DECUS

The DeVIAS Letter

IAS SIG DECUS U.S. CHAPTER

RSX SIG DECUS U.S. CHAPTER

The RSX Multi-Tasker

MARCH 1984 ISSUE

Printed in the U.S.A.

The following are trademarks of Digital Equipment Corporation:

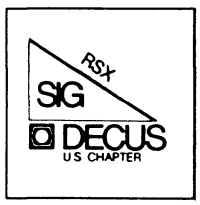
DEC	DIBOL	PDT
DECnet	Digital Logo	RSTS
DECsystem-10	EduSystem	RSX
DECSYSTEM-20	IAS	UNIBUS
DECUS	MASSBUS	VAX
DECwriter	PDP	VMS
		VT

UNIX is a trademark of Bell Laboratories.

Copyright © Digital Equipment Corporation 1984
All Rights Reserved

It is assumed that all articles submitted to the editor of this newsletter are with the authors' permission to publish in any DECUS publication. The articles are the responsibility of the authors and, therefore, DECUS, Digital Equipment Corporation, and the editor assume no responsibility or liability for articles or information appearing in the document. The views herein expressed are those of the authors and do not necessarily express the views of DECUS or Digital Equipment Corporation.

Section One



The RSX Multi-Tasker

RSX MULTI-TASKER

TABLE OF CONTENTS

Columns

From the Editors 1
Tape Copy News 3
Speak Out 4
Working Group News 5
Ask a Question 7
Hints and Things 8

Articles

Dyanamic Allocation of Fortran Data Arrays 9
OPS.CMD Modification 2 12
1983 Fall RSX Q & A Session 16
Character Design Utility 38
Another System-Wide EDTINI File for RSX 39
RP06 Disk Corruption on RSX-11M V3.2 42
Comparison of Three Versions of Runoff 46

FROM THE EDITOR

1.0 SUBSCRIPTION FEES TO RISE

Dominic and I have just returned from a meeting of the DECUS Publications Committee in New Orleans. The main topic of discussion there was the fact that the $12 subscription fee for all newsletters was, first of all, not covering the production costs, and second, was not fair. Few newsletters publish as frequently and with as many pages as do the Multi-Tasker and Pageswapper, so in effect the subscribers to the smaller newsletters were subsidizing us.

The outcome of the discussion was an agreement that subscription fees should be based on the size and frequency of the newsletter. The next issue of Decuscope, due out in mid-April, will carry a subscription renewal form with separate prices for each newsletter. Based on current costs for paper, printing, and mailing, it is expected that the fee for the Multi-Tasker will be about $30 per year, assuming twelve issues at an average page count of 64 pages per issue. The cost of other newsletters may drop. For instance the APL newsletter publishes only twice a year, and may go for a $5 fee.

We had been intending to attempt to publish about 80 pages per month, but the fee for the larger size would be near $48, and we feel this is more than many will want to pay. So if we have a lot of material, over 64 pages, we will resort to 50% reduction and put two pages of material per printed page; the cost will be the same, and we think you readers would rather have the material in smaller print than not have it at all. Let us know if you have any strong feelings about this.

A Task Force is being formed to seek out alternative means of financing the DECUS newsletters. If you have helpful ideas, you can write to the Multi-Tasker, but it would probably be more fruitful if you wrote instead to Decuscope, since this problem affects all of DECUS, not just the RSX SIG. I would like to see more direct subsidizing from DEC, since they profit as much as we do from these newsletters. Another alternative being considered is accepting advertising.

2.0 DEC DIRECT "CUSTOMER SERVICE"

Maybe these comments belong in the Speak Out column, since they are personal opinion and not official business, but I'll put them here anyway. I have had occasion to order material using the DEC Direct 800 number. Sometimes this works well, but twice now the material I ordered has not shown up for months. When I have tried to call back to find out what was delaying my order (or maybe they lost it?), I am told to call another number, not toll free, for "customer service".

That customer service number is always busy. I have dialed it over forty times in a day and never once got through. Finally I called before 9:00 AM and got an answer, and in fact did find out why my FMS manuals had been back ordered for six months. Well, at least I found out that they were still on back order; I can't imagine any valid reason for having the documentation on current software unavailable for six months!

Have any of you encountered similar problems with DEC Direct Customer Service? If you have, I suggest that we deluge them with letters of complaint. They have no way of knowing how many of us are getting busy signals unless we write. Poor service is bad enough; poor service plus a complaint line that you cannot reach is a downright insult. We need to let them know.

3.0 ARTICLE SUBMISSIONS

All submissions for articles should be sent in machine-readable form. Magnetic tape at 800, 1600, or 6250 BPI is acceptable. VMS BACKUP, RSX BRU, PIP, FLX ... we're flexible. RX01 or RX02 floppies are fine, too. The contents of the files should be either in Runoff source format or straight text; please don't send only Runoff output because we may need to re-format. Very short submissions such as notes for Help Yourself can be sent in hard copy, but we really have very little time to re-type your articles for you.

