM CRASH | 03 M | Mar 78 |
| LINK OUTPUT INVALID IF OBJ HAS AN EMPTY GSD RECORD | 04 M | Mar 78 |
| PAT GIVES FATAL ERROR IF OBJ HAS AN EMPTY RECORD | 05 M | Apr 78 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| UNASSIGNED | 06 | XXX XX |
| EDIT VT11 DISPLAY FUNCTIONS WILL NOT OPERATE UNDER XM MONITOR | 07 M/R | Apr 78 |
| TRANSFERS IN INTERCHANGE FORMAT WHEN NO SYSTEM DATE IS GIVEN | 08 M | Jun 78 |
| DUP SCAN RATE FOR FLOPPY | 09 M | Jun 78 |
| DUP /I AND /W SWITCHES DO NOT WORK PROPERLY | 10 M | Jun 78 |
| LINK/FRUN FAILS WHEN PROGRAM IS OVERLAYED AND USES LIBRARIES | 11 M | Jul 78 |
| DUP DOES NOT DIFFERENTIATE BETWEEN DELETED .BAD FILES AND PERMANENT ONES | 12 M | Jul 78 |
| ERRORS IN FILEX INTERCHANGE FORMAT | 13 M | Jul 78 |
| LINK PRODUCES INCORRECT .LDA FILES | 14 M | Sep 78 |
| DUP DOES NOT DETECT END OF SEGMENT IF IT IS FIRST ENTRY IN A DIRECTORY SEGMENT DURING A SQUEEZE OPERATION | 15 M | Oct 78 |
| LIBR CLEARING OF LOCATION ZERO | 16 M | Oct 78 |
| LINK ERROR IN PSECTS MOVED TO ROOT | 17 M | Oct 78 |
| PIP ERRONEOUSLY DELETES FILES | 18 M | Oct 78 |
| LIBR BLOCK BOUNDARY PROBLEM | 19 M | Dec 78 |
| LINK CAN CAUSE TRAP TO 4 | 20 M | Feb 79 |
| CORRECTIONS TO FILEX | 21 M | May 79 |
| DIR CORRECTIONS | 22 M | Nov 79 |
| BAD BLOCK REPLACEMENT ON RK06s | 23 N | Oct 79 |
| WILD CARD MAGTAPE COPY ERROR PROCESSING CORRECTION | 24 M | Oct 79 |

## RT-11 V3B

**DOCUMENTATION**

| | | |
|---|---|---|
| ERROR IN FOREGROUND/BACKGROUND DEMONSTRATION | 01 M | Aug 78 |
| THE /LIST OPTION FOR THE DIBOL, FORTRAN, AND MACRO KEYBOARD MONITOR COMMANDS | 02 M | Nov 78 |
| UPDATE PAGES | 03 N | Dec 78 |
| RT-11 SOFTWARE SUPPORT DOCUMENTATION | 04 M | Feb 79 |
| SUMMARY OF UPDATES FOR RT-11 V03B DOCUMENTATION | 05 M | Feb 79 |
| NEW DEVICE RELEASE DOCUMENTATION, RT-11 V03B | 06 N | Jun 79 |
| .FORK AND .SYNCH BLOCK DOCUMENTATION | 07 N | Jul 79 |
| THE DEVICE TIME-OUT FEATURE | 08 N | Sep 79 |
| CORRECTION OF ERROR RETURNS IN .SYNCH CALL | 09 M | Aug 79 |
| EXAMPLE CODE IN .FORK DOCUMENTATION IS INCORRECT | 10 N | Aug 79 |
| EXTENDED MEMORY RESTRICTIONS | 11 N | Dec 79 |
| NOTES ON .MFPS/ .MTPS PROGRAMMED REQUEST | 12 N | Apr 80 |

**MISCELLANEOUS**

| | | |
|---|---|---|
| ERRORS IN THE SYSGEN CONDITIONAL FILE | 01 M | Jul 78 |
| ERRORS IN MTATCH ROUTINE | 02 M | Nov 78 |
| ODD RING BUFFER SIZES-CAUSE ASSEMBLY ERRORS | 03 R | Jun 79 |
| INCORRECT NULL HANDLER DEVICE IDENTIFIER | 04 M | Jun 79 |
| GENERATING A SINGLE JOB MONITOR MAY CAUSE AN UNDEFINED GLOBAL | 05 M | Aug 79 |
| INCORRECT DEVICE IDENTIFIER FOR PC11 | 06 M | Sep 79 |
| ERROR IN MTIN AND MTOUT ROUTINES | 07 M | Sep 79 |
| HIGH SPEED RING BUFFER PROBLEM ON SYSTEMS WITH ONE DL11 | 08 M | Jan 80 |
| SYSGEN FOR TU58 SUPPORT | 09 F | May 80 |
| DEVICE TIME-OUT SUPPORT IN SYSGEN | 10 F | May 80 |

**MONITOR**

| | | |
|---|---|---|
| SOURCE PATCHING PROCEDURES FOR V3B | 01 M | Aug 78 |
| MULTITERMINAL CORRECTIONS | 02 M | Aug 78 |
| SINGLE JOB TIMER SUPPORT CORRECTIONS | 03 M | Aug 78 |
| FIXES FOR TWO FB/XM PROBLEMS IN VP3B | 04 M | Aug 78 |
| TERMINATING CONSOLE OUTPUT | 05 M | Aug 78 |
| EDITORS AND V03B MONITORS | 06 O | Aug 78 |
| SEEK IN RK DRIVER | 07 M | Aug 78 |
| RL01 CONTROLLER VECTOR AT 160 | 08 M | Aug 78 |
| FPU EXCEPTION HANDLING IN XM MONITOR | 09 M | Sep 78 |
| TWO EXTENDED MEMORY MONITOR PROBLEMS | 10 M | Oct 78 |
| TYPING CTRL/O TO THE CONSOLE TERMINAL SOMETIMES CRASHES RT-11 | 11 M | Oct 78 |
| DX SJ MONITOR BOOTSTRAP CORRECTIONS | 12 O | Oct 78 |
| THE EDIT AND HELP MONITOR COMMANDS FAIL AFTER A VIRTUAL JOB HAS RUN | 13 M | Nov 78 |
| DIRECTORY CORRUPTION AND .UNPROTECT CORRECTIONS | 14 M | Jan 79 |
| FB AND XM MONITOR CLOCK SUPPORT | 15 M | Apr 79 |
| CHANGING CLOCK RATE ON GENERATED MONITORS | 16 M | Apr 79 |
| MULTI-TERMINAL CORRECTIONS TO DECREASE INTERRUPT LATENCY | 17 M | Apr 79 |
| FIXES FOR FB/XM PROBLEM IN V03B.00 | 18 M | Apr 79 |
| FLOPPY SYSGEN WITH KW11-P CLOCK | 19 M | May 79 |
| DISTRIBUTED FB MONITOR CLOCK SUPPORT | 20 M | May 79 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| OPTIONAL PATCH TO IMPROVE PERFORMANCE ON PDP-11/03 SYSTEMS | 21 O | May 79 |
| DISTRIBUTED PD AND DD FB MONITORS CLOCK SUPPORT | 22 M | May 79 |
| OPTIONAL PATCH TO IMPROVE PERFORMANCE ON PDP-11/03 AND PDT SYSTEMS FOR DD AND PD FB MONITORS | 23 O | May 79 |
| INPUT FILE LOST WHEN USING CSIGEN | 24 M | Jun 79 |
| NON-STANDARD VECTOR ADDRESSES FOR RX01 AND RX02 SECOND CONTROLLER | 25 M | Nov 79 |
| ABORT DURING COMPLETION CAUSES SYSTEM FAILURES | 26 M | Nov 79 |
| .ELRG CAN CAUSE THE SYSTEM TO CRASH | 27 M | Sep 79 |
| CORRECTION TO BOOTSTRAP TO RECOGNIZE LSI-11/23 PROCESSOR | 28 M | Oct 79 |
| FPU SAVE AREA IN XM MONITOR | 29 M | Dec 79 |
| BACKGROUND JOB MAY TRAP WHEN FOREGROUND ISSUES .SYNCH FROM INTERRUPT ROUTINE | 30 M | Dec 79 |
| PROBLEM WHEN FOREGROUND AND BACKGROUND JOB USE CSI AT SAME TIME | 31 M | Mar 80 |
| SYSTEM GENERATED SJ MONITOR WITH ESCAPE SEQUENCE SUPPORT | 32 M | Apr 80 |
| BREAKPOINT TRAP PROCESSOR STATUS WORD CORRUPTION | 33 M | Apr 80 |
| CORRECTIONS TO MULTI-TERMINAL SUPPORT | 34 M | May 80 |
| **SOURCES** | | |
| UNRESOLVED DIFFERENCES IN DEMOX1.MAC | 01 M | Jul 78 |
| ISSUING SEEKS TO DX HANDLER IN XM CAUSES RANDOM SYSTEM FAILURES | 02 M | Sep 78 |
| DISTRIBUTED MAGTAPE HANDLER CORRECTIONS | 03 M | Sep 78 |
| DY HANDLER DOUBLE DENSITY ONLY SUPPORT | 04 M | Apr 79 |
| DL QUEUE ELEMENT AND XM ZERO FILL CORRECTIONS | 05 M | Apr 79 |
| MAGTAPE XM AND FSM CORRECTIONS | 06 M | May 79 |
| DL HANDLER SEEK AND UNIT CORRECTIONS | 07 M | Aug 79 |
| MAGTAPE ABORT ENTRY CORRECTION | 08 M | Sep 79 |
| MAGTAPE ABORT ENTRY CORRECTION IN XM | 09 M | Dec 79 |
| DL HANDLER SEEK CORRECTION | 10 M | Jan 80 |
| FILE SEQUENCE NUMBER SEARCH CORRECTION | 11 M | Feb 80 |
| HARD ERROR RECOVERY IN DM HANDLER | 12 M | Mar 80 |
| FSM DOES NOT PROCESS ERRORS CORRECTLY IN XM | 13 M | Apr 80 |
| RL01/RL02 HANDLER CORRECTIONS | 14 M | Apr 80 |
| MULTI-CONTROLLER DY HANDLER PROBLEM | 15 M | May 80 |
| SHORT MAGTAPE READS IN XM | 16 M | Jun 80 |
| MM HANDLER WRITELOCK ERRORS | 17 M | Jun 80 |
| **SYSTEM HANDLERS** | | |
| RL01 HANDLER CORRECTIONS | 01 M | Sep 78 |
| ISSUING A SEEK TO THE DY HANDLER CAUSES THE SYSTEM TO CRASH | 02 M | Oct 78 |
| DM HANDLER CORRECTIONS | 03 M | Oct 78 |
| DM SYSTEM HANDLERS CORRECTIONS | 04 M | Dec 78 |
| DY HANDLER SPFUN CORRECTION | 05 M | Dec 78 |
| DM HANDLER ERROR HANDLING CORRECTIONS | 06 M | Jan 79 |
| RL01 PATCH CLARIFICATION | 07 N | Jan 79 |
| DM CTO AND SPFUN 376 CORRECTIONS | 08 M | May 79 |
| BATCH INCORRECTLY LOGS TERMINAL OUTPUT | 09 M | Apr 80 |
| IMPROPERLY CHECKED INPUT CAUSES UNPREDICTABLE RESULTS | 10 M | Apr 80 |
| **UTILITIES** | | |
| ERRORS IN FILEX INTERCHANGE FORMAT | 01 M | Jul 78 |
| LINK PRODUCES INCORRECT .LDA FILES | 02 M | Sep 78 |
| LIBR CLEARING OF LOCATION ZERO | 03 M | Oct 78 |
| LINK ERROR IN PSECTS MOVED TO ROOT | 04 M | Oct 78 |
| DUP DOES NOT DETECT END OF SEGMENT | 05 M | Oct 78 |
| COPY/DEVICE FAILS ON DISK TO MAGTAPE | 06 M | Oct 78 |
| LINK CAUSES MONITOR ODD ADDRESS TRAP | 07 M | Nov 78 |
| LIBR BLOCK BOUNDARY PROBLEM | 08 M | Jan 79 |
| EDIT ESCAPE CODE CORRECTION | 09 O | Dec 78 |
| ERROR IN ODT | 10 M | Feb 79 |
| ERROR IN EDIT | 11 M | Feb 79 |
| LINK CAN CAUSE TRAP TO 4 | 12 M | Feb 79 |
| CORRECTIONS AND ADDITIONS TO FILEX | 13 M | May 79 |
| RESORC DISPLAYS STATUS OF FIRST 14 TERMINALS | 15 M | Jun 79 |
| LIBR /U SWITCH PROBLEM | 16 M | Aug 79 |
| IMPORTANT RESTRICTIONS FOR SQUEEZE OPERATIONS | 17 M | Aug 79 |
| DIR PROBLEMS | 18 M | Oct 79 |
| BAD BLOCK REPLACEMENT ON RK06s | 19 N | Oct 79 |
| WILD CARD MAGTAPE COPY ERROR PROCESSING CORRECTION | 20 M | Oct 79 |
| PROBLEM WITH PSECTS MOVED TO ROOT DURING LIBRARY PASS | 21 M | Jan 80 |
| PIP PROBLEMS | 22 M | Feb 80 |
| DIR PROBLEM | 23 M | Feb 80 |
| DUMPING DISK FILES WITH MAGTAPE HANDLER LOADED | 24 M | Mar 80 |
| BAD BLOCK REPLACEMENT ON RL01s | 25 M | Apr 80 |

