RT-11

February 1979

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THE SOFTWARE DISPATCH

RT-11 SOFTWARE DISPATCH

The RT-11 Software Dispatch complements the RT-11 V3B Software Dispatch Review. It publishes new and revised Software Product Descriptions, programming notes, software problems and solutions, and documentation corrections. Much of the material is developed from answers to customer Software Performance Reports (SPRs) significant to the general audience, and is printed here to establish a reference notebook for the customer's software interests.

PRODUCTS SUPPORTED in the RT-11 SOFTWARE DISPATCH

APL-11 V1	FORTRAN GRAPHICS PKG V1.1	MSB/FORTRAN IV V1
BASIC/RT-11 V2	FORTRAN/RT-11 Extensions V1B	MU BASIC/RT-11 V1
BASIC/RT Extensions V1	FORTRAN/RT-11 LSI Extensions V1	PDL/RT-11 V1
COS-350/2780	FORTRAN IV/RT-11 V2	PEAK-11 V2
CTS-300 V3, V4	GAMMA-11 F/B V2, V2C	PLOT-11/RT-11 V1.1
CTS-300 DICAM V1	INDUSTRIAL BASIC/RT-11 V1	RT-11/03 FORTRAN Extensions V1
CTS-300 DICAM II V1	LA-11 V3	REMOTE/RT-11 V1
CTS-300/DIS V1	LSP-11 V1	RT-11 V3, V3B
DECnet/RT-V1	LV11/RT-11 Plotting Pkg.V2	RT-11(CTS-300)LSI-11 2780 V2
FOCAL/RT-11 V1B	MSB11-V1	RT-11/2780 V2
	SSP-11/RT-11 V1	

DISTRIBUTION

The Dispatch is directed to one software contact for each licensed Category A and B software product for one year after installation. No mailing will be made to addresses without a software contact name. Address changes and requests for information about maintenance service after the first year should be sent to the nearest DIGITAL Field Office. For address changes, include the new address and mailing label from the most recently received publication.

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

TRADEMARKS of DIGITAL EQUIPMENT CORPORATION
Maynard, Massachusetts

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DECtape	LAB-8	TYPESET-8
DECUS	MASSBUS	TYPESET-11
	UNIBUS	

RT-11 Software Dispatch, February 1979

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT.)

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

How To Make The Best Use Of The SPR Form

What We Can Do For you

1. Blank SPR forms are available upon request in the desired quantities through the SPR Administration (P.O. Box F) and your local office/SPR Center.

2. Copies of the SPR acknowledgement and answer are sent to the appropriate DIGITAL Office/SPR Center for their information.

3. Your local office is provided status for submitted SPRs upon request by contacting SPR Administration.

4. Information is provided to the pertinent District Software Managers on High Priority SPRs that are submitted by customers in their districts.

5. SPRs marked PROBLEM/Error will have a response for supported Category A and B products. These SPRs should refer to suspected deficiencies in the software.

6. SPRs marked SUGGESTION are forwarded to the pertinent software group for information purposes, and are responded to at their discretion.

What You Can Do For Us

1. Customer Name and Address and Problem Statement should always be typed or printed clearly.

2. An SPR should be submitted with only one problem on it. Putting more than one problem on an SPR can greatly lengthen the turn-around time.

3. WHENEVER POSSIBLE, SUBMIT AN SPR WITH ATTACHMENTS, SUCH AS MACHINE READABLE DATA, DETAILED INSTRUCTIONS ON HOW TO REPRODUCE THE PROBLEM, PROGRAM AND/OR DATA FILES, LISTINGS, AND CONSOLE LOG.

4. It would be most helpful to all concerned if problems with patches are reported as soon as possible.

5. For security SPRs, it is imperative that the DO NOT PUBLISH box be marked.

6. It would be helpful if tapes submitted with SPRs are labeled (track and density), and have a directory attached.

7. Should you ever receive an unacceptable SPR response, please contact us or the appropriate SPR Center so that the response may be addressed.

8. SPRs should not be used for problems concerning software policy, software distribution, or hardware. The local office should be contacted in these cases.

RT-11 VØ3-Ø2 SUPPORT (JM)

The cutoff date for RT-11 VØ3-Ø2 SPR (Software Performance Report) response
is 1 March 1979. After 1 March 1979, there is no further obligation to
respond to SPRs for RT-11 VØ3-Ø2, however, SPRs will be answered on the
basis of V3B (as it is the current version).

CREATING AND ACCESSING VIRTUAL ARRAY FILES (CF)

TEXT: The following three rules concern the size of virtual
                    files.

Rule 1.   Any attempt to read from or write to a virtual array
                    element whose subscript(s) exceed(s) the maximum
                    subscript(s) as specified in the DIM# statement will
                    result in the SUBSCRIPT OUT OF BOUNDS error message.

Rule 2.   If the file size, as implied by the DIM# statement,
                    differs from the filesize specified by the FILESIZE
                    option in the OPEN statement, the larger of the two will
                    be taken.

                    Therefore, in the case of an OPEN FOR OUTPUT where the
                    FILESIZE option exceeds the DIM# implied size, a file
                    will be created as large as specified by the FILESIZE
                    option but its elements will not all be accessible.

Rule 3.   Any attempt to access elements beyond the end of a file
                    will result in the SUBSCRIPT OUT OF BOUNDS message.

                    It can be useful to specify a large implied file size in
                    a DIM# statement when OPENing an existing file of unknown
                    size. In this case, however, BASIC-11 protects data
                    beyond the actual file limits by returning the SUBSCRIPT
                    OUT OF BOUNDS message when the file boundary is violated.

REPUBLICATION OF PATCHES (CF)

TEXT: The following are republications of Patches A through F for
                 BASIC-11/RT-11 V2 together with as yet unpublished patches G and H.
                 They supersede all previously published patches.

                 Please note the following points concerning these patches:

                 1. PATCHES C, D, F & H

                    If you are patching unmodified .OBJ files, as supplied by DEC in
                    the BASIC-11/RT-11 V2 binary kit, you may substitute the following
                    values in the lines indicated and omit Patching Step 1 in the
                    given procedure:

Patch #	Patch File Line	Substitute Value
C	.=.+cccccc-eeeeee+74	.=.+5364
D	.=.+ssssss-bbbbbb+2	.=.+1214
F	.=.+ssssss-bbbbbb+2	.=.+1132
H	.=.+rrrrrr-cccccc+144	.=.+1346

                 2. PATCH D

                    Please note that this patch refers to a problem in double
                    precision BASIC-11; therefore, if you choose to perform Patching
                    Step 1, remember to use values from a link map obtained from a
                    double precision link of BASIC-11.

USE OF COMPILE COMMAND (CF)

TEXT: The COMPILE command saves a copy of the internal image
                 that BASIC-11 uses to store programs. This means that
                 statements are stored in a compressed format using tokens
                 and that variable tables are stored intact at the start
                 of the compiled program file for quick and easy
                 restoration when the compiled program file is OLDed back
                 into memory.

                 These variable tables are formed dynamically by internal
                 translation of the statements of a program as they are
                 originally entered and subsequently edited. Little
                 dynamic sorting and housekeeping of variable tables is
                 performed during this process.

                 It is recommended, therefore, that, before a COMPILE
                 command is issued, the current program should be
                 SAVEd/REPLACEd and OLDed. This will cause the variable
                 tables to be rebuilt in memory so that the subsequently
                 compiled file will consist of clean and tidy variable
                 tables, occupying minimum space.

                 This will also insure that all variable pointers in the
                 common string data storage area to symbol table entries
                 are in order in the compiled program file. [Refer to
                 previous article in this publication entitled "Use of
                 COMMON statement when CHAINing"]

                 In summary: - If you have added, changed or deleted
                 COMMON and/or DIM statements you should SAVE/REPLACE and
                 then OLD the current program before you COMPILE it.
                 Remember that COMMON statements must be the lowest line
                 numbered statements in a COMPILEd program.

DECnet-RT V1.0   Seq 9 N
  for RT-11 FB/XM V3.0   1 of 1
DAP INTERFACE

NOTES ON CHANGES TO DAP INTERFACE (WMD)

This article is to call attention to the recent modifications to the NFARs, NFT, and FAL in DECnet/RT. The other purpose of this article is to inform the users of the changes so that any difference in their user tasks using the NFARs will be explained. The NFARs have been modified in the following way:

> 1) Articles Seq. 16.2 titled 'DAP ROUTINES CHANGE MIND DURING FILE TRANSFER' and Seq. 16.3 titled 'CHECK FOR BLOCK MODE TRANSFER' correct a problem in the RT-11 NFARs which relates to the transfer mode of files between RT-11 and any system which supports block mode transfers. Before the correction, RT-11 would default to saying the transfer would be in block mode if the remote system was a non-RSX family system (RSX family systems do not support block mode currently). Later in the DAP message sequence, the NFARs would see the remote segment size, notice that it was not 512 decimal bytes, and decide to do record mode transfers. This is not allowed by DAP. The correction causes RT-11 to stay in block mode if it originally requested it.

> 2) The other important change to RT-11's NFARs has been to modify the NFARs in terms of ASCII carriage control. RSX/VAX family systems will handle the carriage control of variable length ASCII files much better if file is sent with implied carriage control as opposed to embedded control. The change makes the NFT or NFT like task do more work. The host task must check for remote RSX/VAX systems and strip the carriage control out of the variable length ASCII file before sending it to the remote system. A routine similar to the one in article Seq. 17.3 titled 'NFT ASCII FILE TRANSFERS TO VAX/RSX SYSTEMS' is sufficient to do this.

The major changes to FAL on RT-11 are this:

> 1) FAL will now properly process an 'end of stream' message followed by a 'control complete' message.

> 2) FAL has been modified to always send the attributes of ASCII files on RT-11 as stream ASCII. This requires that the remote system be intelligent enough to handle this file type and modify it, if necessary, to reside on the host node.

STORAGE OF THE NULL CHARACTER IN STRING VARIABLES AND VIRTUAL
    STRING ARRAYS (CF)

TEXT: 1.0 This article is intended to explain the significance
                     of null character storage in string variables and
                     virtual string arrays.

                2.0 String variables contain length information when
                     they are created, whereas virtual string arrays do
                     not.

                     Virtual string arrays do not recognize trailing null
                     characters; their length is determined by the number
                     of characters up to the last non-null character.

                     For this reason, only embedded null characters are
                     significant in virtual string arrays.

                3.0 The following table illustrates the significance of
                     the null character, stored as CHR$(0), when it is
                     a) the only character
                     b) embedded between non-null characters
                and c) the trailing character or characters.

****
                     Position of Null Character

****

Is the null recognized by LEN Function (Y/N)?	Only Character in String	Embedded	Trailing
String Variable	Y	Y	Y
Virtual Array	N	Y	N

****

SUBROUTINE 'GMXG' GENERATES ILLEGAL ADDRESS MESSAGE (RK)

When the FORTRAN support subroutine GMXG is called, the
following error message is printed

?Err 61 Illegal memory reference

Users who develop FORTRAN programs using the GAMMA-11
FORTRAN support must correct the object module GMFOR1.OBJ as
follows.

In the following, the user types the underlined text; <ESC>
denotes the ESCAPE (or ALTMODE) key.

If the display is the VSV01 color display,
replace nnn with 532, and mmmm with 6144 below.

If the display is the VT01 storage scope,
replace nnn with 416, and mmmm with 5350 below.

```
.EDIT/CREATE GMXG.MAC
*I.TITLE F4BAS
.IDENT /V2C.03/
.GLOBL SVTYPE
.=.+nnn
JSR PC,PATCH
.=.+3566
PATCH::
JSR PC,SVTYPE
TST (R5)+
RTS PC
.END
<ESC><ESC>
*EX<ESC><ESC>
.MACRO GMXG
ERRORS DETECTED: 0
.R PAT
*GMFOR1.NEW=GMXG/C:mmmm,GMFOR1
```

If the following error message is printed,

?PAT-W-Input file checksum error

do not proceed, but repeat the above; otherwise, type

.RENAME GMFOR1.NEW GMFOR1.OBJ

OPERATION OF OLD, RUN, CHAIN AND OVERLAY WHEN THE SPECIFIED FILE
   IS NOT FOUND (CF)

TEXT: This article is intended to clarify the operation of OLD,
                   RUN, CHAIN and OVERLAY when the specified file is not
                   found. The problem is that there are discrepancies in
                   the documented descriptions of the commands/statements
                   and inconsistency between single user BASIC-11 and MU
                   BASIC-11 V2.