We intend to submit the machine-readable files to the RSX SIG tape so that you can simulate getting back issues and reprints. We have no ability to provide either right now; please don't ask (the Task Force is working on that problem as well).

Tape Copy News

Glen Everhart
RSX Tape Copy Coordinator

A bit of news about the SIG tape.

The fall 1983 RSX SIG tape is very close to release. It contains over 60,000 blocks, with several significant additions since the symposium. These include new releases of

Kermit (complete new distribution)
RSX and RSTS Kermit from Brian Nelson
DG Kermit in RATFOR
CCL V9.1
Swedish PASCAL to fix the problem with recursive calls that made it break after V3.2.

The tapes will be distributed starting with the three Tree Coordinators for the East, Midwest, and West (Kitty Bethe, Paul Tompkins, and Jim Neeland) and should be out by the time this gets into print.

A letter will accompany copies of the tree which asks for information about whether a node wishes to participate in future trees, as well as when the tape was received and in what condition. Please return these letters when the tapes arrive, filled in. They should greatly expedite the process of getting a tape out next time. Meanwhile, the tape sent out will be considerably more recent in many areas than the date of the last DECUS; the Kermits date from late January 1984, as one example. We also had 3 (!) new releases of SRD since the meeting.

Speak Out

January 20, 1984

Process Control Systems, Inc.
1300 S. Calhoun Road
Brookfield, WI 53005

Manager
Corporate Administative Systems Group
Software Services
Digital Equipment Corporation
P.O. Box F
Maynard, MA 01754

Dear Sir:

I am a subscriber to your SOFTWARE DISPATCH for RSX-11M. In the past these dispatches have been a useful and vital source of information. With the Jan. 1984 issue (AD-5196G-B4) the SOFTWARE DISPATCH has become almost totally useless.

I don't need to pay a monthly fee to be told that all my problems will be fixed by '...UPDATE C'. You are wasting paper. You are wasting my time, my money and my patience. I feel like I am reading a serialized mystery novel which promises the solution in a future edition.

I am running RSX-11M V4.1. I received the distribution about 7 months ago with update A. I have yet to receive update B (the salesman said they were issued quarterly), and I am now exposed to a bunch of problems which are described in detail, but told to wait for an update C to get the solution. I too am having some of the problems described. What am I supposed to?

As far as I am concerned, the SOFTWARE DISPATCH now fails in its mission (in your own words on the title page of each DISPATCH) to publish '...software problems and solutions...'.

Yours truly,

Michael E. Mazzoni
President

cc:Editor-Multitasker

Working Group News

Jeff Hamilton
Working Group Coordinator
(214)457-4175

Date of this report: 10FEB84
The working group chairmen are as follows:
RSX-11M Unsupported Versions:
Bill Burton
Texas Research Institute
1300 Moursand
Houston, Texas 77030
System Performance and Accounting
Paul Sorenson
AEP, Interactive Graphics
1 Riverside Plaza
Columbus, Ohio 43215
DECUS Library
Bruce Zielinski
RCA
Marne Highway M/S 138-2
Moorestown, N. J. 08057
SIG Tape Collection
Glen Everhart
RCA Government Systems Division
Route 38
Cherry Hill, New Jersey 08358
SRD
Bob Turkelson
NASA/Goddard Space Flight Center
Mail Code 935
Greenbelt, Maryland 20771
Data Acquisition, Simulation and Process Control (DASPC)
Allen J. Bennett
Clark Equipment Co.
P.O.Box 3000
Battle Creek, Mich. 49016
Runoff
Chuck Spalding
Adept Technology Inc.
1202 Charleston Rd.
Mountain View, Calif. 94043
The Unsupported Version working group is currently planning sessions for the Spring Symposium for past unsupported versions of 11M/11M+. An article has been submitted to the Multitasker to show how to modify the magtape driver to provide better execution of BRU3.2.

The System Performance and Accounting working group is continuing its work in preparing the index of the past RSXSIG tapes in regards to System performance and accounting. There is a session being planned for the Spring Symposium for the System Performance and

Accounting working group to discuss further work to be done.

The DECUS Library working group have continued efforts to construct a tape to provide to the DECUS library of the best software off of the past RSXSIG tapes. The tape is currently under evaluation by the working group.

The SIG Tape Collection working group is currently in the process of getting the Fall83 tape to the tree structure to be delivered to the LUGs. This tape is now in its final format.

The SRD working group has continued work on the improved SRD supplied to the Fall 83 RSXSIG tape. Enhancements and continued bug fixes are being considered.

The DASPC working group has continued its efforts to lobby DEC for more real time development into RSX systems. This will continue into the future. Representatives from the LABS SIG, VAX Realtime Working Group and DASPC continued in their efforts to form a new SIG, but the status is unknown as of this writing. A seperate session is also planned for this working group.