| Component | Sequence | Mon/Yr |
|---|---|---|
| MDUP AND RL01s | 26 M | Apr 80 |
| CORRECTION TO PDT-11/150 SUPPORT IN FILEX | 27 M | Apr 80 |
| PROBLEM WITH DUP ERRORS WHEN /W OPTION USED | 28 M | Apr 80 |
| INSUFFICIENT DIRECTORY SPACE ON NON-SYSTEM FLOPPY | 29 M | Apr 80 |
| EDITING FILES ON WRITE-LOCKED DEVICES | 30 M | May 80 |
| BAD BLOCK SCAN FOR LARGE DEVICES | 31 M | May 80 |
| SAVE/RESTORE OF TERMINAL I/O LOGGING ACTION IN BATCH | 32 M | Jun 80 |
| CORRECTION TO PREVIOUS DIR PATCH | 33 M | Jun 80 |

**RT-11/2780 V2**

| | | |
|---|---|---|
| CORRECTIONS TO 2780 PACKAGE | 01 | Sep 77 |
| RUNNING 2780 ON RT-11 V3 | 02 | Nov 77 |
| PATCHING THE 2780 IN RT-11 V3 | 03 M | Jan 79 |
| CHECK FOR ZERO LENGTH RECORD | 04 M | Jan 79 |
| RESTRICTION OF THE CONSOLE AS AN INPUT/OUTPUT DEVICE | 05 R | Jan 79 |

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# Software Product Description

**PRODUCT NAME: RT-11, Version 4.0**
**Single-User Operating System**

**SPD 12.1.14**

**DESCRIPTION:**

RT-11 is a disk-based, single-user, real-time operating system designed for interactive program development and/or on-line applications on some PDP-11 and PDT-11 based systems. 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, 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 design.

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, that operates whenever the foreground program cannot run. Within their priorities, both foreground and background are fully functional RT-11 programs with access to system capabilities. Although they operate independently, foreground and background can communicate through disk files and/or the message transmission facility.

*The XM monitor* — The XM (Extended Memory) monitor is a version of the FB monitor for supporting systems with greater than 64K bytes of memory. A system generation must be performed for XM support. This feature is accessible through those optional high-level language processors that can automatically produce programs that address areas of memory other than the lowest 64K bytes. The MACRO-11 programmer can also take advantage of this feature for storing data and instructions above the lowest 64K bytes of memory. A linker option allows FORTRAN IV and MACRO-11 programmers to load overlays in extended memory for fast access.

*The SJ monitor* — is for users not requiring FB operation or the additional FB features. SJ requires less memory and has 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 without 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 command. Indirect command files allow command sequences to be stored and invoked repeatedly by the user.

*Contiguous File Structure* — The RT-11 contiguous file structure for random-access devices 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 satisfies a wide variety of input/output requirements by providing three modes of I/O operation:

- Synchronous I/O, where user program processing is suspended until the completion of the I/O event.
- Asynchronous I/O, where an I/O event is started, and user program 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 user program 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 6K 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 5K bytes to this requirement. Options selected through system generation can increase memory requirements.

RT-11's modular structure enables some monitor components to be swapped in as needed, However, if the program's memory requirements allow it, the complete monitor stays resident in memory to increase system responsiveness.

*Ease of Expansion* — The RT-11 system supports a 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 and storing it as a file on the system device.

When a new peripheral handler is added to an RT-11 system, 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 a subset of ANSI-compatible labels and fixed-length unformatted blocks.

*Indirect Command Files* — A set of system commands can be stored in an indirect command file that 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 jobs or other user jobs to run in the foreground. RT-11 BATCH can be used in either SJ monitor configurations of 32K or more bytes of memory, or in any FB or XM configuration.

*SYSLIB* — RT-11 provides access to system services directly from a FORTRAN program. (FORTRAN IV is available under separate license.) Routines are provided to perform direct 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 one to sixteen terminals (four maximum on PDT-11), in addition to the console terminal. These terminals can be addressed by specially written programs (or by optional software), and can be interfaced by up to eight DL11s, one or two DZ11s (one DZ11-E is two DZ11s), up to eight DLV11s, one or two DLV11-Js, or up to four DZV11s. A terminal on a local DL (DLV) interface must be connected to the hardware console interface (vectors 60, 64) at bootstrap time. There can only be one "command console terminal" per system at any time. Originally the command console is the terminal that is connected to the hardware console interface, but it can be reassigned to any other local terminal through a simple keyboard command. The foreground job can communicate with a private console terminal, one other than the command console always used by the background job. Multiterminal support is available with the RT-11 SJ, FB, or XM monitors. The multiterminal support allows dial-up remote users to be connected via Bell 103-type modems. RT-11 does not support leased lines. A system generation must be performed for RT-11 multiterminal support.

*System Generation* — RT-11 is shipped already generated and ready to use. Users can do their own system generation. This is desirable for users who require special features (such as error logging, extended memory support, device time-out support, or multiterminal support), or a system highly optimized for their application. A minimum of 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 highly recommended that a user have at least 56K bytes of memory and an RK05 disk or larger to do a system generation. Diskette system generation also requires a hard copy terminal or a line printer and must be done via the procedure described in the *RT-11 Installation and System Generation Guide*. System generation is not supported on TU58 DECtape II or on the PDT-11/130. System generation on the PDT-11/150 series requires a dual floppy system, 60K bytes of memory, and a hard copy terminal or line printer.

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 are included, along with provisions for command interaction, editing macros, and file manipulation.

*KED and K52* — The RT-11 keypad editors are designed for use on VT100, VT52, VT55, and VT105 video terminals. KED and K52 use the additional function keypad keys on those terminals to allow a user to position a visible cursor anywhere in a text file and to make changes and insertions easily.

*MACRO-11* — MACRO-11 provides macro assembly language programming under RT-11. It has the facilities for using macro libraries, 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.

*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, resolving external 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. Ease of use of the overlay structure is of primary importance, but the power of the overlay system has not been compromised. The system allows multiple overlays in up to seven memory regions, subject only to the memory size. Under the XM monitor, the linker allows overlays to be loaded into extended memory at run-time and executed directly from that memory.

*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, protect, and delete files.

*RESOURCE* — The RT-11 resource program (RESORC) 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.

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

*DIRECTORY* — 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, date, 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. BINCOM is a binary file comparison program that helps locate the changes made in binary files. FILEX allows transfer of RT-11 files to and from some other operating system environments. FORMAT allows the user to format RK05, RK06, and RK07 disks, and RX02 diskettes. FORMAT also provides disk verification by writing patterns and reading them on each block of the volume.

*SYSTEM JOBS* — The FB monitor can optionally support up to six extra jobs, called system jobs. These system jobs are programs supplied by DIGITAL and run in parallel with the user-written foreground and background jobs. System job support is available only through system generation. DIGITAL does not support user-written system jobs.