                   The operations are explained in the following table:

```
##############################################################################
Action      Command           Resulting Current       Contents of
taken in     or               Workspace Program       Workspace
Language    Statement         Name if target          following error
Reference                     file does not exist     message (?FNF)
Manual or
Software
##############################################################################
LRM         OLD new prog      new prog                original program
            RUN new prog      new prog                original program
            CHAIN 'new prog'  new prog                original program
            OVERLAY 'new prog' not defined            not defined
##############################################################################
Single      OLD new prog      new prog                empty
User        RUN new prog      new prog                original program
BASIC-11 V2 CHAIN 'new prog'  new prog                original program
            OVERLAY 'new prog' remains same as before original program
##############################################################################
Multi-      OLD new prog      NONAME                  empty
User        RUN new prog      remains same as before  original program
BASIC-11 V2 CHAIN 'new prog'  remains same as before  original program
            OVERLAY 'new prog' remains same as before original program
##############################################################################
```

CREATING AND ACCESSING VIRTUAL ARRAY FILES (CF)

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                   files.

Rule 1.   Any attempt to read from or write to a virtual array
                   element whose subscript(s)·exceed(s) the maximum
                   subscript(s) as specified in the DIM# statement will
                   result in the SUBSCRIPT OUT OF BOUNDS error message.

Rule 2.   If the file size, as implied by the DIM# statement,
                   differs from the filesize specified by the FILESIZE
                   option in the OPEN statement, the larger of the two will
                   be taken.

                   Therefore, in the case of an OPEN FOR OUTPUT where the
                   FILESIZE option exceeds the DIM# implied size, a file
                   will be created as large as specified by the FILESIZE
                   option but its elements will not all be accessible.

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                   It can be useful to specify a large implied file size in
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                3.0 The following table illustrates the significance of
                     the null character, stored as CHR$(0), when it is
                     a) the only character
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                and c) the trailing character or characters.


```
************************************************************************
                    Position of Null Character

************************************************************************
Is the null             Only Character      Embedded        Trailing
recognized by LEN       in String
Function (Y/N)?
************************************************************************
String Variable              Y                 Y               Y
************************************************************************
Virtual Array                N                 Y               N
************************************************************************
```

USE OF COMPILE COMMAND (CF)

TEXT: The COMPILE command saves a copy of the internal image
                   that BASIC-11 uses to store programs. This means that
                   statements are stored in a compressed format using tokens
                   and that variable tables are stored intact at the start
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                   restoration when the compiled program file is OLDed back
                   into memory.

                   These variable tables are formed dynamically by internal
                   translation of the statements of a program as they are
                   originally entered and subsequently edited. Little
                   dynamic sorting and housekeeping of variable tables is
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                   It is recommended, therefore, that, before a COMPILE
                   command is issued, the current program should be
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                   tables to be rebuilt in memory so that the subsequently
                   compiled file will consist of clean and tidy variable
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                   common string data storage area to symbol table entries
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                   previous article in this publication entitled "Use of
                   COMMON statement when CHAINing"]

                   In summary: - If you have added, changed or deleted
                   COMMON and/or DIM statements you should SAVE/REPLACE and
                   then OLD the current program before you COMPILE it.
                   Remember that COMMON statements must be the lowest line
                   numbered statements in a COMPILEd program.

MU BASIC-11/RT-11 V2

MU BASIC-11/RT-11 V2 CONFIGURATION PROGRAM PATCH 1 (CF)

TEXT: Order of COMMON statements at start of MUCNFG.B00, MUCNF1.B00,
                MUCNF2.B00

                If you COMPILE the configuration program modules MUCNFG.B00,
                MUCNF1.B00, MUCNF2.B00 you will be unable to enter a valid
                device specification when prompted.

                This is because the COMMON statement at line 30 in each module
                should precede line 20 (DEF FNA statement). Refer to an
                earlier article entitled, "Use of COMMON statement when
                CHAINing".

                It is recommended, therefore, that users perform the following
                edits on the configuration program modules if they wish to
                COMPILE them. (<RET> implies carriage return.)

                User ID must be: 00

                OLD prog <RET>
                SUB 30/30/15 <RET>
                30 <RET>
                REPLACE <RET>
                OLD prog <RET>
                COMPILE <RET>

                where 'prog' represents: MUCNFG
                                            MUCNF1
                                            MUCNF2

                Perform the above edit sequence once for each configuration
                program module, three times in all.

RT-11 SOFTWARE DISPATCH
CUMULATIVE INDEX
FEBRUARY 1979

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

IMPORTANT!

Retracted articles are indicated: RETRACTION.

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

M = Mandatory patch. These are critical patches which each customer is required to install.

O = Optional patch. These articles are applicable only if the reported problems have occurred at the
      customer site or if they are unique to his operation.

R = Restriction. These problems are not patchable in released software. Restrictions are reviewed and
      corrected when possible as part of the normal release cycle.

N = NOTE. This information may be helpful to the user.

Component	Sequence	Mon/Yr

APL-11 V1

APL.SAV PROGRAM PATCHES

ERRONEOUS "DEFINITION ERROR" DURING FUNCTION EDITING	01 M	Nov 77
LOSS OF LOWER-CASE ON RE-ENTRY TO APL-11	02 M	Nov 77
APL WORKSPACE	03 R	Nov 77
"SYSTEM ERROR"S GENERATED BY NULL LINE ELEMENTS	04	Dec 77
INTERNAL MEMORY ALLOCATION PROBLEMS	05 M	Dec 77
ERROR FOR SCALAR RESULT OF DECODE OR INNER PRODUCT OPERATION	06 M	Feb 78
SYSTEM ERROR ON PARAMETER RETURN	07 M	May 78

BASIC-11/RT-11 V2

RESEQUENCE PRODUCES AN INCORRECT PROGRAM UNDER CERTAIN CONDITIONS	01 M	Aug 78
PRINT USING	02 M	Jun 78
MAX SIZE OF LINE ENTERED TO BASIC-11	03 M	Jun 78
REM STATEMENT CONTAINING LEFT PARENTHESIS CAUSES SUBSEQUENT SPACES AND PERIODS TO BE REMOVED	04 R	Jun 78
RUN (NH) COMMAND MAY GIVE AN ERROR MESSAGE	05 M	Jul 78
TERMINAL MAY HANG	06 M	Jul 78
DATA FILES	07 M	Jul 78
SAVE DEV: AND REPLACE DEV:	08 M	Jul 78
SINGLE PRECISION HANG AND NUMERIC CONVERSION PROBLEM (PATCH F)	09 M	Aug 78
CONVERSION PROGRAM	10 M	Sep 78
OVERLAYING WHILE IN A SUBROUTINE	11 R	Nov 78
OPERATION OF CTRLC, AND RCTRLC AND SYS (6) FUNCTIONS AND THE CTRL/C COMMAND	12 N	Nov 78
BASIC-11/RT-11 V2 CONVERSION PROGRAM PATCH 1	13 M	Feb 79
OPERATION OF OLD, RUN, CHAIN AND OVERLAY WHEN THE SPECIFIED FILE IS NOT FOUND	14 N	Feb 79
CREATING AND ACCESSING VIRTUAL ARRAY FILES	15 N	Feb 79
REPUBLICATION OF PATCHES	16 N	Feb 79
PRINT USING - PATCH A	17 M	Feb 79
RESEQ - PATCH B	18 M	Feb 79
EDITING A DIM #n STATEMENT - PATCH C	19 M	Feb 79
DOUBLE PRECISION HANG - PATCH D	20 M	Feb 79
SAVE dev: AND REPLACE dev: - PATCH E	21 M	Feb 79
SINGLE PRECISION HANG AND NUMERIC CONVERSION PROBLEM - PATCH F	22 M	Feb 79
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

Component	Sequence	Mon/Yr

90

Component	Sequence	Mon/Yr
REPLACEMENT PAGES	06	Oct 77
"NOT ENOUGH MEMORY" CONDITION	07 M	Jan 78
RECORDS BEING LOST	08 M	Feb 78
RUNNING V3 ON LSI	09 M	Apr 78
LP NO OUTPUT, ERROR 22 ON CLOSE	10 M	Jan 79

SORTG

TAGSORTS NOT ALLOWED ON ISAM FILES	01	May 77
CORRECTION TO VERSION "A" PATCH	02	Oct 77

SORTM

I/O ERROR INTERPRETED AS AN INPUT END OF FILE	01	Apr 77
NEGATIVE NUMBERS IN SORT/MERGE	02	Oct 77
SORTING CARETS	03 M	Jan 78
INCORRECT RECORD COUNT	04 M	Feb 78
FIRST RECORD OUT OF ORDER	05 M	Mar 78
ERR 16 IN TSD	06 M	Jul 78
MERGE WITH DESCENDING KEY	07 M	Sep 78

TSD

CHANGE READS STATEMENT TO ACCEPT 8-BIT ASCII	01	Apr 77
REPLACEMENT PAGES	02	Apr 77
PROGRAM SIZE CALCULATIONS FOR TSD	03	May 77
I/O RACE CONDITION	04	Jun 77
GARBLED OUTPUT DUE TO ALPHA OR DECIMAL DISPLAYS	05	May 77
PROBLEM WITH RENAM	06	Jun 77
LOCASE CONVERTS UNDERLINE TO RUBOUT	07	Jun 77
ISAM FILE SHARING PROBLEM	08	Jun 77
IMPOSSIBLE TRAP ON OVERLAYING	09	Jun 77
ISAM RECORDS CROSSING BLOCK BOUNDARIES	10	Aug 77
RECORDS BEING LOST	11 M	Feb 78
PERMANENTLY LOCKED GROUP	12 M	Mar 78
RUNNING V3 ON LSI	13 M	Apr 78
CLOSING ISAM FROM AN EXTERNAL SUBROUTINE	14 M	Apr 78
PROBLEM WITH ISAM INPUT	15 M	Apr 78
LP NO OUTPUT, ERROR 22 ON CLOSE	16 M	Jan 79

CTS-300 V3 AND CTS-300/DIS V3.5

ISAM REPAIR PROGRAM	01 O	Mar 78

CTS-300 V4

DECFORM

ADDITONAL INFORMATION ON MATH OPTION	01 N	Dec 77
UNDEFINED GLOBALS WITH DECFORM	02	Jan 78
TWO PROBLEMS IN FOCOMP	03 M	Feb 78
EOF AFTER CHANGED RECORD	04 M	Mar 78
LOST RECORD ON DUPLICATE KEY	05 M	Apr 78
MESSAGE FOR SPEED READERS	06 M	Apr 78
EXITING DECFORM VIA FIVE-PART QUESTION	07 M	Jun 78
TOO FEW DATA FIELDS RETURNED	08 M	Jun 78
USR NOSWAP CAUSES TRAP TO 4	09 M	Aug 78
RANDOM ERRORS WITH FIELD CHECK	10 M	Oct 78
ALTERNATE KEYPAD MODE	11 M	Nov 78

DICOMP

TRAP TO 4 UNDER XM	01 M	Feb 78
TRAP TO 10 UNDER FB	02 M	Feb 78
DON'T WASTE PAPER	03 M	Jul 78

DOCUMENTATION

REPLACEMENT PAGES	01 N	Dec 77
DOCUMENTATION CHANGES TO CTS-300 SYSTEM USER'S GUIDE	02 N	Jun 78
DOCUMENTATION CHANGES TO DECFORM USER'S GUIDE	03 N	Jun 78

ISMUTL

THREE PROBLEMS IN ISMUTL	01 M	Dec 77
WRONG FILE SPACE ALLOCATION	02 M	Apr 78
ERRONEOUS ERROR MESSAGE	03 M	Apr 78
ERROR 28	04 M	Apr 78
LEGAL CHARACTERS IN ISAM RECORDS	05 R	May 78