The Runoff group has continued its effort to consolidate desirable features of several versions of Runoff into an "official" version. In the near future an article will appear in the MULTI-TASKER doing a comparison of each of the versions that exist along with DSR the DEC Standard Runoff. Telephone discussions have been held to review the charter that is held for the Runoff working group. No sessions other than the general session is planned for the Spring Symposium.

If you are interested in providing information to a special working group concerning problems or ideas in that area, please get in touch with the working group chairman of that group.

Ask a Question

January 18, 1984
Kimmel-Jensen-Wegerer-Wray
623 26th Avenue
Rock Island, Illinois 61201

The Multi-Tasker
C/O DECUS
One Iron Way, MR2-3/E55
Marlboro, MA 01752

Dear Multi-tasker:

I have two problems that I hope you can help me with:

1. Why is it, if I don't have an account set up (entry in $ACNT) for a directory, a non-privileged user cannot execute a program that opens an output file. (i.e. The user logs in under [20,1] then sets default to [30,1]. The non-privileged user can run programs that don't opens files from [30,1] but pulls an "OPEN FAILURE ON OUTPUT FILE" message on ones that do.) If it is possible, I would like to avoid setting up an account for the directory.

2. I also need help revising the ACCLOG: Task Accounting Package for RSX-11M V3.0, from the DECUS library, to work on RSX-11M V4.0. If someone has already done this I would appreciate any help I can get.

Sincerely,

Shirley A. Schmitt

1. This problem is caused by the file protection mask on the User File Directory (UFD) [30,1] ([0,0]030001.DIR). By default, UFDs have the protection mask SYSTEM:RWED, OWNER:RWED, GROUP:RWED, WORLD:R. When logging into [20,1] and then changing the default directory to [30,1] you remain user [20,1]. The only thing to change is the default directory. If this were not the case a nasty user could change himself into [1,1] and really cause problems. While visiting directory [30,1] you only have world access rights - Readonly. If you tried jumping to another directory within the group, say [20,7], you would have group access rights - RWED; there would be no problem. To rectify your situation, alter the protection mask on UFD [30,1] to allow greater world access (PIP [0,0]030001.DIR/PR/WO:RWE)

2. Readers ?

- DJD

Hints and Things

Automatic Truncation of Files

Glen Hoffing
RCA Government Communication Systems

DEC has very quietly added a nice feature to the Files Control System (FCS) starting with Version 2.0 of the RSX-11M Plus operating system. A one-liner in the release notes states that files now will be automatically truncated when closed. This is almost true, and with a little care it can be made always true.

The problem is that DEC, as with most new features, provides a means of avoiding the feature. In this case, a file is truncated when closed if, and only if, the truncation feature is turned on for that file at the time of the close. As described in the sections on .EXTND and .TRNCL in the I/O Operations Manual, automatic truncation is turned on whenever a file is extended, and turned off whenever a file is extended with zero blocks. If a file is never extended, the feature is turned off. To a Fortran programmer, this means the file will be truncated at close only if the INITIALSIZE allocation for the file is insufficient. Since extend operations are fairly expensive, it is often a good practice to create a file with a large INITIALSIZE allocation, and truncate it after filling it with data. Since this involves no extends, however, this bypasses the automatic truncation feature that is desired. An awkward way around this is to open the file with a zero INITIALSIZE and a large EXTENDSIZE. A better way is to take advantage of the FCS truncate and close routine, .TRNCL, which is now readily accessible from Fortran. First, assemble the following MACRO-11 subroutine:

```
TRUNC::
        MOV     @2(R5),R2       ; move LUN to R2
        CALL    $FCHNL          ; address of LUB to R0
        ADD     #14,R0          ; address of FDB to R0
        CALL    .TRNCL          ; close and truncate file
        .END
```

This subroutine is called from Fortran whenever a file is to be truncated and closed. If the logical unit number of the file is to be re-used within the task, a Fortran CLOSE should also be issued to cleanup the local Fortran database. Thus,

```
LUN = 1
CALL TRUNC(LUN)
```

```
CLOSE (UNIT=LUN)
```

I am not sure of the status of RSX-11M concerning this, but suspect that the same changes went into Version 4.0 as went into M-Plus Version 2.0.

Dynamic Allocation of FORTRAN Data Arrays

Paul R. Sorenson
American Electric Power
Interactive Graphics Section
1 Riverside Plaza
Columbus, OH

Deciding on the maximum data array size required by an application is a common problem in program development. A simple sorting task may be written to handle up to 1000 entries, but the source code must be edited, recompiled, and task built when a 1001 element list must be sorted. Inefficient use of physical memory results when the allocated array size greatly exceeds the space requirements of a typical run.