Two RT-11 utilities (Error Logger and Queue Package) can run as system jobs (in addition to the background and foreground jobs) if system job support is enabled through the system generation process. The system job feature is available to the FB and XM monitors only. Both utilities also run as simple foreground jobs.

The Error Logger keeps statistics on successful and unsuccessful transfers for random access devices. System generation must be performed for error logging support.

The Queue Package sends files to any valid RT-11 device; it is particularly useful for queuing files for subsequent printing. If run as a simple foreground job, the Queue Package does not require system generation.

*DEBUGGING AND PATCHING* — RT-11 provides several utilities to aid users in finding, diagnosing, and correcting programming errors.

- ODT — The on-line debugging technique utility aids in interactive program debugging.
- VDT — The virtual debugging technique utility aids in the interactive debugging of extended memory programs and multiterminal applications.
- PATCH — The PATCH program performs minor modifications to memory image files that are output by the pre-RT-11 Version 4.0 linkers. PATCH cannot be used to modify files linked with the RT-11 Version 4.0 linker.
- SIPP — The save image patch program can be used to patch files that were linked with the RT-11 Version 4.0 linker (and also some files linked with the Versions 03 and 03B linkers).
- PAT — The object module patch program performs minor modifications to files in object format.
- SLP — The source file patch program provides an easy way to make changes to source files.

**MINIMUM HARDWARE REQUIRED:**

A minimum RT-11 system must include the following:

- Processor: PDP-11 or LSI-11 or PDT-11 processor (see Table I for specific CPUs supported).
- Memory: At least 24K bytes of memory for SJ or at least 32K bytes of memory for FB or greater than 64K bytes for XM. At least 32K bytes of memory are required to perform a system generation.
- Console terminal: LA30, LA34, LA36, LA38, LA120, LS120, LT33, LT35, VT05, VT50, VT52, VT55, VT100, or VT105.
- Clock: Line frequency clock for FB operation.
- EIS, KT11 Memory Management Unit, and line frequency clock for XM.

- System device: Every RT-11 system must have a random-access mass storage device (or TU58 cartridge tape) for the system device (see Table I for specific devices).
- System backup device: Every RT-11 system must have a system backup device other than the system device (see Table I).

  Same as software distribution device, or

  any supported removable disk cartridge or disk pack device.
- Software distribution device: Either the system device or the system backup device must also be a distribution medium.

  9-track (800 BPI) magnetic tape (for system device that is either RK05, RK06, RK07, RL01, RL02, or RP03)

  RK05, RL01, or RL02 cartridge disk

  RX01 or RX02 diskette

  TU58 DECtape II cartridge tape

**Table I**
**RT-11 Minimum Hardware Requirements**

| Processor | Minimum Memory | System Device Medium | Backup Device Medium |
|---|---|---|---|
| PDT-11/130 | 32K bytes | TU58 | TU58 |
| PDT-11/150 | 32K bytes | RX01 | RX01 |
| PDP-11 Unibus 11/04, 11/05, 11/10, 11/20, 11/34, 11/35, 11/40, 11/44, 11/45, 11/50 11/55, 11/60 | 24K bytes (32K bytes required for RK06 or RK07 system device) | RJS03/RJS04<br>RK05<br>RK06*<br>RK07*<br>RL01<br>RL02<br>RP03<br>RX01<br>RX02 | Magnetic Tape<br>RK05<br>RL01<br>RL02<br>RX01<br>RX02<br>TU58 |
| PDP-11/03 (LSI-11) | 24K bytes | RK05<br>RL01<br>RL02<br>RX01<br>RX02<br>TU58 | RK05<br>RL01<br>RL02<br>RX01<br>RX02<br>TU58 |
| PDP-11/23 | 64K bytes | RL01<br>RL02<br>RX02<br>TU58 | RL01<br>RL02<br>RX02<br>TU58 |

*RT-11 is not distributed on RK06 or RK07 disk cartridges.

**OPTIONAL HARDWARE:**

NOTE: In some cases, not all hardware features of the following options are supported. Hardware or software restrictions can limit the number of devices that a given system can support.

- Additional memory to a system total of 56K bytes (60K bytes with MSV11-DD memory or PDT-11) for systems running the SJ or FB monitor
- Additional memory to a system total of 248K bytes for systems running the XM monitor
- KK11-A cache memory for PDP-11/34
- KW11-P or KWV11-A programmable real-time clock

*I/O Peripherals:*

- One CR11 or CM11 card reader
- One LA180, LAV11, LPV11, LP11, LP25, LS11, or LP35 line printer
- One PC11 paper tape reader/punch
- One VT11A/VS60 Graphics Display processor

*Magnetic Tape Devices:*

- One TC11 DECtape controller and up to four dual transports (total of eight units)
- Up to eight TU16/TE16 and/or TU45 magnetic tape drives (32K bytes required)
- Up to eight TU10/TE10 and/or TS03 magnetic tape drives (32K bytes required)
- Up to eight TS11 (1600 BPI) magnetic tape drives (32K bytes required)
- Up to two TU58 DECtape II dual cartridge tape systems (total of four units) interfaced via DL11, DLV11, or MXV11

*Disk Devices:*

- One RH11 disk controller with up to eight RJS03 or RJS04 fixed-head disk drives
- One RK11 or RKV11 disk cartridge controller with up to eight RK05J or RK05F disk drives (RK05F counts as two drives)
- One RK611 or RK711 disk cartridge controller with up to eight RK06 and/or RK07 disk drives (32K bytes required)
- One RL11 or RLV11 disk cartridge controller with up to four RL01 and/or RL02 disk drives
- One RL21 or RLV21 disk cartridge controller with up to four RL01 and/or RL02 disk drives
- RPR11 disk controller with up to four RP03 disk pack drives
- Up to two RX11 or RXV11 floppy disk systems with dual RX01 diskette drives (total of four units)
- Up to two RX211 or RXV21 floppy disk systems with dual RX02 diskette drives (total of four units)

*Terminals:*

- The maximum input data rate for a single terminal is 300 baud. The aggregate total input data rate for a system is 4800 baud.
- The output baud rate can be set to any speed. RT-11 sends output as fast as possible, depending on the capacity of the CPU and the nature of its load.
- LA30, LA34, LA36, LA38, LA120, LT33, LT35, VT05, VT50, VT52, VT55, VT100, and VT105 terminals.
- One hard-copy device connected to a DL(V) interface for use as a serial line printer.

*Terminal Interfaces**

- Up to eight lines
  DL11-A, B, C, D, E, W
  DLV11-E, F
  DLV11-J (counts as four lines)
  MXV11-AA, AC
- Up to sixteen lines (up to eight lines on LSI-11, PDP-11/03)
  DZ11-A, B, C, D, E, F
  DZV11
  DFT11-AB cluster controller (PDT only)
- No more than 17 lines total, including console

*Communications Interfaces:**

- DL11 or DLV11-E single-line interfaces
- Up to two DZ11 asynchronous 8-line multiplexer (32K bytes required)
- DZ11-E asynchronous 16-line multiplexer (32K bytes required)
- Up to four DZV11 asynchronous 4-line multiplexer (32K bytes required)
- PDT-11 modem port

**PREREQUISITE SOFTWARE:**

None

**OPTIONAL SOFTWARE:**

APL-11
BASIC-11/RT-11
DECnet-RT
FMS-11/RT-11
FORTRAN IV/RT-11
MU BASIC-11/RT-11

**TRAINING CREDITS:**

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

*NOTE: RT-11 provides remote terminal support only for dial-up lines. RT-11 does not support leased lines.

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

RT-11 is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

DIGITAL INSTALLED

DIGITAL installation is required for Software Product Support. There is no charge for installation if performed at the time of system installation. DIGITAL installed software products, except for operating systems, are subject to an add-on installation fee when purchased subsequent to system installation.

**SOFTWARE PRODUCT SUPPORT:**

RT-11 includes standard services as defined in the Software Support Categories Addendum of 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.

A single-use license only option is a license to copy the software previously obtained under license.

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

The following key (D, E, G, H, Q, R, 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 Cartridge.

D = 9-track 800 BPI Magtape (NRZI)
E = RK05 Disk Cartridge
G = TU58 DECtape II Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
X = RX02 Double Density Diskette
Y = RX01 Floppy Diskette
Z = No hardware dependency

NOTE: Only TU58 and RX01 distribution kits contain additional volumes that are bootable on the PDT-11.

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

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

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

*Upgrade Options*

RT-11, Version 4.0 is available as an upgrade kit from RT-11, Version 03B for use on the same single CPU on which the former system is licensed. The previous license shall be extended to cover this upgrade.

Users of RT-11, Version 03B whose Specified Support Category warranty has not expired may order under license the following software upgrades. The upgrade is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ012 -A— RT-11 binaries, documentation, no support services (media: D, E, G, H, Q, X, Y)

Users of RT-11 whose warranty or Standard Program Update Service has expired may order under license the following software upgrades. The upgrade is distributed in binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ012 -C— RT-11 binaries, documentation, no support services (media: D, E, G, H, Q, X, Y)

QJ012 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

*Sources/Listings Options*

NOTE: Source kits provided by DIGITAL do not necessarily contain all the source files used by DIGITAL to build the binary kits.

QJ013 -E— All sources (media: D, E, H, Q)

QJ013 -F— Listings (media: R)

*Sources/Listings 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.

QJ013 -N— Sources update; requires RT-11, Version 4.0 binary distribution for source assembly (media: D, E, H, Q)

QJ013 -N— Listings update (media: R)

*Miscellaneous Options*

QJ013 -G— Documentation only kit (media: Z)

**ADDITIONAL SERVICES:**

Post-warranty Software Product Services are available for licensed customers. Customers should contact their local DIGITAL office for additional information.

QJ013 -S— Consulting Service (media: Z)

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# Software Product Description

**PRODUCT NAME: RT², Version 4.0**
**RT-11 Run-Time System**

**SPD 12.4.2**

**DESCRIPTION:**

RT² is a license to use a subset of the RT-11, Version 4.0 software on an LSI-11 based system with an RL01, RL02 or RK05 cartridge disk or RX01 or RX02 floppy disk as the systems device. RT² software provides a single job (SJ) or foreground/background (FB) execute-only environment for applications developed on an RT-11 system. It is the user's responsibility to transport the RT² software and the user-developed software from the RT-11 system to the target RT² system.