Component	Sequence	Mon/Yr
DUPLICATE KEYS IN THE INPUT FILE	06 M	Jun 78
MORE INPUT RECORDS THAN SPECIFIED	07 M	Jul 78
THREE PROBLEMS IN ISMUTL	08 M	Sep 78
FOUR PROBLEMS IN ISMUTL	09 M	Oct 78
PROBLEM WITH SEVEN DATA VOLUMES	10 M	Jan 79
LPTSPL		
JOB MISHANDLING	01 M	Jan 78
LPTSPL HANGS IF STARTED DETACHED	02 M	Nov 78
REDUCE		
MULTIPLE FILE PROBLEM	01 M	Jan 78
BAD FILE CAUSES SYSTEM HALT	02 M	Sep 78
WILD CARD PROBLEMS	03 M	Nov 78
DEFAULT DEVICE WITH SHORT COMMAND	04 M	Dec 78
SINGLE USER DIBOL		
PROBLEM WITH CLOSING A FILE	01 M	Dec 77
RANDOM ACCESS PROBLEM	02 M	Jan 78
MINUS ZERO	03 M	Jan 78
LPQUE DOES NOT WORK	04 M	Jan 78
CHANNEL 1	05 M	Jan 78
FIELD EDITING	06 M	Jan 78
WRONG ERROR MESSAGE	07 M	Feb 78
MINUS ZERO	08 M	Feb 78
S.U. DIBOL WORKS ONLY UNDER XM	09 M	Feb 78
RECORDS BEING LOST	10 M	Feb 78
NO SINGLE USER ON 11/10	11 M	Feb 78
RENAME PROBLEM	12 M	Apr 78
NO MAGTAPE IN V4	13 M	Apr 78
ABORT ON SECOND LPQUE STATEMENT	14 M	Jun 78
XCALL VERSN BEGETS TRAP TO 4 (See TSD, Seq 34 M)	15 M	Jun 78
LPNUM CAUSES FILE NOT FOUND	16 M	Jun 78
BAD OPEN	17 M	Jul 78
MONITOR TRAP WITH DIVIDE	18 M	Jul 78
RECORD NUMBERS GREATER THAN 65,535	19 M	Jul 78
PROBLEM ACCEPTING FROM A FILE	20 M	Jul 78
NO CTRL/C TRAP UNDER SUD	21 M	Aug 78
DIRECT CURSOR POSITIONING UNDER SUD	22 M	Aug 78
TTSTS DOES NOT WORK UNDER SINGLE USER DIBOL	23 M	Sep 78
CTRL/C TRAP AND TTSTS	24 M	Oct 78
ERR 23 WITH CARD READER	25 M	Oct 78
VERY LARGE RECORD NUMBERS	26 M	Nov 78
GARBAGE TO THE LP	27 M	Nov 78
LP NO OUTPUT, ERROR 22 ON CLOSE	28 M	Jan 79
SORTG		
KDTYP MISSING	01 M	Feb 78
THREE SORT PROBLEMS	02 M	Nov 78
SORTM		
SORTING CARETS	01 N	Dec 77
TAGSORTS WITH MULTIPLE KEYS	02 M	Jan 78
FIRST RECORD OUT OF ORDER	03 M	Mar 78
ERR 16 IN TSD	04 M	Jul 78
THREE SORT PROBLEMS	05 M	Nov 78
MERGE DOES NOT ACCEPT EMPTY FILES	06 M	Jan 79
SORTP		
NO PROTECTION FROM MIXING DATA MODES	01 M	Jun 78
STATUS.TSD		
WRONG JX INFORMATION	01 M	Dec 77
PENDING MESSAGES	02 M	Jan 78
PROBLEM DURING JOB STARTUP	03 M	Mar 78
TSD		
PROBLEM WITH MULTIPLE ISAM FILES	01 M	Dec 77
TNMBR TRAPS TO 4	01a M	Jan 79
RANDOM ACCESS PROBLEM	02 M	Jan 78
MINUS ZERO	03 M	Jan 78
DELETE CAUSES STACK OVERFLOW	04 M	Jan 78
FIELD EDITING	05 M	Jan 78
PROBLEM WTIH ISAM INPUT	06 M	Jan 78

Component	Sequence	Mon/Yr
SEND CAUSES STACK OVERFLOW	07 M	Feb 78
STATUS GIVES FALSE REPORT	08 M	Feb 78
FILE SHARING	09 M	Feb 78
CHANNEL IN USE PROBLEM	10 M	Feb 78
PROGRAMS CREATED IN REGION 0	11 M	Feb 78
IMPLICIT JOB STARTUP PROBLEM	12 M	Feb 78
PENDING MESSAGES DESTROY SYMBOL TABLE	13 M	Feb 78
TERMINALS IGNORED	14 M	Feb 78
TROUBLE WITH TSD UNDER FB	15 M	Feb 78
MEMORY FAULT WITH SEND/RECV	16 M	Feb 78
PERMANENTLY LOCKED GROUP	17 M	Mar 78
SLOW TERMINAL I/O	18 M	Mar 78
PROBLEM WITH FORCED JOB AND TERMINAL NUMBER	19 M	Mar 78
INCORRECT CHECK FOR FREE SPACE	20 M	Mar 78
SYSGEN/TSDGEN PROBLEM	21 M	Mar 78
OPENING LP: GENERATES ERRORS	22 M	Mar 78
RECORDS BEING LOST	23 M	Apr 78
BAD I/O, FLAG NOT CLEARED	24 M	Apr 78
CLOSING ISAM FROM EXTERNAL SUBROUTINE	25 M	Apr 78
DISPLAY FROM DETACHED PROGRAM TO DETACHED TERMINAL	26 M	Apr 78
NO MAGTAPE IN V4	27 M	Apr 78
BASE LEVEL 2	28 M	Apr 78
R6 STACK OVERFLOW	29 M	May 78
TSD HANGS IF LP GOES OFF LINE	30 M	Jun 78
SLEEP PAST MIDNIGHT, NEVER WAKE UP	31 M	Jun 78
LOWER CASE CONVERTS TO UPPER CASE	32 M	Jun 78
THREE PROBLEMS IN XMTSD	33 M	Jun 78
XCALL VERSN BEGETS TRAP TO 4 (See Single User DIBOL, Seq 15 M)	34 M	Jun 78
SLAVE REFUSES TO WORK	35 M	Jun 78
MORE LP: NOHANG DIFFICULTIES	36 M	Jun 78
MORE TRAPS TO 4 AND 10	37 M	Jun 78
NO ALIGN OR DELETE WITH LPQUE	38 M	Jun 78
TRAP TO 10 CAUSED BY OPEN ISAM FILE	39 M	Jun 78
NO ROOM FOR BUFFER CAUSES TRAP TO 4/10	40 M	Jun 78
MAGTAPE READ DOES NOT WORK	41 M	Jul 78
MONITOR TRAP WITH DIVIDE	42 M	Jul 78
RECORD NUMBERS GREATER THAN 65,535	43 M	Jul 78
BAD BINARY FILE	44 M	Jul 78
STOP CHAIN FAILURE	45 M	Aug 78
SKIPPED TERMINALS CAUSE FORCED JOB STARTUP PROBLEM	46 M	Aug 78
SKIPPED TERMINALS CAUSE "SEND" PROBLEM	47 M	Aug 78
ANOTHER EXTENDED MEMORY ALLOCATION PROBLEM	48 M	Aug 78
REMOTE TERMINAL PROBLEM	49 M	Aug 78
SEND TO -2 SOMETIMES FAILS	50 M	Aug 78
WASTED SPACE	51 M	Aug 78
CANNOT INTERRUPT TIGHT I/O LOOPS	52 M	Aug 78
PROBLEM WITH SEND	53 M	Sep 78
CTRL/C TRAP AND TTSTS	54 M	Oct 78
ATTACH SOMETIMES GETS CONFUSED	55 M	Oct 78
SHUFFLER/LINE PRINTER CONFLICT	56 M	Oct 78
VERY LARGE RECORD NUMBERS	57 M	Nov 78
STOREs TO AN ISAM FILE CAN CAUSE I/O ERROR	58 M	Nov 78
GARBAGE TO THE LP:	59 M	Nov 78
LP NO OUTPUT, ERROR 22 ON CLOSE	60 M	Jan 79

TSDGEN

HARDWARE FORM FEEDS AND TSD	01 M	Nov 78
SET TT SCOPE GETS RESET	02 M	Nov 78

CTS-300/DIS V3.5

USE OF RSTAT WITH ISAM FILES	01 R	NOV 77

DECFORM

SEARCHMODE AND RENAM PROBLEM - NEW VERSION NUMBER	01	Oct 77
MICRO CODE CAUSES TRAP TO 10	02	Oct 77
DECFORM RESTRICTIONS	03	Nov 77
EXTRA CHARACTERS AT STATEMENT END	04	Nov 77
FOCOMP INCORRECTLY ALLOCATES AN EXTRA CHARACTER	05	Nov 77
CONDITIONAL GOTO AND CONDITIONAL SKIP	06	Nov 77
DECFORM PROBLEMS AND RESTRICTION	07	Nov 77

93

Component	Sequence	Mon/Yr
HANG ONE EXIT	08 M	Jan 78
TWO PROBLEMS IN FOCOMP	09 M	Feb 78
EOF AFTER CHANGED RECORD	10 M	Mar 78
NEGATIVE NUMBER ENDING IN ZERO	11 M	Mar 78
LOST RECORD ON DUPLICATE KEY	12 M	Apr 78
MESSAGE FOR SPEED READERS	13 M	Apr 78
EXITING DECFORM VIA FIVE-PART QUESTION	14 M	May 78
DICOMP		
IMPROPER GLOBAL INFORMATION	01	Nov 77
COMMENT CAUSES ERROR	02	Nov 77
DOCUMENTATION		
MULTIVOLUME FILES ON MAGTAPE	01 N	Feb 78
PAGE CORRECTION	02 N	Apr 78
DOCUMENT ERROR	03 N	Apr 78
FILEX		
RESTRICTION ON FILEX	01 R	Nov 77
FILEX INFORMATION AND RESTRICTION	02 R	Mar 78
OUT ERR WITH 128-CHARACTERS RECORDS	03 M	Jul 78
BLANK RECORDS	04 M	Sep 78
ISMUTL		
INDEXING PROBLEM	01	Nov 77
INCORRECT APPEND CALCULATION	02	Nov 77
ERR 16 IN REORG	03	Nov 77
WRONG RECORD COUNT	04	Nov 77
THREE PROBLEMS IN ISMUTL	05	Jan 78
REPLACEMENT PAGES	06 N	Feb 78
WRONG FILE SPACE ALLOCATION	07 M	Apr 78
ERRONEOUS ERROR MESSAGE	08 M	Apr 78
ERROR 28	09 M	Apr 78
LEGAL CHARACTERS IN ISAM RECORDS	10 R	May 78
DUPLICATE KEYS IN THE INPUT FILE	11 M	Jun 78
MORE INPUT RECORDS THAN SPECIFIED	12 M	Jul 78
THREE PROBLEMS IN ISMUTL	13 M	Sep 78
FOUR PROBLEMS IN ISMUTL	14 M	Oct 78
PROBLEM WITH SEVEN DATA VOLUMES	15 M	Jan 79
LPTSPL		
NO CONTINUE AFTER PROGRAM ABORT	01 M	May 78
SINGLE USER DIBOL		
LOCASE CONVERTS UNDERLINE TO RUBOUT	01	Oct 77
ISAM RECORDS CROSSING BLOCK BOUNDARIES	02	Nov 77
PROBLEM IN 32K OR LESS	03	NOV 77
"NOT ENOUGH MEMORY" CONDITION	04	Jan 78
SPURIOUS I/O ERRORS CURING ISAM STORE	05	Jan 78
RECORDS BEING LOST	06 M	Feb 78
LP NO OUTPUT, ERROR 22 ON CLOSE	07 M	Jan 79
SORTG		
TAGSORTS NOT ALLOWED ON ISAM FILES	01	Oct 77
CORRECTION TO VERSION "A" PATCH	02	Nov 77
SORTM		
NEGATIVE NUMBERS IN SORT/MERGE	01	Nov 77
SORTING CARETS	02 N	Jan 78
INCORRECT RECORD COUNT	03 M	Feb 78
FIRST RECORD OUT OF ORDER	04 M	Mar 78
ERR 16 IN TSD	05 M	Jul 78
MERGE WITH DESCENDING KEY	06 M	Sep 78
TSD		
I/O RACE CONDITION	01	Nov 77
ERRONEOUS PATCH TO TSD	01a	Nov 77
INCORRECT JOB NUMBER AT STARTUP TIME	02	Sep 77
PROBLEM WITH RENAM	03	Sep 77
LOCASE CONVERTS UNDERLINE TO RUBOUT	04	Oct 77
ISAM FILE SHARING PROBLEM	05	Nov 77
IMPOSSIBLE TRAP ON OVERLAYING	06	Nov 77
ISAM RECORDS CROSSING BLOCK BOUNDARIES	07	Nov 77