The RSX EXTEND-TASK directive increases a task's virtual address space providing a convenient means to dynamically increase the task's available work space (ala TKB, SRD, etc.). This method is not obviously applicable to FORTRAN tasks, but can be used effectively to expand the size of a data array at run-time. The main advantages of using the extend-task rather than the create/attach/map region directives are its conceptual simplicity, and the potentially larger address space available by not restricting the dynamic array space to begin on an even 4kw boundary. One primary disadvantage is that the task extends its address space contiguously in physical memory whereas the memory management directives allow physical fragmentation of the contiguous virtual address space mapped.

FORTRAN arrays are allocated to contiguous virtual addresses and array subscript references are resolved from the base address of the first element in the array. With array bounds checking disabled (/-CK in F4P and F77), it is easy to reference array elements that are not within the declared bounds of the array; sometimes referred to as a "bug". By physically placing the first array element at the task's top virtual address and issuing the extend-task directive, the array size is limited only be the free virtual address space available to the task. This scheme works

well for dynamically sizing one, single-dimensioned array. Resolving multiple and multi-dimensional array references within the extended virtual address space can be accomplished using the FORTRAN adjustable array facility which can be thought of as a run-time EQUIVALENCE statement (see example below).

To force allocation of a FORTRAN data array to the top virtual address of the task image, the array must be declared as the last or only variable in a named common block. Task builder's ODL .PSECT directive is used to identify this named common block so that it may be forced into an overlay co-tree (see "Trimming Task Image Files", D. DiGiacomo, Multi-Tasker V16:1, July 1982).

The following example shows how multiple, multi-dimensioned arrays may be defined in the extended address space. The program reads a L x M matrix from a file on logical unit 1, and a M x N matrix from a file on logical unit 2, multiplies the two matrices and writes the L x N resultant matrix to a file on logical unit 3. The specifics of the file format are ancillary to the example and are not given in detail.

```
   PROGRAM MAIN
C
C  MAIN dynamically allocates space for 3 two-dimensional
C   real arrays "A", "B", and "C".  "A" and "B" will be
C   read from data files by "INPUT"; the matrix multiply
C   is performed by "MATMUL"; and "C" array will be
C   written to a file by "OUTPUT"
C
   COMMON /DYNCOM/ I
   INTEGER*2 I(1)
   OPEN (UNIT=1...
   READ (1,5) L,M          !Read size of "A"
5  FORMAT(...)
   OPEN (UNIT=2...
   READ (2,5) M,N          !Read size of "B"
   J = L*M                 !Determine size for "A"
   J = J+M*N               ! plus "B"
   J = J+L*N               !  plus "C"
   J = J*2                 !A,B,C are real
   K = (J/32)+1            !# 32 word blocks
   CALL EXTTSK (K,IDSW)    !Allocate space
   IF (IDSW.LT.0) GOTO 90
   INDEXA = 1              !Offset into "I" for "A"
   INDEXB = INDEXA+L*M*2   !Offset into "I" for "B"
   INDEXC = INDEXB+M*N*2   !Offset into "I" for "C"
   CALL INPUT (1,I(INDEXA),L,M)    !Read "A"
   CALL INPUT (2,I(INDEXB),M,N)    !Read "B"
   CALL MATMUL (I(INDEXA),I(INDEXB),I(INDEXC),L,M,N)
   OPEN (UNIT=3...
   WRITE (3,5) L,N         !Write size of "C"
   CALL OUTPUT (3,I(INDEXC),L,N)
```

```
      GO TO 100
   90 WRITE(5,91)IDSW,J
   91 FORMAT(' DSW error _#',i3,'. extending'
      1 ' task by ',i5,' words')
  100         CLOSE (UNIT=1)
      CLOSE (UNIT=2)
      CLOSE (UNIT=3)
      END
C ***
      SUBROUTINE INPUT (LUN,ARRAY,NROW,NCOL)
C
C  INPUT reads a NROW x NCOL matrix from file
C   on logical unit LUN into ARRAY.
C
      REAL*4 ARRAY(NROW,NCOL)
      READ (LUN,...)
      ...
      RETURN
      END
C ***
      SUBROUTINE OUTPUT (LUN,ARRAY,NROW,NCOL)
C
C  OUTPUT writes a NROW x NCOL matrix from ARRAY
C   to file on logical unit LUN.
C
      REAL*4 ARRAY(NROW,NCOL)
      WRITE (LUN,...)
      ...
      RETURN
      END
C ***
      SUBROUTINE MATMUL (A,B,C,L,M,N)
C
C  MATMUL multiplies the L x M matrix A by
C   the M x N matrix B, placing the result in
C   the L x N matrix C.  All arrays are
C   "adjustable" and controlled by caller.
C
      REAL*4 A(L,M), B(M,N), C(L,N)
      DO 8 I=1,L
      DO 8 J=1,N
      SUM = 0.
      DO 6 K=1,M
      SUM = SUM+A(I,K)*B(K,J)
   6  CONTINUE
      C(I,J) = SUM
   8  CONTINUE
      RETURN
      END
```

