

# **RSTS/E Maintenance Notebook**

Order No. AA-L997D-TC

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## **June 1985**

This notebook is a working document that contains published articles on software problems, programming notes, documentation corrections, and optional feature patches. System Managers should keep this document current by incorporating articles published each month in the *RSTS/E Software Dispatch*.

**OPERATING SYSTEM AND VERSION:** RSTS/E V9.0

**SOFTWARE VERSION:** RSTS/E V9.0

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ReGIS  
RSTS  
RSX  
RT  
UNIBUS  
VAX  
VMS  
VT  
Work Processor

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## Preface

The RSTS/E Maintenance Notebook is a maintenance notebook for documentation corrections, published software problems and solutions, and programming notes. Subordinate software information is also included. The RSTS/E Software Dispatch Review and the RSTS/E Software Dispatch are designed so that their articles may be merged into the Maintenance Notebook.

The RSTS/E Software Dispatch Review contains articles published for optional layered software supported on RSTS/E V9.0. In general, this is a composite of all optional layered software articles previously published for RSTS/E, which still apply to the product when run on RSTS/E V9.0.

The RSTS/E Software Dispatch is published monthly and distributed to customers who have purchased a software service contract from DIGITAL. Contact your local DIGITAL office for more information on how to obtain a software service contract if you do not already have one.

The RSTS/E Software Dispatch contains articles for RSTS/E and its layered software. Each month, you should take apart the RSTS/E Software Dispatch and merge the new articles by sequence number in your maintenance notebook.

All articles published are summarized in the Cumulative Index. There is also an index of the version and edit levels for all the Commonly Used System Programs (CUSPs). These indexes are updated as necessary in the RSTS/E Software Dispatch.



## 1.0 Notebook Maintenance

Each month you should take apart the RSTS/E Software Dispatch and merge the new articles by sequence number in your notebook. If an article is a replacement, discard the superseded article. Each article addresses a single topic and its title gives the symptom or a one-line problem description. This information appears at the top of each page. For example:

RSTS/E Software Dispatch, Month year

RSTS/E V9.0

Seq 4.1.4 F

BASIC-PLUS

BASIC-PLUS Patches

1 of 2

DEFAULT TO NOEXTEND MODE - BASIC-PLUS FEATURE PATCH

The system components and subcomponents are listed in Section 2.0. That list will be updated periodically as products become available or obsolete. Articles for each subcomponent are assigned a sequencing number which uniquely identifies the article within that component.subcomponent category. As each new article is published for a subcomponent, it is assigned the next higher sequence number. The entire number is defined as the COMPONENT.SUBCOMPONENT.ISSUE number, an example being the "4.1.4" shown in the upper right corner of the sample heading. Replacement articles are identified as such.

In general, articles with an issue number of zero (component.subcomponent.0) are provided to list problems corrected by a replacement module for the affected component. These articles will be superseded each time a new replacement module is issued for the component.

Each article's sequence number will be followed by a letter, identifying the type of article, as explained below:

M = Mandatory

These articles describe problems corrected by a replacement module. In some cases, these articles will also include a patching procedure you can follow to correct a problem. You are required to install replacement modules or apply patches described in a "M" article unless told otherwise.

F = FEATURE

These articles include patches that extend or configure non-standard capabilities into the product. These functions will be treated as a supported part of the product for the duration of the current release.

R = RESTRICTION

These articles discuss areas that will not be patched in the current release because they require major modifications or because they are not consistent with the design of the product. Restrictions, except those described as permanent, are reviewed and modified when possible as part of the normal release cycle.

N = NOTE

These articles provide explanatory information that supplements the documentation set and provides more detailed information about a program or package. They also provide procedural information to make it easier to use a program or package.



## 2.0 RSTS/E Component.Subcomponent Assignments

The component.subcomponent numbers outlined below appear on articles to be filed following Section 6.1 of this notebook.

### RSTS/E MONITOR

- 0.0 RSTS/E V9.0 General Notes
  - 0.1 System Notes
  - 0.2 System Management Guidelines
- 1.0 Initialization
  - 1.1 INIT.SYS Program Patches
  - 1.2 INIT.SYS Program Notes
- 2.0 System Installation and Update
  - 2.1 Installation/Update Notes
  - 2.2 Installation/Update .COM files
  - 2.3 BPLGEN.SAV
  - 2.4 BUFCHK.TSK
  - 2.5 SYSGEN.SAV
- 3.0 Monitor
  - 3.1 Monitor Patches
  - 3.2 Monitor Notes
  - 3.3 Terminal Service Patches
  - 3.4 Terminal Service Notes
  - 3.5 File Processor Patches
  - 3.6 File Processor Notes
  - 3.7 Device Driver Patches
  - 3.8 Device Driver Notes
  - 3.9 FMS Monitor Patches
  - 3.10 FMS Monitor Notes
- 4.0 BASIC-PLUS
  - 4.1 BASIC-PLUS Patches
  - 4.2 BASIC-PLUS Notes
  - 4.3 Programming Hints
  - 4.4 Math Packages
  - 4.5 Matrix Functions
  - 4.6 PRINT-USING
  - 4.7 Record I/O
  - 4.8 Virtual Core
  - 4.9 String Arithmetic
  - 4.10 Non-Standard BASIC-PLUS Features

- 5.0 RSTS/E 2780 Device Driver
  - 5.1 RSTS/E 2780 Device Driver Patches
  - 5.2 RSTS/E 2780 Device Driver Notes
- 6.0 System Files
  - 6.1 System Files Notes
  - 6.2 BACKUP.TSK
  - 6.3 CSPLIB.LIB
  - 6.4 ERR.ERR
  - 6.5 INIT.SYS
  - 6.6 LOGIN.COM
  - 6.7 RECOVER.COM
  - 6.8 START.COM
  - 6.9 SYSGEN.SIL
  - 6.10 SYSINI.COM
- 7.0 DECnet/E Monitor Package V2.1
  - 7.1 Package Notes
  - 7.2 DECNET.OBJ
  - 7.3 NSPSUB.OBJ
  - 7.4 NSP.OBJ
  - 7.5 NET.OBJ
  - 7.6 TRN.OBJ
  - 7.7 SES.OBJ
  - 7.8 XDDVR.OBJ
  - 7.9 XDDINT.OBJ

#### RSTS/E UTILITIES

- 8.0 Help Package (HELP\$)
  - 8.1 Package Notes
  - 8.2 HELP.TSK
- 9.0 TECO Package (TECO\$)
  - 9.1 TECO Notes
  - 9.2 TECO.RTS
  - 9.3 TECO.TEC
  - 9.4 VTEDIT.TEC
  - 9.5 TECO.INI
  - 9.6 TYPE.TEC
  - 9.7 SQU.TEC
  - 9.8 LOCAL.TEC
  - 9.9 TECKBM.TEC
  - 9.10 SEARCH.TEC
  - 9.11 TECO.DOC

- 10.0 System Library (\$)
  - 10.1 Library Notes
  - 10.2 ACTMGR.TSK
  - 10.3 ATPK.TSK
  - 10.4 DIRECT.TSK
  - 10.5 DSKINT.TSK
  - 10.6 FILCOM.TSK
  - 10.7 LOGIN.TSK
  - 10.8 LOGOUT.TSK
  - 10.9 MAKSIL.TSK
  - 10.10 ONLPAT.SAV
  - 10.11 REORDR.TSK
  - 10.12 SHUTUP.TSK
  - 10.13 SWITCH.TSK
  - 10.14 SYSTAT.TSK
  - 10.15 TERMGR.TSK
  - 10.16 UTLMGR.TSK
- 11.0 Auxiliary Library (AUXLIB\$)
  - 11.1 Package Notes
  - 11.2 BPCREF.TSK
  - 11.3 BPCRFl.TSK
  - 11.4 COPY.TSK
  - 11.5 DISPLY.TSK
  - 11.6 DSKCVT.TSK
  - 11.7 FIT.TSK
  - 11.8 FLINT.TSK
  - 11.9 GRIPE.TSK
  - 11.10 ODT.TSK
  - 11.11 PMDUMP.TSK
  - 11.13 RUNOFF.TSK
  - 11.14 TALK.TSK
- 12.0 Error Control Package (ERROR\$)
  - 12.1 Package Notes
  - 12.2 ANALY1.TSK
  - 12.3 ANALY2.TSK
  - 12.4 ANALY3.TSK
  - 12.5 ANALYS.TSK
  - 12.6 ERRCPY.TSK
  - 12.7 ERRDAT.FIL
  - 12.8 ERRDET.TSK
  - 12.9 ERRDIS.TSK
  - 12.10 ERRINT.TSK
  - 12.11 MSCPER.FIL

13.0 RESTOR Package (RESTOR\$)

- 13.1 Package Notes
- 13.2 BACCOM.TSK
- 13.3 BACCON.TSK
- 13.4 BACDIR.TSK
- 13.5 BACDSK.TSK
- 13.6 BACENT.TSK
- 13.7 BACFRM.TSK
- 13.8 BACLAB.TSK
- 13.9 BACLOD.TSK
- 13.10 BACLST.TSK
- 13.11 BACMNT.TSK
- 13.12 BACKUP.PRM
- 13.13 RESTOR.TSK

14.0 Operator Services and Spooling Package (OPSER\$)

- 14.1 Package Notes
- 14.2 BATCH.DCD
- 14.3 BATCH.TSK
- 14.4 BATDCD.TSK
- 14.5 BATDEC.TSK
- 14.6 BATIDL.TSK
- 14.7 BATRUN.TSK
- 14.8 CHARS.QUE
- 14.9 OPSER.TSK
- 14.10 OPSRUN.TSK
- 14.11 PLEASE.TSK
- 14.12 QUE.TSK
- 14.13 QUEMAN.TSK
- 14.14 QUMRUN.TSK
- 14.15 SPLIDL.TSK
- 14.16 SPLRUN.TSK
- 14.17 SPOOL.TSK

15.0 Print/Batch Services Package (PBS\$)

- 15.1 Package Notes
- 15.2 FORMS.SYS
- 15.3 PBS.TSK
- 15.4 PBSMGR.TSK
- 15.5 QUE.SYS

16.0      Unsupported Package (UNSUPP\$)

- 16.1      Package Notes
- 16.2      BPDA.TSK
- 16.3      B2CREF.TSK
- 16.4      CONNEC.TSK
- 16.5      DIALER.TSK
- 16.6      DSKDMP.TSK
- 16.7      DUMP.TSK
- 16.8      EMTCPY.TSK
- 16.9      FLOAT.TSK
- 16.10     LQSTAT.TSK
- 16.11     MEMORY.TSK
- 16.12     MONEY.TSK
- 16.13     QSTATS.TSK
- 16.14     RNO.TSK
- 16.15     RSTSFL.OBJ
- 16.16     SRCCOM.SAV
- 16.17     STATUS.TSK
- 16.18     VT55.TSK

17.0      Layered Product Update Package (UPDATE\$)

- 17.1      Package Notes
- 17.2      AUTOED.TSK
- 17.3      BUILD.TSK
- 17.4      CPATCH.TSK
- 17.5      CSPCOM.TSK
- 17.6      CSPCOM.OLB
- 17.7      UTILTY.TSK

18.0      Device Test Package (TEST\$)

- 18.1      Package Notes
- 18.2      CPEXER.TSK
- 18.3      CPUTST.TSK
- 18.4      DDEXER.TSK
- 18.5      DSKSEK.TSK
- 18.6      DTEXER.TSK
- 18.7      DXEXER.TSK
- 18.8      DSKEXR.TSK
- 18.9      KBEXER.TSK
- 18.10     LPEXER.TSK
- 18.11     MTEXER.TSK
- 18.12     PPEXER.TSK
- 18.13     PREXER.TSK

RSTS/E DOCUMENTATION

19.0	Documentation	
19.1	RSTS/E Documentation Directory	AA-2642G-TC
19.2	RSTS/E V9.0 Release Notes	AA-5246G-TC
19.3	RSTS/E V9.0 Maintenance Notebook	AA-L997D-TC
19.4	RSTS/E System Installation and Update Guide	AA-2669H-TC
19.5	RSTS/E System Manager's Guide	AA-2762F-TC
19.6	RSTS/E System User's Guide	AA-EZ12A-TC
19.7	RSTS/E Guide to Writing Command Procedures	AA-CF03A-TC
19.8	RSTS/E Utilities Reference Manual	AA-EZ11A-TC
19.9	Introduction to the EDT Editor	AA-K443A-TC
19.10	PDP-11 SORT/MERGE User's Guide	AA-C167A-TC
19.11	RSTS/E RUNOFF User's Guide	AA-3337B-TC
19.12	EDT Editor Manual	AA-M476A-TK
19.13	RSTS/E Task Builder Reference Manual	AA-5072C-TC
	RSTS/E Task Builder Reference Manual Update	AD-5072C-T1
19.14	RSTS/E Programmer's Utilities Manual	AA-D749A-TC
	RSTS/E Programmer's Utilities Manual Update1	AD-D749A-T1
	RSTS/E Programmer's Utilities Manual Update2	AD-D749A-T2
19.15	RSTS/E RT11 Utilities Manual	AA-M213A-TC
19.16	PDP-11 TECO User's Guide	AA-K420B-TC
19.17	BASIC-PLUS Language Manual	AA-2623D-TC
19.18	RSTS/E Programming Manual	AA-EZ09A-TC
19.19	RSTS/E System Directives Manual	AA-EZ10A-TC
19.20	IAS/RSX-11 ODT Reference Manual	AA-M507A-TC
19.21	PDP-11 MACRO-11 Language Reference Manual	AA-V027A-TC
	PDP-11 MACRO-11 Language Reference Manual Update	AD-V027A-T1
19.22	RSTS/E RMS-11 MACRO Programmer's Guide	AA-P507A-TC
19.23	RSTS/E RMS-11: An Introduction	AA-P508A-TC
19.24	RSTS/E RMS-11 User's Guide	AA-P510A-TC
19.25	RSTS/E RMS-11 Utilities Manual	AA-P509A-TC
19.26	RSTS/E Quick Reference Guide	AA-EZ13A-TC
19.27	Introduction to BASIC	AA-0155B-TK
19.28	EDT Quick Reference Guide	AA-M477A-TK

RUN-TIME SYSTEMS SUPPORT

- 20.0 DCL Run-time System and Utilities
  - 20.1 Package Notes
  - 20.2 DCL.RTS
  - 20.3 DCLUTL.TSK
  - 20.4 PRELIN.TSK
- 21.0 RSX Run-time System and Utilities
  - 21.1 Package Notes
  - 21.2 CRF.TSK
  - 21.3 LBR.TSK
  - 21.4 MAC.TSK
  - 21.5 PAT.TSK
  - 21.6 RSX.RTS
  - 21.7 RSXMAC.SML
  - 21.8 STK.TSK
  - 21.9 SYSLIB.OLB
  - 21.10 TKB.TSK
- 22.0 RT-11 Run-time System and Utilities
  - 22.1 Package Notes
  - 22.2 CREF.SAV
  - 22.3 HOOK.SAV
  - 22.4 LIBR.SAV
  - 22.5 LINK.SAV
  - 22.6 MACRO.SAV
  - 22.7 ONLPAT.SAV
  - 22.8 PAT.SAV
  - 22.9 PIP.SAV
  - 22.10 RT11.RTS
  - 22.11 SAVRES.SAV
  - 22.12 SILUS.SAV

OPTIONAL SOFTWARE

- 23.0 EDT V3.0
  - 23.1 Package Notes
- 24.0 (Reserved)
- 25.0 RSTS/E 2780 Package V3.0
  - 25.1 Package Notes
  - 25.2 RJ2780
  - 25.3 RSTS/E 2780 User's Guide (DEC-11-ORJEA-B-D)
- 26.0 (Reserved)
- 27.0 FMS-11 V1.5
  - 27.1 Package Notes
- 28.0 (Reserved)
- 29.0 (Reserved)
- 30.0 (Reserved)



- 31.0 DECnet/E Utilities V2.1 (DECNET\$)
  - 31.1 Package Notes
  - 31.2 DTRECV.TSK
  - 31.3 DTSEND.TSK
  - 31.4 EVTLOG.TSK
  - 31.5 FAL.TSK
  - 31.6 LSN.TSK
  - 31.7 MIRROR.TSK
  - 31.8 NCP.TSK
  - 31.9 NCUCVT.TSK
  - 31.10 NET.TSK
  - 31.11 NFT.TSK
  - 31.12 NETCPY.TSK
  - 31.13 NETCVT.TSK
  - 31.14 NETFNC.BAS
  - 31.15 NETMLB (.MLB and .SML)
  - 31.16 NETOFF.TSK
  - 31.17 NETPAT.SAV
  - 31.18 NETSLP.TSK
  - 31.19 NPKDVR.TSK
  - 31.20 TLK.TSK
- 32.0 DECnet/E V2.1 Documentation
  - 32.1 DECnet/E V2.1 Release Notes
  - 32.2 DECnet/E V2.0 System Manager's Guide
  - 32.3 DECnet/E V2.0 Network Programming in BASIC-PLUS and BASIC-PLUS-2
  - 32.4 DECnet/E V2.0 Network Programming in MACRO
  - 32.5 DECnet/E V2.0 Network Programming in FORTRAN
  - 32.6 DECnet/E V2.0 Network Programming in COBOL
  - 32.7 DECnet/E V2.0 System User's Manual
  - 32.8 DECnet/E V2.0 Installation Manual
- 33.0 (Reserved)
- 34.0 (Reserved)
- 35.0 (Reserved)
- 36.0 DECmail-11 V2.0
  - 36.1 Package Notes
- 37.0 (Reserved)
- 38.0 (Reserved)
- 39.0 (Reserved)
- 40.0 RPG V8.8
  - 40.1 Package Notes
- 41.0 (Reserved)

- 42.0 (Reserved)
- 43.0 (Reserved)
- 44.0 (Reserved)
- 45.0 DECdx/RSTS V1.0
  - 45.1 Package Notes
- 46.0 INDENT V1.4
  - 46.1 Package Notes
- 47.0 ADE V2.4
  - 47.1 Package Notes
- 48.0 BASIC-PLUS-2 V2.3
  - 48.1 Package Notes
- 49.0 DATATRIEVE-11 V3.1
  - 49.1 Package Notes
- 50.0 KMC Drivers and Utilities
  - 50.1 Package Notes
  - 50.2 IBM Interconnect (II) Driver
  - 50.3 KMC11 (XK) Driver
  - 50.4 KMCUT
- 51.0 RSTS/E 3271 Protocol Emulator V2.1
  - 51.1 Package Notes
  - 51.2 (Reserved)
  - 51.3 3271 Microcode (CRAM)
  - 51.4 3271 Microcode (RAM)
  - 51.5 MTO
  - 51.6 RSTS/E 3271 Protocol Emulator V2.1 Release Notes (AA-H474C-TC)
  - 51.7 RSTS/E 3271 Protocol Emulator User's Guide (AA-D365A-TC)
  - 51.8 DIBOL Interface
- 52.0 RSTS/E High Performance 2780/3780 Emulator V1.1
  - 52.1 Package Notes
  - 52.2 2780 Microcode (CRAM)
  - 52.3 2780 Microcode (RAM)
  - 52.4 3780 Microcode (CRAM)
  - 52.5 3780 Microcode (RAM)
  - 52.6 RJESPL
  - 52.7 RSTS/E 2780/3780 High Performance Emulator V1.1 Release Notes (AA-J458B-TC)
  - 52.8 RSTS/E High Performance 2780/3780 Emulator User's Guide (AA-J177A-TC)
- 53.0 SORT/MERGE V3.0
  - 53.1 Package Notes

54.0 ADE V2.3  
54.1 Package Notes

55.0 FORTRAN IV V2.6  
55.1 Package Notes

56.0 COBOL-81 V2.3  
56.1 Package Notes

57.0 FORTRAN-77 V5.0  
57.1 Package Notes

58.0 FORTRAN-77 DEBUG V1.0  
58.1 Package Notes

59.0 (Reserved)

60.0 Message Router V1.0  
60.1 Package Notes

61.0 (Reserved)

62.0 PLXY-11 V1.3  
62.1 Package Notes

63.0 (Reserved)

64.0 (Reserved)

65.0 (Reserved)

66.0 PRO IV V1.0  
66.1 Package Notes

67.0 (Reserved)

68.0 MENU-11 V2.0  
68.1 Package Notes

69.0 DECword/DP V1.2  
69.1 Package Notes

70.0 COBOL-11 V4.4  
70.1 Package Notes  
70.2 COBOL Compiler - NON-CIS  
70.3 COBOL Compiler - CIS

71.0 DMS-500 V2.1  
71.1 Release Notes  
71.2 DMS-500 User's Guide

These are the component numbers for the ISAM and RAM package:

71.3	DMSFSS.BAS
71.4	DMSISO.BAS
71.5	DMSRAO.BAS
71.6	DMSISR.BAS
71.7	DMSISC.BAS
71.8	DMSRAR.BAS
71.9	DMSISA.BAS
71.10	DMSRAA.BAS
71.11	DMSFSU.BAS
71.12	DMSFSX.BAS
71.13	DMSUTL.BAS
71.14	IAMGEN.BAS
71.15	IAMCRI.BAS
71.16	IAMDMP.BAS
71.17	IAMVFY.BAS
71.18	IAMFNS.BAS

These are the component numbers for the DSORT package:

71.19	DSORT.BAS
71.20	DSORTD.BAS
71.21	DSORTF.BAS
71.22	DSORTX.BAS
71.23	DSORTS.BAS
71.24	DSORTM.BAS
71.25	DSORTO.BAS

72.0 (Reserved)

73.0 DIBOL V5.1A

73.1 Package Notes

74.0 (Reserved)

75.0 RMS-11 V2.0

75.1 Package Notes

76.0 DIBS-11/CTS500 V1.0

76.1 Package Notes

77.0 (Reserved)

78.0 (Reserved)

79.0 (Reserved)

80.0 (Reserved)

81.0 DECgraph-11 V1.2

81.1 Package Notes

82.0 (Reserved)

83.0 (Reserved)

84.0 (Reserved)

85.0 (Reserved)

90.0 User Assigned Components - For Development Use

90.1 Package Notes

91.0 User Assigned Components - For User Use

to

99.0



### 3.0 Software Performance Reports

Each new installation is provided with Software Performance Report (SPR) forms. The SPR form allows you to suggest enhancements to, or report problems with DIGITAL software or documentation. When you discover a problem, complete an SPR and mail it to the local SPR Center (see the inside back cover of the SPR form).