Component	Sequence	Mon/Yr
RECORDS BEING LOST	08 M	Feb 78
PERMANENTLY LOCKED GROUP	09 M	Mar 78
CLOSING ISAM FROM AN EXTERNAL SUBROUTINE	10 M	Apr 78
PROBLEM WITH ISAM INPUT	11 M	Apr 78
LP NO OUTPUT, ERROR 22 ON CLOSE	12 M	Jan 79

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

DDCMP
DDCMP LINE COUNTERS OVERFLOW TO ZERO	01 O	Jul 78

DMC
DMC LINE COUNTERS OVERFLOW TO ZERO	01 O	Jul 78

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

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

NSP
PROTOCOL VIOLATION IN NODE INITIALIZATION	01 M	Jan 79

NFT
NFT ASCII FILE TRANSFER TO VAX/RSX SYSTEMS	03 M	Feb 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 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
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

Component	Sequence	Mon/Yr
FORTRAN IV/RT-11 V2.1		
FORTRAN IV V2.1 MAINTENANCE RELEASE	01 N	Dec 78
COMPILER		
PATCH 1	02 M	Feb 79
PATCH 2	03 M	Feb 79
PATCH 3	04 M	Feb 79
OTS		
PATCH 4	05 M	Feb 79
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
NEGATIVE INTENSITY	02 N	Nov 78
GAMMA-11 F/B V2		
DATA ANALYSIS PROGRAM	01 M	Feb 77
STUDY TRANSFER 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 O	Feb 79
FGAMMA/BGAMMA RACE CONDITION	17 M	Feb 79
DELAYED START LIST MODE STUDIES	18 M	Feb 79

96

Component	Sequence	Mon/Yr
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
PROBLEMS WITH PATIENT MONITOR AND GSA ADMIN BLOCKS	23 M	Feb 79
FOREGROUND GATED LIST MODE STUDIES FAIL	24 M	Feb 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

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

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

LV11/RT-11 PLOTTING PACKAGE V2

SUBROUTINE PLOT DOES NOT CORRECTLY REPRODUCT VT11 PICTURE	01 M	Apr 78

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*.*) 97	07 N	May 78

Component	Sequence	Mon/Yr
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

Component	Sequence	Mon/Yr
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.BOO, MUCNF1.BOO, MUCNF2.BOO	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

PDL/RT-11 V1B

Component	Sequence	Mon/Yr
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

Component	Sequence	Mon/Yr
"MREPRT" AND "REPRT" GET CONFUSED	01 M	Aug 78

REMOTE/RT-11 V1

Component	Sequence	Mon/Yr
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

Component	Sequence	Mon/Yr
"HANG" CONDITIONS	26 R	Apr 78
UANSSIGNED	27	XXX XX
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

Component	Sequence	Mon/Yr
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

Component	Sequence	Mon/Yr
EDIT DOES NOT OPERATE CORRECTLY UNDER XM MONITOR	01 M	Mar 78

MACRO

Component	Sequence	Mon/Yr
.NARG FAILS WHEN AUTOMATIC LABEL GENERATION IS USED	01 M	Apr 78

MISCELLANEOUS

Component	Sequence	Mon/Yr
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

MONITOR

Component	Sequence	Mon/Yr
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

SOURCES

Component	Sequence	Mon/Yr
UNRESOLVED DIFFERENCES IN DEMOX1.MAC	01 M	Aug 78
DISTRIBUTED MAGTAPE HANDLER CORRECTIONS	02 M	Sep 78

SYSTEM HANDLERS

Component	Sequence	Mon/Yr
DM HANDLER CORRECTIONS	01 M	Oct 78
DM SYSTEM HANDLERS CORRECTIONS	02 M	Dec 78
DM HANDLER ERROR HANDLING CORRECTIONS	03 M	Jan 79

UTILITIES

Component	Sequence	Mon/Yr
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
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

Component	Sequence	Mon/Yr
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

RT-11 V3B

DOCUMENTATION

ERROR IN FOREGROUND/BACKGROUND DEMONSTRATION	01 M	Aug 78
THE /LIST OPTION FOR THE DIBO, 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

MISCELLANEOUS

ERRORS IN THE SYSGEN CONDITIONAL FILE	01 M	Jul 78
ERROS IN MTATCH ROUTINE	02 M	Nov 78

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

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

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
RT01 PATCH CLARIFICATION	07 N	Jan 79

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

Component	Sequence	Mon/Yr
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

RT-11/2780 V2

Component	Sequence	Mon/Yr
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

SECTION A: RT-11 (CTS-300)/LSI-11 2780 SPECIFIC INFORMATION

DESCRIPTION:

RT-11 (CTS-300)/LSI-11 2780 provides emulation of an IBM 2780 remote batch terminal. It runs under the RT-11 Foreground/Background monitor on a suitably equipped RT-11 (Version 2C or later) or CTS-300/DIS (Version 1.0 or later) system. General characteristics of DIGITAL's PDP-11 based 2780 products are given in Section B of this Software Product Description.

Any disk device supported by RT-11 or CTS-300 for the LSI-11 can be used as a source of transmission files. Any disk or line printer supported by RT-11 or CTS-300 for the LSI-11 can be used to receive files.

The LA180 can be used only in off-line mode to print files temporarily stored on disk.

RT-11 (CTS-300)/LSI-11 2780 will run at modem speeds up to 2400 bits per second, in either foreground or background. No other tasks may run concurrently with the 2780 emulator.

MINIMUM HARDWARE REQUIRED:

Any valid LSI-11 based RT-11 or CTS-300 Foreground/Background system configuration which includes:

- at least 32K bytes of memory for 2780 operation in the background
- at least 48K bytes of memory for 2780 operation in the foreground
- a disk device
- DUV11 Synchronous Line Interface
- REV11-A or -B bootstrap with memory refresh terminator
- Terminal (LA32, VT52)

OR

Any one of the following DEC Datasystem configurations (with DUV11):

- DS322 RX11 Floppy-based system
- DS324 RK11 DECpack-based system

OPTIONAL HARDWARE:

LP11 (CTS-300 systems only) or LA180 line printer

PREREQUISITE SOFTWARE:

RT-11 operating system, Version 2C or later

OR

CTS-300/DIS System Software, Version 1.0 or later

OPTIONAL SOFTWARE:

None

TRAINING CREDITS:

No training credits are included in the 2780 Emulator Software License charges. Training courses are not required in order to operate the product.

SUPPORT CATEGORY:

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

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

ORDERING INFORMATION:

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

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

A single-use license only option is a license to copy

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

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

The following key (E, Q, R, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJD58-AE = binaries on RK05 disk.

E = RK05 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJD58 -A— Single-use license, binaries, documentation, support services (RT-11 not included) (media: E, Q, Y)

QJD58 -C— Single-use license, binaries, documentation, no support services (media: E, Q, Y)

QJD58 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

Source/Listing Options

QJD58 -E— All sources (RT-11 not included) (media: E, Q, Y)

QJD58 -F— Listings (RT-11 not included) (media: R)

ADDITIONAL SERVICES:
None

ADDENDUM
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

CATEGORY A

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.

2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.

3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

CATEGORY B

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

CATEGORY C

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.

SECTION B: 2780 Emulator GENERAL DESCRIPTION

The 2780 Emulator is a collective name for the set of software products that allows various DIGITAL operating systems to emulate the operation of an IBM 2780 Model 1 or 2 Data Transmission Terminal with the multiple record option. Emulation of the 2780 permits communication between such DIGITAL systems and (1) the following IBM Remote Job Entry programs supporting the device: OS/HASP, OS/ASP, DOS-POWER and OS/RJE, or (2) a second DIGITAL-supplied 2780 emulator.

The following DIGITAL operating systems support the emulator for the 2780 Model 2: RSTS/E (CTS-500), IAS, RSX-11M, RT-11 and DECsystem-10[1]. In addition, a CTS-300 based emulator (Model 1 only) and a LSI-11 based RT-11 (CTS-300) 2780 are available.

Section A gives the distinguishing features of the particular 2780 emulator described by this SPD. The remainder of this section describes items common to all PDP-11 2780 emulators.

OPERATION:

After the system operator starts the 2780 Emulator, it solicits and responds to console command input.

Transmission: All 2780 emulators can transmit data from card readers, if they are present in the system, and transmit data files from disk storage devices. The RSTS/E 2780 Emulator has the added capability of spooling or queuing transmission requests from timesharing users.

All 2780 emulators transmit EBCDIC and binary data. Since the host systems use the ASCII character set, however, they accept ASCII characters for transmission and then perform automatic character conversion. No conversion is performed on binary data.

The physical units of data that are transmitted are called blocks. Blocks are divided into logical units called records. Maximum block size is 400 characters; maximum record size when transmitting to IBM operating systems is 80 characters, and when communicating with other 2780s or 2780 emulators, the record size is variable up to 132 characters. Records that are less than maximum allowable size are either extended to the maximum by blank filling, or transmitted as is, at the user's option. Up to seven (7) records can be transmitted per block.

Reception: All 2780 emulators can print received character data on a line printer, if one is present in the system. In most cases, the software simulates limited-function vertical format control (VFC) by providing Top of Form (Skip to Channel 1), Print-and-Space-1, -2, or -3 line(s) functions, and Skip to Channels 2 through 8, all of which cause module 8 line space operation--i.e., skip to the next line which is an even multiple of 8 from Top-of-Form. Both 64- and

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[1] Limited to 2780 mode only for PDP-11 communication.

96-character line printers are supported. However, support of line printers which are too slow to keep up with the speed of the communications link (i.e., LS11 and LV11) is limited to off-line or DIGITAL-to-DIGITAL usage, because their speed can cause timeout errors in an IBM system.

All emulators write files onto disk storage devices. In such cases, a separate file is created for each received file.

All 2780 emulators receive EBCDIC or binary data. They can automatically convert EBCDIC data to ASCII upon reception, or EBCDIC data can be written to a file by the use of the binary mode.

Maximum receive block size is 400 characters. The maximum receive record size is a two-character escape code, plus 132 data characters. Up to seven (7) records can be received per block.

All emulators provide automatic answer to dial-in rings.

Modems and Data Links: All 2780 emulators support operation over synchronous data links, in point-to-point contention mode only, at speeds up to 4800 bps (except the LSI-11 based RT-11/2780 which runs at 2400 bps). Bell 201 or 208 modems or equivalent are specified. Operation with other modems is not precluded, but warranted support does not apply in these cases.

Data link control characters are supplied automatically by the emulators. On transmission errors, the emulators will re-try up to seven (7) times before declaring the link dead.

Configuring PDP-11 2780 Emulator Systems: Configuration requirements for each emulator are defined in Section A. Briefly, the PDP-11 2780 emulators require the following hardware beyond the standard operating system configurations:

- DP11, DU11, DUP11, or DUV11 Synchronous Line Interface
- KG11-A Communications Arithmetic Element (except the LSI-11 based RT-11/2780)
- KW11-L or KW11-P clock (except the LSI-11 based RT-11/2780)
- 16K bytes of additional memory beyond the minimum may be required. (Refer to Section A.)

TRAINING CREDITS:

No training credits are included in the 2780 Emulator Software License charges. Training courses are not required in order to operate the product.

SUPPORT CATEGORY:

Installation will be deemed complete in the case of connection with IBM when:

- The customer's 360/370 configuration includes a 2701 Data Adapter, a 2703 Transmission Control Unit, a 3704 or 3705 Transmission Controller, or a System/370 Model 135 Integrated Communications Adapter.