The task build and ODL command files for this example would resemble:

```
;
; *** Task build file for dynamic array
; ***  allocation using extend-task directive
;
MAIN/CP/FP,MAIN/-SP=MAIN/MP
//

;
; *** ODL file to force FORTRAN named common
; ***  /DYNCOM/ to top of task's virtual
; ***  address space by making it a co-tree
;
   .PSECT  DYNCOM,RW,D,GBL,REL,OVR
   .ROOT   MAIN-INPUT-OUTPUT-MATMUL,DYNCOM
   .END
```

OPS.CMD MODIFICATION 2

Jeff Blavat
Bucyrus-Erie Co.
1100 Milwaukee Avenue
South Milwaukee, Wisconsin 53172

This is another version of the OPS.CMD command file as it appeared in the December 83 MULTI-TASKER. The situation that prompted another version is that the one that appeared was incomplete. Also, after adding in the missing part, the %^&*(thing wouldn't work. It couldn't handle nine character file names, and there appears to be more than one format for the output of SRD. The listing that follows corrects all of these problems consistent with our version of SRD and additionally provides for the automatic installation and removal of required utility tasks.

```
   .ENABLE SUBSTITUTION
   .SETN N 1
   .SETF MAKFIL
   .SETS CMDNAM "TMP.TMP"
   .PARSE COMMAN "()()" DUMMY SRD DUMMY XXX
.;
.; If no SRD selection, take one
.;
   .SETT INLINE
   .IF XXX NE "" .GOTO STRIN
```

```
        .SETF INLINE
      ;
      ;  OPS.CMD - Select files and perform operation
      ;
      ;  @OPS (SRD selection) (command line)
      ;
      ;  EXAMPLES:  @OPS (*.TSK/AF:11-APR-83) (MAC $F,$F/-SP=$F)
      ;                    OR
      ;             @OPS and then answer the questions
      ;  Parameters are:
      ;  $N - entire filename
      ;  $D - device
      ;  $U - UIC ($G - group, $O - owner)
      ;  $F - filename
      ;  $T - file type
      ;  $V - version
      ;
      ;  LIMITS: Up to 5 command lines allowed
      ;          Up to 7 substitutions per line
      ;
        .IF SRD NE "" .GOTO CMDS
        .ASK MAKFIL Generate a command file (without executing it)
        .IFF MAKFIL .GOTO SWORD
        .ASKS A File name (default = 'CMDNAM')
        .IF A EQ "" .SETS A CMDNAM
        .SETS CMDNAM A
      .SWORD:
      ;  SRD selection (RETURN to exit)
        .ASKS SRD
        .IF SRD EQ "" .EXIT
      .;  If on command line, loop and read strings
      .;
      .CMDS:
      ;  Command line  'N' (RETURN for no more commands)
        .ASKS XXX
        .IF XXX EQ "" .GOTO SORT
      .STRIN:    .SETS CMD'N' XXX
      .;
      .;  Parse command line for later use
      .;
        .PARSE CMD'N' "$$$$$$$" Q1'N' Q2 Q3 Q4 Q5 Q6 Q7
        .SETN NN 2
        .SETS $Z ""
      .PIECE:    .SETS Q'NN''N'"$"+Q'NN'[1:1]
        .IF Q'NN''N' EQ "$" .SETS Q'NN''N' "$Z"
        .SETS R'NN''N' Q'NN'[2:100]
        .INC NN
        .IF NN LE 7 .GOTO PIECE
      .;
        .INC N
        .IF N LE 5 .AND .IFF INLINE .GOTO CMDS
      .;
      .;  Make SRD selection to temp file
```

```
.SORT:
   .IF N EQ 1 .EXIT
.;
.;  This little trick installs SRD only if and when it's needed and
.;  removes it when it's use is done if it was not installed.
.;
   .SETT ISRD
   .IFNINS SRD .SETF ISRD
   .IFF ISRD INS $SRD
SRD SRD.TMP='SRD'/LI
   .IFF ISRD REM SRD
.;
.;  Open the temp file for read
   .OPENR SRD.TMP
   .IFT MAKFIL .OPEN #1 'CMDNAM'
.;
.;  Nothing is more frustrating than inputting a sequence of seven
.;  commands and then finding out that the third one failed because
.;  the required utility was not installed.  This section takes
.;  care of that problem.
.;
   .SETN N 1
.INSTAL:
   .IFNDF CMD'N' .GOTO OK
   .PARSE Q1'N' " " COM'N' DUMMY
   .SETS COM COM'N'