Responses will be sent to the name and address appearing on the form. You can obtain additional SPR forms by writing to the local SPR Center.

SPR response service is provided at no charge for one year after installation and may be continued by subscription thereafter.

#### 3.1 Software Performance Report Guidelines

These guidelines for RSTS/E SPR completion ensure that adequate information is included to prevent delays in processing.

For all types of actual or suspected software problems, the following should be included with the SPR:

1. A complete description of the problem.
2. The CPU type.
3. The system disk type.
4. The amount and type of memory.
5. If possible, a simple program or procedure which can be used to reproduce the problem.
6. Any additional information which you may think is relevant.

For problems associated with the RSTS/E monitor or crash analysis package (ANALYS), also include:

1. The crash dump printed by ANALYS (which includes annotations, a listing of the symbol table, and a list of all installed patches).
2. A machine readable copy (preferably a backup on 9-track magnetic tape) of your monitor and CRASH.SYS file. Your media will be returned with your SPR answer.

When submitting an SPR concerning a DIGITAL-supplied utility (CUSP), also include:

1. The name of the CUSP.
2. A "RUN" of the CUSP which displays the header line, version number, and the problem which is occurring, if possible.
3. A list of any optional feature patches installed.
4. Whether the program runs under BASIC-PLUS (.BAC version) or RSX (.TSK version).
5. A listing of the account(s), and the account(s) attributes, in which the problem occurs.
6. A complete listing of the CUSP (preferably on magnetic tape) if your installation has made any non-standard changes.
7. Listings of all relevant input and output files.

#### NOTE

No SPR, monitor or CUSP, will be considered unless ALL relevant Mandatory patches published to date have been applied. Before submitting an SPR, you should review the relevant section(s) of the Maintenance Notebook, to ensure that ALL Mandatory updates and patches to the program or package have been installed.



#### 4.0 Procedures for Updating RSTS/E Software

This section briefly describes the updating procedures to be used for maintenance of RSTS/E V9.0. The procedures to be followed for updating the monitor and system programs when installing a new RSTS/E system are described in the RSTS/E System Installation and Update Guide. The procedures for updating the software as part of normal system maintenance are described in the RSTS/E System Manager's Guide.

Most corrections to RSTS software are done by replacing the affected components with updated versions distributed on the next release of RSTS/E (V9.1, V9.2, etc.). These replacement modules are automatically installed as part of the RSTS installation and update process.

In cases where a critical problem is discovered, DIGITAL will publish an article in the RSTS/E Software Dispatch describing the problem and suggesting possible work-arounds until the module is replaced in the next V9 update release. If no reasonable work-arounds are available, a patching procedure will be included in the article so you can correct the defective module. Step-by-step instructions on how to apply the patch will be included.

Unless otherwise stated, Mandatory patches published in the RSTS/E Software Dispatch should be installed as soon as possible. Since not all Mandatory patches apply to every installation, patches to unused or optional components will fail when you attempt to apply them. In such cases, the patch article will describe how the patch will fail if it does not apply to your system.

Be sure to file and maintain all Dispatch articles, even for unused components. Your site may choose at some future time to install additional components; these components will then have to be brought up to the latest support level.

Some Dispatch articles may include "Feature" patches, allowing you to modify a component to enable an optional feature of that component. These Feature patches are optional and are not required to keep a component at its current support level. However, if you encounter problems in a component containing optional features, you must report which Feature patches have been installed when submitting a Software Performance Report (SPR).

#### 4.1 Monitor Patching

Normally, problems discovered in a RSTS/E monitor are corrected by replacing the defective component during the installation and update procedure. You must rebuild your system's monitor each time you receive a new RSTS/E update to install any corrections made to the monitor components.

If it should become necessary for you to apply a patch to your system's monitor, the RSTS/E Software Dispatch article describing the problem will also explain how to apply the patch. Normally, changes to the RSTS/E monitor are made using the off-line PATCH option of INIT.SYS or the on-line program \$ONLPAT.SAV. General descriptions of these patching tools and how to use them are included in the RSTS/E System Installation and Update Guide and the RSTS/E System Manager's Guide.

The patching article will include specific instructions on how to apply the patch. The expected dialogue will be shown in the article as it should appear when you install the patch. If any deviation occurs, you should immediately:

1. Halt the patching process
2. Restore any changes already made to their former values
3. Determine where the discrepancy occurred

#### 4.2 Commonly Used System Program (CUSP) Module Replacement

Like the monitor, corrections to individual RSTS/E programs are made by replacing the defective module with a replacement from the V9.0 Installation Kit. These replacement modules are automatically installed whenever you install or update the package containing the replacement program. For example, if a replacement module for the HELP.TSK program is included on a RSTS/E installation kit, then that module will replace the copy of HELP.TSK on your system whenever you install or update the HELP package.

Note that you no longer need to copy replacement modules for the RSTS/E CUSPs to disk with PATCPY before beginning the installation or update. All replacement modules for bundled software will automatically be applied whenever you install or update your RSTS/E software.

#### 4.3 Installation Kits

RSTS/E Installation Kits contain the minimal software necessary to create a RSTS/E system, as well as replacement modules and/or patches for software supported under RSTS/E V9.0. The RSTS/E V9.0 Installation Kit contains all patches published in the RSTS/E V9.0 Maintenance Notebook and in the RSTS/E V9.0 Software Dispatch Review. Each subsequent RSTS/E Installation Kit (V9.1, V9.2, etc.) will contain all of the components from the previous installation kit, plus any new modules and/or patches published in the RSTS/E Software Dispatch. Thus, you only need the most recent RSTS/E installation kit to update your system to the current revision level.

Note that in some cases, patches previously published in the RSTS/E Software Dispatch will become obsolete, since the correction provided by the patch will be included in the replacement module itself. In such cases, a new Dispatch article will be published to supersede the previous patch article.

The cumulative index published in the RSTS/E Software Dispatch will indicate which installation kit (V9.0, V9.1, etc.) first contained a patch or module replacement.

Procedures for using the installation kit to update standard RSTS/E software can be found in the RSTS/E System Installation and Update Guide. Procedures for updating optional layered software are usually found in the appropriate installation manual for the product.

#### 4.4 Patches and Replacement Modules for Optional Layered Products

The RSTS/E V9.0 Installation Kit also contains patches and replacement modules for optional layered products. Information on how to update layered products will be included with each installation kit in the file UPDATE.DOC. This file is automatically copied to the UPDATE\$ account on your system whenever you install the UPDATE package during a system installation or update. Be sure to read the information in the UPDATE.DOC file before updating any RSTS/E layered product.

Note that PBUILD is no longer included with RSTS/E. To update those layered products that used PBUILD in the past, you must now mount the original layered product distribution kit and use the BUILD/PATCH or PATCH option of BUILD.TSK.

To install layered product patches or replacement modules, you must first transfer all of the patches, replacement modules, and command files for that product to a patch account (PATCH\$ by default) on your system. This step is now required for both disk and tape installation kits.

To transfer layered product update components from the RSTS/E installation kit to the PATCH\$ account, perform either of these steps:

1. During the installation procedure, type "YES" to the prompt:

Do you want to transfer the layered product update components from the Installation kit ?

2. Invoke the DCL "copy update" command procedure by typing the DCL command line:

```
$ @[0,1]COPYUP "package name"
```

where "package name" is the name of the layered product you want to update.

For more information on updating a layered product, please read the file UPDATE\$:UPDATE.DOC included with the UPDATE package on all RSTS/E V9.0 Installation Kits.

## 5.0 Software Product Descriptions (SPDs) and Option Bulletins

### 5.1 Software Product Descriptions (SPDs)

Periodically, new or revised Software Product Description (SPD) bulletins will appear in the RSTS/E Software Dispatch for various software products marketed by DIGITAL. This section of the notebook is provided as a convenient place to file these SPDs for future reference.

Every SPD has a unique number, for example:

SPD 13.1.20

This number appears on the first page of the SPD bulletin, at the far right hand side of the PRODUCT NAME: line.

Note that the last part of the SPD number is the revision level, with 0 being assigned for original issues of SPDs.

### 5.2 Option Bulletins

Periodically, new or revised Option Bulletins will appear in the RSTS/E Software Dispatch for various products marketed by DIGITAL. This section of the notebook is provided as a convenient place to file these bulletins. There is no filing scheme for option bulletins.

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## 6.0 RSTS/E Articles

Section 6.0 is the repository for all RSTS/E articles. This section will include problem solutions, optional "Feature" patches, documentation errata, programming hints, and tips for better operation of RSTS/E.

Anyone who installs a RSTS/E system (whether on-line under time sharing or as the initial version of the system) should become familiar with these articles. This should be a continuing process of education as sub-sections are added and updated.

The section which follows is an index to all articles included in the original RSTS/E Maintenance Notebook. This index will be updated monthly as new articles are published in the RSTS/E Software Dispatch.

6.1 Cumulative Index of RSTS/E V9.0 Maintenance Notebook Articles

<u>Component</u>	<u>Sequence</u>
RSTS/E MONITOR	
<u>RSTS/E V9.0 GENERAL NOTES</u>	
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ANNOUNCING RSTS/E V9.0	0.1.2 N
System Management Guidelines	
USING SAVE/RESTORE ON A TWO-DISK SYSTEM	0.2.1 N
<u>Initialization</u>	
INIT.SYS Program Notes	
DEVICES WITH NON-STANDARD UNIBUS ADDRESSES AND VECTORS	1.2.1 N
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Monitor Patches	
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BASIC-PLUS Patches	
SPECIAL PRINT-USING CHARACTERS	4.1.1 F
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DEFAULT TO NOEXTEND MODE	4.1.4 F
IMMEDIATE MODE FROM .BAS FILE	4.1.5 F
NO PPN'S IN CATALOG COMMAND	4.1.6 F
DISABLING THE CCL SYS CALL	4.1.7 F
CLEAR I/O BUFFERS USED BY OPEN STATEMENTS	4.1.8 M
FORCE "ILLEGAL STATEMENT" ERROR WHEN USING OBSOLETE	
SEND/RECEIVE	4.1.9 F



Non-Standard BASIC-PLUS Features

THE BASIC-PLUS DEBUG FACILITY	4.10.1	N
THE BASIC-PLUS DUMP FACILITY	4.10.2	N
CHANGING THE BASIC-PLUS DEBUG KEYWORDS	4.10.3	F
ENABLING THE BASIC-PLUS DUMP FEATURE	4.10.4	F
ENABLING DUMP FROM COMPILED FILES FOR NON-PRIVILEGED USERS	4.10.5	F
CHANGING THE BASIC-PLUS D?MP KEYWORD	4.10.6	F

RSTS/E 2780 DEVICE DRIVER

2780 Device Driver Patches

BUFFER LIMIT CHECKING	5.1.1	M
DISCONNECT COMMAND HANDLING	5.1.2	M
DP11 TRANSMIT HANG CONDITION	5.1.3	M
DUI1/DP11 TRANSMIT HANG CONDITION	5.1.4	M
LOSS OR DUPLICATION OF DATA	5.1.5	M
DOUBLE CLOSE ALTERS MONITOR	5.1.6	M
GET/PUT INTERLOCK PROBLEM	5.1.7	M
2780 HANDLER FAILURE PROBLEM	5.1.8	M
LOCAL BINARY TRANSMIT PROBLEM	5.1.9	M

2780 Device Driver Notes

INSTALLING AND TROUBLE-SHOOTING 2780'S	5.2.1	N
--	-------	---

RSTS/E UTILITIES

Error Control Package (ERROR\$)

Package Notes

UNDERSTANDING "PA MEMORY SYSTEM" ERROR LOGS	12.1.1	N
---	--------	---

Operator Services and Spooling Package (OPSER\$)

Package Notes

NOTES ON USE OF THE SERIAL LA180 (LA180S) TERMINAL	14.1.1	N
USING TWO OR MORE PRINTERS TO SERVE A QUEUE	14.1.2	N

RUN-TIME SYSTEMS SUPPORT

DCL

Package Notes

FILE SPECIFICATIONS IN DCL	20.1.1	N
SETTING UP THE DCL LINK COMMAND	20.1.2	N

RSX Utilities

Package Notes

USING RTSODT FOR DEBUGGING RUN-TIME SYSTEMS 21.1.1 N

CRF.TSK

USING THE RSX CRF UTILITY 21.2.1 N

RT-11 Run-time System and Utilities

Package Notes

USE OF UNDERSCORE IN RT11 EMULATOR UTILITIES 22.1.1 N

USING RTSODT FOR DEBUGGING RUN-TIME SYSTEMS 22.1.2 N

HOOK.SAV

NOTES ON HOOK.SAV 22.3.1 N

OPTIONAL SOFTWARE

RSTS/E 2780 PACKAGE V3.0

RJ2780

FAILURE TO CLEAR 'JOB ACTIVE' ON ATTACH 25.2.1 M

LOCAL BINARY TRANSMIT FAILURE 25.2.2 M

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## RSTS/E V9.0 COMPONENT SUMMARY

This table lists all of the software components included with RSTS/E V9.0. It does not include optional layered product components or temporary modules created during installation. Modules belonging to an optional package included with RSTS/E will only be present if you choose to install that package on your system.

Listed with each module is its current version/edit level, its standard protection code, and its expected location on your system.

Note that file protection codes play a critical role in the overall security of your system. You should not change the protection code of any file included with RSTS/E unless directed to do so. Changing a file's protection code to a different value may compromise security or cause the program to fail in unpredictable ways.

This article will be superseded whenever a component is added, deleted or replaced in a later release of RSTS/E.

## System Installation and Update

Component -----	Edit ----	Prot ----	Location -----
BPLGEN.SAV	V9.0-14	<124>	SYSGEN\$:
BUFCHK.TSK	V9.0-14	<124>	SYSGEN\$:
COPYUP.COM	V9.0-14	<104>	[0,1]
INSTAL.COM	V9.0-14	<104>	[0,1]
SYSGEN.SAV	V9.0-14	<124>	SYSGEN\$:
UPDATE.COM	V9.0-14	<104>	[0,1]

## System Files

Component -----	Edit ----	Prot ----	Location -----
BACKUP.TSK	V9.0-14	<104>	[0,1]
CSPLIB.LIB	V9.0-14	<60>	[0,1]
ERR .ERR	V9.0-14	<40>	[0,1]
INIT .SYS	V9.0-14	<60>	[0,1]
LOGIN .COM	V9.0-14	<104>	[0,1]
RECOVR.COM	V9.0-14	<124>	[0,1]
START .COM	V9.0-14	<124>	[0,1]
SYSGEN.SIL	V9.0-14	<60>	[0,1]
SYSINI.COM	V9.0-14	<124>	[0,1]

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## HELP

Component	Edit	Prot	Location
-----	----	----	-----
HELP .TSK	V9.0-14	<232>	HELP\$:
* .HLP	V9.0-14	<40>	HELP\$:

## TECO

Component	Edit	Prot	Location
-----	----	----	-----
CRTRUB.MAC	V39.00	<60>	TECO\$:
CRTRUB.OBJ	V39.00	<60>	TECO\$:
FMTMAC.TEC	V39.00	<104>	TECO\$:
FMTMAC.TES	V39.00	<40>	TECO\$:
GEXIT .OBJ	V9.0-39	<60>	TECO\$:
LOCAL .TEC	V39.00	<104>	TECO\$:
LOCAL .TES	V39.00	<40>	TECO\$:
SCREEN.OBJ	V39.00	<60>	TECO\$:
SCRINS.OBJ	V39.00	<60>	TECO\$:
SCROLL.OBJ	V39.00	<60>	TECO\$:
SEARCH.TEC	V39.00	<104>	TECO\$:
SEARCH.TES	V39.00	<40>	TECO\$:
SQU .TEC	V39.00	<104>	TECO\$:
SQU .TES	V39.00	<40>	TECO\$:
TECKBM.TEC		<104>	TECO\$:
TECKBM.TES		<40>	TECO\$:
TECO .DOC	V40	<40>	TECO\$:
TECO .INI	V03.00	<40>	TECO\$:
TECO .RTS	V40.00	<60>	TECO\$:
TECO .TEC	V40.00	<104>	TECO\$:
TECO .TES	V40.00	<40>	TECO\$:
TECOIN.TES	V03.00	<40>	TECO\$:
TECOLB.OBJ		<60>	TECO\$:
TECORN.DOC	V40	<40>	TECO\$:
TYPE .TEC	V39.00	<104>	TECO\$:
TYPE .TES	V39.00	<40>	TECO\$:
VTEDIT.DOC	V39.00	<40>	TECO\$:
VTEDIT.TEC	V39.00	<104>	TECO\$:
VTEDIT.TES	V39.00	<40>	TECO\$:

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## System Library

Component -----	Edit ----	Prot ----	Location -----
ACTMGR.TSK	V9.0-14	<232>	[1,2]
ATPK .TSK	V9.0-14	<232>	[1,2]
AUTOED.TSK	V9.0-14	<124>	[1,2] (see note 1)
BUILD .TSK	V9.0-14	<124>	[1,2] (see note 1)
COMMON.MAC	V9.0-14	<40>	[1,2]
CPATCH.TSK	V9.0-14	<124>	[1,2] (see note 1)
CSPCOM.TSK	V9.0-14	<124>	[1,2] (see note 1)
DIRECT.TSK	V9.0-14	<232>	[1,2]
DSKINT.TSK	V9.0-14	<124>	[1,2]
ERR .STB	V9.0-14	<40>	[1,2]
FILCOM.TSK	V9.0-14	<104>	[1,2]
LOGIN .TSK	V9.0-14	<232>	[1,2]
LOGOUT.TSK	V9.0-14	<232>	[1,2]
MAKSIL.TSK	V9.0-14	<104>	[1,2]
ONLCLN.TSK	V9.0-14	<232>	[1,2]
ONLPAT.SAV	V9.0-14	<104>	[1,2]
PIP .SAV	V9.0-14	<232>	[1,2]
PLEASE.TSK	V9.0-14	<232>	[1,2] (see note 2)
QUE .TSK	V9.0-14	<232>	[1,2] (see note 2)
REORDR.TSK	V9.0-14	<124>	[1,2]
SAVRES.SAV	V9.0-14	<124>	[1,2]
SHUTUP.TSK	V9.0-14	<232>	[1,2]
SWITCH.TSK	V9.0-14	<232>	[1,2]
SYSTAT.TSK	V9.0-14	<232>	[1,2]
TERMGR.TSK	V9.0-14	<232>	[1,2]
UTILITY.TSK	V9.0-14	<124>	[1,2] (see note 1)
UTLMGR.TSK	V9.0-14	<232>	[1,2]

## Note 1

These programs are "dispatcher" programs that chain to the actual program located in the UPDATE\$ account.

## Note 2

These programs are "dispatcher" programs that chain to the actual program located in the OPSER\$ account.