RT² includes license to copy only the following RT-11, Version 4.0 modules as received in an RT-11 kit from DIGITAL and to copy RT-11, Version 4.0 monitors sysgened for use on the LSI-11.

- RT11BL.SYS baseline SJ monitor
- RT11SJ.SYS RT-11 SJ monitor
- RT11FB.SYS RT-11 FB monitor
- DD.SYS TU58 handler
- DY.SYS RX02 handler
- DL.SYS RL01/RL02 handler
- RK.SYS RK05 handler
- DX.SYS RX01 handler
- TT.SYS terminal handler
- LP.SYS line printer handler
- LS.SYS serial line printer handler
- DUP.SAV Device Utility Program
- KED.SAVE Keypad Editor
- K52.SAVE
- PIP.SAV Peripheral Interchange Program
- DIR.SAV Directory Listing Program

Single-use licenses are available to operate the BASIC and APL run-time systems as optional software under RT².

Applications developed under FORTRAN IV/RT-11 may be copied under the RT² license, along with the FORTRAN IV OTS. The FORTRAN IV Compiler may not be used on RT².

**MINIMUM HARDWARE REQUIRED:**

Any valid LSI-11 based system with:

- at least 24K bytes of memory for the SJ monitor
- at least 32K bytes of memory for the FB RL01, RL02, or RX02 monitor
- an RKV11, RLV11, or RLV21 cartridge disk system or an RXV11 or RXV21 floppy disk system
- an LA36, LA38, VT52 or VT100 console terminal

An RT-11, Version 4.0 system is required for developing applications software and building an RT² system.

**OPTIONAL HARDWARE:**

- System total of 256K words of memory
- LAV11-P line printer

**PREREQUISITE SOFTWARE:**

RT-11 Version 4.0 Operating System

**OPTIONAL SOFTWARE:**

BASIC-11/RT-11
APL-11

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

CUSTOMER SUPPORTED

RT² is provided on an "as is" basis without warranty expressed or implied. Any software services, if available, will be provided at the then current charges.

**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.

A single-use license only option is a license to copy the software previously obtained under license.

The following key (Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJV13-DZ = single-use license only.

Z = No hardware dependency

QJV13 -D— Single-use license only (media: Z)
Minimum quantity: 50

**ADDITIONAL SERVICES:**

None

# digital
# Software Product Description

**PRODUCT NAME: BASIC-11/RT-11, Version 2.0** **SPD 12.5.8**

**DESCRIPTION:**

BASIC is a conversational programming language developed at Dartmouth College that uses simple English language-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 call interface
- Formatted output using the PRINT USING statement

**MINIMUM HARDWARE REQUIRED:**

One of the following:

- Any valid RT-11 operating system configuration on 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 4.0

**OPTIONAL SOFTWARE:**

FMS-11/RT-11 systems with at least 56K bytes of memory.

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

BASIC-11/RT-11 is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

CUSTOMER INSTALLED

BASIC-11/RT-11 is a software product engineered to be installed by the customer and includes other Software Product Support services listed below.

**SOFTWARE PRODUCT SUPPORT:**

BASIC-11/RT-11 includes standard services as defined in the Software Support Categories Addendum of this SPD.

**ORDERING INFORMATION:**

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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.

A single-use license only option is a license to copy the software previously obtained under license.

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.

The following key (D, E, G, H, Q, R, 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 800 BPI Magtape (NRZI).

D = 9-track 800 BPI Magtape (NRZI)
E = RK05 Disk Cartridge
G = TU58 DECtape II Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJ913 -A— Single-use license, binaries, documentation, support services (media: D, E, G, H, Q, Y)

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

QJ913 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

*Sources/Listings Options*

QJ913 -E— Sources (media: D, E, H, Q, 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: D, E, G, H, Q, Y)

QJ913 -H— Right to copy for single use (under existing license), no binaries, no documentation (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: D, E, G, H, Q, 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.

QJ913 -N— Sources Update (D, E, H, Q, Y)

QJ913 -N— Listings update (media: R)

*Miscellaneous Options*

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

**ADDITIONAL SERVICES:**

Post-warranty Software Product Services for this software product are available with the prerequisite being the purchase of a RT-11 Self-Maintenance Service for Software. Customers should contact their local DIGITAL office for additional information.

# digital
# Software Product Description

**PRODUCT NAME: CTS-300, Version 6.0**
**Commercial Transaction System-300**

**SPD 12.9.9**

**DESCRIPTION:**

CTS-300 is a disk based single-user/multiuser system designed to support commercial applications on small PDP-11 based DEC Datasystems or equivalent configurations.CTS-300 applications are written in DIBOL, DIGITAL's own Business Oriented High-level Language. DIBOL is similar to COBOL in that it has a Data Division and a Procedure Division, but DIBOL is a more concise language. DIBOL provides the application programmer with the ability to do data manipulation, arithmetic expression evaluation, table subscripting, record redefinition, external calls to other programs, spooling, sequential and random access, and indexed access to files. Exception conditions cause control to transfer to a user-specified statement where the cause of the condition can be determined.

The following table illustrates the user/job capacity versus minimum configurations under each of the Datasystems:

| | D150 (PDT150) | D320 (11/03) | D330 (11/23) | D350 (1134A) |
|---|---|---|---|---|
| Number of users | 1 | 1-4 | 1-8 | 1-12 |
| Number of jobs | 1-4 | 1-4 | 1-16 | 1-16 |
| Memory | 32-60K bytes | 32-56K bytes | 32-248K bytes | 32-248K bytes |
| Disk capacity | 512K bytes | 1-32M bytes | 1-42M bytes | 10-266M bytes |

Although 12 users is the stated limit, most application environments should use caution beyond the eighth user, because terminal response time is likely to degrade as more users are added to the system. Particular care needs to be exercised with program size, overlay technique, file size and layout, etc.

CTS-300 is also available in fully supported mode *only* on other equivalently configured systems that meet minimum requirements.

CTS-300 is a packaged software system consisting of the RT-11 operating system, a choice of three run-time systems, and a number of utilities. Since RT-11 is included in this package, a CTS-300 licensee can order any RT-11 dependent product without reordering a specific license for RT-11.

Although CTS-300 is a layered product, it should be noted that DIBOL will not run concurrently with other languages.

*Run-Time Systems (RTS):*

SUD — Single-user DIBOL RTS allows one DIBOL user or job to be run on a system. It is designed for an entry level system running in 32K bytes of memory. SUD runs on all RT-11 monitors (SJ, FB, XM). SUD also runs as the background job in the FB monitor with a line printer spooler running in the foreground. Control returns to the monitor upon completion of the SUD program.

TSD — Time Shared DIBOL RTS allows 1 to 4 DIBOL users or jobs to run simultaneously. It is designed for a medium-sized system running in 56K bytes of memory. File sharing facilities at the record level permit multiple users to share and update the same data files. TSD is an executive that normally is run on an SJ monitor SYSGENed for multiterminal support. TSD controls loading of DIBOL programs, allocation and recovery of memory for DIBOL programs, program scheduling, detached programs, file-sharing, record I/O, intertask communication, as well as other less visible functions. A DIBOL line printer spooler also runs in the TSD environment. Program completion, or the detaching of a program returns control to the TSD executive.

XMTSD — Extended Memory TSD RTS allows 1 to 12 DIBOL users or 1 to 16 DIBOL jobs to run simultaneously (up to 12 could be attached to terminals with the remainder running in a detached environment). Designed for larger systems running in 128K to 248K bytes of memory using the XM monitor, XMTSD has the same features and capability found in TSD. In addition, XMTSD offers multiuser program development. When XMTSD is loaded in the foreground of the XM monitor, the background is reserved for queuing and executing indirect command files. These files can contain compile and link instructions. Programs can be created and modified by running a CRT oriented editor called DKED, that executes as a DIBOL job. More than one copy of DKED can run concurrently.

The same DIBOL program can be migrated from one RTS to another without modification. Relinking is required when changing from SUD to TSD or XMTSD or vice versa. DIBOL programs linked for TSD or XMTSD will run under either RTS. A single-key Indexed Sequential Access Method (ISAM) file system is also available for each RTS.

*CTS-300 Utility Programs:*

CTSGEN — The CTS-300 Generator Program is an interactive DIBOL-11 utility program that tailors the system to a user's needs. It can create a SUD, TSD or XMTSD RTS to match the specific hardware and software of the installation. Through CTSGEN a user specifies such items as the total number of terminals, jobs, messages, and files open at one time. Support for DDT and forced job start-up are also among the choices available.

DDT — The DIBOL Debugging Technique is a system utility that allows for user/programmer interaction with a DIBOL program while it is executing. Using DDT, a programmer can set predetermined stopping points to halt the program, examine and/or alter the contents of variables, and trace through lines of a DIBOL program. These features allow a programmer to locate problems, correct data values, and test any programming errors directly, before reediting and recompiling.

DECFORM — The DECFORM Data Entry utility is a program generator that processes screen format directives and produces a DIBOL program that, when compiled and executed, performs specified data entry functions. In addition to defining screen formats, auto-duplication, alphabetic or decimal checking, range checking, field totaling, cross-field validation, and auto-increment characteristics, DECFORM makes possible additions, inquiries, changes, and verifications to sequentially ordered files or Indexed Sequential Access Method (ISAM) files. Deletions are possible only with ISAM files. DECFORM is primarily a tool to facilitate and reduce program development efforts. Its major use is in data file creation, modification and inquiry.

DKED — Is a version of RT-11's keyboard editor (KED) that runs as a job under TSD or XMTSD. It is a text editor, designed to run in VT52 mode on a VT52 or VT100, and is used to create and modify ASCII text files.

DICOMP — DICOMP is the DIBOL compiler. It translates DIBOL source programs into interpretive code that, when linked, can be executed by the three RTS.

DMS-300 — Data Management Services provide capabilities for handling sequential, random, or keyed records in files. Records in an ISAM file can be keyed by a symbolic value. DMS-300 also supports file sharing and multivolume files. Sequential and random file processing are standard in every RTS. ISAM is an option. DIBOL has special language statements to use these file access methods efficiently.

ISMUTL — ISAM files are created and maintained by means of the ISAM Utility Program. Its three major functions are CREATE, STATUS, and REORGANIZE.