● A DIGITAL sample procedure included with the software has been successfully executed.

Installation in DIGITAL-to-DIGITAL operation will be deemed complete when DIGITAL-supplied files can be transmitted successfully in both directions.

CUSTOMER RESPONSIBILITIES:

Before installation of the software, the customer must:

1. Obtain, install, and demonstrate operational to DIGITAL's satisfaction any modems and other equipment and facilities necessary to interface to DIGITAL's communications line interfaces and terminals.

2. Install or have installed all hardware, including terminals, to be used on the system.

3. Generate for terminal support any and all IBM systems that will be communicating with the emulator, to DIGITAL's satisfaction.

4. Make available to DIGITAL personnel all hardware, including communications facilities and terminals, to be used during installation and acceptance testing for a reasonable period of time each day as mutually agreed upon by DIGITAL and customer, until acceptance criteria are satisfied.

5. Provide access privileges and machine time on any and all IBM systems on which the installation is to be performed.

6. When communicating with IBM, make available to DIGITAL personnel an IBM 360/370 job stream with data, to run via the 2780 Emulator on-line to a 360/370 in accordance with the configuration specifications outlined above.

Delays caused by any failure to meet these responsibilities will be charged at the then prevailing rate for time and materials.

The following table summarizes some of the features of the PDP-11 2780 Emulators.

CHARACTERISTIC EMULATOR NAME	MINIMUM CONFIGURATION SUMMARY (see Section A)	HOST OPERATING SYSTEM	MAXIMUM SPEED	OUTPUT DEVICES SUPPORTED	INPUT DEVICES SUPPORTED	FORMS CONTROL SUPPORTED	SPOOLING SUPPORTED	MODEMS AND IBM OPERATING SYSTEMS SUPPORTED
RSX-11D/2780 RSX-11M/2780 IAS/2780	Any standard RSX-11D or RSX-11M configuration with the following memory: 11M - 16KW 11D - 56KW IAS - 72KW DU11, DP11 or DUP11, KG11	RSX-11D or RSX-11M or IAS	4800 bps	Line printer or any Files-11 device except DECtape and paper tape punch	Card reader or any other Files-11 device except DECtape	Top of Form. Skip 1, 2, or 3 lines. Skip modulo 8. Horizontal forms control	Yes on reception. No on transmission	Bell 208 or 201 or equivalent; OS/RJE, OS/HASP, DOS/POWER, OS/ASP
RSTS/2780 (CTS-500/2780)	Minimal RSTS/E or CTS-500 system consistent with number of users and expected application, plus 8K words of memory. DU11, DUP11, or DP11, KG11	RSTS/E (CTS-500)	4800 bps	Line printer or any disk except flexible diskette, magnetic tape (limited)	Card reader or any disk, magnetic tape (limited)	Top of Form. Skip 1, 2, or 3 lines. Horizontal forms control	Yes	Same as above
RT-11/2780 (CTS-300/2780)	Disk-based Foreground/ Background RT-11 or COS-350 system with 16K words of memory. DU11 or DP11 or DUP11, KW11-L, KG11-A	RT-11 (CTS-300)	4800 bps	Line printer or any disk supported by RT-11 (CTS-300)	Card reader, paper tape reader, or any disk supported by RT-11 (CTS-300)	Top of Form. Skip 1, 2, or 3 lines. Skip modulo 8. Horizontal forms control	No	Same as above
RT-11 (CTS-300) LSI-2780	Disk-based Foreground/ Background RT-11 system with 16K words of memory. DUV11, REV-11 (AORC)	RT-11 (CTS-300)	2400 bps	Line printer or any disk supported by RT-11 (CTS-300)	Any disk supported by RT11 (CTS-300)	Top of Form. Skip 1, 2, or 3 lines. Skip modulo 8. horizontal forms control	No	Same as above

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Software Product Description

SECTION A: RT-11/2780 (CTS-300/2780) SPECIFIC INFORMATION

DESCRIPTION:

RT-11/2780 (CTS-300/2780) provides emulation of an IBM 2780 remote batch terminal. It runs under the RT-11 Foreground/Background monitor on a suitably equipped RT-11 (Version 2B or later) or CTS-300 system. General characteristics of DIGITAL's PDP-11 based 2780 products are given in Section B of this Software Product Description.

Any RT-11 or CTS-300 supported disk device, card reader or paper tape reader can be used as a source of transmission files. Any RT-11 or CTS-300 supported disk device or line printer except the LS11 and LV11 can be used to receive files. (The LS11 or LV11 can be used in off-line mode, however, to print files temporarily stored on disk.)

The performance characteristics for the system vary, depending primarily on whether RT-11/2780 (CTS-300/2780) is running the foreground or background. At 4800 baud with the 2780 Emulator running in the foreground on a PDP-11/05, between 50 percent (during transmission/reception) and 70 percent (when the link is idle) of the CPU is available for a background job. Because foreground has priority on system resources, background operation of the 2780 Emulator is possible only with a foreground job that allows the 2780 Emulator at least 90 milliseconds out of every 100 to service time-critical protocol requirements. Hence, computational tasks, for example, should be run in the background, with the 2780 Emulator running in the foreground.

MINIMUM HARDWARE REQUIRED:

Any valid RT-11 Foreground/Background system configuration (except LSI-11 and PDT based systems) with:

- at least 32K bytes of memory for 2780 operation in the background
- at least 48K bytes of memory for 2780 operation in the foreground
- KW11-L Line Frequency Clock
- a disk device
- KG11-A Communications Arithmetic Element

- DP11, DU11, or DUP11 Synchronous Line Interface (NOTE: The line interface must have a higher priority than the RX11 floppy disk, should one be present on the system.)

OR, Any one of the following DEC Datasystem configurations:

- DS352 RX11 Floppy-based system
- DS354 RK11 DECpack-based system
- DS356 RPR11 Disk pack-based system

with:

- at least 32K bytes of memory for 2780 operation in the background
- at least 48k bytes of memory for 2780 operation in the foreground

A DU11 Synchronous Line Interface and KG11 Communications Arithmetic Element are included in the CTS-300/2780 package.

NOTE:

The line interface must have a higher priority than the RX11 floppy disk on the D352 and D356 systems.

OPTIONAL HARDWARE:

Any disk, paper tape reader, card reader or line printer supported by RT-11 or CTS-300, except LS11 and LV11. For CTS-300 systems, there is a maximum of one (1) RX11 controller per system.

PREREQUISITE SOFTWARE:

RT-11 operating system, Version 2 or later
OR, CTS-300 System Software, Version 1.0 or later

OPTIONAL SOFTWARE SUPPORTED:

None

TRAINING CREDITS:

None

SUPPORT CATEGORY:

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

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

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, and use such software in accordance with DIGITAL's Standard Terms and Conditions of Sale. The category of support applicable to such copied software is Category C.

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

The following key (C, D, E, F, Q, R, V, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJD63-AD = binaries on 9-track magnetic tape.

C = DECtape
D = 9-track Magnetic Tape
E = RK05 Disk Cartridge
F = 7-track Magnetic Tape
Q = RL01 Disk Cartridge
R = Microfiche
V = RK07 Disk Cartridge
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJD63 -A— Single-use license, binaries, documentation, support services (RT-11 not included) (media: C, D, E, F, Q, V, Y)

QJD63 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

For CTS-300 Systems
DS3CC -A— Single-use license, binaries, documentation, communications subsystem, support services (media: E, Q, V, Y)

DS3CC -D— Single-use license only, with communications subsystem, no support services (media: Z)

Source/Listing Options
QJD63 -E— All sources (RT-11 not included) (media: C, D, E, F, Q, V, Y)

QJD63 -F— Listings (RT-11 not included) (media: R)

ADDITIONAL SERVICES:

None

ADDENDUM
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

CATEGORY A

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.

2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.

3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

CATEGORY B

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

CATEGORY C

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.

SECTION B: 2780 Emulator GENERAL DESCRIPTION

The 2780 Emulator is a collective name for the set of software products that allows various DIGITAL operating systems to emulate the operation of an IBM 2780 Model 1 or 2 Data Transmission Terminal with the multiple record option. Emulation of the 2780 permits communication between such DIGITAL systems and (1) the following IBM Remote Job Entry programs supporting the device: OS/HASP, OS/ASP, DOS-POWER and OS/RJE, or (2) a second DIGITAL-supplied 2780 emulator.

The following DIGITAL operating systems support the emulator for the 2780 Model 2: RSTS/E (CTS-500), IAS, RSX-11M, RT-11 and DECsystem-10[1]. In addition, a CTS-300 based emulator (Model 1 only) and a LSI-11 based RT-11 (CTS-300) 2780 are available.

Section A gives the distinguishing features of the particular 2780 emulator described by this SPD. The remainder of this section describes items common to all PDP-11 2780 emulators.

OPERATION:

After the system operator starts the 2780 Emulator, it solicits and responds to console command input.

Transmission: All 2780 emulators can transmit data from card readers, if they are present in the system, and transmit data files from disk storage devices. The RSTS/E 2780 Emulator has the added capability of spooling or queuing transmission requests from timesharing users.

All 2780 emulators transmit EBCDIC and binary data. Since the host systems use the ASCII character set, however, they accept ASCII characters for transmission and then perform automatic character conversion. No conversion is performed on binary data.

The physical units of data that are transmitted are called blocks. Blocks are divided into logical units called records. Maximum block size is 400 characters; maximum record size when transmitting to IBM operating systems is 80 characters, and when communicating with other 2780s or 2780 emulators, the record size is variable up to 132 characters. Records that are less than maximum allowable size are either extended to the maximum by blank filling, or transmitted as is, at the user's option. Up to seven (7) records can be transmitted per block.

Reception: All 2780 emulators can print received character data on a line printer, if one is present in the system. In most cases, the software simulates limited-function vertical format control (VFC) by providing Top of Form (Skip to Channel 1), Print-and-Space-1, -2, or -3 line(s) functions, and Skip to Channels 2 through 8, all of which cause module 8 line space operation--i.e., skip to the next line which is an even multiple of 8 from Top-of-Form. Both 64- and

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[1]Limited to 2780 mode only for PDP-11 communication.

96-character line printers are supported. However, support of line printers which are too slow to keep up with the speed of the communications link (i.e., LS11 and LV11) is limited to off-line or DIGITAL-to-DIGITAL usage, because their speed can cause timeout errors in an IBM system.

All emulators write files onto disk storage devices. In such cases, a separate file is created for each received file.

All 2780 emulators receive EBCDIC or binary data. They can automatically convert EBCDIC data to ASCII upon reception, or EBCDIC data can be written to a file by the use of the binary mode.

Maximum receive block size is 400 characters. The maximum receive record size is a two-character escape code, plus 132 data characters. Up to seven (7) records can be received per block.

All emulators provide automatic answer to dial-in rings.

Modems and Data Links: All 2780 emulators support operation over synchronous data links, in point-to-point contention mode only, at speeds up to 4800 bps (except the LSI-11 based RT-11/2780 which runs at 2400 bps). Bell 201 or 208 modems or equivalent are specified. Operation with other modems is not precluded, but warranted support does not apply in these cases.

Data link control characters are supplied automatically by the emulators. On transmission errors, the emulators will re-try up to seven (7) times before declaring the link dead.

Configuring PDP-11 2780 Emulator Systems: Configuration requirements for each emulator are defined in Section A. Briefly, the PDP-11 2780 emulators require the following hardware beyond the standard operating system configurations:

- DP11, DU11, DUP11, or DUV11 Synchronous Line Interface
- KG11-A Communications Arithmetic Element (except the LSI-11 based RT-11/2780)
- KW11-L or KW11-P clock (except the LSI-11 based RT-11/2780)
- 16K bytes of additional memory beyond the minimum may be required. (Refer to Section A.)

TRAINING CREDITS:

No training credits are included in the 2780 Emulator Software License charges. Training courses are not required in order to operate the product.

SUPPORT CATEGORY:

Installation will be deemed complete in the case of connection with IBM when:

- The customer's 360/370 configuration includes a 2701 Data Adapter, a 2703 Transmission Control Unit, a 3704 or 3705 Transmission Controller, or a System/370 Model 135 Integrated Communications Adapter.