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### Auxiliary Library

Component -----	Edit ----	Prot ----	Location -----
BPCREF.TSK	V9.0-14	<104>	AUXLIB\$:
BPCRFL.TSK	V9.0-14	<104>	AUXLIB\$:
COPY .TSK	V9.0-14	<104>	AUXLIB\$:
DISPLY.TSK	V9.0-14	<232>	AUXLIB\$:
DSKCVT.TSK	V9.0-14	<124>	AUXLIB\$:
FIT .TSK	V9.0-14	<124>	AUXLIB\$:
FLINT .TSK	V9.0-14	<104>	AUXLIB\$:
GRIPE .TSK	V9.0-14	<232>	AUXLIB\$:
ODT .TSK	V9.0-14	<104>	AUXLIB\$:
PMDUMP.TSK	V9.0-14	<104>	AUXLIB\$:
QUOLST.TSK	V9.0-14	<232>	AUXLIB\$:
RUNOFF.TSK	V9.0-14	<104>	AUXLIB\$:
TALK .TSK	V9.0-14	<232>	AUXLIB\$:

### Error Control

Component -----	Edit ----	Prot ----	Location -----
ANALY1.TSK	V9.0-14	<124>	ERROR\$:
ANALY2.TSK	V9.0-14	<124>	ERROR\$:
ANALY3.TSK	V9.0-14	<124>	ERROR\$:
ANALYS.TSK	V9.0-14	<124>	ERROR\$:
ERRCPY.TSK	V9.0-14	<232>	ERROR\$:
ERRDAT.FIL	V9.0-14	<60>	ERROR\$:
ERRDET.TSK	V9.0-14	<232>	ERROR\$:
ERRDIS.TSK	V9.0-14	<232>	ERROR\$:
ERRINT.TSK	V9.0-14	<232>	ERROR\$:
MSCPER.FIL	V9.0-14	<60>	ERROR\$:

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## RESTOR

Component -----	Edit ----	Prot ----	Location -----
BACCOM.TSK	V9.0-14	<252>	RESTOR\$:
BACCON.TSK	V9.0-14	<252>	RESTOR\$:
BACDIR.TSK	V9.0-14	<252>	RESTOR\$:
BACDSK.TSK	V9.0-14	<252>	RESTOR\$:
BACENT.TSK	V9.0-14	<252>	RESTOR\$:
BACFRM.TSK	V9.0-14	<252>	RESTOR\$:
BACLAB.TSK	V9.0-14	<252>	RESTOR\$:
BACLOD.TSK	V9.0-14	<252>	RESTOR\$:
BACLST.TSK	V9.0-14	<252>	RESTOR\$:
BACMNT.TSK	V9.0-14	<252>	RESTOR\$:
BACKUP.HLP	V9.0-14	<60>	RESTOR\$:
BACKUP.PRM	V9.0-14	<60>	RESTOR\$:
RESTOR.TSK	V9.0-14	<252>	RESTOR\$:

## Operator Services (OPSER)

Component -----	Edit ----	Prot ----	Location -----
BATCH .DCD	V9.0-14	<60>	OPSER\$:
BATCH .TSK	V9.0-14	<232>	OPSER\$:
BATDCD.TSK	V9.0-14	<232>	OPSER\$:
BATDEC.TSK	V9.0-14	<232>	OPSER\$:
BATIDL.TSK	V9.0-14	<232>	OPSER\$:
BATRUN.TSK	V9.0-14	<232>	OPSER\$:
CHARS .QUE	V9.0-14	<60>	OPSER\$:
OPSER .TSK	V9.0-14	<232>	OPSER\$:
OPSRUN.TSK	V9.0-14	<232>	OPSER\$:
PLEASE.TSK	V9.0-14	<232>	OPSER\$: (see note)
QUE .TSK	V9.0-14	<232>	OPSER\$: (see note)
QUEMAN.TSK	V9.0-14	<232>	OPSER\$:
QUMRUN.TSK	V9.0-14	<232>	OPSER\$:
SPLIDL.TSK	V9.0-14	<232>	OPSER\$:
SPLRUN.TSK	V9.0-14	<232>	OPSER\$:
SPOOL .TSK	V9.0-14	<232>	OPSER\$:

## Note

These programs have corresponding "dispatcher" programs in the system library (\$) account, for backward compatibility with programs or command procedures that reference these programs in the \$ account.

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## Print/Batch Services (PBS)

Component -----	Edit ----	Prot ----	Location -----
FORMS .SYS	V9.0-14	<40>	PBS\$:
PBSMGR.TSK	V9.0-14	<232>	PBS\$:
PBS .SYS	V9.0-14	<188>	PBS\$:
PBS .TSK	V9.0-14	<232>	PBS\$:
PBSERR.ERR	V9.0-14	<40>	PBS\$:

## Unsupported Software

Component -----	Edit ----	Prot ----	Location -----
BPDA .BAS	V9.0-14	<60>	UNSUPP\$:
BPDA .TSK	V9.0-14	<104>	UNSUPP\$:
B2CREF.DOC	V9.0-14	<40>	UNSUPP\$:
B2CREF.HLP	V9.0-14	<60>	UNSUPP\$:
B2CREF.TSK	V9.0-14	<104>	UNSUPP\$:
CMTAB .MAC	V9.0-14	<60>	UNSUPP\$:
COMND .MAC	V9.0-14	<60>	UNSUPP\$:
CONNEC.BAS	V9.0-14	<60>	UNSUPP\$:
CONNEC.TSK	V9.0-14	<104>	UNSUPP\$:
DIALER.BAS	V9.0-14	<60>	UNSUPP\$:
DIALER.DOC	V9.0-14	<60>	UNSUPP\$:
DIALER.TSK	V9.0-14	<104>	UNSUPP\$:
DSKDMP.BAS	V9.0-14	<60>	UNSUPP\$:
DSKDMP.HLP	V9.0-14	<60>	UNSUPP\$:
DSKDMP.TSK	V9.0-14	<124>	UNSUPP\$:
DSKPEK.OBJ	V9.0-14	<60>	UNSUPP\$:
DUMP .SAV	V9.0-14	<104>	UNSUPP\$:
EMTCPY.BAS	V9.0-14	<60>	UNSUPP\$:
EMTCPY.TSK	V9.0-14	<124>	UNSUPP\$:
ERMSG .MAC	V9.0-14	<60>	UNSUPP\$:
FLOAT .BAS	V9.0-14	<60>	UNSUPP\$:
FLOAT .TSK	V9.0-14	<124>	UNSUPP\$:
FMTCM .MAC	V9.0-14	<60>	UNSUPP\$:
HYPHEN.MAC	V9.0-14	<60>	UNSUPP\$:
INDEX .MAC	V9.0-14	<60>	UNSUPP\$:
LQSTAT.BAS	V9.0-14	<60>	UNSUPP\$:
LQSTAT.TSK	V9.0-14	<124>	UNSUPP\$:



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## Unsupported Software

Component -----	Edit ----	Prot ----	Location -----
MEMORY.BAS	V9.0-14	<60>	UNSUPP\$:
MEMORY.TSK	V9.0-14	<124>	UNSUPP\$:
MONEY .BAS	V9.0-14	<60>	UNSUPP\$:
MONEY .TSK	V9.0-14	<124>	UNSUPP\$:
PINDX .MAC	V9.0-14	<60>	UNSUPP\$:
QSTATS.B2S	V9.0-14	<60>	UNSUPP\$:
QSTATS.DOC	V9.0-14	<60>	UNSUPP\$:
QSTATS.TSK	V9.0-14	<124>	UNSUPP\$:
RNCMD .MAC	V9.0-14	<60>	UNSUPP\$:
RNFIO .MAC	V9.0-14	<60>	UNSUPP\$:
RNPRES .MAC	V9.0-14	<60>	UNSUPP\$:
RNO .RNO	V9.0-14	<60>	UNSUPP\$:
RNO .TSK	V9.0-14	<104>	UNSUPP\$:
RNOBLD.CMD	V9.0-14	<60>	UNSUPP\$:
RNOBLD.ODL	V9.0-14	<60>	UNSUPP\$:
RNORSX.MAC	V9.0-14	<60>	UNSUPP\$:
RSTSFL.DOC	V9.0-14	<60>	UNSUPP\$:
RSTSFL.HLP	V9.0-14	<60>	UNSUPP\$:
RSTSFL.OBJ	V9.0-14	<60>	UNSUPP\$:
RSTSFL.OLB	V9.0-14	<60>	UNSUPP\$:
RUNOFF.MAC	V9.0-14	<60>	UNSUPP\$:
SRCCOM.SAV	V9.0-14	<104>	UNSUPP\$:
START .MAC	V9.0-14	<60>	UNSUPP\$:
STATUS.B2S	V9.0-14	<60>	UNSUPP\$:
STATUS.TSK	V9.0-14	<124>	UNSUPP\$:

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## Layered Product Update

Component -----	Edit ----	Prot ----	Location -----
AUTOED.TSK	V9.0-14	<124>	UPDATE\$: (see note)
BUILD .TSK	V9.0-14	<124>	UPDATE\$: (see note)
CPATCH.TSK	V9.0-14	<124>	UPDATE\$: (see note)
CSPCOM.TSK	V9.0-14	<124>	UPDATE\$: (see note)
CSPCOM.OLB	V9.0-14	<60>	LB:
UPDATE.DOC	V9.0	<60>	UPDATE\$:
UTILTY.TSK	V9.0-14	<124>	UPDATE\$: (see note)

## Note

These programs have corresponding "dispatcher" programs in the system library (\$) account, for backward compatibility with programs or command procedures that reference these programs in the \$ account.

## Device Test

Component -----	Edit ----	Prot ----	Location -----
CPEXER.TSK	V9.0-14	<124>	TEST\$:
CPUTST.TSK	V9.0-14	<124>	TEST\$:
DSKSEK.TSK	V9.0-14	<124>	TEST\$:
DTEXER.TSK	V9.0-14	<124>	TEST\$:
DXEXER.TSK	V9.0-14	<124>	TEST\$:
DSKEXR.TSK	V9.0-14	<124>	TEST\$:
KBEXER.TSK	V9.0-14	<124>	TEST\$:
LPEXER.TSK	V9.0-14	<124>	TEST\$:
MTEXER.TSK	V9.0-14	<124>	TEST\$:
PPEXER.TSK	V9.0-14	<124>	TEST\$:
PREXER.TSK	V9.0-14	<124>	TEST\$:

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## DCL Runtime System and Utilities

Component	Edit	Prot	Location
-----	----	----	-----
BP2 .LNK	V9.0-14	<40>	[1,2]
C81 .LNK	V9.0-14	<40>	[1,2]
DCL .RTS	V9.0-14	<232>	[0,1]
DCLUTL.TSK	V9.0-14	<232>	[1,2]
DIBOL .LNK	V9.0-14	<40>	[1,2]
DMS .LNK	V9.0-14	<40>	[1,2]
F77 .LNK	V9.0-14	<40>	[1,2]
PRELIN.TSK	V9.0-14	<232>	[1,2]
RSX11 .LNK	V9.0-14	<40>	[1,2]

## RSX Runtime System and Utilities

Component	Edit	Prot	Location
-----	----	----	-----
CRF .TSK	V05.03c	<104>	[1,2]
LBR .TSK	V06.00	<104>	[1,2]
MAC .TSK	V05.03c	<104>	[1,2]
ODT .OBJ	09.009	<40>	LB:
ODTID .OBJ	D01.01	<40>	LB:
PAT .TSK	V02.02	<104>	[1,2]
RSX .RTS	V9.0-14	<60>	[0,1]
RSXMAC.SML		<40>	LB:
STK .TSK	09.009	<104>	[1,2]
SYSLIB.OLB		<40>	LB:
TKB .TSK	09.009	<104>	[1,2]

## RT-11 Runtime System and Utilities

Component	Edit	Prot	Location
-----	----	----	-----
CREF .SAV	V05.03a	<104>	[1,2]
HOOK .SAV	V9.0-14	<124>	SYSGEN\$:
LIBR .SAV	V04.00	<104>	[1,2]
LINK .SAV	V08.02R	<104>	[1,2]
MACRO .SAV	V05.03c	<104>	[1,2]
PAT .SAV	V04.00	<104>	[1,2]
RT11 .RTS	V9.0-14	<60>	[0,1]
SILUS .SAV	V9.0-14	<104>	[1,2]
SYSLIB.OBJ		<40>	[1,2]
SYSMAC.SML		<40>	[1,2]

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## BASIC-PLUS Runtime System

Component -----	Edit ----	Prot ----	Location -----
BASIC .RTS	V9.0-14	<60>	[0,1]

## EDT V3.0

Component -----	Edit ----	Prot ----	Location -----
EDT .LIB	V3.0	<60>	EDT\$:
EDT .TSK	V3.0	<104>	EDT\$:
EDT100.DOC	V3.0	<40>	EDT\$:
EDT200.DOC	V3.0	<40>	EDT\$:
EDT52 .DOC	V3.0	<40>	EDT\$:
EDTHEL.HLP	V3.0	<40>	LB:
EDTKIT.DOC	V3.0	<60>	EDT\$:

## SORT V3.0

Component -----	Edit ----	Prot ----	Location -----
MGEFIL.ODL	V3.0	<40>	LB:
MGELIB.OLB	V3.0	<40>	LB:
MGEREC.ODL	V3.0	<40>	LB:
MGESHR.OLB	V3.0	<40>	LB:
MGEUTL.TSK	V3.0	<104>	SORT\$:
SMRES .LIB	V3.0	<60>	[0,1]
SMRES .STB	V3.0	<40>	LB:
SMRES .TSK	V3.0	<40>	LB:
SMSHR .ODL	V3.0	<40>	LB:
SRTFIL.ODL	V3.0	<40>	LB:
SRTLIB.OLB	V3.0	<40>	LB:
SRTREC.ODL	V3.0	<40>	LB:
SRTSHR.OLB	V3.0	<40>	LB:
SRTTRN.TSK	V3.0	<104>	SORT\$:
SRTUTL.TSK	V3.0	<104>	SORT\$:
STMGFL.ODL	V3.0	<40>	LB:
STMGRC.ODL	V3.0	<40>	LB:

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RMS V2.0

Component -----	Edit ----	Prot ----	Location -----
DAP11X.ODL	V2.0	<40>	LB:
DAPRES.LIB	V2.0	<60>	RMS\$:
DAPRES.STB	V2.0	<40>	LB:
DAPRES.TSK	V2.0	<40>	LB:
DAPRLX.ODL	V2.0	<40>	LB:
R0RMS1.MAC	V2.0	<40>	LB:
RMS11 .ODL	V2.0	<40>	LB:
RMS11S.ODL	V2.0	<40>	LB:
RMS11X.ODL	V2.0	<40>	LB:
RMS12S.ODL	V2.0	<40>	LB:
RMS12X.ODL	V2.0	<40>	LB:
RMSBCK.TSK	V2.000	<104>	RMS\$:
RMSCNV.TSK	V2.001	<104>	RMS\$:
RMSDAP.OLB	V2.0	<40>	LB:
RMSDEF.TSK	V2.000	<104>	RMS\$:
RMSDES.HLP	V2.0	<40>	LB:
RMSDES.TSK	V2.001	<104>	RMS\$:
RMSDSP.TSK	V2.002	<104>	RMS\$:
RMSIFL.TSK	V2.006	<104>	RMS\$:
RMSLBA.LIB	V2.0	<60>	RMS\$:
RMSLBB.LIB	V2.0	<60>	RMS\$:
RMSLBC.LIB	V2.0	<60>	RMS\$:
RMSLBD.LIB	V2.0	<60>	RMS\$:
RMSLBE.LIB	V2.0	<60>	RMS\$:
RMSLBF.LIB	V2.0	<60>	RMS\$:
RMSLIB.OLB	V2.0	<40>	LB:
RMSMAC.MLB	V2.0	<40>	LB:
RMSRES.LIB	V2.0	<60>	RMS\$:
RMSRES.STB	V2.0	<40>	LB:
RMSRES.TSK	V2.0	<40>	LB:
RMSRLX.ODL	V2.0	<40>	LB:
RMSRST.TSK	V2.002	<232>	RMS\$:



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## ANNOUNCING RSTS/E VERSION 9.0

RSTS/E V9.0, which has been in development for over 2 years, includes major enhancements to most of the RSTS/E system. These range from DCL-based integrated system and account management to streaming support for TU80 tape drives. Overall the enhancements in RSTS/E V9.0 are focused on five major goals. These goals are:

- Complete and integrate the DCL-based user interface
- Provide operational compatibility with VMS
- New fast BACKUP with support for streaming tape drives
- Improve system security
- Provide faster, easier installation and update

## PRODUCT DESCRIPTION

### DCL Command File Processing

The new RSTS/E DCL command file processor is based on the VMS model and is fully integrated with the RSTS/E system at command level. This feature allows users to define command procedures, define their own commands on a per user basis and automate many user and system management tasks. It is subset compatible with VMS command file processing, so many command procedures can be moved from a RSTS/E system to a VMS system and back again without modification. This can also help to reduce the level of complexity required to manage VMS and RSTS/E systems kept in the same area or involving the same people, since many functions can be accessed by using similar command procedures.

The DCL command processor is a text processor whose performance is generally slower than most other high-level languages. For this reason, you should consider performance when deciding what language is best suited to a particular task. DCL should be viewed as a "command level" language that best handles the execution and control of system or user commands.

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## Logging In

One impact of DCL command processing performance concerns logging in. When logging in on V9.0, the LOGIN program will chain to the system-wide login command file, LOGIN.COM, located in account [0,1] on the system disk. This file contains commands to be performed for all users logging in to the system. Users in turn can create their own LOGIN command files to define new commands, read mail, assign logicals, or perform any other task as part of the login sequence.

Some tasks that were previously done in the LOGIN program are now done in the system login command procedure. For example, printing of the \$NOTICE.TXT file at your terminal is now handled by the system LOGIN.COM file, rather than the LOGIN program.

Because login command files are normally executed "silently" (no echoing of the commands at your terminal), the login sequence in V9.0 may appear slower than in the past. This will, of course, depend on the size of the system login command file and each user's login command file, as well as system load, resources, etc.

Login delays were a recognized problem during the V9.0 field test. Since the start of field test, much effort went into optimizing the system login command file to minimize its processing time.

Because of these efforts, most users logging in to a light- or medium-loaded V9.0 system with the distributed system LOGIN.COM file will notice only a slight delay (less than five seconds) between entering their password and the display of the DCL prompt. On heavily-loaded systems, the delay may be longer.

DIGITAL is investigating ways of making DCL command processing faster in the future. This effort will further reduce any delays during login.

## DCL is Extended to the Entire RSTS/E System

In past releases of RSTS/E users were required to learn many different utilities and their syntax to fully utilize the power of the RSTS/E system. In RSTS/E V9.0 there are over 100 modifications to DCL which solve this problem. These range from new qualifiers on existing commands to the addition of entirely new commands which add major new capabilities to the RSTS/E system.



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There are many illustrations of V9.0 modifications throughout the RSTS/E V9.0 system:

- The new DCL based integrated account management function which replaces many separate utilities such as UTILITY, MONEY and REACT.
- The new batch processor uses DCL command files and executes them at the time specified by the user.
- The new BACKUP function is accessed using DCL commands.

#### New BACKUP Utility Increases Capabilities and Throughput

The new BACKUP utility includes four main areas of improvement: increased capabilities, backup sets which are in VMS compatible format, support for the new Asynchronous I/O directives, and support for streaming tape drives such as the TU80.

Writing and reading backup sets in VMS compatible format makes it easy to transfer data from a PDP-11 to a VAX and back again.

Full streaming support for streaming tape drives such as the TU80 will allow users to backup their systems in a fraction of the time which is now required. It also lays the groundwork for support of future streaming tape drives.

#### Security Enhancements

Since RSTS/E is used primarily in the commercial environment, RSTS/E users are particularly concerned with security. Steady progress was made in this area in the course of past releases; however, RSTS/E V9.0 has moved a giant step forward with five major areas of improvement:

- Multiple privilege attributes by account
- Longer passwords
- Hashed passwords
- System password
- Enhanced disk quota checking and enforcement

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Multiple privilege attributes by account eliminates the use of "all or nothing" accounts and implements the VMS model of privilege attributes. Using this model, users are given only those privileges which they require and no others. Their account number (PPN) no longer denotes a privilege level. This gives the system manager tighter control over what users are allowed to do on the system.

Passwords have been lengthened from a maximum of 6 characters to 14 characters. Optionally by account, passwords can be set up so that they are no longer available for lookup and are hashed so that they can not be retrieved.

Another feature of the new security system is the use of captive accounts. These are accounts which are setup to startup a program, such as a menu of selectable options or an application like word processing, and when the user exits from the program RSTS/E logs the user out of the system.

Another aspect of security is the ability to control system resources. RSTS/E V9.0 features increased control of disk usage through logged in and logged out quotas. This allows the system manager to allocate and control disk resources effectively.

Conversion to these new approaches can be done either gradually or all at once depending on the needs of the system.

#### Separate I&D Space Support for User Programs

Standard 16-bit addressing allows user programs to grow to 32KW before overlaying is required. With RSTS/E V9.0 users can now address upto a maximum of 64KW through the use of separate Instruction and Data (I&D) space. This will lead to improved performance and lessen overlay complexity. Currently the languages that support I&D space are BASIC-Plus-2 V2.3, Macro (MAC), and Fortran 77.

#### Virtual Disk

System managers can allocate a portion of contiguous unused memory to be a virtual disk. This memory is considered to be a file-structured device and can be accessed by user programs in the same way that other disks are accessed except that data accesses occur at memory speeds rather than disk speeds.

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### Enhanced 8-Bit Character Support

The RSTS/E monitor has been enhanced to support 8-bit characters such as the multinational character set. Many of the CUSPs will now accept 8-bit characters but may not fully use them. BASIC-PLUS has not been enhanced to include this support.

### Autobaud Detection

Autobaud detection support includes baud rates from 110 to 9600 baud. Speeds can be detected for dial-up and directly connected terminals.

### Faster, Easier Installation and Updating

The installation and SYSGEN processes have been made far simpler and include defaults and help that was not available in previous releases. When installing a system (after the first time) previous answers can be automatically used as input into the installation process. In some cases installation and updating time can be reduced by 80%.

### Memory Requirements

Due to the greatly enhanced capabilities, the memory required has also increased. The increase is not extreme and PDP 11/34 systems will continue to be supported, but users will have less space to run jobs than they do when running under RSTS/E V8.0.

### Performance

RSTS V9.0 generally uses more processing overhead than previous versions, due to the many new features added to the monitor. Most light- to medium-loaded systems will not notice this extra overhead, while heavily loaded systems may see some performance loss. Your system's performance will depend on your type of processor, amount of memory, type and organization of disks, and the number and types of jobs running on your system.