- CREATE is used to create a new ISAM file. Options are provided to create an empty ISAM file, or convert a sequential file to an ISAM file. The CREATE function can be carried out without operator intervention.
- STATUS provides a concise view of the current structure of the file: length of keys, records, and groups, levels of indexing, and information about the use of load exclusion and overflow areas in the data file.
- REORGANIZE is used to reorganize an ISAM file for more efficient operation. It is used when most of the groups in the file are filled and the overflow area or append area is filled. The effect of REORG is to redistribute the records of the file so it appears to be a newly created file.

LPTSPL — The Line Printer Spooler is a utility program that prints data files and program source files. In response to an LPQUE statement, the spooler program receives information on the file to be printed. The spooler queues the file and begins to print it when the line printer is available. In the SUD RTS, the spooler outputs to one line printer. In the TSD and SMTSD RTS, the spooler is a DIBOL program consisting of a queue manager and four satellite programs that output to as many as four line printers.

SORT/MERGE — The SORT/MERGE utility permits the user to define the parameters for the sorting and/or merging of data files. A DIBOL program is then generated by the system to perform the required sort and/or merge. The user can specify up to eight key fields to control the ordering of the output records, in either ascending or descending sequence. A wide range of operating parameters, such as the number of work files to be used, is provided to enable the user to achieve maximum sort efficiency.

STATUS — The job and system state program, STATUS, retrieves and displays information about the TSD or XMTSD RTS. STATUS passes the information listed below to a line printer or a terminal:

- Available free core
- List of active jobs
- Detailed information of a specified active job
- Detailed information of pending messages
- List of pending line printer jobs
- Characteristics of the current RTS

**MINIMUM HARDWARE REQUIRED:**

CTS-300 is intended to run primarily on DEC Datasystem 150s and 300s; it will operate, however, on other similarly configured hardware with the following minimum:

- A VT05, VT50H, VT52, VT100, or LA36 console terminal. A VT50H, VT52, or VT100 terminal (in VT52 mode) is required for use with DECFORM, ISMUTL, and STATUS utilities

- The Extended Instruction Set (EIS or equivalent) for XMTSD
- Memory management hardware is needed in the D330 and D350 series to use extended memory (memory above 56K bytes); it is needed, as well, in any 11/23, 1134A, 11/44 or 11/60 processor intending to use extended memory.
- Memory required for SUD — 32K bytes; TSD — 56K bytes; XMTSD — 128K bytes

**OPTIONAL HARDWARE:**

The following options are available for D150 systems:

- Additional memory up to a system total of 60K bytes
- LA180 or LA120 Serial Printer
- VT100 Advanced Video Option (VT1XX-AB)

The following options are available for D320 systems:

- Additional memory up to a system total of 56K bytes
- VT100 Advanced Video Option (VT1XX-AB)
- Up to a system total of four VT05, VT50H, VT52, VT100, LA36 or LA120 terminals
- Up to four LAV11 or LPV11 line printers
- Up to four DLV11 asynchronous line interfaces (one per terminal)
- One DZV11 asynchronous line multiplexer with up to four lines
- RKV disk cartridge system with controller
- RK05 disk cartridge drives up to eight
- RLV disk cartridge system with controller
- RL disk cartridge drives up to four, two of which can be RL02 add-ons
- Up to two RXV floppy disk systems, with four drives total

The following options are available for special D323S and D325S systems:

- Additional memory up to a system total of 56K bytes
- VT100 advanced video option (VT1XX-AB)
- Up to a system total of four VT05, VT50H, VT52, VT100, LA36, or LA120 terminals
- Up to four LA11 or LP11 line printers
- Up to four DL11 asynchronous line interfaces (one per terminal)
- One DZ11 asynchronous line multiplexer with up to four lines
- RL disk cartridge system with controller
- RL disk cartridge drives up to four
- Up to two RX floppy disk systems, with four drive total

The following options are available for D330 systems:

- Additional memory up to a system total of 248K bytes
- VT100 advanced video options (VT1XX-AB)
- Up to a system total of eight VT05, VT50H, VT52, VT100, LA36 or LA120 terminals
- Up to four LAV11 or LPV11 line printers
- Up to eight DLV11 serial asynchronous line interfaces (one per terminal) for eight lines total
- Up to two DZV11 asychronous line multiplexers for eight lines total
- RLV disk cartridge system with controller
- RL disk cartridge drives up to four
- Up to two RXV floppy disk systems, with four drives total

NOTE: Due to limited expansion space inside a base 11/23 CPU system box, additional hardware options can require an expander box and cabinet.

The following options are available for D350 systems:

- Additional memory to a system total of 248K bytes
- VT100 advanced video option (VT1XX-AB)
- Up to a system total of twelve VT05, VT50H, VT100, LA34, LA36, LA38, or LA120 terminals
- Up to four LS11, LA11, or LP11 line printers
- Up to sixteen DL11 asynchronous line interfaces (one per terminal) for sixteen lines total
- Up to two DZ11 multiplexers with up to eight lines each
- RK11 disk cartridge system with controller
- RK05 disk cartridge drives up to eight
- RL disk cartridge system with controller
- RL disk cartridge drives up to four
- RPR11 disk pack system with up to eight drives
- Up to two RX floppy disk systems, with four drives total
- RK611 disk pack system
- RK06 disk pack drives up to eight, or
  RK711 disk pack system
  RK07 disk pack drive up to eight

NOTE: A mix of up to eight RK06s and RK07s total is possible

- CR11 card reader
- TME11 magnetic tape controller with upto eight TU10 transports or TJE16 controller with up to two TS03 transports.

NOTE: CTS-300 will run on the 11/44 processor; but no more than 248K bytes of memory can be used by CTS-300.

**PREREQUISITE SOFTWARE:**

None

**OPTIONAL SOFTWARE:**

CTS-300 RDCP 2780/3780
CTS-300 DICAM/3271

**TRAINING CREDITS:**

TWO (2) — Applies only to options that include support services. Consult the latest Educational Services Catalog at your local DIGITAL office for available courses, course requirements, and guidelines.

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

CTS-300 is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

DIGITAL INSTALLED

DIGITAL installation is required for Software Product Support. There is no charge for installation if performed at the time of system installation. DIGITAL installed software products, except for operating systems, are subject to an add-on installation fee when purchased subsequent to system installation.

**SOFTWARE PRODUCT SUPPORT**

CTS-300 includes standard services as defined in the Software Support Categories Addendum of this SPD.

CTS-300 installation requires a system generation. To help customers, DIGITAL will perform the initial system generation if the system disk is an RL01, RL02, RK05, RK06 or RK07. When requested by the customer, DIGITAL will install floppy disk systems, on a time and materials basis.

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Options with no support services are only available after the purchase of one supported license.

A single-use license only option is a license to copy the software previously obtained under license.

The following key (E, H, Q, T, V, X, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ354-AV = distribution on RK07 Disk Cartridge.

E = RK05 Disk Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
T = RK06 Disk Cartridge
V = RK07 Disk Cartridge
X = RX02 Double Density Diskette
Y = RX01 Floppy Diskette
Z = No hardware dependency

This software is available with a valid DEC Datasystem 150, 320, 330, or 350 that includes support services. License only CTS-300 is available only with a valid DEC Datasystem 150, 320, 330, or 350 that does not include software support services.

D150 Floppy Disk Based (RX01)
DS352 RX01 Floppy Disk Based
DS356 RPR02 Disk Pack Based
D322 RX01 Floppy Disk Based
D323 RX02 Floppy Disk Based
D324 RK05 Cartridge Disk Based
D325 RL01 Cartridge Disk Based
D333 RX02 Floppy Disk Based
D335 RL01 Cartridge Disk Based
D336 RL02 Cartridge Disk Based
D354 RK05 Cartridge Disk Based
D355 RL01 Cartridge Disk Based
D356 RL02 Cartridge Disk Based
D357 RK06 Cartridge Disk Based
D358 RK07 Cartridge Disk Based

CTS-300 is also offered with full DIGITAL support services only on hardware configurations that meet minimum system requirements. A customer would order the line item:

QJ354 -A— Single-use license, binaries, documentation, support services (media: E, H, Q, T, V, X, Y)

A partial listing of other DIGITAL packaged systems that meet CTS-300 requirements are listed below. For a more complete configuration guide, refer to the RT-11, Version 4.0 SPD (12.1).

D532, D535, D538
D542, D548
DM30-LLB, DM30-HHB
RE37-HHB
SE30-HHB, SE30-LLB, SE30-MMA
SE40-HHA, SE40-MMA
SE60-HHA
SM20-LLA
SM30-HHB, SM30-LLB, SM30-MMA
SM40-HHA, SM40-MMA
SM60-HHA, SM60-HHB, SM60-LLA, SM60-MMA
SP30-HVA, SP30-LLA
SP60-HVA
SR20-LLA, SR20-SSA
SR30-LLB, SR30-SSB
SR60-LLA
SR-VXLLB, SR-VXSSA, SR-VXSSB
SR-WXLLA, SR-WXSSA

*Update Options*

Users of previous CTS-300 versions 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 are included unless specifically stated.

QJ354 -H— Binaries, documentation (media: E, H, Q, T, V, X, Y)

QJ354 -H— Right to copy for single use (under existing license), no binaries, no documenta(media: Z)

Users of previous CTS-300 versions 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.

QJ354 -W— Binaries, documentation (media: E, H, Q, T, V, X, Y)

**ADDITIONAL SERVICES:**

Post-warranty Software Product Services are available for licensed customers. Customers should contact their local DIGITAL office for additional information.

# digital
# Software Product Description

**PRODUCT NAME: FORTRAN IV/RT-11, Version 2.1** **SPD 12.10.11**

**DESCRIPTION:**

FORTRAN IV is an extended implementation of the FORTRAN language based on the ANSI FORTRAN, X3.9-1966 standard. It operates under the RT-11 operating system. The PDP-11 FORTRAN IV language includes the following extensions to the ANSI standard:

- General expressions allowed in all meaningful contexts
- Mixed-mode arithmetic
- BYTE data type for character manipulation
- ENCODE, DECODE statements
- PRINT, TYPE, ACCEPT input/output statements
- Direct-access unformatted input/output DEFINE FILE statement
- Comments allowed at end of each source line
- PROGRAM statement
- OPEN and CLOSE file access control statements
- List-directed input/output

Additionally, virtual arrays are supported on systems with memory management directives. Virtual arrays are memory-resident, and require enough main memory to contain all elements of all arrays.