- A DIGITAL sample procedure included with the software has been successfully executed.

Installation in DIGITAL-to-DIGITAL operation will be deemed complete when DIGITAL-supplied files can be transmitted successfully in both directions.

CUSTOMER RESPONSIBILITIES:

Before installation of the Software, the customer must:

1. Obtain, install, and demonstrate operational to DIGITAL's satisfaction any modems and other equipment and facilities necessary to interface to DIGITAL's communications line interfaces and terminals.

2. Install or have installed all hardware, including terminals, to be used on the system.

3. Generate for terminal support any and all IBM systems that will be communicating with the emulator, to DIGITAL's satisfaction.

4. Make available to DIGITAL personnel all hardware, including communications facilities and terminals, to be used during installation and acceptance testing for a reasonable period of time each day as mutually agreed upon by DIGITAL and customer, until acceptance criteria are satisfied.

5. Provide access privileges and machine time on any and all IBM systems on which the installation is to be performed.

6. When communicating with IBM, make available to DIGITAL personnel an IBM 360/370 job stream with data, to run via the 2780 Emulator on-line to a 360/370 in accordance with the configuration specifications outlined above.

Delays caused by any failure to meet these responsibilities will be charged at the then prevailing rate for time and materials.

The following table summarizes some of the features of the PDP-11 2780 Emulators.

CHARACTERISTIC EMULATOR NAME	MINIMUM CONFIGURATION SUMMARY (see Section A)	HOST OPERATING SYSTEM	MAXIMUM SPEED	OUTPUT DEVICES SUPPORTED	INPUT DEVICES SUPPORTED	FORMS CONTROL SUPPORTED	SPOOLING SUPPORTED	MODEMS AND IBM OPERATING SYSTEMS SUPPORTED
RSX-11D/2780 RSX-11M/2780 IAS/2780	Any standard RSX-11D or RSX-11M configuration with the following memory: 11M - 16KW 11D - 56KW IAS - 72KW DU11, DP11 or DUP11, KG11	RSX-11D or RSX-11M or IAS	4800 bps	Line printer or any Files-11 device except DECtape and paper tape punch	Card reader or any other Files-11 device except DECtape	Top of Form, Skip 1, 2, or 3 lines. Skip modulo 8, Horizontal forms control	Yes on reception. No on transmission	Bell 208 or 201 or equivalent; OS/RJE, OS/HASP, DOS/POWER, OS/ASP
RSTS/2780 (CTS-500/2780)	Minimal RSTS/E or CTS-500 system consistent with number of users and expected application. plus 8K words of memory. DU11, DUP11, or DP11, KG11	RSTS/E (CTS-500)	4800 bps	Line printer or any disk except flexible diskette, magnetic tape (limited)	Card reader or any disk, magnetic tape (limited)	Top of Form, Skip 1, 2, or 3 lines. Horizontal forms control	Yes	Same as above
RT-11/2780 (CTS-300/2780)	Disk-based Foreground/ Background RT-11 or COS-350 system with 16K words of memory. DU11 or DP11 or DUP11, KW11-L, KG11-A	RT-11 (CTS-300)	4800 bps	Line printer or any disk supported by RT-11 (CTS-300)	Card reader, paper tape reader, or any disk supported by RT-11 (CTS-300)	Top of Form, Skip 1, 2, or 3 lines. Skip modulo 8, Horizontal forms control	No	Same as above
RT-11 (CTS-300) LSI-2780	Disk-based Foreground/ Background RT-11 system with 16K words of memory. DUV11, REV-11 (AORC)	RT-11 (CTS-300)	2400 bps	Line printer or any disk supported by RT-11 (CTS-300)	Any disk supported by RT11 (CTS-300)	Top of Form, Skip 1, 2, or 3 lines. Skip modulo 8, horizontal forms control	No	Same as above

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Software Product Description

DESCRIPTION:

The FORTRAN/RT-11 Extensions consist of:

- FORTRAN IV/RT-11, Version 2.1
- A library of graphics subroutines supporting the VT11 and VS60 display processors
- A library of laboratory subroutines supporting the LPS11 Laboratory Peripheral System, the AR11 Analog Real Time Subsystem, and the AD11-K, KW11-K, and DR11-K laboratory I/O modules
- A FORTRAN debugger

The FORTRAN/RT-11 graphics library is a comprehensive set of FORTRAN-callable subroutines that enable the user to create and interact with graphic output on the VT11 and VS60 display processors. The subroutines enable the programmer to use many of the features of the VS60. If the library is configured for the VT11, the subroutines emulate the VS60 features whenever possible. Programs can thus be written for either device. The user need only link the program with the appropriate library. For additional flexibility, most subroutines are written in FORTRAN to facilitate maintenance and modification.

The FORTRAN/RT-11 VT55 subroutine provides access to all of the graphics features of the VT55 graphics terminal. In addition, single subroutine calls can be used to plot lines or complete data curves.

The laboratory subroutine library provides the capability of acquiring data in all of the modes provided by the LPS11 and AR11 hardware and to operate a CRT display through the digital-to-analog converters provided in these units. A completion routine capability allows the user to write subroutines which are activated asynchronously upon completion of many actions, such as the filling of a data buffer. DR11-K support allows up to eight of these interfaces to be operated simultaneously. The AD11-K (with optional AM11-K), AA11-K, and KW11-K are supported in a fashion compatible with the LPS11 support. The library is easily configured for the particular set of hardware on the user's machine.

The FORTRAN debugger enables users at the console terminal to "debug" the programs at the FORTRAN level.

MINIMUM HARDWARE REQUIRED:

Any valid RT-11 configuration with at least 32 bytes of memory. 48K bytes of memory are recommended for large graphics display files such as may be encountered with the VS60.

OPTIONAL HARDWARE:

Any optional devices supported by the operating system and FORTRAN IV/RT-11, Version 2.1.

VT11A Graphics Display Processor
VS60 Graphics Display Processor
VT55 Graphics Terminal
LPS-11 Laboratory Peripheral System
AR11 Analog Real Time Subsystem
DR11-K Digital I/O System (up to 8)
AD11-K Analog-to-digital converter
KW11-K Real-time clock
AM11-K Multiplexer
AA11-K Digital-to-analog converter

PREREQUISITE SOFTWARE:

RT-11 Operating System, Version 03B (with the exception of the XM feature under the Foreground/Background monitor)

OPTIONAL SOFTWARE:

None

TRAINING CREDITS:

None

SUPPORT CATEGORY:

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

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

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 cop-

ied, in whole or in part (with the proper inclusion of the DIGITAL copyright notice and any DIGITAL proprietary notices on the software) only for use on such CPU. All source licensed software is furnished only under the terms and conditions of a separate Software Program Sources License Agreement between Purchaser and DIGITAL.

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

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

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

The following key (D, E, Q, R, T, Y, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ980-AD = binaries on 9-track magnetic tape.

D = 9-track Magnetic Tape
E = RK05 Disk Cartridge
Q = RL01 Disk Cartridge
R = Microfiche
T = RK06 Disk Cartridge
Y = RX01 Floppy Diskette
Z = No hardware dependency

QJ980 -A— Single-use license, binaries, documentation, support services (media: D, E, Q, T, Y)

QJ980 -C— Single-use license, binaries, documentation, no support services (media: D, E, Q, T, Y)

QJ980 -D— Single-use license only, no binaries, no documentation, no support services (media: Z)

Source/Listing Options
QJ980 -E— All sources (media: D, E, Q, T)
QJ980 -F— Listings (media: R)

Update Options

Users of FORTRAN/RT-11 Extensions, Version 1.0 or 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 source or binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ980 -H— Binaries, documentation (media: D, E, Q, T, Y)

QJ980 -H— Right to copy for single-use (under existing license), no binaries, no documentation, no support services (media: Z)

QJ980 -N— Sources update (media: D, E, Q, T)

Users of FORTRAN/RT-11 Extensions, Version 1 or 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 source or binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ980 -W— Binaries, documentation (media: D, E, Q, T, Y)

ADDITIONAL SERVICES:
None

ADDENDUM
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

CATEGORY A

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.

2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.

3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

CATEGORY B

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

CATEGORY C

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.

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Software Product Description

DESCRIPTION:

GAMMA-11 F/B is a hardware/software system for nuclear medicine. GAMMA-11 is designed to acquire, store, display, and manipulate images from the gamma camera in order to supply quantitative, meaningful clinical information.

In the foreground/background configuration, gamma camera data acquisition can take place independently of another process. This configuration includes two (2) terminals. One (1) terminal is designated the foreground acquisition terminal for the gamma camera and controls the setup and initiation of data collection. The other terminal, designated the background terminal, can be used simultaneously with the foreground terminal for data analysis by GAMMA-11 programs, for program development in BASIC or FORTRAN, or for running any other programs that do not need immediate access to the disks for successful completion.

Only one (1) terminal is included in the single-job configuration. This configuration has all the capabilities of the foreground/background system, except that data acquisition and processing can not be carried out simultaneously.

A transportable configuration (MDA11) also exists which provides data acquisition capabilities only.

Data Acquisition

GAMMA-11 programs allow data acquired to be stored in five (5) different size matrices for static studies and four (4) different size matrices for dynamic studies. Thus a user can choose the proper size and resolution for the job at hand. List mode acquisition (i.e., unstructured data) is also available. Static studies can be collected and terminated by a preset time, preset count, or matrix element overflow. Static studies can be linked to provide easy collection of and access to sequential static views. Dynamic studies are collected at a specified frame rate. List mode studies can be acquired with an effective frame rate of 100 frames per second.

An external synchronizing time marker can be included when acquiring either dynamic or list mode studies. When acquired with the time marker, these modes are called Gate Synchronized Acquisition (GSA) and Physiological List Mode (PLM), respectively, and are used primarily for cardiac studies.

GSA data is stored in either 32x32 or 64x64 matrices. The maximum number of images per study is determined by the amount of available memory. During acquisition, images are displayed "live" on the video display. The heart cycle time (or the time between external synchronizing events) is continuously monitored and displayed. For GSA data acquisition, the operator can either choose fixed time intervals for each image or allow the program to divide the heart cycle time (averaged over 30 seconds) by the number of images chosen. A heart cycle time window can be selected so that if a given cycle time falls outside of this window, then the following cycle is rejected.

NOTE:
GSA must be run from the background terminal.

NOTE:
No list mode studies are possible on the MDA11.

Physiological List Mode studies are acquired with one (1) millisecond time intervals.

Data is reframed by creating a number of images based on the interval between successive external time markers.

With dual isotope collection, two (2) separate images (one for each isotope) can be collected simultaneously. This capability does not apply to GSA or PLM.

NOTE:
The gamma camera must also have the dual isotope option.

Once collection parameters and procedures are established, they can be set up as protocols or predefined studies. Up to 20 predefined studies can be used to speed setup, minimize error, and standardize collection procedures.

Patient Study Index

Once collected, patient studies are identified by a system-generated index file. Each study is identified by patient name, number, organ, study type, and acquisition date. Studies are selected for analysis by index number; the user need not be concerned with the physical location of disk data.

Data Analysis and Display

Data is displayed on the VSV01 color video monitor. The VSV01 color display includes a hardware character generator permitting display, along with the image, of patient identification and image counting statistics. All photographs taken from the display are thus positively identified.

NOTE:

No data analysis or display is possible on the MDA11 system.

Display Features:
- Color or monochrome display
- 64 colors; 16 colors displayed simultaneously
- Up to 31 color spectra defined
- Intensity or isometric display
- 4- or 8-image display (16 with optional VSV01 bit maps)
- Normal or magnified display
- Lower and upper thresholding with or without contrast enhancement
- Dual/full size image display (split screen or overlayed)
- Negative image display

Data Manipulation Features:
- Skip frames (forward or backward)
- Sequential frame add
- Image rotation (90-degree steps)
- Image translation (horizontal and vertical)
- Non-uniformity correction
- Frame algebra — add, subtract, multiply, divide or merge frames; add, subtract, or multiply frames by a constant
- 9-point smoothing
- 9 save areas for temporary storage of images or ROI curves
- Up to 55 optional save areas for temporary storage of images
- Slice profiles (vertical or horizontal)
- Isocontour generation
- Interpolation of images (optional VSV01 bit maps required for 256 x 256 interpolation)

Region of Interest Features:
- Regular (keyboard controlled)
- Irregular (joystick controlled)
- Circumference or fill mode definition (irregular)
- Pertinent count rate information for each region displayed with image
- Up to 12 regions displayed
- Simultaneous display of curves and images with ROIs outlined
- Select regions by thresholding (irregular)
- Select regions in magnified mode (irregular)
- Time/activity curves displayed normally, averaged, or overlayed
- Ability to expand selected portions of ROI curves

Dynamic Playback:
- Sequences of preprocessed images can be displayed in cine mode.
- 2 to 4 playback buffers can be combined into one and displayed synchronously.
- Speed and direction of playback can be controlled via the joystick or keyboard.