Performance in some areas of the system is better. For example, the new BACKUP package allows you to backup your disks faster than before. Also, the new virtual disk feature allows systems with sufficient memory to reduce disk accesses by keeping frequently used or heavily overlaid programs on the virtual disk in memory.

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DIGITAL is currently investigating other ways to improve system performance on RSTS in the future.

#### Compatibility with RSTS/E Version 8.0-7

RSTS/E Version 9.0 is generally upwards compatible from Version 8.0-7 at the program level. Features which could affect this compatibility, such as multiple privileges and quotas, can be installed in a way which is compatible with their Version 8.0 implementation. A complete description of these differences can be found in the RSTS/E Version 9.0 Release Notes.

#### Quality Evaluation

RSTS/E Version 9.0 has received the highest level of quality testing of any RSTS system ever. An extensive package of regression tests and installation tests has been performed on all of the development base levels for the product. Field testing has been performed for eight months at over 30 sites, with a consensus among the sites that they would recommend running V9.0.

#### ORDERING/AVAILABILITY INFORMATION

RSTS/E Version 9.0 is scheduled to be available in June, 1985. For specific service availability and pricing information, please contact your local DIGITAL Account Manager.

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## USING SAVE/RESTORE ON A TWO-DISK SYSTEM

This article describes the procedure for using SAVE/RESTORE to backup the disks on a system which has only two disk drives and no magnetic tape drives. On such a system, you can backup the system disk by shutting down the RSTS/E system and using the SAVRES option of INIT. It is impossible, however, to perform such a backup of the non-system disk, since the procedure would require that the system disk, the disk being backed up, and the SAVE volume all be mounted simultaneously, and hence would require three or more disk drives, or a magnetic tape drive.

The solution presented in this article is to place a copy of the INIT.SYS system initialization code on the non-system disk, allowing it to run as the "system" disk for off-line SAVE/RESTORE operations. This procedure has one drawback: the INIT.SYS initialization code requires about 600 blocks on the non-system disk (about 11% of an RK05). If you have small disks, such as RK05's or RL01's, you should consider expanding your hardware to include another disk drive or magnetic tape unit. For disks larger than RL01's, the overhead of having the INIT.SYS initialization code on each non-system disk is usually small enough to be tolerable, although you must decide based on your system's needs.

You should put the INIT.SYS initialization code ([0,1]INIT.SYS) on the non-system disk immediately after initializing the disk with DSKINT. This ensures that there is enough space for INIT.SYS. After generating the monitor, run-time system, and system library, perform the procedures outlined below. In the following example, the notation "SY0:" denotes the disk drive on which your normal system disk is mounted, and "xxn:" denotes the other disk drive, which is used for various purposes in the procedure:

1. If you have not yet initialized the non-system disk that you plan to use, initialize it using the DCL INITIALIZE command or the DSKINT utility. Then mount the disk using the MOUNT command.
2. Issue the commands given below:

```
$ COPY [0,1]INIT.SYS xxn:[0,1]/CLUSTER SIZE=16
$ RUN SYSGEN$HOOK.SAV<cr>
<HOOK's header line>
*xxn:[0,1]INIT.SYS<cr>
Hook complete
*^Z
$
```

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3. Your non-system disk is now ready to use. You may dismount it and mount it as a public or private disk if you desire. When you wish to back up that disk, you must shut down your system, bootstrap the non-system disk, and mount a scratch disk in place of your normal system disk. You may now use the SAVRES option of INIT to SAVE or IMAGE-copy your non-system disk to the backup disk.

NOTE

Every time you install an update, you must delete the copies of INIT.SYS on any other disks to which you have copied it, and repeat the above procedure.

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## DEVICES WITH NON-STANDARD UNIBUS ADDRESSES AND VECTORS

Some installations have devices which are installed at non-standard UNIBUS addresses or which vector to non-standard locations. INIT does not automatically recognize these devices. Of course, the best solution is to have field service reconfigure these devices so that they conform to the standard. Appendix C of the RSTS/E System Installation and Update Manual contains the information you need to determine the correct UNIBUS addresses and vectors for all devices supported by RSTS/E. Note that extra units such as the second RX, second PR, etc., do not have "homes" and must use the CSR option.

If re-configuration is not possible, you can use the HARDWR option of INIT. The CSR suboption sets non-standard UNIBUS addresses and the VECTOR suboption sets non-standard vectors. DIGITAL strongly recommends that you use only the CSR suboption. This tells INIT to find the device at its non-standard UNIBUS address, but lets INIT determine the device's vector. If the device is functioning properly, INIT will find the device's non-standard vector. The only device for which INIT cannot determine a vector is the card reader. If a card reader has a non-standard vector, you must use the VECTOR suboption. The PA611 paper tape reader must be powered on for INIT to find its vector. Use the VECTOR suboption if you intend to start your system with a PA611 paper tape reader powered off.

Be careful when you assign non-standard vectors to devices. INIT checks all device vectors (assigned through the VECTOR suboption or automatically determined) against a table of reserved locations. INIT also checks to see if any vector location is used by more than one device. Any conflict will print the message:

Vector for Device XXn: (vvv) already in use - device disabled

where vvv is the octal address of the erring vector.

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The RSTS/E reserved locations, which may not be used as device vectors, are:

Addresses	RSTS/E usage
0-2	Detection of jumps to 0 and traps to 0
4-36	System trap vectors
40-56	Reload start addresses, failure HALT
100-102	KW11-L line frequency clock vector
104-106	KW11-P crystal clock vector
110-112	Jump to 0 handling
114-116	Memory parity trap vector
144-146	Crash dump handling
234-236	Statistics handling
240-242	PIRQ trap vector
244-246	FPP or FIS exception trap vector
250-252	Memory Management Unit trap vector



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## DISABLING THE USE OF DATA SPACE - MONITOR FEATURE PATCH

### PROBLEM:

Some systems may find it desirable to permanently disable the use of data space by the monitor because optional software generated into the system is not compatible with the monitor using data space. If your monitor contains any unsupported software, such as a locally written device driver, then it is unlikely to work with data space. The only supported monitor software which works with data space is software that comes from either the RSTS/E V9.0, DECnet/E V2.1, FMS-11 V1.5, RSTS/E 3271 Protocol Emulator, or RSTS/E High Performance 2780/3780 Protocol Emulator distribution kits. Note that data space will automatically not be used if your system includes the optional RSTS/E-2780 (RJ2780) package.

### SOLUTION:

The patching procedure detailed as follows will cause the monitor to never use data space, regardless of whether the processor it is running on supports it or not.

#### Note

This patch does not disable user-mode instruction and data space. Non-standard monitor code may need modification before attempting to run any user programs which use separate instruction and data space.

### PROCEDURE:

1. This is a feature patch to the RSTS/E V9.0 monitor. It may be installed in any target monitor SIL.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? <cr>

(RETURN for installed monitor SIL)

3. This patch can be installed manually using ONLPAT, the on-line patching program. Note, however, that if the patch is applied online to the installed monitor SIL, it will not take effect until the system is re-booted.

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```

RUN $ONLPAT
Command File Name? <cr>          (RETURN for manual installation)
File to patch? <cr>              (RETURN for installed monitor SIL)
File found in account [0,1]

```

This feature patch is contained in the file PA0301.001 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

```

Module name? DEFAULT
Base address? ..NODS
Offset address? 0
  Base   Offset   Old      New?
001000  000000   000000   ? \
001000  000000       000   ? -1
001000  000001       000   ? ^Z   (CTRL/Z for new offset)
Offset address? ^Z               (CTRL/Z for new base)
Base address? ^Z                 (CTRL/Z for new module)
Module name? RSTS
Base address? $$0301
Offset address? 0
  Base   Offset   Old      New?
??????  000000   ??????   ? Q!1
??????  000002   ??????   ? ^C   (up-arrow/C to exit; CTRL/C
                                   for INIT)

```

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#### CHANGING SPECIAL LOGIN TERMINAL - TERMINAL SERVICE FEATURE PATCH

The number of jobs that can log in to a RSTS/E system is limited by the swapping space available, the JOB MAX set at system start-up time, and the login setting (set by the SET SYSTEM/[NO]LOGINS command). However, the console terminal (KB0:) is a special terminal, and can log in regardless of the login setting, provided that swapping space and JOB MAX permit.

With the following patch, one or two special keyboards can be selected, or this feature can be disabled entirely.

#### PROCEDURE:

1. This is a feature patch to the RSTS/E V9.0 monitor. It may be installed in any target monitor SIL.
2. Decide which terminals should be allowed to log in regardless of the login setting, and use those numbers as m and n in the patch in step 5. If you want to allow only one terminal, use its number as m and use -1 in place of n. If you want to disable this feature, use -1 in place of both m and n. Be sure you include the decimal point after the new value of m or n so that it is interpreted as a decimal number.
3. The patch described in Step 5 can be installed using the PATCH option of INIT.SYS:

Option: PATCH  
File to patch? <cr> (RETURN for installed monitor SIL)

4. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT  
Command File Name? <cr> (RETURN for manual installation)  
File to patch? <cr> (RETURN for installed monitor SIL)  
File found in account [0,1]

This feature patch is contained in the file PA0303.001 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

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## NOTE

The patch file for this patch requires manual editing to include installation specific parameters before it can be successfully installed.

## 5. The patch is as follows:

```
Module name? TER
Base address? ..CTZ.
Offset address? 0
  Base   Offset   Old      New?
??????  000000   000000   ? m.*2   (or -1, from step 2)
??????  000002   001407   ? ^Z     (CTRL/Z for new offset)
Offset address? ^Z                               (CTRL/Z for new base)
Base address? ..CTY.
Offset address? 0
  Base   Offset   Old      New?
??????  000000   177777   ? n.*2   (or -1, from step 2)
??????  000002   001404   ? ^Z     (CTRL/Z for new offset)
Offset address? ^Z                               (CTRL/Z for new base)
Base address? ^Z                               (CTRL/Z for new module)
Module name? RSTS
Base address? $$0303
Offset address? 0
  Base   Offset   Old      New?
??????  000000   ??????   ? Q!1
??????  000002   ??????   ? ^C     (up-arrow/C to exit; CTRL/C
                                     for INIT)
```

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## INPUT ESCAPE SEQUENCE HANDLING - TERMINAL SERVICE FEATURE PATCH

RSTS/E allows multiple character incoming escape sequences. The RSTS/E Programming Manual fully describes the escape sequence handling.

One of the multi-character escape sequences is ESCape followed by "P", followed by one modifier character. On the VT52 terminal, the upper left-hand key on the auxiliary keypad (usually blue) generates ESC P. When the VT100 terminal is operating in VT52 mode, the upper left-hand key on the auxiliary keypad (usually labeled "PF1") generates ESC P. If the terminal user types this key and then any other graphic key, the whole sequence is gathered by the terminal service and delivered to the application program. None of the sequence is echoed. Thus, the blue key can be considered a "function" key to be followed by some function code character.

On the other hand, some existing applications using the VT52 may expect this key to generate a stand-alone escape sequence with no required (or desired) modifier character. You may install the following patch to change the terminal service so that the ESCape, "P" sequence does not expect a modifier character. Note that this patch affects all terminals on the system.

### PROCEDURE:

1. This is a feature patch to the RSTS/E monitor. It may be installed in any target monitor SIL.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? <cr>

(RETURN for installed monitor SIL)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr>

(RETURN for manual installation)

File to patch? <cr>

(RETURN for installed monitor SIL)

File found in account [0,1]

This feature patch is contained in the file PA0303.002 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or

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update procedure.

4. The patch is as follows:

```
Module name? TER
Base address? ..ESCP
Offset address? 0
  Base   Offset  Old      New?
??????  000000  050001  ? Q&l77400
??????  000002  ??????  ? ^Z   (CTRL/Z for new offset)
Offset address? ^Z   (CTRL/Z for new base)
Base address? ^Z     (CTRL/Z for new module)
Module name? RSTS
Base address? $$0303
Offset address? 0
  Base   Offset  Old      New?
??????  000000  ??????  ? Q!2
??????  000002  ??????  ? ^C   (up-arrow/C to exit; CTRL/C
                                     for INIT)
```

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## UNDERSTANDING TERMINAL PARITY AND STOP BIT SETTINGS

### Terminal Parity

The DCL command SET TERMINAL/[NO]PARITY[=ODD!EVEN] controls the format in which data characters are sent to a terminal. /NOPARITY (the default) sends the full 8 bits of a byte out to a terminal. If the /NOEIGHTBIT characteristic is set, /PARITY=EVEN and /PARITY=ODD trim the byte to 7 bits of data and then set or clear the eighth bit to achieve the correct parity setting. (Note: Binary Output Mode is "Data Binary Output Mode". /NOPARITY yields 8 bit data, /PARITY=EVEN and /PARITY=ODD yield 7 bit data if the /NOEIGHTBIT characteristic is set.)

The DL11A/B/C/D/E and DJ11 interfaces do not have programmable hardware parity generation. For these interfaces, terminal service generates the output parity bit. The DH11, DHV11, DHU11 and DZ11 have programmable hardware parity generation, which is used by terminal service.

### Stop Bit Settings

Terminal interfaces with programmable baud rate settings (DH11, DHV11, DHU11 and DZ11) also have programmable stop-bit settings. RSTS will automatically select 2 stop bits for speed settings of 110 baud or less and 1 stop bit for speeds greater than 110 baud. Older mechanical terminals, such as the ASR33 (which runs at 110 baud), require the time delay of 2 stop bits for synchronization. Modern terminals need only 1 stop bit.

When converting from baud rates to characters per second (CPS), the correct number of stop bits becomes clear. Asynchronous communication consists of 1 start bit, 8 data bits, and 1 or 2 stop bit(s).

$$\frac{(110 \text{ BITS PER SECOND})}{(1+8+2 \text{ BITS PER CHARACTER})} = 110/11 = 10 \text{ CHARACTERS PER SECOND}$$

$$\frac{(300 \text{ BITS PER SECOND})}{(1+8+1 \text{ BITS PER CHARACTER})} = 300/10 = 30 \text{ CHARACTERS PER SECOND}$$





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## MODEM CONTROL ON PRIVATE, LEASED LINES

Some RSTS/E installations use private, leased phone lines for terminal connections. If the line has no modem or no modem control (for example, data signals only) then the line should be set as a local line using the DCL command SET TERMINAL/NODIALUP. In this case the private, leased line is simply a long local connection. On the other hand, many private, leased lines do use modem control.

When using modem control, there are five modem signals used by RSTS/E:

### 1. Ring Indicator (Circuit CE, pin 22)

This signal is true if the modem's "phone" is ringing. RSTS/E does not control this signal; the modem does. Private, leased lines normally do not "ring."

### 2. Carrier Detect (Circuit CF, pin 8)

This signal is true when the modem is receiving carrier from the modem on the other end of the line. RSTS/E does not control this signal; the modem does.

### 3. Clear to Send (Circuit CB, pin 5)

This signal is true when it is "OK to send data" to the other modem. RSTS/E does not control this signal; the modem does.

### 4. Data Terminal Ready (Circuit CD, pin 20)

This signal is controlled by RSTS/E, not the modem. When RSTS/E sets this signal to true, the modem answers the phone (if it is not already answered) and sends carrier to the modem at the other end of the connection.

### 5. Request to Send (Circuit CA, pin 4)

This signal is controlled by RSTS/E, not the modem. When RSTS/E sets this signal to true, the modem tells the other modem it is now "clear to send".

RSTS/E always sets and clears Data Terminal Ready and Request to Send together.

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The normal sequence for a dial-up modem line is:

1. Someone calls in. The modem asserts Ring Indicator.
2. RSTS/E sets Data Terminal Ready and Request to Send.
3. The modem answers the phone and sends out carrier and Clear to Send. The Ring Indicator goes off.
4. The other end sends carrier and Request to Send. The modem sets Carrier Detect and Clear to Send.
5. RSTS/E enables the line for data communication.
6. Data communication occurs...
7. The other end drops carrier. The modem clears Carrier Detect and Clear to Send.
8. RSTS/E starts a 5 second timeout.
9. The timeout expires. RSTS/E clears Data Terminal Ready and Request to Send.
10. The connection is now broken.

In addition, RSTS/E polls all modem lines once each second. If Carrier Detect has come on without a Ring Indication, the line will be enabled by setting Data Terminal Ready and Request to Send. If Carrier Detect is on when the system is initially started, this happens immediately. So, to use a modem-controlled private, leased line as a local line:

1. Strap the Ring Indicator signal false. This ensures that RSTS/E never sees a "ringing" line to get confused about.
2. Strap the Carrier Detect and Clear to Send signals true. This ensures that RSTS/E will immediately enable the line by setting Data Terminal Ready and Request to Send.

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## CONTROLLING EMT LOGGING - FILE PROCESSOR FEATURE PATCH

If you included EMT Logging when you generated your system, you may want to modify the set of directives which the monitor passes to your logging program. The following procedure allows you to enable or disable EMT logging for each of the directives which can be logged.

### PROCEDURE:

1. This is a feature patch to the RSTS/E V9.0 monitor. It may be installed in any target monitor SIL which has been generated to include the EMT Logging feature. If you attempt to install this patch on a SIL that does not include the EMT logging feature, the patch will fail with the error, "?Address above module bounds."
2. Note that as supplied, the patch disables logging for each of the directives. DIGITAL recommends that you retain a copy of the patch in this form, to use as a starting point for creating later versions, should your requirements change.
3. Decide which directives you want to have logged. For each one, locate the appropriate segment(s) of the patch. The value under "New?" will be "Q!100", which is the value to disable logging. To enable logging (reversing the sense of the patch), replace this value with "Q&\100".
4. Note that some directives can be invoked via CALFIP, some via .UUO, and some via either CALFIP or .UUO. The following patch contains three sections: the first controls those directives which can be invoked via either CALFIP or .UUO. (The second and third control those directives invoked via CALFIP alone and .UUO alone, respectively.) You will need to make TWO changes for any directive appearing in the first group: once for the CALFIP invocation path, and once for the .UUO invocation path.

The paired directives appear next to each other in the first group. Directives appear in ascending order by CALFIP code for the first two groups, and by .UUO code for the third group; these codes are the MACRO values documented in the RSTS/E System Directives Manual.

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5. The patch described in Step 7 can be installed using the PATCH option of INIT.SYS:

Option: PATCH  
File to patch? <cr> (RETURN for installed monitor SIL)

6. This patch can be installed manually using ONLPAT, the on-line patching program. Note, however, that if the patch is applied online to the installed monitor SIL, it will not take effect until the system is re-booted.

RUN \$ONLPAT  
Command File Name? <cr> (RETURN for manual installation)  
File to patch? <cr> (RETURN for installed monitor SIL)  
File found in account [0,1]

This feature patch is contained in the file PA0305.001 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

#### NOTE

The patch file for this patch requires manual editing to include installation specific parameters before it can be successfully installed.

7. The patch is as follows:

```
Module name? RSTS
Base address? EMLTBL
Offset address? 0 ; Verify EMT Logging generated
  Base      Offset  Old      New?
  ??????    000000  ?????? ? ^Z (CTRL/Z for new offset)
Offset address? ^Z (CTRL/Z for new base)
Base address? $$0305
Offset address? 0
  Base      Offset  Old      New?
  ??????    000001  ?????? ? Q!1
  ??????    000002      ??? ? ^Z (CTRL/Z for new offset)
Offset address? ^Z (CTRL/Z for new base)
Base address? $EMLFQ ; Beginning of paired CALFIP - UUO
functions
Offset address? ASSFQ/2 ; ASSIGN function, CALFIP flavor
  Base      Offset  Old      New?
  ??????    000012  ?????? ? Q!100
  ??????    000014  ?????? ? ^Z (CTRL/Z for new offset)
Offset address? ^Z (CTRL/Z for new base)
```

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```

Base address? $UUOSN
Offset address? UU.ASS-UU$MIN      ; ASSIGN function, UUO flavor
  Base      Offset  Old      New?
  ??????    000047      ???   ? Q!100
  ??????    000050      ???   ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? $EMLFQ
Offset address? DEAFQ/2             ; DEASSIGN function, CALFIP
flavor
  Base      Offset  Old      New?
  ??????    000013      ???   ? Q!100
  ??????    000014      ???   ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? $UUOSN
Offset address? UU.DEA-UU$MIN      ; DEASSIGN function, UUO flavor
  Base      Offset  Old      New?
  ??????    000050      ?????? ? Q!100
  ??????    000052      ?????? ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? $EMLFQ
Offset address? DALFQ/2             ; DEASSIGN ALL function, CALFIP
flavor
  Base      Offset  Old      New?
  ??????    000014      ?????? ? Q!100
  ??????    000016      ?????? ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? $UUOSN
Offset address? UU.DAL-UU$MIN      ; DEASSIGN ALL function, UUO
flavor
  Base      Offset  Old      New?
  ??????    000051      ???   ? Q!100
  ??????    000052      ???   ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? $EMLFQ
Offset address? LOKFQ/2             ; LOOKUP function, CALFIP flavor
  Base      Offset  Old      New?
  ??????    000011      ???   ? Q!100
  ??????    000012      ???   ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? $UUOSN
Offset address? UU.LOK-UU$MIN      ; LOOKUP function, UUO flavor
  Base      Offset  Old      New?
  ??????    000056      ?????? ? Q!100
  ??????    000060      ?????? ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  ; End of paired CALFIP - UUO functions
Base address? $EMLFQ                ; Beginning of CALFIP-only functions
Offset address? CLSFQ/2             ; CLOSE function
  Base      Offset  Old      New?