The PDP-11 FORTRAN IV compiler is a fast, one-pass compiler. Compiler options allow program size (threaded code) versus execution speed (in-line code) tradeoffs. FORTRAN IV compiler optimizations include:

- Common subexpression elimination
- Local code tailoring
- Array vectoring
- Optional in-line code generation for integer and logical operations

*Object Time System*

FORTRAN IV includes a set of object modules, called the OTS (*O*bject *T*ime *S*ystem), that are selectively linked with compiler-produced object modules to produce an executable program.

The RT-11 system provides several special features for FORTRAN IV. FORTRAN programs may be developed under RT-11 and output in absolute binary format for execution on a stand-alone PDP-11 system with minimal peripherals, or for loading into ROM or PROM memory.

Using SYSLIB, the RT-11 FORTRAN system subroutine library, all features of the RT-11 monitor are available to FORTRAN programs. Additionally, SYSLIB provides subroutines which support extensive character string manipulations, where the characters are stored as variable-length strings in BYTE arrays.

**MINIMUM HARDWARE REQUIRED:**

Any valid RT-11 configuration (32K bytes of memory are required for string support).

RT-11 Memory Management Unit and EIS hardware are required for virtual arrays.

**OPTIONAL HARDWARE:**

FORTRAN IV supports all devices supported by the operating system.

FORTRAN IV generated code can be selected to support the following arithmetic hardware options:

- KE11-A Extended Arithmetic Element
- KE11-B Extended Arithmetic Element
- KE11-E Extended Instruction Set
- KE11-F Floating Instruction Set
- KEV11 Extended Arithmetic Chip

The FORTRAN IV OTS additionally supports the FP11 floating point processor.

**PREREQUISITE SOFTWARE:**

RT-11 Operating System, Version 4.0

**OPTIONAL SOFTWARE:**

FORTRAN/RT-11 Extensions
PLOT 11/RT-11
SSP-11, Scientific Subroutine Package
FMS-11/RT-11

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

FORTRAN IV/RT-11 is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

CUSTOMER INSTALLED

FORTRAN IV/RT-11 is a software product engineered to be installed by the customer and includes other Software Product Support services listed below.

**SOFTWARE PRODUCT SUPPORT:**

FORTRAN IV/RT-11 includes standard services as defined in the Software Support Categories Addendum of 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.

A single-use license only option is a license to copy the software previously obtained under license.

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

The following key (D, E, G, H, Q, R, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ813-AD = binaries on 9-Track 800 BPI magtape (NRZI).

D = 9-track 800 BPI Magtape (NRZI)
E = RK05 Disk Cartridge
G = TU58 DECtape II Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJ813 -A— Single-use license, binaries, documentation, support services (media: D, E, G, H, Q, Y)

QJ813 -C— Single-use license, binaries, documentation, no support services (media: D, E, H, G, Q, Y)

QJ813 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

*Sources/Listings Options*

QJ813 -E— Sources (media: D, E, Q,)
QJ813 -F— Listings (media: R)

*Upgrade Options*

Customers who are currently licensed users of FORTRAN IV/RT-11 may obtain this new product by purchasing a license to an upgrade kit for use on the same CPU as their previous license.

QJE06 -A— Single-use license, binaries, documentation, support services (media: Y)

*Update Options*

Users of FORTRAN IV/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.

QJ813 -H— Binaries, documentation (media: D, E, G, H, Q, Y)

QJ813 -H— Right to copy for single-use (under existing license), no binaries, no documentation, no support services (media: Z)

Users of FORTRAN IV/RT-11, Version 1C or Version 2.0, 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.

QJ813 -W— Binaries, documentation (media: D, E, G, H, Q, Y)

*Sources/Listings Update Options:*

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

QJ813 -N— Sources update (media: D, E, Q)

*Miscellaneous Options*

QJ813 -G— Documentation only kit (media: Z)

**ADDITIONAL SERVICES:**

None

# digital
# Software Product Description

**PRODUCT NAME: RT²/PDT, Version 4.0**
**Run-Time System for PDT-11**

**SPD 12.13.2**

## DESCRIPTION:

RT²/PDT is a subset of the RT-11 Real Time Operating System. It provides a Baseline Single-Job (BL), Single-Job (SJ), or a Foreground/Background (FB) execute-only environment on a PDT for applications that the user can develop on a full-scale RT-11 system.

RT²/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 RT²/PDT system and user-developed software to the target PDT system.

An RT²/PDT license allows the user to copy only the following RT-11 modules as distributed in an RT-11 kit from DIGITAL and to copy RT-11 monitors sysgened for use on the PDT.

| MODULE | DESCRIPTION |
|---|---|
| RT11BL.SYS | RT-11 baseline SJ monitor |
| RT11SJ.SYS | RT-11 SJ monitor |
| RT11FB.SYS | RT-11 FB monitor |
| LP.SYS | Line printer handler |
| LS.SYS | Serial line printer handler |
| PD.SYS | PDT-11 handler |
| TT.SYS | Terminal handler |
| SWAP.SYS | Monitor scratch blocks for system Utility Program |
| DIR.SAV | Directory listing program |
| DUP.SAV | Device Utility Program |
| KED.SAV | Keypad Editor |
| PIP.SAV | Peripheral Interchange Program |

Single-use licenses are available to operate BASIC-11/RT-11, APL and FMS-11 run-time systems as optional software under RT²/PDT. Applications developed under FORTRAN IV/RT-11 can be copied under the RT²/PDT license, along with the FORTRAN IV OTS. The FORTRAN IV compiler cannot be used on RT²/PDT.

## MINIMUM HARDWARE REQUIRED:

- PDT-11/150 series system or a PDT-11/130 system with at least 32K bytes of memory.
- An RT-11, Version 4.0 system is required for developing application software and building the RT²/PDT system.

## OPTIONAL HARDWARE:

- System total of 60K bytes of memory
- DFT11-AB Cluster Controller (3 EIA Ports)
- LA36 hardcopy terminal
- LA38 hardcopy terminal
- LA120 or LS120 hardcopy terminal
- LA180-C or LA180-E line printer
- VT100 video terminal

## PREREQUISITE SOFTWARE:

RT-11, Version 4.0 Operating System (with DIGITAL Supported/DIGITAL Installed support) is required on the development system from which RT²/PDT is copied.

## OPTIONAL SOFTWARE:

The following software can be used with RT²/PDT in a run-time environment.

APL-11
BASIC-11/RT-11
FMS-11/RT-11 (only components ARTS and FDV)

## TRAINING CREDITS:

None

## SUPPORT CATEGORY:

CUSTOMER SUPPORTED

RT²/PDT is provided on an "as is" basis without warranty expressed or implied. Any software services, if available, will be provided at the then current charges.

**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.

A single-use license only option is a license to copy the software previously obtained under license.

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

# digital
# Software Product Description

**PRODUCT NAME: MU BASIC-11/RT-11, Version 2.0** **SPD 12.20.5**

**DESCRIPTION:**

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

MU BASIC-11/RT-11 is an interpreter operating under the RT-11 operating system foreground/background (FB) monitor with multiterminal capability (up to eight).

MU BASIC-11/RT-11 features:

- One to four users on PDP-11/03, LSI-11, or PDT-11/150 systems.
- One to eight users with equal size memory partitions on larger PDP-11s; no swapping.
- A variety of program manipulation commands, including commands for saving, editing, running, and retrieving BASIC programs.
- Suport for real (single or double precision) integer and string data types.
- Ability to run in either the foreground or background under the RT-11 FB monitor concurrently with another job; supports all RT-11 supported devices (except VT11).
- Support for all terminals supported by RT-11.
- User identification and file protection scheme to control system access and utilization (optional); public and group libraries for file sharing; privileged user capability.
- All peripheral devices can be used by any user at any terminal. However, the ASSIGN and DEASSIGN commands permit restricted use of a non-public device to a single user.
- Limited ability for a user to ASSIGN a terminal (that is currently not in use) as an input or output device.
- Sequential data storage using the RT-11 file system. The maximum number of simultaneously open files is limited only by available memory and RT-11 channel considerations.
- Virtual arrays on disk (integer, real, and string) for processing quantities of data too large to fit in available memory, or for performing random-access I/O.
- Program chaining and overlaying with COMMON to accommodate large programs.
- Formatted output with PRINT USING statement.
- String support, complete with string arrays and functions.
- A CALL statement that allows easy interfacing of assembly language routines. These routines can be called by name and passed multiple arguments. These routines must be included at link time.
- Immediate mode execution for desk calculator operation and program debugging.
- Privileged mode to protect applications programs.

**MINIMUM HARDWARE REQUIRED:**

Any valid RT-11, Version 4.0 (FB monitor with multiterminal support) configuration with:

- RK11, RX11, or RL11 controller and drive
- Line frequency clock
- 56K bytes of memory

Total memory required depends on the number of users, length of programs, BASIC features included, devices used, and number of simultaneously open files. A maximum of four users are supported for PDP-11/03, LSI-11, or PDT-11/150 based systems.

DECtape II is not supported as the system device.

**OPTIONAL HARDWARE:**

Supports any device supported by the prerequisite software (except VT11).

**PREREQUISITE SOFTWARE:**

One of the following:

- RT-11, Version 4.0 operating system with multiterminal support multiterminal support must be sysgened into RT-11; and RT-11 SYSGEN is included in an MU BASIC-11/RT-11 installation.
- RT$^2$, Version 4.0 with multiterminal support

**OPTIONAL SOFTWARE:**

None

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

MU BASIC-11/RT-11 is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

CUSTOMER INSTALLED

MU BASIC-11/RT-11 is a software product engineered to be installed by the customer and includes other Software Product Support services listed below.

**SOFTWARE PRODUCT SUPPORT:**

MU BASIC-11/RT-11 includes standard services as defined in the Software Support Categories Addendum of 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.

A single-use license only option is a license to copy the software previously obtained under license.

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

The following key (E, G, H, Q, R, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ921-AY = binaries on RX01 Floppy Diskette.