Predefined Analysis Features:
- Multiple commands can be entered on a single line.
- Predefined analysis procedures (macros) can be created, edited, saved, and executed from the system disk.
- Predefined analysis can be linked with predefined study acquisition to semi-automate the system.
- Macros can call FORTRAN or BASIC programs; special calls allow macro re-entry.

Miscellaneous Features:
- Routine for patient positioning and detection of a valid gate signal
- Dual isotope display and processing
- Additional disk space not required for recontructed images in list mode analysis
- Comment editor

Utility Programs

Study Deletion — This function requires user verification to prevent accidental deletion of important data.

Study Transfer — This function transfers patient studies between any two (2) RT-11 file-structured devices (disks, magtape, floppy disks, etc.)

MINIMUM HARDWARE REQUIRED:

Any UNIBUS PDP-11 with line frequency clock that meets the following main memory requirements:
- 32K bytes for single-job operation with RK05 as system disk
- 64K bytes for foreground/background operation with RK05 as system disk
- 64K bytes for single job operation with RL01, RK06, or RK07 as system disks
- 96K bytes for foreground/background operation with RL01, RK06, or RK07 disks

and includes,

Mass Storage (one of the following):
- One (1) RK05, RL01, or RK06 disk with a second disk or RT-11 supported magnetic tape unit
- One (1) RK07 disk and a RT-11 supported magnetic tape unit
- Two (2) RK05, RL01, or RK06 disks

Terminals:
- Any console terminal supported by the prerequisite software. (Two (2) terminals are required for foreground/background operation. The foreground terminal must operate at 1200 baud or greater.)

Display:
- VSV01 Video Display

Interface: (One of the following)
- NC11 gamma camera interface with KW11-P (AR11 needed for foreground/background operation and/or GSA or PLM), or
- NCV11 gamma camera interface (includes KWV11; AR11 not needed)
- MDA11 requires the GAMMA-11 system to have an RX02 floppy disk drive for communication

OPTIONAL HARDWARE:
- Any RT-11 supported mass storage device for off-line data storage except TA11 cassette
- A system total of 256K bytes main memory
- MDA11 acquistion system
- MDA11 software for the MDA11 system is distributed with the GAMMA-11 F/B software. Each MDA11 system includes a DZ license to copy this MDA software for use on that MDA11 system. RX02 drive is required on the host system.

PREREQUISITE SOFTWARE:

None

OPTIONAL SOFTWARE:

FORTRAN IV/RT-11, Version 2.0

TRAINING CREDITS:

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

SUPPORT CATEGORY:

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

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

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.

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

The following key (A, D) represents the form of power source for the product and must be specified at the end of the number, i.e., GMA11-AA = system using 115 volt/60 Hertz power.

A = 115 volt/60 Hertz
D = 230 volt/50 Hertz

The following key (D, E, Q, T, Z) represents the distribution media for the product and must be specified at the end of the order number, e.g., QJ723-AD = binaries on 9-track magnetic tape.

D = 9-track Magnetic Tape
E = RK05 Disk Cartridge
Q = RL01 Disk Cartridge
T = RK06 Disk Cartridge
Z = No hardware dependency

GMA11 -B— GAMMA-11 single job system includes hardware single-use license for GAMMA-11, RT-11, BASIC-11/RT-11, binaries on RK06 disk, documentation, support services (power: A, D)

GMA11 -C— GAMMA-11 single job system includes hardware, single-use license for GAMMA-11, RT-11, BASIC-11/RT-11, binaries on RL01 disk, documentation, support services (power: A, D)

Source/Listing Options

QJ721 -E— All GAMMA-11 sources (media: D, E, Q, T)

Upgrade Options

The following option is available as an upgrade kit from GAMMA-11, Version 7.0, for use on the same single CPU on which GAMMA-11, Version 7.0, is licensed. The license previously granted for GAMMA-11, Version 7.0, shall be extended to cover this upgrade.

QJ723 -A— Single-use license for GAMMA-11 F/B, RT-11, BASIC-11/RT-11, binaries, documentation, support services (media: D, E)

Update Options

Users of GAMMA-11 F/B, Version 2.0, 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 source or binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ721 -H— Binaries, documentation (media: D, E, Q, T)

Users of GAMMA-11 F/B, Version 2.0 or later, 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 source or binary form on the appropriate medium and includes no installation or other services unless specifically stated.

QJ721 -W— Binaries, documentation (media: D, E, Q, T)

QJ721　-G— Documentation only (media: Z)

ADDITIONAL SERVICES:
None

ADDENDUM
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

CATEGORY A

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.

2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.

3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

CATEGORY B

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

CATEGORY C

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.

digital
Software Product Description

DESCRIPTION:

MOBILE GAMMA-11 is a hardware/software system for nuclear medicine. MOBILE GAMMA-11 is designed to acquire, store, display and manipulate images from the gamma camera in order to supply quantitative, meaningful clinical information.

The system is configured for single-job operation; that is, any one of the following may be performed at a time: data acquisition from a gamma camera, data analysis by GAMMA-11 programs or program development in BASIC or FORTRAN.

Data Acquisition

MOBILE GAMMA-11 programs allow data acquired to be stored in five (5) different size matrices for static studies and four (4) different size matrices for dynamic studies. Thus a user can choose the proper size and resolution for the job at hand. Static studies can be collected and terminated by a preset time, preset count, or matrix element overflow. Static studies can be linked to provide easy collection of and access to sequential static views. Dynamic studies are collected at a specified frame rate.

An external synchronizing time marker can be included when acquiring dynamic mode studies. This acquisition mode is called Gate Synchronized Acquisition (GSA) and is used primarily for cardiac studies.

GSA data is stored in either 32x32 or 64x64 matrices. The maximum number of images per study is 48 and 12 respectively. During acquisition, images are displayed "live" on the video display. The heart cycle time (or the time between external synchronizing events) is continuously monitored and displayed. For GSA data acquisition, the operator can either choose fixed time intervals for each image or allow the program to divide the heart cycle time (averaged over 30 seconds) by the number of images chosen. A heart cycle time window can be selected so that if a given cycle time falls outside of this window, then the following cycle is rejected.

With dual isotope collection, two separate images (one for each isotope) can be collected simultaneously. This capability does not apply to GSA.

NOTE:

The gamma camera must also have the dual isotope option.

Once collection parameters and procedures are established, they can be set up as protocols or predefined studies. Up to 20 predefined studies can be used to speed setup, minimize error, and standardize collection procedures.

Patient Study Index

Once collected, patient studies are identified by a system-generated index file. Each study is identified by patient name, number, organ, study type, and acquisition date. Studies are selected for analysis by index number; the user need not be concerned with the physical location of disk data.

Data Analysis and Display

Data is displayed on the video monitor. The display includes a hardware character generator permitting display, along with the image, of patient identification and image counting statistics. All photographs taken from the display are thus positively identified.

Display Features:
- Intensity or isometric display
- 4- or 8-image display (16 with optional VTV01 bit maps)
- Normal or magnified display
- Lower and upper thresholding with or without contrast enhancement
- Dual/full size image display (split screen or overlayed)
- Negative image display

Data Manipulation Features:
- Skip frames (forward or backward)
- Sequential frame add
- Image rotation (90-degree steps)
- Image translation (horizontal and vertical)
- Non-uniformity correction
- Frame algebra — add, subtract, multiply, divide or merge frames; add, subtract, or multiply frames by a constant
- 9-point smoothing
- 3 save areas for temporary storage of images or ROI curves
- Slice profiles (vertical or horizontal)
- Isocontour generation
- Interpolation of images (optional VTV01 bit maps required for 256 x 256 interpolation)

Region of Interest Features:

- Regular (keyboard controlled)
- Irregular (joystick controlled)
- Circumference or fill mode definition (irregular)
- Pertinent count rate information for each region displayed with image
- Up to 12 regions displayed
- Simultaneous display of curves and images with ROIs outlined
- Select regions by thresholding (irregular)
- Select regions in magnified mode (irregular)
- Time/activity curves displayed normally, averaged, or overlayed
- Ability to expand selected portions of ROI curves

Dynamic Playback:

- Sequences of preprocessed images can be displayed in cine mode.
- 2 to 4 playback buffers can be combined into one and displayed synchronously.
- Speed and direction of playback can be controlled via the joystick or keyboard.

Predefined Analysis Features:

- Multiple commands can be entered on a single line.
- Predefined analysis procedures (macros) can be created, edited, saved, and executed from the system disk.
- Predefined analysis can be linked with predefined study acquisition to semi-automate the system.
- Macros can call FORTRAN or BASIC programs; special calls allow macro re-entry.

Miscellaneous Features:

- Routine for patient positioning and detection of a valid gate signal
- Dual isotope display and processing
- Comment editor

Utility Programs

Study Deletion — This function requires user verification to prevent accidental deletion of important data.

Study Transfer — This function transfers patient studies between any two (2) RT-11 file-structured devices (disks, magtape, floppy disks, etc.)

MINIMUM HARDWARE REQUIRED:

LSI-11 with 64K bytes MOS memory
Two (2) RX02 floppy disk drives
Any console terminal supported by RT11
VTV01 video controller plus a video monitor
NCV11 gamma camera interface
H3060-B joystick

OPTIONAL HARDWARE:
None

PREREQUISITE SOFTWARE:
None

OPTIONAL SOFTWARE:
FORTRAN IV/RT-11, Version 2.0

TRAINING CREDITS:
None

SUPPORT CATEGORY:

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

UPDATE POLICY:

Software Updates, if any, released by DIGITAL during the one (1) year period following installation, will be provided to the customer for a media charge (includes no installation). After the first year, updates, if any, will be made available according to then prevailing DIGITAL policies.

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 (A, D) represents the form of power source for the product and must be specified at the end of the number, i.e., GMV11-AA = system using 115 volt/60 Hertz power.

A = 115 volt/60 Hertz
D = 230 volt/50 Hertz

GMV11 -A— MOBILE GAMMA system includes hardware, single-use license for MOBILE GAMMA-11, RT-11, BASIC-11/RT-11 binaries on RX02, documentation, no support services.

Miscellaneous Options:

QJ721 -G— Documentation only (media: Z)

ADDITIONAL SERVICES:
None

ADDENDUM
SOFTWARE SUPPORT CATEGORIES

Each software product (hereinafter 'SOFTWARE') with a designated Support Category A or B in the applicable Software Product Description (SPD) existing at the time of order will be the current release at the time of delivery and will conform to the SPD. DIGITAL's sole obligation shall be to correct defects (nonconformance of the SOFTWARE to the SPD) as described below. Any SOFTWARE with a designated Support Category C will be furnished on an 'as is' basis.

For SOFTWARE with a designated Support Category A or B, DIGITAL will provide the services set forth below without additional charge.

CATEGORY A

1. Upon notification by customer to the nearest DIGITAL office that the computer system, including all required prerequisite hardware and software, is ready for the installation of the SOFTWARE, DIGITAL will install such SOFTWARE in any location within the contiguous forty-eight (48) United States, the District of Columbia, or a country in which DIGITAL or a subsidiary of DIGITAL has a software service facility. The notification must be received by DIGITAL and the system must be ready for installation within thirty (30) days after the delivery of the SOFTWARE to customer or DIGITAL will have no obligation to install. Installation will consist of: (1) verification that all components of the SOFTWARE have been received by customer, (2) loading the SOFTWARE, and (3) executing a DIGITAL sample procedure.