```

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??????	000000	??????	? Q!100	
??????	000002	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	OPNFQ/2			; OPEN function
Base	Offset	Old	New?	
??????	000001	???	? Q!100	
??????	000002	???	? ^Z	(CTRL/Z for new offset)
Offset address?	CREFQ/2			; CREATE function
Base	Offset	Old	New?	
??????	000002	??????	? Q!100	
??????	000004	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	DLNFQ/2			; DELETE function
Base	Offset	Old	New?	
??????	000003	???	? Q!100	
??????	000004	???	? ^Z	(CTRL/Z for new offset)
Offset address?	RENFQ/2			; RENAME function
Base	Offset	Old	New?	
??????	000004	??????	? Q!100	
??????	000006	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	DIRFQ/2			; DIRECTORY (wildcard) function
Base	Offset	Old	New?	
??????	000005	???	? Q!100	
??????	000006	???	? ^Z	(CTRL/Z for new offset)
Offset address?	RSTFQ/2			; RESET function
Base	Offset	Old	New?	
??????	000010	??????	? Q!100	
??????	000012	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	CRTFQ/2			; CREATE Temporary file function
Base	Offset	Old	New?	
??????	000015	???	? Q!100	
??????	000016	???	? ^Z	(CTRL/Z for new offset)
Offset address?	CRBFQ/2			; CREATE Binary file function
Base	Offset	Old	New?	
??????	000016	??????	? Q!100	
??????	000020	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	RUNFQ/2			; RUN function
Base	Offset	Old	New?	
??????	000017	???	? Q!100	
??????	000020	???	? ^Z	(CTRL/Z for new offset)
Offset address?	^Z			; End of CALFIP-only functions
Base address?	\$UUOSN			; Beginning of UUO-only functions
Offset address?	UU.TB3-UU\$MIN			; Monitor Tables III function
Base	Offset	Old	New?	
??????	000000	??????	? Q!100	
??????	000002	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.SPL-UU\$MIN			; SPOOL function
Base	Offset	Old	New?	
??????	000001	???	? Q!100	
??????	000002	???	? ^Z	(CTRL/Z for new offset)

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Offset address? UU.DMP-UU\$MIN					; Snapshot dump function
Base	Offset	Old	New?		
??????	000002	??????	? Q!100		
??????	000004	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.FIL-UU\$MIN					; FILE statistics function
Base	Offset	Old	New?		
??????	000003	???	? Q!100		
??????	000004	???	? ^Z		(CTRL/Z for new offset)
Offset address? UU.ATR-UU\$MIN					; Read/Write attributes function
Base	Offset	Old	New?		
??????	000004	??????	? Q!100		
??????	000006	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.LOG-UU\$MIN					; Set number of logins function
Base	Offset	Old	New?		
??????	000012	??????	? Q!100		
??????	000014	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.RTS-UU\$MIN					; RTS/RESLIB control functions
Base	Offset	Old	New?		
??????	000013	???	? Q!100		
??????	000014	???	? ^Z		(CTRL/Z for new offset)
Offset address? UU.NAM-UU\$MIN					; RTS name for file function
Base	Offset	Old	New?		
??????	000014	??????	? Q!100		
??????	000016	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.ACT-UU\$MIN					; Accounting dump function
Base	Offset	Old	New?		
??????	000016	??????	? Q!100		
??????	000020	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.DAT-UU\$MIN					; System date/time function
Base	Offset	Old	New?		
??????	000017	???	? Q!100		
??????	000020	???	? ^Z		(CTRL/Z for new offset)
Offset address? UU.PRI-UU\$MIN					; Priority/Run Burst/Size
function					
Base	Offset	Old	New?		
??????	000020	??????	? Q!100		
??????	000022	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.TB2-UU\$MIN					; Monitor Tables II function
Base	Offset	Old	New?		
??????	000021	???	? Q!100		
??????	000022	???	? ^Z		(CTRL/Z for new offset)
Offset address? UU.BCK-UU\$MIN					; File backup statistics
function					
Base	Offset	Old	New?		
??????	000022	??????	? Q!100		
??????	000024	??????	? ^Z		(CTRL/Z for new offset)
Offset address? UU.HNG-UU\$MIN					; Hangup dataset function
Base	Offset	Old	New?		

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??????	000024	??????	? Q!100	
??????	000026	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.FCB-UU\$MIN			; FCB/WCB/DDB data function
Base	Offset	Old	New?	
??????	000025	???	? Q!100	
??????	000026	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.POK-UU\$MIN			; POKE function
Base	Offset	Old	New?	
??????	000027	???	? Q!100	
??????	000030	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.TBl-UU\$MIN			; Monitor Tables I function
Base	Offset	Old	New?	
??????	000032	??????	? Q!100	
??????	000034	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.NLG-UU\$MIN			; Disable further logins
function				
Base	Offset	Old	New?	
??????	000033	???	? Q!100	
??????	000034	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.YLG-UU\$MIN			; Enable logins function
Base	Offset	Old	New?	
??????	000034	??????	? Q!100	
??????	000036	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.PAS-UU\$MIN			; Create PPN function
Base	Offset	Old	New?	
??????	000035	???	? Q!100	
??????	000036	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.DLU-UU\$MIN			; Delete PPN function
Base	Offset	Old	New?	
??????	000036	??????	? Q!100	
??????	000040	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.MNT-UU\$MIN			; Disk/Terminal functions
Base	Offset	Old	New?	
??????	000040	??????	? Q!100	
??????	000042	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.LIN-UU\$MIN			; LOGIN function
Base	Offset	Old	New?	
??????	000041	???	? Q!100	
??????	000042	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.BYE-UU\$MIN			; LOGOUT function
Base	Offset	Old	New?	
??????	000042	??????	? Q!100	
??????	000044	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.ATT-UU\$MIN			; ATTACH function
Base	Offset	Old	New?	
??????	000043	???	? Q!100	
??????	000044	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.DET-UU\$MIN			; DETACH function



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Base	Offset	Old	New?	
??????	000044	??????	? Q!100	
??????	000046	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.ERR-UU\$MIN			; Error message text function
Base	Offset	Old	New?	
??????	000046	??????	? Q!100	
??????	000050	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.ZER-UU\$MIN			; ZERO device/PPN function
Base	Offset	Old	New?	
??????	000052	??????	? Q!100	
??????	000054	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.RAD-UU\$MIN			; Read/Write accounting data
function				
Base	Offset	Old	New?	
??????	000053	???	? Q!100	
??????	000054	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.DIR-UU\$MIN			; Directory (index) function
Base	Offset	Old	New?	
??????	000054	??????	? Q!100	
??????	000056	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.TRM-UU\$MIN			; Terminal characteristics
function				
Base	Offset	Old	New?	
??????	000055	???	? Q!100	
??????	000056	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.CHE-UU\$MIN			; Disk caching control function
Base	Offset	Old	New?	
??????	000060	??????	? Q!100	
??????	000062	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.CNV-UU\$MIN			; Date/Time conversion function
Base	Offset	Old	New?	
??????	000061	???	? Q!100	
??????	000062	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.SWP-UU\$MIN			; System file control function
Base	Offset	Old	New?	
??????	000064	??????	? Q!100	
??????	000066	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.JOB-UU\$MIN			; Job creation function
Base	Offset	Old	New?	
??????	000065	???	? Q!100	
??????	000066	???	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.PPN-UU\$MIN			; PPN wildcard lookup function
Base	Offset	Old	New?	
??????	000066	??????	? Q!100	
??????	000070	??????	? ^Z	(CTRL/Z for new offset)
Offset address?	UU.SYS-UU\$MIN			; Job status function
Base	Offset	Old	New?	
??????	000067	???	? Q!100	

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??????	000070	???	? ^Z	(CTRL/Z for new offset)
Offset address? UU.STL-UU\$MIN				; Stall system function
Base	Offset	Old	New?	
??????	000072	??????	? Q!100	
??????	000074	??????	? ^Z	(CTRL/Z for new offset)
Offset address? UU.ONX-UU\$MIN				; Open next function
Base	Offset	Old	New?	
??????	000076	??????	? Q!100	
??????	000100	??????	? ^C	(up-arrow/C to exit; CTRL/C for INIT)

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## USING THE CSS PAPER TAPE READER ON RSTS/E- DEVICE DRIVER FEATURE PATCH

### PROBLEM:

The paper tape reader device driver included in the RSTS/E object library does not work with the CSS paper tape reader (PA611).

### SOLUTION:

The paper tape reader driver for RSTS/E is for Digital Equipment Corporation model PC11. The following optional patch will make the driver compatible with the CSS paper tape reader model PA611. Note that after applying this patch, the device driver does not work with model PC11.

### PROCEDURE:

1. This is a feature patch to the RSTS/E monitor. It may be installed in any target monitor SIL that supports paper tape readers. If this support was not included in the monitor during your system generation, the patch will fail with a "Symbol not found in STB" error after you specify ..PCSS as the Base Address.
2. The patch described in Step 4 below can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? <cr> (RETURN for installed monitor SIL)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? <cr> (RETURN for installed monitor SIL)

File found in account [0,1]

This feature patch is contained in the file PA0307.001 as part of the UPDATE package. To transfer this file to the UPDATES\$ account, select the package name UPDATE during the system installation or update procedure.

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Monitor  
Device Driver Patches

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4. The patch is as follows:

```
Module name? RSTS
Base address? ..PCSS
Offset address? 0
  Base   Offset  Old      New?
??????  000000  100200  ? 100100
??????  000002  ??????  ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z      (CTRL/Z for new base)
Base address? $$0307
Offset address? 0
  Base   Offset  Old      New?
??????  000000  ??????  ? Q!1
??????  000002  ??????  ? ^C      (up-arrow/C to exit; CTRL/C
for INIT)
```

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 BASIC-PLUS  
 BASIC-PLUS Patches

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# SPECIAL PRINT-USING CHARACTERS - BASIC-PLUS FEATURE PATCH

The PRINT-USING option of BASIC-PLUS provides for floating dollar sign, comma insertion every three digits to the left of the decimal point, and printing of the decimal point. The \$-sign is used for the currency symbol in the United States and Canada, but various other symbols are used for other monetary systems. In the United Kingdom it would be useful to float the Pound Sterling symbol (or whatever ASCII character is used to represent that symbol) instead of the \$-sign. In France, a floating Franc symbol (or F) would be generally more useful than the floating \$-sign. The role of the comma and period are also reversed in France (e.g., 9,999,999.02 should be printed as 9.999.999,02).

To accommodate these differences in monetary systems, PRINT-USING is coded to allow substitution of any character for the floating currency symbol, the decimal point character, and the "every three digits" character. These three characters are defined by three words in the BASIC-PLUS run-time system. System defaults and several suggestions are shown in the table below:

Location	Usage	Default	England	France
..PUCH+0	Floating currency symbol	\$ (044)	& (046)	F (106)
..PUCH+2	Decimal point character	. (056)	. (056)	, (054)
..PUCH+4	Every three digits character	, (054)	, (054)	. (056)

Substitution of different characters, such as those listed under England and France, is done with a simple patch. Any change will affect both the PRINT-USING format string and the output produced. For example, if the suggestions under France were installed, the following PRINT-USING statement would result in the output shown:

```
PRINT USING "FF#.#####", 3673298.02, 4545.20
```

```
F3.673.298,02
F4.545,20
```

Since any change in this area does render the PRINT-USING documentation slightly incorrect, an appropriate note should be published for users of the system.

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PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system configured with Print-Using.
2. Determine the three special characters you want to use for the floating currency symbol, the decimal point character, and the "every three digits" character. The chosen characters can be entered as either:

'x        where x is the chosen printable character  
n        where n is the octal value of the chosen character  
n.       where n is the decimal value of the chosen character

3. The patch described in Step 5 can be installed using the PATCH option of INIT.SYS:

Option: PATCH  
File to patch? BASIC.RTS                    (BASIC-PLUS run-time system name)

4. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT  
Command File Name? <cr>                    (RETURN for manual installation)  
File to patch? [0,1]BASIC.RTS                (BASIC-PLUS run-time system name)  
File found in account [0,1]

This feature patch is contained in the file PA0401.001 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

NOTE

The patch file for this patch requires manual editing to include installation specific parameters before it can be successfully installed.

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BASIC-PLUS  
BASIC-PLUS Patches

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5. The patch is as follows:

```
Base address? ..PUCH
Offset address? 0
  Base   Offset  Old      New?
??????? 000000  000044  ? 'f    (currency sign from Step 2)
??????? 000002  000056  ? ',    (decimal point from Step 2)
??????? 000004  000054  ? '.    ("every three" from Step 2)
??????? 000006  ??????  ? ^C    (up-arrow/C to exit;CTRL/C
                                     for INIT)
```

6. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

```
$ UNLOAD/RUNTIME_SYSTEM BASIC (BASIC-PLUS run-time system name)
```

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

)

)

)

)


)



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BASIC-PLUS  
BASIC-PLUS Patches

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The BASIC-PLUS default SCALE factor may be modified by utilizing the procedure in this article. A complete description of SCALE factors is included in the BASIC-PLUS Language Manual.

*Required for BASIC4*

*Scale 6*

PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system configured with the 4-word, scaled math package.
2. Determine the new BASIC-PLUS default SCALE factor. This default SCALE factor must be between 0 and 6 inclusive.
3. The patch described in Step 5 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

4. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0401.002 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

NOTE

The patch file for this patch requires manual editing to include installation specific parameters before it can be successfully installed.

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BASIC-PLUS  
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5. The patch is as follows:

Base address? ..SCA.

Offset address? 0

Base	Offset	Old	New?	
??????	000000	000000	? n	(from Step 2)
??????	000002	??????	? ^C	(up-arrow/C to exit; CTRL/C for INIT)

6. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

BASIC PLUS FEATURE CH

CH Yes

PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system configured with the 4-word, scaled math package.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

File to patch? BASIC.RTS

(BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

Command File Name? <cr>

```
(RETURN for manual installation)
```

File to patch? [0,1]BASIC.RTS

(BASIC-PLUS run-time system name)

```
File found in account [0,1]
```

This feature patch is contained in the file PA0401.003 as part of the UPDATE package. To transfer this file to the UPDATES\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

Base address? ..SCE.

Offset address? 0

Base	Offset	Old	New?
??????	000000	104577	? 240
??????	000002	000207	? ^C

```
(for no warning message)
```

```
(for no warning message;  
(up-arrow/C to exit; CTRL/C  
for INIT)
```

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BASIC-PLUS  
BASIC-PLUS Patches

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5. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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BASIC-PLUS  
BASIC-PLUS Patches

Seq 4.1.4 F

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#### DEFAULT TO NOEXTEND MODE - BASIC-PLUS FEATURE PATCH

Normally, BASIC-PLUS defaults to EXTEND mode. To change this default to NOEXTEND mode, apply the patch in this article.

#### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH  
File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT  
Command File Name? <cr> (RETURN for manual installation)  
File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)  
File found in account [0,1]

This feature patch is contained in the file PA0401.004 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

Base address? ..XTN.  
Offset address? 0

Base	Offset	Old	New?
??????	000000	020000	? 0
??????	000002	??????	? ^C

(up-arrow/C to exit; CTRL/C for INIT)

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5. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

```
$ UNLOAD/RUNTIME_SYSTEM BASIC (BASIC-PLUS run-time system name)
```

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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BASIC-PLUS  
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#### IMMEDIATE MODE FROM .BAS FILE - BASIC-PLUS FEATURE PATCH

Normally, BASIC-PLUS does not allow immediate-mode commands to appear in the file accessed by the "OLD" command. This may be desirable in environments where this feature was used in previous versions of BASIC-PLUS. To allow BASIC-PLUS to accept immediate mode commands in files, apply the patch in this article.

#### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0401.005 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

Base address? ..IBAS

Offset address? 0

Base	Offset	Old	New?
??????	000000	001401	? 401
??????	000002	104767	? ^C

(up-arrow/C to exit; CTRL/C  
for INIT)

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Seq 4.1.5 F

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5. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

```
$ UNLOAD/RUNTIME_SYSTEM BASIC (BASIC-PLUS run-time system name)
```

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.



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#### NO PPN'S IN CATALOG COMMAND - BASIC-PLUS FEATURE PATCH

Normally, BASIC-PLUS allows any user to list the contents of another user's directory with the CATALOG [P,PN] command. The patch in this article prevents BASIC-PLUS from accepting a project, programmer number in the CATALOG command. Thus, only the user's own directory may be listed.

#### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0401.006 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

Base address? ..CAT.

Offset address? 0

Base	Offset	Old	New?
??????	000000	000401	? 5064
??????	000002	000006	? ^C

(up-arrow/C to exit; CTRL/C for INIT)

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BASIC-PLUS  
BASIC-PLUS Patches

Seq 4.1.6 F

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5. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

```
$ UNLOAD/RUNTIME_SYSTEM BASIC (BASIC-PLUS run-time system name)
```

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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BASIC-PLUS  
BASIC-PLUS Patches

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## DISABLING THE CCL SYS CALL - BASIC-PLUS FEATURE PATCH

Normally, BASIC-PLUS allows any user to execute any valid CCL command on the system with SYS call 14. However, some installations may choose to disable this feature to discourage users from writing programs that will simulate the features of a standard run-time system. The patch in this article prevents BASIC-PLUS from executing SYS call 14.

### Note

This patch will disable the execution of the system wide LOGIN.COM file when logging in, if the LOGIN program has been compiled with BASIC-PLUS (.BAC file type).

### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of init.sys:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0401.007 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

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4. The patch is as follows:

Base address? ..CCL.

Offset address? 0

Base	Offset	Old	New?
??????	000000	??????	? UUOBAD
??????	000002	??????	? ^C (up-arrow/C to exit; CTRL/C for INIT)

5. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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BASIC-PLUS  
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#### CLEAR I/O BUFFERS USED BY OPEN STATEMENTS

- MANDATORY BASIC-PLUS PATCH

#### PROBLEM:

BASIC-PLUS does not clear I/O buffers used by OPEN statements. This affects security, as it allows users to examine portions of memory allocated to buffers created by the OPEN command.

#### SOLUTION:

This problem is corrected by a patch contained in the command file BASIC.CMD and is automatically applied whenever you install or update BASIC-PLUS.

#### Note

If you update the BASIC-PLUS runtime system while it is installed, you must unload it before the correction will take effect. To unload the BASIC-PLUS runtime system, issue the command:

```
$ UNLOAD/RUNTIME_SYSTEM BASIC
```

The UNLOAD command does not remove the run-time system; it simply instructs the monitor to reload it the next time a job requests it.



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BASIC-PLUS  
BASIC-PLUS Patches

Seq 4.1.9 F

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FORCE "ILLEGAL STATEMENT" ERROR WHEN USING OBSOLETE SEND/RECEIVE  
- BASIC-PLUS FEATURE PATCH

PROBLEM:

Send/Receive SYS call 18 (SYS(CHR\$(6%)+CHR\$(18%)+...)) in BASIC-PLUS is obsolete and should not be used. New applications should use SYS call 22 for all send/receive functions.

SOLUTION:

The patching procedure detailed in Step 4 will cause BASIC-PLUS to generate an "?Illegal Statement" error whenever the obsolete Send/Receive SYS call (SYS(CHR\$(6%)+CHR\$(18%)+....)) is used. This patch will help to identify programs which use this obsolete SYS call so they may be changed to the new format Send/Receive SYS call (Refer to RSTS/E Programming Manual for information).

Note

Some programs in the OPSER (Operator Services and Spooling) package still use SYS call 18 for send/receive functions. You should not apply this feature patch if you are still using the OPSER package. The Print/Batch Services package does not use SYS call 18.

PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

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This feature patch is contained in the file PA0401.009 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

Base address? ..S18.

Offset address? 0

Base	Offset	Old	New?
??????	000000	111302	? 104771
??????	000002	010246	? ^C

(up-arrow/C to exit; CTRL/C  
for INIT)

5. If the above patch was installed using ONLPAT, it will take effect the next time THE run-time system is reloaded. If the run-time system has been INSTALLED, execute THE following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.



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BASIC-PLUS  
Non-standard BASIC-PLUS Features

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## THE BASIC-PLUS DEBUG FACILITY

A feature of BASIC-PLUS, the DEBUG facility, is available with RSTS/E as an unsupported feature, and may be changed or removed in future versions of BASIC-PLUS.

The DEBUG commands extend the present BASIC-PLUS immediate-mode debugging commands by allowing you to trace the flow of your program and to set breakpoints. These commands provide a subset of the functions provided by the BASIC-PLUS-2 debugging facility, and are only available as immediate-mode commands. They cannot be used within BASIC-PLUS programs. The commands are used in one of two ways:

- Issuing them between the OLD and RUN of a program and, thereafter, whenever a breakpoint is hit.
- By including STOP statements within the program, and then issuing the DEBUG commands when the first STOP statement is encountered and, thereafter, whenever another STOP statement or breakpoint is hit.

Any DEBUG commands are disabled when:

- A "RUN <program-name>" command is successfully executed
- A NEW, OLD, or EXIT command is executed
- Any valid CCL command is executed

The keywords used with the DEBUG facility have been implemented with the second character of each keyword changed to a question mark ("?"). The patch described in article Seq 4.10.3 F may be used to change the question marks to the characters required to make the keyword names match the names of their respective functions (for example, "T?ACE" is changed to "TRACE"). Note that, if this patch is applied, any program with a variable or function name that represents a variant of TRACE, UNTRACE, BREAK, or UNBREAK (such as TRACE%, FNBREAK\$, etc.) will not compile until the variable name is changed.