E = RK05 Disk Cartridge
G = TU58 DECtape II Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJ921 -A— Single-use license, binaries documentation, support services (media: E, G, H, Q, Y)

QJ921 -C— Single-use license, binaries, documentation, no support services (media: E, G, H, Q, Y)

QJ921 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

*Sources/Listings Options*

QJ921 -E— Sources (media: E, H, Q, Y)

QJ921 -F— Listings (media: R)

*Update Options*

Users of MU BASIC-11/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.

QJ921 -H— Binaries, documentation (media: E, G, H, Q, Y)

QJ921 -H— Right to copy for single-use (under existing license), no binaries, no documentation (media: Z)

Users of MU BASIC-11/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.

QJ921 -W— Binaries, documentation (media: E, G, H, Q, Y)

*Sources/Listings Update Options*

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

QJ921 -N— Sources update (media: E, H, Q, Y)

QJ921 -N— Listings Update (media: R)

*Miscellaneous Options*

QJ921 -G— Documentation only kit (media: Z)

**ADDITIONAL SERVICES:**

Post-warranty Software Product Services for this software product are available with the prerequisite being the purchase of the RT-11 Self-Maintenance Service for Software. Customers should contact their local DIGITAL office for additional information.

# digital
# Software Product Description

**PRODUCT NAME: PROM/RT-11, Version 1.0** **SPD 12.21.1**

**PROM Programming Utility**

**DESCRIPTION:**

PROM/RT-11 is a software utility designed to control and operate a universal PROM programming hardware device. The programmer hardware connects to a 11/03, 11/23, or 11/34 RT-11 development system over an RS-232C serial line. This is distinct from the console interface on the system.

The package allows the user to create PROM or EPROM-based applications using RT-11 by taking the completed microcomputer program and creating the appropriate chips from PROM or EPROM option boards.

PROM/RT-11 operates under the RT-11 Version 03B or 4.0 Operating System. The utility program will run in either the background or the foreground of the RT-11 system; when used in the foreground, it will allow concurrent program development and PROM programmer operations.

The following user commands are supported by this product:

| | |
|---|---|
| COPY | Copies an existing PROM chip by reading its contents and replicating in another chip. |
| DIAGNOSE | Runs extended PROM programmer and interface diagnostics to analyze/isolate a hardware problem. |
| HELP | Prints a list of all valid commands on the terminal |
| INTERFACE | Alters Control and Status Register (CSR) and vector addresses for serial interface to PROM programmer hardware. |
| LIST | Prints a listing of the contents of a PROM and EPROM chip. |
| MODIFY | Modifies the contents of one or more existing PROM or EPROM chips. |
| PROGRAM | Programs a set of PROM or EPROM chips from an RT-11 file; automatic verify is included. |
| SEQUENTIAL | Redefines PROGRAM, MODIFY and VERIFY commands to be used to prepare PROMs that are not intended for use with a PDP-11. |
| VERIFY | Verifies that existing PROM or EPROM chips match the contents of a master PROM or program file. |

**MINIMUM HARDWARE REQUIRED:**

Any valid 11/03, 11/23, or 11/34 RT-11 Version 03B or 4.0 based systems with a minimum of 32K bytes of Random Access Memory for background operation or 56K bytes of Random AccessMemory for foreground operation. In addition, the system must include an RS-232C serial line interface with a cable which is dedicated to the PROM programmer, and a PB11K PROM adapter kit, for the type of PROM chips being blasted.

SUPPORTED INTERFACES: DLV11-E, DLV11-F, DLV11-J (1 port), MXV11-A (1 port), DL11-W and DL11-E

**OPTIONAL HARDWARE:**

Additional PB11K Adapter Kits

**PREREQUISITE SOFTWARE:**

RT-11, Version 03B or 4.0

**OPTIONAL SOFTWARE:**

None

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

CUSTOMER SUPPORTED

PROM/RT-11 is provided on an "as is" basis without warranty expressed or implied. Any software services, if available, will be provided at the then current charges.

**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.

The following key (Q, Y) represents the distribution media for the product and must be specified at the end of the order number, e.g., PB11-AY = binaries on RX01 Floppy Diskette.

Q = RL01 Disk Cartridge
Y = RX01 Floppy Diskette

PB11 -A— PROM programmer hardware, single-use license, binaries and documentation (media: Q, Y)

**ADDITIONAL SERVICES:**

None

# digital
# Software Product Description

**PRODUCT NAME: FMS-11/RT-11, Version 1.1** **SPD 12.22.2**

**DESCRIPTION:**

FMS-11/RT-11 is a set of utilities and subroutines that provide a multiterminal video forms capability for programs written in MACRO-11, BASIC-11, or FORTRAN IV under the RT-11 operating system. Forms defined using FMS-11 can use the following features of DIGITAL's VT100 terminal:

- Reverse video characters
- Bold characters
- Underline characters
- Blinking characters
- 132-column lines
- Jump and smooth scrolling
- Split screen
- Reverse screen

FMS-11/RT-11 applications can be developed under the RT-11 operating system and executed under the control of either RT-11 or its execute-only subsets, $RT^2$ or $RT^2$/PDT.

The FMS-11 system can be used as a general purpose manager of operator I/O to programs written in any of the supported languages and also as a front end in traditional source data entry applications.

Each field in an FMS-11/RT-11 form can be assigned attributes such as:

- Validation "picture"
- Embedded text characters
- Right/left justification
- Fixed decimal
- "Must complete"

A default value and a line of explanatory HELP text can be associated with each field of a form. In addition, a separate HELP display can be associated with each form.

Another feature of FMS-11/RT-11 is "named data", that lows named strings of constant data to be associated th a form at form creation time and retrieved dynamilly by name or number during program execution.

MS-11/RT-11 applications written in MACRO-11 or ORTRAN IV can be built for either single- or multiminal applications. In multiterminal applications the minals can run different tasks and can change ks independently of one another. The FMS-11/ -11 software will support the maximum number of minals allowed under each RT-11 hardware nfiguration.

FMS-11/RT-11 consists of the following software components:

Form Editor (FRED) — The application developer uses the interactive Form Editor to create and modify video forms by typing them on a VT100 screen as they are to appear to the application user. All of the form attributes and individual field attributes are assigned in this form editing process. Form descriptions can be stored as data files for further processing or in form libraries for immediate use by application programs.

Form Utility (FRMUTL) — is a multifunction program that manipulates FMS-11/RT-11 forms descriptions. It can be used to list the directory of a form library or to print a complete description of a form from a form library or from a data file. FRMUTL can also be used to produce an RT-11 object module of form descriptions to be linked with the application when memory-resident forms are desired.

Form Driver (FDV) — is a reentrant subroutine called from application programs to perform screen processing. The Form Driver manages terminal I/O, displays forms, manipulates the screen, performs basic input validation, and responds to the operator's requests for HELP. Operations are performed on a per-field or form-wide basis using the form description generated by FRED during the form editing process.

The Form Driver's high level language call interface allows applications written in BASIC-11 or FORTRAN IV to take full advantage of the Form Driver's capabilities.

The Form Driver will support VT100 or VT52 terminals although the video attributes (e.g. reverse video) supported by the VT100 are not supported on the VT52. A separate Form Driver Library must be used for each class of terminal.

Application Run-Time Supervisor (ARTS) — allows each terminal in a multiterminal system to run a MACRO-11 or FORTRAN IV application program independently of the programs on the other terminals. As an interface between the application programs and the RT-11 monitor, ARTS acts as a multitasking submonitor, providing subroutines for terminal and mass storage I/O and for shared and private file access management. Unique ARTS features include resident tasks not attached to any terminal and intertask message services. ARTS (with all of its tasks) runs in the background partition of the RT-11 monitor.

**MINIMUM HARDWARE REQUIRED:**

*For application execution:*

Any valid RT-11, RT² or RT²/PDT system with a VT100 or VT52 terminal.

The table below summarizes the minimum memory requirement for systems executing FMS-11/RT-11 applications. The figures include 8K bytes for the Form Driver and from 2K to 12K bytes for ARTS, depending on the capability included at FMS-11 SYSGEN time.

| | MACRO-11 | FORTRAN IV | BASIC-11 |
|---|---|---|---|
| Single-Terminal | 32Kb | 56Kb | 56Kb |
| Multiterminal | 56Kb | 56Kb* | |

*Multiterminal FORTRAN support is limited to very small programs.

*Form application development:*

Any valid RT-11 system with at least 56K bytes of memory and at least one VT100 terminal. The DIGITAL supplied SYSGEN procedure for FMS-11/RT-11 requires a disk of at least 2.5 MB capacity in addition to the software load device.

**OPTIONAL HARDWARE:**

Supports additional VT100 or VT52 terminals for application execution up to the maximum allowed under the RT-11/hardware configuration.

**PREREQUISITE SOFTWARE:**

*For application execution:*

RT-11 Operating System, Version 4.0
RT², Version 4.0 or RT²/PDT, Version 4.0

*For application development:*

RT-11 Operating System, Version 4.0

**OPTIONAL SOFTWARE:**

BASIC-11/RT-11
FORTRAN IV/RT-11

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

FMS-11/RT-11 is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

CUSTOMER INSTALLED

FMS-11/RT-11 is a software product engineered to be installed by the customer and includes other Software Product Support services listed below.

**SOFTWARE PRODUCT SUPPORT:**

FMS-11/RT-11 includes standard services as defined in the Software Support Categories Addendum of 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.

A single-use license only option is a license to copy the software previously obtained under license.

The following key (E, G, H, Q, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ713-AY = binaries on RX01 Floppy Diskette.

E = RK05 Disk Cartridge
G = TU58 DECtape II Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJ713 -A— Single-use license, binaries, documentation, support services (media: E, G, H, Q, Y)

QJ713 -C— Single-use license, binaries, documentation, no support services (media: E, G, H, Q, Y)

QJ713 -D— Single-use license only for all FMS-11/RT-11 components, no binaries, no documentation, no support services (media: Z)

QJ714 -D— Single-use license, for ARTS and FDV only, no binaries, no documentation, no support services (media: Z)

*Update Options*

Users of FMS-11/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.