   .IFT MAKFIL .ENABLE DATA #1
   .SETT ICOM'N'
   .IFNINS 'COM' .SETF ICOM'N'
   .IFF ICOM'N' INS $'COM'
.DISABLE DATA #1
   .INC N
   .IF N LE 7 .GOTO INSTAL
.OK:
.;
.;  Read SRD file and select filename
.;  Parse so $N is entire filename
.;           $D is device
.;           $U is UIC ($G is group, $O is owner)
.;           $F is file name
.;           $T is file type
.;           $V is version
.;
.;  Our version of SRD does not include blank lines between directory
.;  listings so the MFD label had to be moved to prevent premature
.;  exit on wildcard directory listings.
   .READ LINE
   .IFT <EOF> .GOTO FINIS
.MFD:
   .SETS TEST LINE[1:3]
   .IF TEST NE " **" .GOTO FINIS
   .PARSE LINE "  [,]" DUMMY DUMMY $D $G $O DUMMY
   .SETS $U "["+$G+","+$O+"]"
```

```
.;
.;  Our verion of SRD does not include a blank line between the
.;  file header and the listing, so an extra read statement
.;  was removed from this section.
.; .READ LINE
.;
.LOOP:
   .READ LINE
   .IFT <EOF> .GOTO FINIS
   .SETS TEST LINE[16:16]
   .IF TEST NE ";" .GOTO MFD
.;  Double parsing of the file name listing is necessary to read
.;  nine character file names.  A nine character name in an SRD
.;  listing does not contain any spaces.  The old version would
.;  produce nonsense filespecs for a nine character file name.
   .PARSE LINE ".;" $F $T $V
   .PARSE $F " " $F DUMMY
.;
   .SETS $T "."+$T
   .SETS $V ";"+$V
   .SETS $N $D+$U+$F+$T+$V
.;
.;  Execute commands or build a command file for each line
.;
   .IFNDF CMD1 .GOTO LOOP
.SETS COMAND Q11+'Q21'+R21+'Q31'+R31+'Q41'+R41+'Q51'+R51+'Q61'+R61+'Q71'+R71
   .IFF MAKFIL 'COMAND'
   .IFT MAKFIL .DATA #1 'COMAND'
   .IFNDF CMD2 .GOTO LOOP
.SETS COMAND Q12+'Q22'+R22+'Q32'+R32+'Q42'+R42+'Q52'+R52+'Q62'+R62+'Q72'+R72
   .IFF MAKFIL 'COMAND'
   .IFT MAKFIL .DATA #1 'COMAND'
   .IFNDF CMD3 .GOTO LOOP
.SETS COMAND Q13+'Q23'+R23+'Q33'+R33+'Q43'+R43+'Q53'+R53+'Q63'+R63+'Q73'+R73
   .IFF MAKFIL 'COMAND'
   .IFT MAKFIL .DATA #1 'COMAND'
   .IFNDF CMD4 .GOTO LOOP
.SETS COMAND Q14+'Q24'+R24+'Q34'+R34+'Q44'+R44+'Q54'+R54+'Q64'+R64+'Q74'+R74
   .IFF MAKFIL 'COMAND'
.;
.;  The command file from this point on was missing from the listing
.;  in the December 83 issue of THE MULTI-TASKER.  I hope that I have
.;  completed it sufficiently.  (It does work)
.;
   .IFT MAKFIL .DATA #1 'COMAND'
   .IFNDF CMD5 .GOTO LOOP
.SETS COMAND Q15+'Q25'+R25+'Q35'+R35+'Q45'+R45+'Q55'+R55+'Q65'+R65+'Q75'+R75
   .IFF MAKFIL 'COMAND'
   .IFT MAKFIL .DATA #1 'COMAND'
   .GOTO LOOP
.;
.FINIS:
   .CLOSE SRD.TMP
```

```
PIP SRD.TMP;*/DE
.;
.;  Required utilities were installed, if necessary, in a previous
.;  section of the command file.  This section removes these
.;  installed tasks.  (If every command file installs tasks without
.;  removing them, by the end of the day the task list can be formidable.)
.;
   .SETN N 1
.REMOVE:
   .IFNDF CMD'N' .GOTO DONE
   .PARSE Q1'N' " " COM'N' DUMMY
   .SETS COM COM'N'
   .IFT MAKFIL .ENABLE DATA #1
   .IFINS 'COM' .IFF ICOM'N' REM 'COM'
.DISABLE DATA #1
   .INC N
   .IF N LE 7 .GOTO REMOVE
.DONE:
   .IFT MAKFIL .CLOSE #1
```

RSX Question and Answer Session

1983 Fall DECUS U. S. Symposium
Las Vegas, Nevada
Reported by Rob Howell

1.

Denny Walters, American McGaw

There have been many statements directed at the elimination of 'MCR' in preference of 'DCL' . WIll 'MCR' ever go away?

ANSWER: There are no plans to remove 'MCR'.

2.

Roger Jenkins, Wycliffe Bible Translators

4.1 Print Spooler no longer will forward space and backspace the print.

ANSWER: This is a known bug that will be fixed in update B or C.

3.

David Berkenmeyer, Clark Equipment Co.