For the purposes of this discussion, assume that the patch described above has been installed. If you include the DEBUG features, but choose not to install the patch, replace all occurrences of the keywords below as follows:

With Patch	Without Patch
TRACE	T?ACE
UNTRACE	U?TRACE
BREAK	B?EAK

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UNBREAK    U?BREAK

#### TRACE/UNTRACE

The TRACE command causes BASIC-PLUS to print the message "at line nnn" (where "nnn" represents a line number) each time that a line number is encountered or the current line number changes.

The UNTRACE command disables any previous invocation of the TRACE command.

#### BREAK/UNBREAK

The BREAK command allows you to specify that execution should stop any time that a specified line number is encountered. Up to 10 such breakpoints can be set. The BREAK command is of the form:

BREAK [ N1, N2, N3 ..., N10 ]

where "Nn" represents a line number between 1 and 32767.

When a breakpoint is encountered, BASIC-PLUS prints the message "Break at line nnn" and returns to "Ready" as though a STOP statement had been executed. At this point you can examine or change the values of variables, execute the DUMP command (if enabled, see article Seq 4.10.2 N), or execute any other legal command. Type "CONT" (continue) to resume execution.

If the BREAK command is issued without a line number argument, BASIC-PLUS will BREAK each time that a new line is encountered.

The UNBREAK command is used to disable breakpoints, and is of the form

UNBREAK [ N1, N2, N3, ..., N10 ]

If no line numbers are specified, all breakpoints are disabled.

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BASIC-PLUS  
Non-standard BASIC-PLUS Features

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## UNDERSTANDING LINE NUMBERS IN THE DEBUG FACILITY

(This section discusses the actual implementation of the DEBUG facility in the BASIC-PLUS run-time system, and should help to explain certain anomalies that you may encounter.)

The DEBUG code is entered whenever an internal construct called a "statement header" is encountered. Statement headers are generated for the following BASIC-PLUS elements:

Line numbers	DIMENSION statements	DATA statements
FOR statements	NEXT statements	
DEF statements	FNEND statements	

When a statement header is encountered, BASIC-PLUS first checks to see if the BREAK or TRACE feature has been requested. If not, program execution continues.

If BREAK or TRACE has been requested, BASIC-PLUS now compares the current line number with the previously encountered line number. If they are the same, program execution continues.

If a different line number has been encountered, BASIC-PLUS then checks to see if the statement header represents a function definition ("DEF") statement. If so, program execution continues.

Because of the internal structure of BASIC-PLUS, it is not possible to BREAK at a function definition. As you can see from the algorithm used, any attempt to BREAK at a function definition is rejected while the program is being executed, rather than when the BREAK command is specified.

If the BREAK feature has been requested, BASIC-PLUS compares the current line number with the list of breakpoints that have been requested. If the current line number is included in the breakpoint list, BASIC-PLUS prints "Break at line nnn," and returns to keyboard monitor ("Ready") state.

If the TRACE feature has been requested, BASIC-PLUS prints "at line nnn" and proceeds with execution of the program.

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BASIC-PLUS  
Non-standard BASIC-PLUS Features

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## SUPPORT POLICY FOR THE BASIC-PLUS DEBUG FEATURE

DIGITAL makes no commitment, expressed or implied, to support the BASIC-PLUS run-time system, or any BASIC-PLUS System programs (CUSPs) used with that run-time system, if the DEBUG feature is enabled in the BASIC-PLUS run-time system.

If you experience problems with the DEBUG feature, please submit an FYI-type (priority 5) Software Performance Report (SPR). While making no commitment to fix problems reported with the DEBUG facility, DIGITAL would like to know about any problems that you encounter.

## ENABLING THE DEBUG FACILITY

The DEBUG facility requires approximately 160 (decimal) additional words in the BASIC-PLUS run-time system. In most cases, this means that one or more of the other optional features (String Arithmetic, Print Using, etc.) must be omitted to prevent the BASIC-PLUS run-time system from exceeding 16K words in size.

To include the DEBUG facility in your BASIC-PLUS run-time system, append "/D" to the name you select at the "BASIC-PLUS RTS name ?" query. For example:

BASIC-PLUS RTS name ? <BASIC> BASIC/D

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BASIC-PLUS  
Non-standard BASIC-PLUS Features

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## THE BASIC-PLUS DUMP FACILITY

A feature of BASIC-PLUS, the DUMP facility, is available with RSTS/E as an unsupported feature, and may be changed or removed in future versions of BASIC-PLUS.

The keyword D?MP has been implemented to write a post-mortem dump to the specified file on a random-access device if the patch described in article Seq 4.10.4 F is installed. To change the keyword to DUMP, also install the patch described in article Seq 4.10.6 F. Note that, if this patch is installed, any program with a variable or function named DUMP, DUMP%, DUMP\$, FNDUMP(), etc. will not compile until the name of the variable is changed.

For the purposes of this discussion, assume that the patch described above has been installed. If you enable the DUMP facility, but choose not to install this patch, replace all occurrences of "DUMP" with "D?MP" in the discussion below.

The DUMP command provides an extension to the present BASIC-PLUS immediate mode debugging commands by allowing you to take a "snap-shot" dump of your current job. After DUMPing your program, you can use the BPDA (BASIC-PLUS Dump Analyzer) program to display the contents of all variables used by the program. In addition, you can continue executing your program after issuing the DUMP command; this allows you to inspect the state of the program at several stages of execution.

The DUMP command is only available as an immediate-mode command (i.e., it cannot be used in a BASIC-PLUS program), and has the syntax:

DUMP <file-specification>

If no device name is specified, the public disk structure ("SY:") is used. If no filename is specified, the current program name is used. If no file type is specified, ".PMD" is used.

## THE BASIC-PLUS DUMP ANALYSIS PROGRAM

After the DUMP command has been issued, you can use the BPDA program to print the contents of each variable that is used in the program, as well as the contents of the buffer of any open files.

The BPDA program asks for an input file name. The default file type is ".PMD". There is no default for the file name. Wildcards are illegal.

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When BPDA asks for the output file name, responding with <cr> will direct the output to your terminal. If no filename is specified, the input filename is used with the default file type ".PDA".

You may also respond to the "Input file?" query with a command of the form:

<outfile> = <infile>

The DUMP facility has not been implemented as a standard feature because it could be used to obtain confidential information, such as student grades or payroll information, in applications where a user could type CTRL/C and examine the contents of buffers and variables. If the feature is enabled, however, there are two mechanisms available to protect against this kind of situation:

- Non-privileged users are normally prevented from using the DUMP command on programs that are running from compiled files. This restriction may be removed if desired (see article Seq 4.10.5 F).
- Whether or not non-privileged users are allowed to use the DUMP command on programs that are executed from compiled files, they still may not use the DUMP command on a program that uses temporary privileges, since the BASIC-PLUS run-time system clears the program from memory before a non-privileged user returns to keyboard monitor state.

Some installations may find it desirable to generate two versions of the BASIC-PLUS run-time system, one for development and one for production. This would prevent the potential problems described above, while providing the DUMP feature for development work.

#### SUPPORT POLICY FOR THE BASIC-PLUS DUMP FACILITY

DIGITAL makes no commitment, expressed or implied, to support the BASIC-PLUS run-time system, or any BASIC-PLUS System programs (CUSPs) used with that run-time system, if the DUMP facility is enabled.

If you experience problems with the DUMP feature, please submit an FYI-type (priority 5) Software Performance Report (SPR). While making no commitment to fix problems reported with the DUMP facility, DIGITAL would like to know about any problems that you encounter.

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## CHANGING THE BASIC-PLUS DEBUG KEYWORDS - BASIC-PLUS FEATURE PATCH

### PROBLEM:

If support for the DEBUG facility has been included in the BASIC-PLUS run-time system, the keywords BREAK, TRACE, UNBREAK, and UNTRACE are initially enabled with the second character of the keyword changed to a question mark ("?"), for example, B?EAK, T?ACE, U?BREAK, and U?TRACE.

### SOLUTION:

The following patching procedure will replace the question marks with the correct characters, thus changing the keywords to BREAK, TRACE, UNBREAK, and UNTRACE.

#### NOTE

If this patch is installed, any program with a variable or function name of one of these keywords, such as BREAK% or FNTRACE\$, will fail to compile until the variable name has been changed.

### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the .PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0410.003 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

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4. The patch is as follows:

```

Base address? ..BEA.
Offset address? 0
  Base   Offset  Old      New?
??????? 000000      077  ? 'R
??????? 000001      ???  ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? ..TAC.
Offset address? 0
  Base   Offset  Old      New?
??????? 000000      077  ? 'R
??????? 000001      ???  ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? ..UBR.
Offset address? 0
  Base   Offset  Old      New?
??????? 000000      077  ? 'N
??????? 000001      ???  ? ^Z      (CTRL/Z for new offset)
Offset address? ^Z                  (CTRL/Z for new base)
Base address? ..UTR.
Offset address? 0
  Base   Offset  Old      New?
??????? 000000      077  ? 'N
??????? 000001      ???  ? ^C      (up-arrow/C to exit; CTRL/C
                                     for INIT)
    
```

5. If the above patch was installed using ONLPAT, it will take effect the next time the run-time system is reloaded. If the run-time system has been INSTALLED, execute the following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.



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## ENABLING THE BASIC-PLUS DUMP FEATURE - BASIC-PLUS FEATURE PATCH

### PROBLEM:

The (unsupported) BASIC-PLUS "DUMP" feature is initially disabled. Some installations may choose to enable this feature, even though it is unsupported. (See article Seq 4.10.2 N for a complete description of the DUMP feature. See article Seq 4.10.6 N to change the keyword from "D?MP" to "DUMP".)

### SOLUTION:

The following patching procedure will enable the DUMP feature.

### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0410.004 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

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4. The patch is as follows:

Base address? ..PMD.

Offset address? 0

Base	Offset	Old	New?
??????	000000	104755	? BNE+2
??????	000002	??????	? ^C

(up-arrow/C to exit; CTRL/C  
for INIT)

5. If this patch was installed using ONLPAT, it will take effect the next time THE run-time system is reloaded. If the run-time system has been INSTALLED, execute THE following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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BASIC-PLUS  
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ENABLING DUMP FROM COMPILED FILES FOR NON-PRIVILEGED USERS  
- BASIC-PLUS FEATURE PATCH

PROBLEM:

Normally, if the DUMP feature is enabled (see article Seq 4.10.2 N), BASIC-PLUS will not allow some users to DUMP programs that are executing from compiled files, even though they may DUMP programs that are executing from source files. This protection prevents users from DUMPing programs which may contain confidential information in their variable strings or file buffers. In order to use the DUMP command, the user must have WACNT, WWRITE, SYSIO and RDMEM privileges.

Some installations, however, may want to allow all users to DUMP all BASIC-PLUS programs to which they have RUN access, regardless of whether the program is compiled.

SOLUTION:

The following patching procedure will cause BASIC-PLUS to allow all users to DUMP programs that they are executing. (Note that a program whose protection code includes the 128. bit for temporary privileges is always cleared from a non-privileged user's job space before returning the keyboard monitor ("Ready") state. Hence, a non-privileged user can never DUMP such a program.)

PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

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This feature patch is contained in the file PA0410.005 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

4. The patch is as follows:

Base address? ..NPD.

Offset address? 0

Base	Offset	Old	New?
??????	000000	004767	? NOP
??????	000002	??????	? NOP
??????	000004	005046	? ^C

(up-arrow/C to exit; CTRL/C  
for INIT)

6. If the above patch was installed using ONLPAT, it will take effect the next time THE run-time system is reloaded. If the run-time system has been INSTALLED, execute THE following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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Seq 4.10.6 F

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## CHANGING THE BASIC-PLUS D?MP KEYWORD - BASIC-PLUS FEATURE PATCH

### PROBLEM:

The DUMP command, which is disabled unless the patch described in article Seq 4.10.4 F is installed, has been implemented with the keyword "D?MP." Some installations may desire to change this keyword to "DUMP."

### SOLUTION:

The following patching procedure will change the keyword "D?MP" to "DUMP." If this patch is installed, please note that any program which uses a variable or function name such as DUMP% or FNDUMP\$, will not compile until the variable name is changed.

### PROCEDURE:

1. This is a feature patch to the BASIC-PLUS run-time system. It may be installed in any BASIC-PLUS run-time system.
2. The patch described in Step 4 can be installed using the PATCH option of INIT.SYS:

Option: PATCH

File to patch? BASIC.RTS (BASIC-PLUS run-time system name)

3. This patch can be installed manually using ONLPAT, the on-line patching program:

RUN \$ONLPAT

Command File Name? <cr> (RETURN for manual installation)

File to patch? [0,1]BASIC.RTS (BASIC-PLUS run-time system name)

File found in account [0,1]

This feature patch is contained in the file PA0410.006 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.

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4. The patch is as follows:

Base address? ..DMP.

Offset address? 0

Base	Offset	Old	New?
------	--------	-----	------

??????	000000	077	? 'U
--------	--------	-----	------

??????	000001	???	? ^C
--------	--------	-----	------

(up-arrow/C to exit; CTRL/C  
for INIT)

5. If this patch was installed using ONLPAT, it will take effect the next time THE run-time system is reloaded. If the run-time system has been INSTALLED, execute THE following commands:

\$ UNLOAD/RUNTIME\_SYSTEM BASIC (BASIC-PLUS run-time system name)

NOTE: The UNLOAD command will not remove the run-time system, but simply instructs the monitor to reload it the next time a job requests it.

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## BUFFER LIMIT CHECKING - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

The RSTS/E extended buffering scheme in effect since V06B obsoletes the buffer limit checking code in the 2780 device driver. This buffer limit checking code was removed from the DUL1/DUP11 version of the driver, but was left in the DP11 version. Certain valid buffer addresses will cause the DP11 version to fail.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

### Note

This patch will fail when applied to a monitor that is not configured to include DP11 devices.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.





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2780 Device Driver Patches

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## DISCONNECT COMMAND HANDLING - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

If the 2780 device driver receives a disconnect command (DLE EOT), it mistakenly releases its buffers and line table. A subsequent close will cause modification of critical monitor memory. A system crash may occur thereafter.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.



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## DP11 TRANSMIT HANG CONDITION - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

Under certain load conditions, when the 2780 package issues the error 'Send Error - Transmit Hang - Redial Required', critical locations in the monitor can be modified. This will cause a subsequent system crash.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

### Note

This patch will fail when applied to a monitor that is not configured to include DP11 devices.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.



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DU11/DUP11 TRANSMIT HANG CONDITION - MANDATORY 2780 DEVICE DRIVER  
PATCH

PROBLEM:

Under certain load conditions, when the 2780 package issues the error 'Send Error - Transmit Hang - Redial Required', critical locations in the monitor can be modified. This will cause a subsequent system crash.

SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

Note

This patch will fail when applied to a monitor that is not configured to include DU11/DUP11 devices.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.



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RSTS/E 2780 Device Driver  
2780 Device Driver Patches

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## LOSS OR DUPLICATION OF DATA - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

Occasionally the loss or duplication of data occurs. There is no indication from the 2780 package that any trouble had occurred.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.





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DOUBLE CLOSE ALTERS MONITOR - MANDATORY 2780 DEVICE DRIVER PATCH

PROBLEM:

The 2780 Device Driver does not protect itself against closing the RJ: device twice in all cases. A double close can alter monitor memory and cause a system crash.

SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.



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RSTS/E 2780 Device Driver  
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Seq 5.1.7 M

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## GET/PUT INTERLOCK PROBLEM - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

Due to timing considerations on systems with zero turn-around delay, it is possible for a bid from a remote unit to be processed before the completion of the routine for End Of Transmission. This causes the driver to receive the bid when it "thinks" it is in transmit mode and the GET/PUT INTERLOCK error is triggered.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.



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## 2780 HANDLER FAILURE PROBLEM - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

When the RSTS/E system is under heavy load, it is possible for the notification of the receipt of a bid to be passed back with a receive buffer address of zero. When the driver attempts to requeue the buffer, it is considered a fatal error.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.



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## LOCAL BINARY TRANSMIT PROBLEM - MANDATORY 2780 DEVICE DRIVER PATCH

### PROBLEM:

If the default transmit command is 2780 or GEN, it should be possible to send, as part of a multiple file transfer, a file or files in binary mode. This is done by using the "/B" switch to override the transmit command for those files which should be sent untranslated. Currently, the mode of the first file controls the mode for the complete transfer.

### SOLUTION:

This problem is corrected by a patch contained in the file RJ2780.CMD in the SYSGEN\$ account. This patch is automatically applied whenever you generate a RSTS/E monitor that includes support for the RJ2780 package.

For further details on how to generate a RSTS/E monitor, see the RSTS/E System Installation and Update Guide.





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## INSTALLING AND TROUBLESHOOTING 2780'S

Installing a communication package involves a minimum of two vendors and more likely three or four. The most time-consuming aspect of installation can be pinpointing a problem. When installing A to communicate with B, the problem may be in one of seven areas:

- A's software (either code or SYSGEN parameters)
- A's hardware
- A's modem
- Phone line
- B's modem
- B's hardware
- B's software

Sometimes a given symptom can have several possible causes. Then it is necessary to go through a step-by-step elimination procedure.

Here are some ideas and suggestions which may be helpful when difficulties arise in installation of 2780 packages.

### 1. What is a 2780 and what is its protocol?

For those who are unfamiliar with what a 2780 emulator is emulating, here is a short description of what it is and what its protocol is like.

The 2780 is an unintelligent, hard-wired terminal which can communicate to an IBM host or to another 2780. It reads cards and transmits them over a synchronous link to another computer. It receives data back and prints it. The model 2 2780 can also receive back data for a card punch.

The 2780 sends 80 character card image records, blocked into a maximum of a 400 character block. For reception, it prints or punches a file according to a peripheral selection code (basically, an ESC 4 sends a file to the punch). It is able to accept horizontal tabs and handles them according to the spacing of a special HT record which is sent at the beginning of the file. The block size is again a maximum of 400 characters.

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A synchronous protocol is used to enable the data to be sent back and forth. The protocol determines who speaks, when, and whether or not the other end heard them correctly. When there is synchronous communication, the two modems sample the line at a preset speed (2000 times a second or 4800, etc.), and the data is sent in blocks with one character directly following another. Every message, therefore, whether a single control character or a 400 character block is preceded by four SYNC characters and followed by a PAD. The SYNC characters are used to allow the hardware to tell when valid data is coming (as opposed to noise on the line), and the PAD is used to make sure that the final significant character is fully received. Every data record sent has a CRC (cyclic redundancy check) computed on its characters, and following each record and block (IUS, ETB, and ETX) is a two-character checksum which is used to make sure the data was received correctly.

The major control characters used in the 2780 protocol are:

ENQ (enquiry):	(1) Used to request permission to send data (bid); (2) Used to request resending of a missed response.
ACK0 (acknowledge):	(1) Used to give permission to send data; (2) Used to accept every other data block.
ACK1 (acknowledge):	Used to accept every other data block.
NAK (negative acknowledge):	Used to reject a data block.
STX (start of text):	Used to indicate the beginning of a data block.
ETB (end of block):	Used to indicate the end of a data block.
ETX (end of text):	Normally used to indicate the end of the final block of the job.
IUS (intermediate record end):	Used to indicate the end of a record.
EOT (end of transmission):	Used to indicate completed transmission and give up control of line.

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A sample job might be sent as follows:

A	B
-	-
ENQ -->	;request permission to send
	<-- ACK0 ;permission given
STX DATA1 ETB -->	;block of data
	<-- ACK1 ;acknowledge correct reception
STX DATA2 ETB -->	;another block
	<-- ACK0
STX DATA3 ETB -->	
	<-- NAK ;rejection of data
STX DATA3 ETB -->	;resending of data block
	<-- ACK1
STX DATA4 ETX -->	
ENQ -->	;.3 second silence request for response
	<-- ACK1 ;response shows did not see block, since an ACK0 is the expected response for DATA4
STX DATA4 ETX -->	;block re-sent
	<-- ACK0
EOT -->	;transmission complete
	<-- ENQ ;other side requests permission to send data

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## 2. What to check before installation of the software.

There are some questions to be asked before 2780 installation.

What operating system will you be communicating with? If it is not another PDP-11, is it one of the usual IBM systems? If it is a different system (for example, a Univac 1108 with a Comterm front end or an RPG program running on a System 3, etc.) has a demo test been done with the system, and what problems, if any, were encountered?

What kind of modems are being used? If they are not identical, are they compatible. If they are the same type, are the options the same on both? If it is a local connection are modem eliminators being used, or are null modems being used? Null modems require a clocking option on the computer hardware to provide transmit clocking. Are the modems for a speed higher than is warranted by the software? RSX11M, RSX11D, and RSTS/E are not warranted to work over 4800 baud.

Make sure that the modem has been grounded on the same ground as the hardware. The communications interface and many modems can be affected by being plugged into a device which is grounded differently.

Is the DP11, DU11, or DUP11 the furthest forward device on the bus (except the system disk) which operates at hardware level 5? If there is a DH11 or DZ11 on the system, it will probably be necessary to raise the hardware level of the communications interface to 6. This is because the DH11 often is programmed to remain at interrupt level until the silo is emptied (the DZ11 has no silo and must interrupt per character).