2. During the ninety (90) day period after installation, if the customer encounters a problem with the current unaltered release of the SOFTWARE which DIGITAL determines to be a defect in the SOFTWARE, DIGITAL will provide the following remedial service (on site where necessary): (1) if the SOFTWARE is inoperable, apply a temporary correction (TC) or make a reasonable attempt to develop an emergency by-pass, and (2) assist the customer to prepare a Software Performance Report (SPR) and submit it to DIGITAL.

3. During the one (1) year period following installation, if the customer encounters a problem with the SOFTWARE which his diagnosis indicates is caused by a SOFTWARE defect, the customer may submit an SPR to DIGITAL. DIGITAL will respond to problems reported in SPRs which are caused by defects in the current unaltered release of the SOFTWARE via the Maintenance Periodical for the SOFTWARE, which reports SPRs received, code corrections, temporary corrections, generally useful emergency by-passes and/or notice of the availability of corrected code. Software Updates, if any, released by DIGITAL during the one (1) year period, will be provided to the customer on DIGITAL's standard distribution media as specified in the applicable SPD. The customer will be charged only for the media on which such updates are provided, unless otherwise stated in the applicable SPD, at DIGITAL's then current media prices.

CATEGORY B

During the one (1) year period following delivery, the services provided to the customer will be the same as set forth in 3 above.

CATEGORY C

SOFTWARE is provided on an 'as is' basis. Any software services, if available, will be provided at the then current charges.

DIGITAL shall have the right to make additional charges for any additional effort required to provide services resulting from customer use of other than current unaltered release of the SOFTWARE operated in accordance with the SPD.

DECUS SPECIAL INTEREST GROUPS

A DECUS Special Interest Group (SIG) is an activity whereby members of the DIGITAL Equipment Computer Users Society who share common interests in a particular field, join together to promote the interchange of information. Specialization may be in application areas such as education or industry, specific software systems such as OS/8 and RSX-11, or a specific main-frame such as the DECsystem-10/20.

SIG members derive numberous benefits from communicating with others who share specialized interests and who may wish to share their experiences. SIGs sponsor business meetings, tutorials, and workshops at the various chapter symposia which fulfill the two-fold purpose of fostering communication among users and between users and DIGITAL. Channeled communication provides DIGITAL and the users with insight into the direction of future developments. SIGs provide direct feedback to DIGITAL's in-house activities and have thereby made substantial contributions to OS/8, RSX-11, RSTS and TOPS-10.

User submitted articles, minutes of local meetings and letters comprise the major portion of the individual SIG newsletters. Suggestions, hints, bug fixes, program plans, or questions of a non-commercial nature are suitable material for SIG newsletters.

SIG members are encouraged to make presentations at the SIG sessions held during DECUS Symposia.

The semi-annual U.S. Symposia sessions are organized by special interest areas. Submissions received from the user community are reviewed by symposia committee members from the special interest groups for appropriate placement on the agenda.

Special Interest Group participation in the review of programs submitted to the DECUS Program Library provides an opportunity to improve the quality and utility of programs available to you and to fellow users.

DIGITAL standards are issued to DECUS members for review and on the theory and philosophy of the standards. DECUS is a voting member of ANSI X3. Users are encouraged to register their areas of expertise with DECUS and assist with reviewing standards. SIGs often play a role in this process.

Below is a list of U.S. Special Interest Groups within DECUS.

If you would like information regarding membership in any of the Special Interest Groups, contact DECUS U.S. Chapter, One Iron Way, MR2-3/E55, Marlboro, MA 01752 or one of the other DECUS Chapter offices in Kanata, Sidney or Geneva.

NETSIG—Networks Special Interest Group
RSTS SIG—RSTS and RSTS/E Special Interest Group
SIGIG—Special Interest Group on Interactive Graphics
ESIG—Engineering Applications Special Interest Group
SIG 18—18 Bit Users Special Interest Group
12-Bit SIG—12 Bit User Special Interest Group
RSX-11/IAS SIG
RT-11 SIG
EDUSIG—Educational Users Special Interest Group
DEBUG—Digital Equipment Business Users Group
MUSIG—Mumps Special Interest Group
PASCAL SIG
DBMS SIG
TECO SIG
LSI-11 SIG
COBOL-11 SIG
DATATRIEVE-11 SIG
Library Applications SIG
BIOMED SIG

DIGITAL EQUIPMENT COMPUTER USERS SOCIETY

RT-11 SPECIAL INTEREST GROUP

A Special Interest Group has been formed to serve users of RT-11. The organization of the SIG consists of a SIG Chairman and working committees for standards, documentation, library submissions, newsletters, and help for new users. Submissions to the newsletter should be directed to:

John T. Rasted
JTR Associates
58 Rasted Lane
Meriden, CT 06450
(203) 634-1632

Other communications can be sent to:

Thomas J. Provost
P.O. Box 95
Middleton, MA 01949   or
(617) 774-2370
(617) 245-6600 (Boston tie line)

John T. Rasted
c/o DECUS
One Iron Way - MR2-3/E55
Marlboro, MA 01752

SIG's activities encompass the following:

1. Preparation of a SIG newsletter (user submissions are strongly encouraged).
2. Exchange of user-written programs. This exchange could include TASKS representing user-written extensions to RT-11 RT-11 (including, but not limited to device drivers) as well as utility and applications programs, etc.
3. Establishment of communications with the DECUS staff to obtain for SIG members early information on RT-11 related additions to the DECUS Library. These communications will also serve to provide prompt testing of such submissions.
4. Establishment of user input to appropriate groups within DEC, so that they will receive user feedback on any additions or needed changes to RT-11. Additionally, SIG members may receive early warning from DEC about RT-11 changes.
5. Establishment of SIG-maintained files of RT-11 errors and error solutions, where they exist, independent of DEC publications.
6. Establishment of RT-11 "Welcome Wagon" type services to aid new users.
7. Coordination of user input to standards and documentation work.

_____

If you wish to become a member of the RT-11 SIG, please fill out the form below and return it to the DECUS Office. (Please type or print).

NAME _____*DECUS MEMBERSHIP NO. _____

AFFILIATION _____

ADDRESS _____

CITY _____STATE _____ZIP CODE _____

Are you registered with DEC as an RT-11 user? _____Version Number _____

Fortran? _____ Basic? _____

*Please note one must be a member of DECUS prior to requesting RT-11 SIG involvement. For general membership information, contact the DECUS Office, One Iron Way - MR2-3/E55, Marlboro, MA 01752

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	AREAS COVERED	SPR CENTER
United States, remainder of Far East, Middle East, Africa Latin America	Administrative Services Group, SWS P.O.Box F Maynard MA 01754	Italy	Digital Equipment SPA Viale Fulvio Testi 117 20092 Cinisillo Balsamo Italy
Canada	Digital Equipment Canada P.O.Box 11500 Kanata Canada K2H 8K8 Ontario	Japan	Digital Equipment Corp., INTL 3rd Floor Kowa Building 8-7 Sanban Cho Chiyoda Ku Tokyo 102 Japan
United Kingdom	Digital Equipment Corp., LTD Fountain House Butts Centre RG1 7QN Reading England	New Zealand	Digital Equipment Corp., LTD Challenge House 3 Wolfe Street P.O.Box 2471 Auckland New Zealand 10010
Australia-Melbourne	Digital Equipment Aust. Pty., LTD 60 Park Street South Melbourne Victoria Australia 3205	Belgium, Holland	Digital Equipment BV Kaap Horndreef 38 3563 AV Utrecht Netherlands
Australia-Sydney	Digital Equipment Aust. Pty., LTD 123 125 Willoughby Road P.O.Box 491 Crows Nest NSW Australia 2065	Denmark, Finland, Norway, Sweden	Digital Equipment Corp., AB Englundavaegen 73 TR 171 41 Solna Sweden
Brazil	Digital Equipment Comercio Ind Rua Batatais 429 Esq AL Campin 01423 Jardim Paulista Sao Paulo 0100 Brazil	Switzerland, Spain, Greece, Romania, Portugal, Bulgaria Yugoslavia	Digital Equipment Corp., SA 20 Quai Ernest Ansermet Boite Postale 23 CH 1211 Geneva Switzerland
Caribbean	De Latin America P.O.Box 11038 Fernando Juncos Sta. Santurce PR 00910	Austria, Poland Hungary, Rumania East Germany, West Germany, Russia, Czechslovakia	Digital Equipment Corp., GMBH Wallsteinplatz 2 8000 Munchen 40 Germany 8000
France	Digital Equipment Corp., LTD. Centre Silic Cidex L225 18 Rue Saarinen 94533 Rungis France	Israel	DECSYS Computers, LTD 7 Habakuk Street Il-Tel Aviv 63505 Israel

DIGITAL EQUIPMENT CORPORATION, Corporate Headquarters: Maynard, Massachusetts 01754, Telephone: (617)897-5111—SALES AND SERVICE OFFICES: UNITED STATES—ALABAMA, Huntsville • ARIZONA, Phoenix and Tucson • CALIFORNIA, El Segundo, Los Angeles, Oakland, Ridgecrest, San Diego, San Francisco (Mountain View), Santa Ana, Santa Clara, Stanford, Sunnyvale and Woodland Hills • COLORADO, Englewood • CONNECTICUT, Fairfield and Meriden • DISTRICT OF COLUMBIA, Washington (Lanham, MD) • FLORIDA, Ft. Lauderdale and Orlando • GEORGIA, Atlanta • HAWAII, Honolulu • ILLINOIS, Chicago (Rolling Meadows) • INDIANA, Indianapolis • IOWA, Bettendorf • KENTUCKY, Louisville • LOUISIANA, New Orleans (Metairie) • MARYLAND, Odenton • MASSACHUSETTS, Marlborough, Waltham and Westfield • MICHIGAN, Detroit (Farmington Hills) • MINNESOTA, Minneapolis • MISSOURI, Kansas City (Independence) and St. Louis • NEW HAMPSHIRE, Manchester • NEW JERSEY, Cherry Hill, Fairfield, Metuchen and Princeton • NEW MEXICO, Albuquerque • NEW YORK, Albany, Buffalo (Cheektowaga), Long Island (Huntington Station), Manhattan, Rochester and Syracuse • NORTH CAROLINA, Durham/Chapel Hill • OHIO, Cleveland (Euclid), Columbus and Dayton • OKLAHOMA, Tulsa • OREGON, Eugene and Portland • PENNSYLVANIA, Allentown, Philadelphia (Bluebell) and Pittsburgh • SOUTH CAROLINA, Columbia • TENNESSEE, Knoxville and Nashville • TEXAS, Austin, Dallas and Houston • UTAH, Salt Lake City • VIRGINIA, Richmond • WASHINGTON, Bellevue • WISCONSIN, Milwaukee (Brookfield) • INTERNATIONAL—ARGENTINA, Buenos Aires • AUSTRALIA, Adelaide, Brisbane, Canberra, Melbourne, Perth and Sydney • AUSTRIA, Vienna • BELGIUM, Brussels • BOLIVIA, La Paz • BRAZIL, Rio de Janeiro and Sao Paulo • CANADA, Calgary, Edmonton, Halifax, London, Montreal, Ottawa, Toronto, Vancouver and Winnipeg • CHILE, Santiago • DENMARK, Copenhagen • FINLAND, Helsinki • FRANCE, Lyon, Grenoble and Paris • GERMAN FEDERAL REPUBLIC, Cologne, Frankfurt, Hamburg, Hannover, Munich, Nuremburg, Stuttgart and West Berlin • HONG KONG • INDIA, Bombay • INDONESIA, Djakarta • IRELAND, Dublin • ITALY, Milan, Rome and Turin • IRAN, Tehran • JAPAN, Osaka and Tokyo • MALAYSIA, Kuala Lumpur • MEXICO, Mexico City • NETHERLANDS, Utrecht • NEW ZEALAND, Auckland and Christchurch • NORWAY, Oslo • PUERTO RICO, Santurce • SINGAPORE • SPAIN, Madrid • SWEDEN, Gothenburg and Stockholm • SWITZERLAND, Geneva and Zurich • UNITED KINGDOM, Birmingham, Bristol, Epsom, Edinburgh, Leeds, Leicester, London, Manchester and Reading • VENEZUELA, Caracas •