In ST. Louis the developers of RSX11M+ took a poll concerning

whether common regions should checkpoint back to their task image files upon removal. The consensus was that it should not! Will this be the case in the next re- lease?
ANSWER: Yes in M+ V2.2

4.

Allen Jay Bennett, Clark Equipment Systems Division

Why does V4.0 MTDRV on RSX11M gets -3 when BRU rewinds tape on PDP-11/34?

ANSWER: Fixed on V4.1

5.

Jim Preciado, Advanced Technology Systems

I have been experiencing random verify errors with BRU both on-line and stand-alone. Dumping the tapes on which the problem occurred, it did not have a label block. This has happened on two systems. Is this a problem with BRU?

ANSWER: Send in an SPR with tape.

6.

Bruce R Mitchell, Machine Intel. and Ind. Magic

Adding a second RM03 with three massbus adapters produced the drive in the wrong unit number. Additionally, the drive would not come on line. The drive was added by rebuilding the DR: driver and re-VMRing the system.Even rebuilding all Cachebus interfaces did not give the desired results. A sysgen finally was done to obtain the desired configuration.

ANSWER: File an SPR. Problem not previously encountered.

7.

Mike Rembis, American Dade

Can the active task names displayed by ATL be modified?

ANSWER: Use OPEN to change the active task name.

8.

Bruce Walters, Mayo Foundation

Are there any problems with PIP to ansii mag tape with multiple volumes on RSX11M V4.0 ? I can't read back multiple volumes.

ANSWER: SPRs have been submitted, DEC should respond shortly.

9.

G. Abrahamian, Teradyne Inc.

When more than one copy of F77 is running on 11/44 RSX11M V4.0 with an UDA50 in unibus, the compiler generates internal inconsistency errors or syntax errors. Why?

ANSWER: The consences was that there is a problem in the fortran compiler and not RSX. The RA80 tries to do optimizations

10.

Michael Morrow, Clark Equipment Co.

The /transfer switch for PRI as distributed with RSX11M+ V2.1 has the following bug: if you have SY: assigned to a non public disk and print a file from that disk, you get a message 'file failed to copy...'. If you have SY: assigned to a public drive and specify the non public drive as device in PRI, it works successfully. It worked before ok on V1.0 !

ANSWER: Send in an SPR. We are not aware of this problem.

11.

Ed Sheena, Lawrence Berkeley Lab

I set my terminal to crt and 9600 baud at startup, yet when I logon (before login.cmd executes), the erase key behaves like it would for a hard copy terminal. Why?

Answer: No satisfactory reply! Presumably sysgening terminals as remote causes this problem.

12.

Larry Baker, USGS/HP Labs

The M+ enhanced parity error recovery support has four outstanding deficiencies: 1)An error on a 32-word boundary

causes Fixer to go into an infinite loop filing up your disk with error log entries. 2)The Scan algorithm is not very intelligent and can fill up a disk when a bank of memory fails. 3)A RO region that encounters a parity error is not properly handled(e.g.FCSFSL). 4)There is no way to RSX of a known bad memory location on re-boot to avoid crashes(e.g.F11ACP encounters parity error in user task buffer). We supplied fixes in an SPR back in Version 1.0 to remedy all these problems and have been successfully running our modifications for 2 years. The Fixer in M+ V2.1 is still same as V1.0! Can we expect some work in this area?

ANSWER: Errors in Exec have all been repaired. We are looking at solution supplied by your SPR for integrity of Fixer. We will look at fixes for improved Fixer algorithm.

13.

Y. David Imai, Douglas Aircraft

Bootable Flopy Program: Qio writing logical block interleave factor 2 means: track 1 3 5...25, 2 4 6...26 . Skew factor 6. What does this mean and which track and sector is next?

ANSWER: WPB; See I/O Reference Guide for 'write physical block'.

14.

David Birkenmeyer, Clark Equipment Co.

Are checkpointable commons subject to 'Executive level disk swapping'? If so, is it possible for a common with attached tasks to be checkpointed away from is attached tasks?

ANSWER: No

15.

Dave Hunt, Lawrence Livermore Lab

From what I read, I can make a bootable 11S system for a TSV05. In fact, I can save it from VMR onto the TSV05. It won't boot! Is it possible to make a bootable TSV05 RSX11S system?

ANSWER: This does work on DEC supported systems and people have done it. However, others warn that there mat be a problem trying to run it in a 18 bit system. Since my system is a 3rd party vendor system, it was suggested that I have been bit by a 'gotcha'. Bob Bismuth suggested we try it with V4.1 before talking to the vendor. Additionally, it was suggested that VMR Save determines that the TSV05 is actually a TS11 if it finds UMRs in the system.

16.

Jim Blaney, National Starch and Chemical Co.

Random halts on system: potential cause is outdated prongs on RDC panel.(Mentioned at RSX Magic Session)

ANSWER: Micro Tech Research, Sunnyvale Cal.