Have the diagnostics been run for the communications interface and the KG11? The DP, DU, or DUP should be checked out with the turn-around plug at the end of the modem cable or with the modem in maintenance mode.

Two manuals are shipped with the 2780 software. They are the 2780 RCS Users Guide\* and the 2780 RCS Installation Notes (DEC-11-CCDNA-A-D). Relevant chapters should be read in advance of installation. There will be some overlap between this article and the manuals, but in many ways they should complement each other.

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\* DEC-11-ORJEA-B-D is for RSTS/E 2780 only.

DEC-11-CRCSA-A-D, DN1, DN2, DN3, and DN4 are for the other 2780's.

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### 3. Initial attempt to run

One of the more frustrating circumstances is to bring up the package, issue a transmit command, and have it do absolutely nothing. Silence, however, can be just as informative as a message.

This section will itemize the things that can go wrong in the sequence in which they would be encountered. It is specified when systems react in different ways. The systems involved are RT11, RSX11M, RSX11D, and RSTS/E.

- a. Run the program for the first time and
  - (1) there is a trap to 4 in RT11 and RSTS/E
  - (2) there is an odd address trap abort in RSX11M or D

Probably the device address of the DUL1 or DUP11 is incorrect. They are floating device address devices. Check that the device was installed at the correct address (for example, if the DUL1 is the only floating device on the system it will be at 760040, if the DUP11 is the only floating device it will be at 760050) and also that the system was told the same address. RSTS/E calculates the address during boot, RT11, RSX11M and D have it specified during taskbuild. The KG11 may also be missing. This is the hardware CRC calculator. If it is missing the software cannot run.

- b. Run the program and get ready to make the connect to the other system. Dial the phone, receive the beep from the other end, and push (or pull) the data button and
  - (1) the data light does not come on
  - (2) the DSR (or MR) indicator does not light.

Usually a dial-out modem will not give DSR (data set ready) until DTR (data terminal ready) has been presented by the communications interface

- (1) check that the light is not just burned out
- (2) check that you have put the system on-line (all systems but RSTS/E)
- (3) check that the DTR bit is on in the status word
- (4) check that a valid but incorrect device address was not used (RT11, RSX11M and D)
- (5) check that the hardware diagnostics were run, including the one using the modem cable.
- (6) check that the cable is securely plugged into the modem

With a leased line, the modem often has DSR strapped on. In that case, this type of error may not be discovered until later in the procedure (see c. and d.). There are now some dial-out modems (for

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example, some MILGO modems) which have DSR strapped on also. They will react the same as the leased line modems.

- c. The program has been run and the connection established; a transmit transfer command is issued and a modem (or data set) not ready message is given.
  - (1) the data set is not ready (for example, DSR is not up)
  - (2) a valid, but incorrect, device address has been used.
- d. This is at the same stage as c. The first transmit command has been issued, but nothing happens. There are several possible causes.
  - (1) Incorrect interrupt vector (RSX11M and D). Since in these systems interrupt vector is specified at build time, check that it corresponds to the actual hardware vector.
  - (2) No response to the bid (RT11, RSX11M and D). These systems do an infinite retry on the bid if they get no response. (RSTS/E does a timeout). Unfortunately, this cause is really a symptom with multiple causes of its own. Some possibilities are:
    - (a) the remote end software is not up (usually leased line) or the connection was not made (a dial-out modem with DSR strapped on).
    - (b) the modems have different speeds (for example, 2000 baud talking to 2400).
    - (c) the modem is not sending out the signal (this can usually be checked by finding out whether the other side has seen the bid).
    - (d) the other end is responding, but the turn-around time is too fast (usually on a two-wire dial-out system where there are echo suppressers on the line).
    - (e) the other end is responding but the modem either does not see it (receive strength too low) or the modem does not pass it back (bad receive leads on the modem), or our hardware does not see it (bad receive chip or modem cable - this should be caught by diagnostics or actual zero turn-around delay (see f.)).

To determine whether or not the bid is actually being sent out, check the receive end to see if it has gone into receive mode. If it is in receive mode, but the transmitting side is still in control mode, the bid is being seen but the response is not (or the response is not considered valid).

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- e. A transmit command is given and the program aborts. In RT11 if the wrong interrupt vector has been specified, the program is aborted and the monitor reprompts. In RSX11M if the 2780 is running in a partition that can be 'shuffled' the program may have been moved. This will have completely unpredictable effects, since the interrupt will jump to where the correct code used to be.
- f. When attempting to transmit there are frequent transmit abort errors. Each system has its own version of the error message, but they all indicate that either eight attempts to send a data block were NAKed, or eight attempts to get a valid response were ignored.

On RSTS/E V06B and later releases, a status request will show whether the data is being NAKed or timed-out. In the other packages an error request will show the number of NAKs. If the transmit is aborting, but there are few or no NAKs the problem is timeouts.

If the first block is not being accepted, the KG11 may not be working correctly. If it is improperly seated the program may be sending out a CRC of zeros. This should be easily caught by diagnostics.

On a multi-user system the package should not be run at a higher speed than is warranted.

On a multi-user system with a DH11 or DZ11, the communications interface should be at hardware bus request level 6.

Other possibilities are: modems with different turn-around delays, bad modems, incompatible modems, and noisy phone lines.

If there is an actual zero turn-around delay (not just a modem with no delay, but a system with a front-end which is capable of responding without any processing delays) it is possible to have the response return while our hardware is sending trailing pads. Either a minimum delay time should be installed or the number of trailing pads should be decreased.

- g. Transmit works fine, but files cannot be received.

Most of the suggestions for f. should be checked. Two of the most likely ones are running at too high a speed for the system, or having the communication interface at level 5 on a system with high DH11 or DZ11 load.

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If no data from the other side is accepted at all it is quite possible that the other system is SYSGEN'd to support either a 3780 or a HASP Workstation instead of a 2780. Our data will be acceptable to their side, since the 2780 is, in effect, a subset of the other two. In both cases, the data block can be too long (they will both send up to 512 characters and the 2780 can only accept 400) and the CRC calculations are done on the complete block instead of on each record. The usual indication is that we consistently NAK the very first block that they attempt to send to us.

If the other side is SYSGEN'd as a 2780, but is sending too long a record (over 132 data characters plus a two character escape sequence) most of our packages will now accept the record and truncate it (as long as there were no other problems with the data). The user will be informed as to the number of truncated records at the end of the reception.

- h. The package has been transmitting and receiving without difficulty. It is in the middle of transmitting and all activity stops. The package is in transmit mode, but nothing is going out.

This is usually caused by losing DSR on a modem which will not give CTS (clear to send) to a RTS (request to send) if DSR has been lost (for example, BELL 208B modems). Check the modem, and if this is correct, try to push the talk button and then the data button to try to re-establish the connection. If that does not work you will have to redial. RSTS/E V06B (and later releases) will timeout in 30 seconds and terminate transmit. The other packages will not terminate until operator intervention has taken place.

Installation is complete when the program has been brought up, a connection made, and files transmitted and received.



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## NOTES ON THE USE OF THE SERIAL LA180 (LA180S) TERMINAL

The first part of this article describes the behavior of the Serial LA180 terminal (called the LA180S) when its power is turned off, either at system start-up time or at some later time during timesharing, and makes recommendations to prevent loss of data.

If any terminal (including an LA180S) is powered off when the system is booted, the device appears to the system to be operational. If a user tries to print a file on the terminal, the system will send characters to the device at the usual speed and assume that they are being printed properly. Obviously, since the device is powered off, the characters are not being printed, but the device cannot return any indication of that fact to the system. The entire file will be sent as if it were printing.

If a spooler is started on such a KB: line, any files queued to that spooler will be sent, just as if the device were printing properly. The queue will gradually empty, and any files queued with /DELETE will be deleted.

Since there is no method by which the software can differentiate between a terminal which is powered off and one which is printing properly, it is highly recommended that the person starting up a RSTS/E system check to ensure that all terminal devices which are ordinarily spooled are powered on and properly online before system start-up is performed.

A second class of problems involves the behavior of the LA180S when it is powered off or powered on after it has been ALLOCATED or OPENed.

During its power down and power up sequence, the LA180S terminal may send spurious characters to the host processor. The ASCII code of these characters appears to be random, but they occasionally take on the value of control characters (for example, CTRL/C). Since the program printing on the terminal may not expect input of any kind from the terminal, these spurious characters may result in unexpected errors: a CTRL/C may cause the program to exit; a CTRL/O will cause all further output to be discarded without printing; and so on. There is no way for the software to protect against all possible spurious inputs. RSTS/E is able to protect against all spurious input except CTRL/S (XON) and CTRL/Q (XOFF) via the MODE 32% option on the OPEN statement. However, spurious XON/XOFF characters can still cause loss of synchronization between the host system and the terminal. The only way to prevent this problem is to ensure that the LA180S is never powered off or powered on while it is ALLOCATED or OPENed.

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A final problem concerns loss of data when the LA180S is powered off. The LA180S contains an internal buffer which is used to hold characters which have been received from the host processor but which have not yet been printed. When the LA180S goes OFFLINE (either because the ONLINE/OFFLINE switch is placed in the OFFLINE position, or because some exception condition, such as a paper jam, has been detected) this buffer may still contain some unprinted data. If the terminal is placed back ONLINE, printing will resume with no loss of data. If, however, the terminal is turned off, the buffer is cleared and any data in the buffer is lost. The only protection against this loss is to ensure that the LA180S is not powered off while it is printing.

In summary, DIGITAL recommends that any LA180S terminal to be used under RSTS/E timesharing be powered on before system start-up and that it remain on whenever it is in use. If the terminal is powered off, loss of data and unexpected errors may result.

Another kind of problem has been encountered when spooling to an LA180S. This problem concerns the manner in which the terminal device handles printed lines that are longer than the width of the terminal.

When a line is printed on the LA180S, the device prints characters until it gets to the physical right margin. At that point, the logic of the terminal inhibits further printing until a carriage return character moves the print head back from the margin. When a CR is encountered in such a situation, the LA180S also generates a line-feed, causing spacing to a new line. Since most print lines are terminated by a CR/LF sequence, however, the second LF will, again, cause spacing to a new line, leaving one line blank. Thus, printing a line which is longer than the width of the LA180S (for example, longer than 132 characters) will cause a blank line on the printed output.

.p When performing normal print operations under RSTS/E, the user will not ordinarily encounter this problem. The RSTS/E Terminal Service ordinarily keeps track of the characters printed on the terminal and explicitly issues a CR/LF sequence to the terminal when the print head reaches the right margin (as defined by the /WIDTH qualifier in a SET TERMINAL command). Thus, lines printed to that terminal which are longer than the width of the terminal result in printing of all characters, but on multiple lines. The only programs which will have trouble are those which need to keep track of vertical position on the page (for example, the line printer spooler) and, therefore, invoke the special MODE (Mode 4%) to inhibit the automatic CR/LF by terminal service. Files printed by such programs will have blank lines after each line which was longer than the terminal width. There is no practical software remedy for this problem.

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## USING TWO OR MORE PRINTERS TO SERVE A QUEUE

It is possible to have two or more printers serve a single print queue. For example, you can have two printers serve the LP0: queue, which is the default queue. Ordinary print jobs (those queued to LP0:) would be printed on either printer.

This feature is most useful when you have two or more similar printers in the same vicinity. It is not generally useful to have a fast and a slow printer serve the same queue, nor to have two printers in different locations serve the same queue.

A different form can be mounted on each printer. If this is done, the spooling package will automatically select the printer that has the correct form for a particular job. Or, if the correct form is not mounted on any available printer, the spooling package will hold the job.

Start up each spooler by running the SPOOL program, as discussed in the RSTS/E System Manager's Guide. Specify the same queue name for each -- for example, specify LP0: if the spoolers are to serve the LP0: queue. But you must use the /NAME:rcvrid switch to ensure that each spooler is given a different receiver ID. Otherwise, the SPOOL program will print the message "?Duplicate receiver ID."

In the following example, the devices LP0: and LP1: both serve the queue named LP0:.

```
RUN OPSER$:SPOOL
#LP0:/NAME:LP0/PHYSICAL:LP0:
Detaching ...
```

```
RUN OPSER$:SPOOL
#LP0:/NAME:LP1/PHYSICAL:LP1:
Detaching ...
```

To avoid confusion, a queue should not have the same name as a printer that serves another queue. For example, if queue LP0: is served by printers LP0: and LP1:, then you would not want to name another queue LP1:.



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## FILE SPECIFICATIONS IN DCL

The rules about file specifications in DCL are slightly more restrictive than elsewhere in RSTS/E.

The special PPN character "!" does not work in DCL. The exclamation point is used as the comment delimiter.

The special PPN characters "@", "%", "&", and "#" are accepted in the current version, but their use is not supported. They are reserved DCL characters, and may have other meanings in the future.

The special PPN character "\$" is legal and supported in DCL. It will continue to designate the system library [1,2].

The traditional RSTS/E file specification switches /MODE, /SIZE, and /RONLY cannot be used in DCL. Many of the same features are available through DCL, but you must use DCL notation. Protection codes in angle brackets ("") cannot be used in DCL. The DCL syntax for protection codes is "/PROTECTION:nn".

Parentheses ("()") cannot be used to delimit the project-programmer number of a file in DCL. Brackets ("[]") must be used instead. Parentheses are reserved DCL characters.

The single-character wildcard "?" works in DCL, but it is unsupported. It may have a different meaning in the future.

)

)

)

)

)

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## SETTING UP THE DCL LINK COMMAND

This article explains how to set up your system so that the DCL LINK command can be used. If you intend that the LINK command will be used, you should read this article before you install any layered languages. Other aspects of setting up DCL are described in the RSTS/E System Installation and Update Guide and the RSTS/E System Manager's Guide.

The DCL LINK command provides a simple way of linking programs. It lets you link programs in two RT11-based languages (FORTRAN-IV and MACRO-11) and five RSX-11-based languages (BASIC-PLUS-2, COBOL-81, DIBOL, FORTRAN-77, and MACRO/RSX). With several of these languages, the LINK command also lets you specify an overlay structure using a simple dialogue.

The requirements for setting up the LINK command depend on what languages you want to be able to link with, and whether you want to be able to link with FMS. The following paragraphs explain how to set LINK up for each language.

The default language assumed by the LINK command is BASIC-PLUS-2. You may want to change this default if your installation does not have BASIC-PLUS-2, or if you prefer that a different language be the default. To do this you could assign the GLOBAL symbol LINK := LINK/language in the system-wide LOGIN.COM file.

### Disabling Languages

You should disable linking with a particular language if your installation does not have all of the files or other requirements for that language. The following table shows what file to delete for each language to be disabled. These files are installed automatically.

Language to Disable	File to Delete
-----	-----
All RSX-based languages	[1,2]PRELIN.TSK
BASIC-PLUS-2	LB:BP2.LNK
COBOL-81	LB:C81.LNK
DIBOL	LB:DIBOL.LNK and LB:DMS.LNK
FORTTRAN-IV	(none)
FORTTRAN-77	LB:F77.LNK
MACRO/RT11	(none)
MACRO/RSX	LB:RSX11.LNK

If a user tries to link with a language you have disabled in this manner, DCL will display the message "?Command not installed."

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Requirements for RT11-based Languages

## MACRO-11

Location	Required File	When Installed
-----	-----	-----
SY:[1,2]	LINK.SAV	RSTS/E System Generation
SY:[1,2]	SYSLIB.OBJ	RSTS/E System Generation

LINK/RT11 is automatically disabled if LINK.SAV is not present. If LINK.SAV is not present and a user types LINK/RT11, DCL will display the message "?Command not installed."

## FORTRAN-IV V2.5

Location	Required File	When Installed
-----	-----	-----
SY:[1,2]	LINK.SAV	RSTS/E System Generation
SY:[1,2]	SYSLIB.OBJ	RSTS/E System Generation
SY:[1,2]	FORLIB.OBJ	FORTRAN-IV Installation

## Note:

1. When you install FORTRAN-IV you have the options of either including the FORTRAN library routines in SYSLIB.OBJ or putting them separately, in FORLIB.OBJ. For LINK/FOR to work properly, select FORLIB.OBJ.
2. LINK/FOR is automatically disabled if LINK.SAV is not present. If LINK.SAV is not present and a user types LINK/RT11, the system will display the message "?Command not installed."



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### Requirements for RSX-based Languages

All of the RSX-based languages have certain linking requirements in common:

Location	Required File	When Installed
-----	-----	-----
SY:[1,2]	PRELIN.TSK	RSTS/E Installation
SY:[1,2]	TKB.TSK	RSTS/E RSX Emulator Build
LB:	RMSRES.TSK	RSTS/E RMS Installation
LB:	RMSRES.STB	RSTS/E RMS Installation
RMS\$:	RMSRES.LIB	RSTS/E RMS Installation
LB:	RMSLIB.OLB	RSTS/E RMS Installation
LB:	SYSLIB.OLB	RSTS/E RSX Emulator Build
LB:	RMSRLX.ODL	RSTS/E RMS Installation

#### Note:

1. When you generate your system specify RSX emulation in the monitor and resident library support. Answer YES to the questions "Resident libraries ?" and "RSX directives ?"
2. Install the RSX Emulator Package.
3. Establish a library account with the system-wide logical name LB:. (This is done automatically during the RSX installation.)
4. Install the RMS package. Select the RMSRES resident library.
5. ADD the RMSRES resident library.
6. Ensure PRELIN.TSK (pre-link) program has a protection code of 232.

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## Forms Management System

You can use Digital's Forms Management System (FMS) with any of the RSX-based languages. There are certain requirements for setting up the LINK command to link FMS into the program:

Location	Required File	When Installed
-----	-----	-----
LB:	FDVRES.TSK	FMS Installation
LB:	FDVRES.STB	FMS Installation
SY:[0,1] (usually)	FDVRES.LIB	FMS Installation
LB:	FDVRES.OLB	FMS Installation
LB:	HLLDFN.OBJ	FMS Installation
LB:	FDVDRS.OBJ	FMS Installation

## Note:

1. ADD the FDVRES resident library.
2. You must have the appropriate high-level language interface file in account LB:. These are: HLLBP2.OBJ for BASIC-PLUS-2; HLLDBL.OBJ for DIBOL; HLLFOR.OBJ for FORTRAN-77; and HLLCOB.OBJ for COBOL-81. They are installed during FMS Installation.

## BASIC-PLUS-2 V2.3

Location	Required File	When Installed
-----	-----	-----
LB:	BP2.LNK	RSTS/E Installation
LB:	BASICS.TSK	BASIC-PLUS-2 Installation
LB:	BASICS.STB	BASIC-PLUS-2 Installation
SY:[0,1] (usually)	BASICS.LIB	BASIC-PLUS-2 Installation
LB:	BASRMS.OLB	BASIC-PLUS-2 Installation
LB:	BP2COM.OLB	BASIC-PLUS-2 Installation
LB:	BP2IC7.ODL	BASIC-PLUS-2 Installation

## Note:

1. ADD the BASICS resident library.
2. If you gave a name other than BP2COM to the BASIC-PLUS-2 object library, then edit the file LB:BP2.LNK, and change LB:BP2COM.OLB to the appropriate file specification.

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## COBOL-81 V2.3

Location -----	Required File -----	When Installed -----
SY:[1,2]	C81ODL.TSK	COBOL-81 Installation
SY:[1,2]	ATPK.TSK	RSTS/E Standard CUSP Build
SY:[1,2]	PIP.SAV	RSTS/E System Generation

Additionally, if you select CIS (Commercial Instruction Set) when you install COBOL-81:

LB:	C81CIS.TSK	COBOL-81 Installation
LB:	C81CIS.STB	COBOL-81 Installation
SY:[0,1] (usually)	C81CIS.LIB	COBOL-81 Installation

If you select NONCIS when you install COBOL-81:

LB:	C81LIB.TSK	COBOL-81 Installation
LB:	C81LIB.STB	COBOL-81 Installation
SY:[0,1] (usually)	C81LIB.LIB	COBOL-81 Installation

## Note:

1. ATPK's protection code must include 128. In other words, it must be a privileged program. The standard CUSP installation procedure sets ATPK's protection code to 232, which is satisfactory.
2. ADD the COBOL resident library, C81CIS or C81LIB.

If [1,2]PIP.SAV or [1,2]C81ODL.TSK is not present, the LINK command will fail with "?Can't find file or account." If [1,2]ATPK is not present, the LINK command will fail with "?Unexpected error in PRELIN ... ?Can't find file or account."

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DIBOL V5.1A, using RMS

Location -----	Required File -----	When Installed -----
LB:	DIBOL.LNK	RSTS/E Installation
LB:	DIBOLR.TSK	DIBOL Installation
LB:	DIBOLR.STB	DIBOL Installation
SY:[0,1] (usually)	DIBOLR.LIB	DIBOL Installation
LB:	RMSUSL.OLB	DIBOL Installation
LB:	RMSOSL.OLB	DIBOL Installation

Note:

1. When you install DIBOL V5.1A select the RMS I/O package (rather than DMS).

DIBOL V5.1A, using DMS

Location -----	Required File -----	When Installed -----
LB:	DMS.LNK	RSTS/E Installation
LB:	DIBOLD.TSK	DIBOL Installation
LB:	DIBOLD.STB	DIBOL Installation
SY:[0,1] (usually)	DIBOLD.LIB	DIBOL Installation
LB:	DMSUSL.OLB	DIBOL Installation
LB:	DMSOSL.OLB	DIBOL Installation

Note:

1. When you install DIBOL V5.1A select the DMS I/O package (rather than RMS).

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# FORTTRAN-77 V5.0-14

Location	Required File	When Installed
-----	-----	-----
LB:	F77.LNK	RSTS/E Installation
LB:	F4POTS.OLB	FORTTRAN-77 Installation
LB:	RMS11M.ODL	FORTTRAN-77 Installation

## Note:

1. When you install the FORTTRAN-77 V5.0 compiler select the RMS I/O package (rather than FCS).
2. When you install FORTTRAN-77 you have the option of either including the FORTTRAN library routines in SYSLIB.OLB or putting them separately in F4POTS.OLB. For LINK/F77 to work properly, select F4POTS.OLB.
3. Edit the file LB:RMS11M.ODL. Change all occurrences of "LB:[1,1]" to "LB:".