QJ713 -H— Binaries, documentation (media: E, G, H, Q, Y)

QJ713 -H— Right to copy for single-use (under existing license), no binaries, no documentation (media: Z)

QJ714 -H— Right to copy for single-use for ARTS and FDV only (under existing license), no binaries, no documentation (media: Z)

Users of FMS-11/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.

QJ713 -W— Binaries, documentation (media: E, G, H, Q, Y)

*Miscellaneous Options*

QJ713 -G— Documentation only kit (media: Z)

**ADDTIONAL SERVICES:**

None

digital

# Software Product Description

**PRODUCT NAME: APL-11/RT, Version 2.0** **SPD 14.42.0**

**DESCRIPTION:**

APL is a mathematically structured programming language that features many functions which operate on arrays of arbitrary order. APL can define recursive procedures that use local variables. The special APL character set can be used on a terminal that supports it, or can be simulated with mnemonic escape sequences on other terminals. The user can interact with the APL interpreter to examine and change variables, alter statements without recompilation, and trace program action.

In its simplest mode of operation, APL-11/RT performs the functions of an intelligent calculator. APL has been used extensively in the areas of science, engineering, education, and business applications.

Some features of APL-11/RT:

- Multiple statement lines
- Standard PDP-11 file-naming formats
- User workspace saved on all disk devices supported by the operating system
- Advanced primitive functions:
  - Execute a character string (commands, statement lines)
  - Format primitive functions for building output reports
  - Set functions for determining set union, intersection, etc.
  - Scan operator for producing year-to-date totals, etc.
  - Divide-quad functions for finding matrix inverses and solving sets of linear equations
- System variables for controlling the user's workspace, such as index origin, page width, and atomic vector
- System functions:
  - Functions for converting between programs as executable objects and variables
  - Functions for determining the class of objects or names in the workspace
- System commands for saving, loading, and copying workspaces
- User-level file operations on ASCII sequential and direct access files

**MINIMUM HARDWARE REQUIRED:**

Any valid RT-11 system configuration with at least 44K bytes of memory (48K bytes are recommended).

**OPTIONAL HARDWARE:**

- FP11 Floating Point Processors
- EIS and FIS Instruction Sets
- 300 BAUD LA37 terminal (LA36 with the APL option installed)
- 1200 BAUD LA120 terminal with the APL option installed

**PREREQUISITE SOFTWARE:**

RT-11 Operating System, Version 4.0

**OPTIONAL SOFTWARE:**

None

**TRAINING CREDITS:**

None

**SUPPORT CATEGORY:**

DIGITAL SUPPORTED

APL-11/RT is a DIGITAL Supported Software Product.

**SOFTWARE INSTALLATION:**

CUSTOMER INSTALLED

APL-11/RT is a software product engineered to be installed by the customer and includes other Software Product services listed below.

**SOFTWARE PRODUCT SUPPORT**

APL-11/RT includes standard services as defined in the Software Support Categories Addendum of 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.

A single-use license only option is a license to copy the software previously obtained under license.

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

The following key (D, E, G, H, Q, R, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ909-AE =binaries on RK05 Disk Cartridge.

D = 9-track 800 BPI Magtape (NRZI)
E = RK05 Disk Cartridge
G = TU58 DECtape II Cartridge
H = RL02 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
Y = RX01 Floppy Diskette
Z = No hardware dependency

NOTE: An RX01 diskette can be read on an RX02 drive.

QJ909 -A— Single-use license, binaries, documentation, support services (media: D, E, G, H, Q, Y)

QJ909 -C— Single-use license, binaries, documentation, no support services (media: D, E, G, H, Q, Y)

QJ909 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

*Sources/Listings Options*

QJ909 -E— Sources (media: D, E, H, Q)

QJ909 -F— Listings (media: R)

*Update Options*

Users of APL-11, Version 1.0 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.

QJ909 -H— Binaries, documentation (media: D, E, G, H, Q, Y)

QJ909 -H— Right to copy for single-use (under existing license), no binaries, no documentation (media: Z)

*Miscellaneous Options*

QJ909 -G— Documentation only kit (media: Z)

**ADDITIONAL SERVICES:**

None


# DIGITAL EQUIPMENT COMPUTER USERS SOCIETY

## INTRODUCTION

DECUS, the Digital Equipment Computer Users Society, was established in March of 1961 to advance the effective use of DIGITAL computers. It is a 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.

## ORGANIZATION

The Digital Equipment Computer Users Society is a federation of chapters, whose membership is determined by geographic location. The membership is organized to meet the specific needs of members in its area such as Symposia and Special User Group activities. The DECUS chapters are:

- *AUSTRALIAN CHAPTER (Australia, Indonesia, Malaysia, New Zealand, PNG, Singapore, )*
- *EUROPEAN CHAPTER (Europe, Middle East, North Africa, Russia)*
- *CANADIAN CHAPTER (Canada)*
- *U.S. CHAPTER (U.S. and All Others)*

## ACTIVITIES

### 1. SYMPOSIA

Symposia are sponsored throughout the year by each of the DECUS Chapters and Regional/National User Groups. These meetings provide an opportunity for users of DIGITAL computers to meet with other users and with DIGITAL management, engineers, and customer service representatives. They provide a forum for users to exchange information on technique and approaches to issues of common interest and to provide feedback to DIGITAL on existing and future products and services. Sessions at the symposia include user-driven workshops, tutorials, product panels, as well as application/system-specific presentations.

The technical papers and presentations from each symposium are published as DECUS Proceedings.

### 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 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, a DIGITAL representative, and its organization must meet the guidelines of the Chapter Executive Board.

Geographic subgroupings are formed to service the DECUS members within a specific area although they may also be based on interests as in SIGs. There are four types of geographic subgroupings:

1. *LUGs — Local User Groups*
2. *NUGs — National User Groups*
3. *RUGS — Regional User Groups*
4. *SLUGs — Student Local User Groups*

## 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.

## MEMBERSHIP

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

*INSTALLATION MEMBERSHIP*

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.

An Installation should appoint a person immediately concerned with the use of the computer to act as delegate to the Society. A delegate receives all official communications and has a vote on DECUS policies and elections. An organization or company is eligible for as many voting delegates as it has DIGITAL computers. Each delegate must file an application for Installation Membership.

*ASSOCIATE MEMBERSHIP*

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

Membership status is acquired by submitting the enclosed application to the appropriate Chapter Executive Secretary for approval by the Chapter Executive Board.

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

NAME: _____
(First) (Last/Family Name)

COMPANY: (INSTALLATION): _____

ADDRESS 1: _____

2: _____

3: _____

4: _____

(City Town,State Province, and Zip Postal Code)

COUNTRY: _____

TELEPHONE: _____ TELEX _____

I obtained this form from _____

## DECUS OFFICES

DECUS Australia
P.O. Box 384
Chatswood
NSW 2067
Australia

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

DECUS Europe
P.O. Box 510
12, avenue des Morgines
CH-1213 Petit-Lancy 1/GE
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).*

| Areas Covered | SPR Center |
|---|---|
| United States; remainder of Far East, Middle East, Africa Latin America | Administrative Services Group, SWS<br>P.O. Box F<br>Maynard, Ma 01754 |
| Canada | Digital Equipment Canada<br>P.O. Box 11500<br>Ottawa, Ontario<br>Canada K2H 8K8 |
| United Kingdom, Bahraine, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Qatar, Oman, Saudi Arabia, Syria, United Arab Emirates, Yemen, Arab Republic. | Digital Equipment Corp. LTD<br>Fountain House Butts Centre<br>GB - Reading RG17QN<br>England |
| Australia-Melbourne | Digital Equipment Aust. PTY. LTD<br>60 Park Street<br>So. Melbourne Victoria<br>Australia 3205 |
| Australia-Sydney | Digital Equipment Aust. PTY. LTD<br>123 125 Willoughby Rd.<br>P. O. Box 491<br>Crows Nest NSW<br>Australia 2065 |
| Brazil | Digital Equipment Comercio Ind.<br>Rua Batatais 429 Esq AL Campin<br>01423 Jardim Paulista<br>Sao Paulo 0100<br>Brazil |
| Caribbean | De Latin America<br>P. O. Box 11038<br>Fernando Juncos Sta.<br>Santurce<br>PR 00910 |
| France | Digital Equipment France<br>18, rue Saarinen France<br>Silic 225<br>F - 94528 Rungis - Cedex<br>France |
| Italy | Digital Equipment S.P.A.<br>Viale Fulvio Testi 117<br>I-20092 Cinisillo Balsamo<br>Milan,<br>Italy |
| Japan | Digital Equipment Corp. INTL<br>3rd Floor Kowa Bldg.<br>8-7 Sanban Cho<br>Chiyoda Ku Tokyo 102<br>Japan |
| New Zealand | Digital Equipment N.Z. LTD<br>P.O. Box 17093<br>Greenlane,<br>Auckland 5,<br>New Zealand |
| Belgium, Holland, Luxemburg | Digital Equipment B.V.<br>KAAP Horndreef 38<br>NL - Utrecht/Overvecht<br>Holland |
| Sweden | Digital Equipment Corp. AB<br>Englundavägen 7<br>S-171 24 Solna,<br>Sweden |
| Denmark | Digital Equipment Corp. APS<br>Kristineberg 3<br>DK-2100 Copenhagen Ø<br>Denmark |
| Finland | Digital Equipment Corp. OY<br>PL16<br>SF - 02201 ESPOO 20<br>Finland |
| Norway | Digital Equipment Corp. A/S<br>Pottenmakerveien 8<br>N - Oslo 5<br>Norway |
| Austria, East Germany, West Germany, Poland, Hungary, Rumania, Czechoslovakia, Russia, Bulgaria | Digital Equipment Corp. GMBH<br>Wallsteinplatz 2<br>D - 8 Munich 40<br>West Germany |
| Israël | DECSYS Computers LTD.<br>4, Yirmiyahou Str.<br>P.O. Box 6359<br>IL - Tel-Aviv 63505<br>Israël |

| Areas Covered | SPR Center |
|---|---|
| Greece, Portugal, Spain, Switzerland, Yugoslavia & Sina (Morocco, Algeria, Tunisia, Cyprus, Turkey, Malta) | Digital Equipment Corp. SA<br>9, route des Jeunes<br>1211 Geneva 26<br>Switzerland |

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