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## USING RTSODT FOR DEBUGGING RUN-TIME SYSTEMS

A version of ODT is provided on the RSTS/E V9.0 distribution kit as an unsupported feature which can be linked with user-written run-time systems.

To use RTSODT with run-time systems that are assembled and task-built under the RSX run-time system you may specify "RTSODT" in the ODL file. For example:

```
; ODTBLD.ODL
;
;     *** RSXODT.RTS OVERLAY DESCRIPTION ***
;
; RSXODT VERSION V7.2
;
;
;     .NAME      RSXODT
;     .ROOT      RSXODT-LB:SYSLIB/DL-RSXEMU-RSXPMO-RSXRUN-RSXPLA-RSXKBM-ODT
;
; RSXRTS MUST BE THE FIRST MODULE LINKED IN ANY RSX BASED RTS
; RSXODT MUST BE THE LAST MODULE LINKED IN IF YOU WANT ODT
;
RSXEMU: .FCTR    LB:SYSLIB/LB:RSXRTS:RSXIO:RSXAST:RSXSST:RSXDIR
RSXPMO: .FCTR    LB:SYSLIB/LB:RSXPMO
RSXRUN: .FCTR    LB:SYSLIB/LB:RSXRUN
RSXPLA: .FCTR    LB:SYSLIB/LB:RSXPLA
RSXKBM: .FCTR    LB:SYSLIB/LB:RSXKBM:RSXAT:RSXHLP:RSXMCR
ODT:    .FCTR    LB:SYSLIB/LB:RTSODT
;
; .END
```

Refer to article Seq 22.1.2 N for a description of the use of RTSODT with run-time systems that are assembled and linked under the RT11 run-time system.





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# USING THE RSX CRF UTILITY

The RSX utility CRF.TSK is included on the RSTS distribution kit as an unsupported product. It is installed in the system library (\$) account with other components in the RSX package.

This program will create cross-reference listings from the binary cross reference (.CRF) files optionally produced by the RSX task builder (TKB) and RSX MACRO assembler (MAC). The cross reference file created by MAC lists page and line number references to data items and routines, whereas the cross reference file created by TKB lists the names of the object modules which reference these items. The following are examples of these two types of output:

## MACRO Assembler output:

CRF	CREATED BY	MACRO	ON 15-JUN-85 AT 06:02	PAGE 1
SYMBOL CROSS REFERENCE				CREF 07.065
SYMBOL	VALUE	REFERENCES		
CR	= 000015	#4-180		
FF	= 000014	#4-180		
HT	= 000011	#4-180		
LF	= 000012	#4-180		
L\$\$IST	= *****	1-1	1-2	2-53 4-182
RSTS	= 000001	#4-39		
R\$\$11M	= 000000	#4-38		
SPA	= 000040	#4-180		
VT	= 000013	#4-180		
V1145	= *****	4-157		
\$\$\$VER	= 034066	#3-2	#5-1	

## Task Builder output:

CRF	CREATED BY	TKB	ON 15-JUN-85 AT 06:23	PAGE 1
GLOBAL CROSS REFERENCE				CREF 07.065
SYMBOL	VALUE	REFERENCES...		
A.BTTN	000002	# DIRSYM		
A.DFUI	000102	CRFIN # FCSGBL		
A.LULU	000002	# DIRSYM		
A.LUNA	000004	# DIRSYM		
A.LUNU	000006	# DIRSYM		
A.TRBA	000002	# DIRSYM		
BADDIR	000001	# ERR	FIP	
BADNAM	000002	# ERR	FIP	

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RSX Emulator and Utilities Package  
CRF.TSK

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More details on the CRF output can be found in the RSTS/E Programmer's Utilities Manual.

To request that MAC or TKB produce a binary cross-reference file, specify the /CR switch in the command line to these programs. For MAC the switch is included with the listing file specification and for TKB it is included with the map file specification. The binary file created has the same name as the listing or map file and its file type is always .CRF.

CRF.TSK is run using either the RUN command or the CRF CCL if installed. When run using the RUN command, CRF will prompt with "CRF>". Typing CTRL/Z to this prompt will cause an exit to your default RTS. The command line is a single RSTS/E file specification of the file into which the cross reference listing is to be placed. The default file type for this file is .LST. If the file specified already exists, CRF appends the listing to it; otherwise, a new file is created. The CRF output is variable length records and, therefore, if the file specified for output already exists, it must also be a variable length file. The listing file produced by MAC and the map file created by TKB are both variable length files making them prime candidates.

CRF also accepts as input an indirect command file (preceded by "@") which can contain a list of file specifications. Each specification in the file will be processed as if it was separately entered to the "CRF>" prompt. The default file type for the command file is .CMD. CRF only allows one level of command indirection.

CRF requires the binary cross-reference file to have the same name as the output file with a file type of ".CRF". CRF always deletes the binary ".CRF" file when it is done. Therefore, if it is desirable to keep the binary file, it must be copied to a non-".CRF" file prior to running CRF.TSK.

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## USE OF UNDERSCORE IN RT-11 EMULATOR UTILITIES

RSTS/E allows the use of the underscore (    ) character before a device name in a file specification to indicate that the device name is not to undergo logical translation. Utilities provided with the RT-11 emulator will allow the use of the underscore character; however, due to the nature of the emulator, it is still possible for the device name to undergo translation before a file is opened.

In the RT-11 emulator, file specifications given to a utility are scanned using the RT-11 CSI (command string interpreter). At this time, the device designation may or may not undergo logical translation (depending on whether or not the underscore was used). The CSI returns RT-11 file description blocks to the utilities.

When the utility program then requests the emulator to open a file, the file open code does an additional logical translation on the specified device name. This is an unavoidable consequence of allowing logical device names to be specified in RT-11 file description blocks.



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## USING RTSODT FOR DEBUGGING RUN-TIME SYSTEMS

A version of ODT is provided on the RSTS/E distribution kit as an unsupported feature which can be linked with user-written run-time systems.

To use RTSODT with run-time systems that are assembled and linked under the RT11 run-time system, execute the following commands:

```
RUN $LBR.TSK<cr>  
LBR>RTSODT.OBJ=LB:SYSLIB/EX:RTSODT<cr>  
LBR>^Z
```

Ready

```
RUN $PIP.SAV<cr>  
*RTSODT.OBJ=RTSODT.OBJ/RMS:FB<cr>  
*^Z
```

Ready

You may now include RTSODT.OBJ in the list of input files during the LINK. For example:

```
RUN $LINK<cr>  
*RT11OD/Z,RT11OD/W,RT11OD=RT11/X/H:#177776/U:#4000/C<cr>  
*#ERR.STB,#RTSODT<cr>  
*PATCH<cr>  
*^Z
```

Ready

Refer to article Seq 21.1.1 N for a description of the use of RTSODT with run-time systems that are assembled and linked under the RSX run-time system.



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HOOK.SAV

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#### NOTES ON HOOK.SAV

HOOK.SAV is a program which will write a bootstrap program on RSTS/E file-structured disks and magnetic tapes. Though it is intended only for use during system installation, it can be used to make any RSTS/E file-structured disk or tape bootable.

#### Creating a bootable RSTS/E File-structured Disk

Mount the disk to be HOOKed:

```
$ MOUNT xxn:packid/NOSHARE
```

Copy INIT.SYS from your system disk to the output device:

```
$ COPY SY0:[0,1]INIT.SYS xxn:[0,1]INIT.SYS/CLUSTER SIZE=16
```

Then, run HOOK.SAV:

```
$ RUN SYSGEN$HOOK.SAV<cr>  
<HOOK's header line>  
*xxn:[0,1]INIT.SYS<cr>  
Hook complete  
*^Z  
$
```

#### Creating a bootable RSTS/E DOS-format Magnetic Tape

Mount a scratch magnetic tape on a tape drive. (Note that HOOK.SAV will zero the tape before using it.) Then, run HOOK.SAV:

```
$ RUN SYSGEN$HOOK.SAV<cr>  
<HOOK's header line>  
*xxn:[0,1]INIT.SYS/D[:n.],SY0:[0,1]INIT.SYS<cr>  
Hook complete  
*^Z  
$
```

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## NOTES

1. Magnetic tape density: Specify "/D:n" after the "output" dev:filnam, as follows:

/D:800.	Set 800 BPI, odd parity
/D	Same as /D:800.
/D:1600.	Set 1600 BPI, phase encoded
/D:1600	Same as /D:1600.

### Note:

- o /D:800 (no dot) is an illegal specification
  - o If /D is not specified, the drive's current settings are used.
  - o HOOK will allocate the tape drive to you, in DOS format, at the density that you specify (or do not specify).
2. Normally, HOOK finds the bootstraps for disks and magnetic tapes in SY0:[0,1]INIT.SYS. If, as may happen on a development machine, [0,1]INIT.SYS does not have the most recent version of the appropriate bootstrap, you can specify an alternate file in which to find the bootstraps. Hence, a full HOOK command line looks like:

<outdev:filename> , <file for mt-only> , <bootstraps>

The bootstrap file should look like INIT.SYS.

3. HOOK writes magnetic tapes with DOS labels. If the tape is written at 800 bpi, the name of the first file on the tape will be [0,1]MTBOOT.SYS. If the tape is written at 1600 bpi, the name of the first file will be [0,1]MSBOOT.SYS. Note that the difference is important; the 800 bpi bootstrap is significantly different from the 1600 bpi bootstrap.
4. If no filename is specified with the device specification for magnetic tape, the default name INIT.SYS is used, with the current PPN. In other words, if you are logged in under [123,1] and specify

MT0:/D:800.,[0,1]FOO.FOO

the files on the tape will be "[0,1]MTBOOT.SYS" and "[123,1]INIT.SYS".



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If you have any reason to wonder if a magnetic tape is bootable, check the directory, which should have 2 files with legal RSTS/E filenames. The first file should be 1 block long (2 blocks on SAVE set tapes, which are bootable tapes created by SAVRES). If the directory looks unusual, it is not a bootable RSTS/E tape.

5. The following might be useful information.

Standard command lines:

DL0:[0,1]INIT.SYS

Load and execute [0,1]INIT.SYS when DL0: is booted.

MM1:[0,1]INIT.SYS/D:1600,DR0:[0,1]INIT.SYS

Load and execute MM1:[0,1]INIT.SYS when MM1: is booted;  
copy the file to be executed from DR0:[0,1]INIT.SYS; set  
the density to 1600 bpi.

Non-standard command line:

DB3:[0,1]INIT.SYS,,[4,4]NEWINI.SYS

Load and execute [0,1]INIT.SYS when DB3: is booted; get  
the bootstrap from [4,4]NEWINI.SYS.

6. Possible Errors:

?Can't open disk NFS

Someone else is using the disk to be HOOKed, or you do  
not have WRTNFS and SYSMOD privileges.

?Can't open [0,1]SY0:INIT.SYS

You must have WREAD,WRTNFS, and SYSMOD privileges to  
run HOOK.SAV

?Directory error

The output disk is not a valid RSTS/E file-structured  
disk.

?File high limit too large

The file to be loaded by the bootstrap program is too  
large.

?Error reading boot block

An I/O error occurred while reading the disk to be  
HOOKed; it may be offline.

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?Error writing boot block

An I/O error occurred while writing the bootstrap program; the disk may be write-locked.

?Error reading INIT.SYS

An I/O error occurred while reading INIT.SYS.

?Explicit unit number required

The device name specified must include an explicit unit number.

?Ill cmd?

HOOK.SAV could not interpret the specified command line.

?Illegal density

The density that you specified cannot be used on this tape drive.

?Illegal overlay number in INIT

You are using an obsolete version of INIT.SYS.

?INIT.SYS is not a SAV format SIL

You are using an obsolete version of INIT.SYS.

?INIT.SYS is too fragmented

Occurs on disk if the INIT.SYS file being hooked is sufficiently fragmented across the disk that the boot block pointers to INIT do not fit in the boot block. Solution: make INIT contiguous or as a minimum use a clustersize of 16 for INIT.

?Not a bootable device

HOOK.SAV cannot write a bootstrap for that device.

?Null file can't be hooked

Self explanatory.

?No BOOT in STB

You are using an obsolete version of INIT.SYS.

Second input file required for magtape hook

You must specify a file to be copied to the magnetic tape.

?UFD open failure

An I/O error occurred.

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RJ2780

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## FAILURE TO CLEAR 'JOB ACTIVE' ON ATTACH - MANDATORY RJ2780 PATCH

### NOTE

This patch appeared in an earlier issue of the RSTS/E V06B-02 Software Dispatch (September, 1977) as a patch to the RSTS/E V06B RJ2780.BAS program. Since the same program is used under the V9.0 system, this patch is being republished for the RSTS/E V9.0 Software Dispatch Review. Because of this, the edit level remains at "V06B-03". If you have applied the earlier V06B patch, do not apply this patch again.

### PROBLEM:

Once RJ2780 has been put into SPOOL mode, an ATTACH should cause any job being sent by QUEMAN to be REQUEUED, and all variables in the RJ2780 program itself concerning that job to be cleared. Processing should then resume, taking input from the terminal to which the program is ATTACHED. When SPOOL mode is re-entered, the same job should be sent by QUEMAN, and processed by the RJ2780 program. Instead, the RJ2780 program becomes confused when it receives a new SPOOL command, and the NEWJOB sent by QUEMAN causes an error message and the job is not processed.

### SOLUTION:

The following patch causes reset of all variables upon ATTACH.

### PROCEDURE:

1. For purposes of the discussion, we will assume that the required program to be patched is located on the public disk structure. In the patching procedure, we will refer to the program by its most simple name format: <program name>.BAS. The person performing the patching operation should, if necessary, replace all program references with suitable text according to the requirements of the installation.

Also, for purposes of presenting the patching procedure, we assume that the patching operation will be performed in a privileged account.

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RJ2780

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2. This mandatory patch is contained in the file PA2502.001 as part of the UPDATE package. To transfer this file to the UPDATE\$ account, select the package name UPDATE during the system installation or update procedure.
3. To apply the patch automatically, perform the following RSTS/E system commands:

```
RUN $CPATCH<cr>
<CPATCH's header line>
```

```
File to patch - RJ2780.BAS=RJ2780.BAS<cr>
#[logfile=]UPDATE$:PA2502.001<cr>
```

- 4.##To apply the patch manually, perform the following RSTS/E system commands.

```
RUN $CPATCH<cr>
<CPATCH's header line>
```

```
File to patch - RJ2780.BAS=RJ2780.BAS<cr>
#[logfile=]<cr>
```

```
*H/6!/V<cr>
```

```
6!          EDIT          :          03
```

```
*G/03/I/A/V<cr>
```

```
6!          EDIT          :          03A
```

```
*H/7!/V<cr>
```

```
7!          EDIT DATE     :          02-JUN-77
```

```
*G/02-JUN-77/-9C/06-JUL-77/V<cr>
```

```
7!          EDIT DATE     :          06-JUL-77
```

```
*H/21!/V<cr>
```

```
21!         VER/ED        EDIT DATE     REASON
```

```
*G/REASON/I<cr>
```

```
<lf>
```

```
!<tab>6B-03A<tab><tab>6-JUL-77<tab>FIX ATTACH/DETACH PROBLEM WITH<lf>
```

```
!<tab><tab><tab><tab><tab>QUEMAN COMMUNICATION.<esc>*V<cr>
```

```
!          QUEMAN COMMUNICATION.
```

```
*H/1010<tab>/V<cr>
```

```
1010       I$="V06B-03"
```

```
*G/03/I/A/V<cr>
```

```
1010       I$="V06B-03A"
```

```
*H/1492<tab>/V<cr>
```

```
1492       M$="ATTACH"
```

```
*G/DETACH%=/V<cr>
```

```
\ DETACH%=((E3% AND 1%)<>0%)
```

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```
*OAI<cr>
<tab>\ INJOB%,ABTJOB%=0%<lf>
<esc>*V<cr>
      \ DETACH%=((E3% AND 1%)<>0%)
*EX<cr>
Patch from KB:[P,PN]CPATCH.CMD complete
#^Z
File to patch - ^Z
```

Ready

5. To re-compile the program and re-enter it into the system library, type the following RSTS/E commands.

```
OLD RJ2780<cr>
```

Ready

```
COMPILE $RJ2780<cr>
```

Ready

6. The person making the changes to the program should now take whatever steps are necessary, according to installation guidelines, to save the new version of the program.
7. The source (.BAS) version of the program should now be removed from the public structure.



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RSTS/E 2780 Package V3.0  
RJ2780

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## LOCAL BINARY TRANSMIT FAILURE - MANDATORY RJ2780 PATCH

### NOTE

RJ2780.BAS as released with RSTS/E V06B is used on all V06B and later versions of RSTS/E. For this reason, the edit level of the program remains at "V06B-03".

### PROBLEM:

If the default transmit command is 2780 or GEN, it should be possible to send, as part of a multiple file transfer, a file or files in binary mode. This is done by using the "/B" switch to override the transmit command for those files which should be sent untranslated. Currently, the mode of the first file of a multiple file transfer controls the mode for the complete transfer.

### SOLUTION:

The following patching procedure will correct this problem.

### NOTE

The mandatory 2780 Device Driver patch described in article Seq 5.1.9 M, published in this notebook, must be installed along with this patch.

### PROCEDURE:

1. For purposes of the discussion, we will assume that the required program to be patched is located on the public disk structure. In the patching procedure, we will refer to the program by its most simple name format: <program name>.BAS. The person performing the patching operation should, if necessary, replace all program references with suitable text according to the requirements of the installation.

Also, for purposes of presenting the patching procedure, we assume that the patching operation will be performed in a privileged account.

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 RJ2780

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2. The command file for this patch appears in patch kit version "A" or later. If you do not have this distribution you can produce a command file by specifying a file for [logfile=] in the following procedure.

To apply the patch manually, perform the following RSTS/E system commands:

RUN \$CPATCH<cr>  
<CPATCH's header line>

```
File to patch - RJ2780.BAS=RJ2780.BAS<cr>
#[logfile=]<cr>
*H/6!/V<cr>
6!          EDIT          :          03A
*G/03A/I/B/V<cr>
6!          EDIT          :          03AB
*H/7!/V<cr>
7!          EDIT DATE     :          06-JUL-77
*G/06-JUL-77/-9C/23-MAR-79/V<cr>
7!          EDIT DATE     :          23-MAR-79
*H/21!/G/REASON/V<cr>
21!         VER/ED        EDIT DATE    REASON
*I<cr>
<lf>
!<tab>6B-03AB<tab><tab>23-MAR-79<tab>FIX LOCAL BINARY PROBLEM.<esc>*V<cr>
!          6B-03AB        23-MAR-79        FIX LOCAL BINARY PROBLEM.
*H/1010<tab>/V<cr>
1010        I$="V06B-03A"
*G/03A/I/B/V<cr>
1010        I$="V06B-03AB"
*H/4010<tab>/V<cr>
4010        FIELD #1%, 134% AS B1$
*10AV<cr>
          ! FIELD THE RJ: BUFFER.
*I<cr>
<tab>\ PUTBIN%=NEWBIN%<lf>
<esc>*V<cr>
          ! FIELD THE RJ: BUFFER.
*H/4130<tab>/V<cr>
4130        F$=LEFT(CHR$(27%)+F$,MAXLEN%) IF X.TEST% AND 128%
*8AV<cr>
          \ RETURN
*I<cr>
<tab>\ PUTBIN%=NEWBIN%<lf>
<esc>*V<cr>
          \ RETURN
```



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```
*H/4230<tab>/V<cr>
4230      E%,E2%=0%
*3AV<cr>
      \ PUTBIN%=(R% OR (B1% AND B2%)) AND 1%
*G/PUTBIN/-6C/NEWBIN/V<cr>
      \ NEWBIN%=(R% OR (B1% AND B2%)) AND 1%
*EX<cr>
Patch from KB:[P,PN]CPATCH.CMD complete
#^Z
File to patch - ^Z
```

Ready

3. To re-compile the program and re-enter it into the system library, type the following RSTS/E commands:

```
OLD RJ2780<cr>
```

Ready

```
COMPILE $RJ2780<cr>
```

Ready

4. The person making the changes to the program should now take whatever steps are necessary, according to installation guidelines, to save the new version of the program.
5. The source (.BAS) version of the program should now be removed from the public structure.



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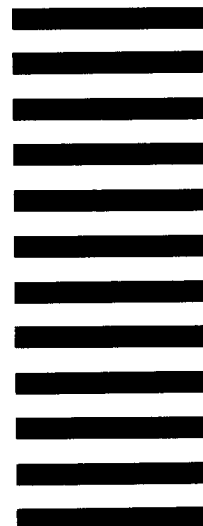
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