17.

Paul Repacholi, Analytical Engine Co. Perth

Would you please explain the 'Place in the world' for RSX? Does it have a goal? What is it?

ANSWER: We have marketing goals not techical goals. Talk to us.

18.

Wilfried Sander, Finnigan Mat

When will we get mote symbol space in the 'Slow Task Builder'?

ANSWER: We will look at a solution for future releases. There are notes in the TKB Manual that could help now.

19.

Deborah Shapiro, General Instruments

The TSV05 is only supported at 25 ips instead of 100 ips or in a streaming mode. Will it be supported of higher speeds? If not, why? Backups take forever!

ANSWER: Bru cannot drive a mag tape at 125 ips because of lack of buffers. Dec is looking into a streaming device.

20.

Robert Undis, Boeing

How will the new Fortran/Macro Debugger be made available?

ANSWER: The Debugger will be offered as a layered product and must be purchased separately.

21.

R.M.Agresta, General Motors Co: Cadillac

Using M+ V2.1 Autopatch B, while Bruing an RM05, with a 100000

block, contiguous RMS file, Bru fails on verify with: 'Disk too fragmented'. B.McCarthy said last symposium that V2.1 will have that fixed! It is not!

ANSWER: We will look into it.

22.

Allen Jay Bennett, Clark Automated Systems Div.

When sequentially reading records with RSX-RMS on an alternate key, a RFA read with RAB will convert back to primary key sequence. Can you help me re-establish an alternate key sequence after a read by RFA?

ANSWER: No!

23.

Gary Maxwell, Scientific Research Management Co.

Would you consider establishing protectin masks for batch queues(like files and regions) to restrict access to batch streams? This would allow the setup of private batch steams based on the user's logon UIC when jobs are submitted.

ANSWER: We will take it into consideration.

24.

Robert Koch, Systems and Applied Sciences Co.

I have a PDP-11/70 with 128k words and I cannot get a 4.1 sysgen that will boot. It works on the same configuration with 256k words. Is there a fix for this problem?

ANSWER: Several SPRs already submitted. Should be published soon!

25.

Jim Neeland, Hughes Research Labs

We have encountered occasions under M4.0 and M+2.0 where a user's task will see a fatal error on a RL02 during a read or write, which is not logged by error-logging.

ANSWER: Submit an SPR. No known problem.

26.

Wilfried Sander, Finnijan Mat

All running tasks have priorities. As soon as they are ´stopped´ for event flag, they set priority to 0. This causes the Shuffler to elect tasks to be checkpointed regardless of their original priority. This is inconvenient. It should checkpoint the lowest priority tasks first, because we cannot use ´wait for event flag´ ,as this would require installation of tasks with the same priority.

ANSWER: We will look into this.

27.

Michael Kuhn, Ross Medical Center: CPL

I inherited an 11/34 with RSX11 V3.2. I have been working with RSX for only 3 monthes. I want to know if updating to V4.0 or V4.1 would be recommended or not?

ANSWER: Yes, but no reasons recommended!

28.

This question was not turned in.

29.

Bob Hamel, Genrad

I have an ACP/pr:5 task on 11M that uses apr 5-7. I map a region to aprs 2-4. Do i need to unmap aprs 2-4 to do a $swstk? What about the ´obscure system bugs´ mentioned in TKB manual and Exec. Ref. manual? How about M+?

ANSWER: Ok, but region won´t be there when we go to privileged.

30.

Bob Hamel, Genrad

Is it safe for a driver to call $Qastt(in Reqsb) to queue an ast to a task? M and M+?

ANSWER: Yes, also see $Cint by Alan Frisbie for use of $Qastt.

31.

T. Mobberley, Eocom

When will we see support (a set command) for the number of character, odd/even parity and number of stop bits for the

DH-11?

ANSWER: Next update of next release of 11M/M+.

32.

Ed Stack, Hughes Aircraft Co.

On RSX-11M V4.1, I cannot resolve the symbol $RSLT when taskbuilding a simple macro RMS-11K program against LB:[1,1] RMSRES.TSK. The problem does not exist when taskbuilding in a non-overlay environment using LB:[1,1]RMSLIB.OLB. Is there a bug in V4.1 RMSRES?

ANSWER: Try to reproduce on system in demo area, else submit an SPR.

33.

Gilbert Grodsky, Xerox Special Information Systems

In the V3.1 print spooler there was a TKB option to force a page eject at the end of every file. The current print spooler doesn't have this option. How can I put this feature back into the print spooler?

ANSWER: Dec will take the suggestion back and will put the functionality back in the print spooler.

34.

T. Mobberley, Eocom

Now that you have agreed that MCR will not go away, when will we see absolute compatablity between RSX/RT/RSTS/VMS DCL?

ANSWER: We will try to obtain compatability.

35.

A. Galasso, Datagraphy

Does anyone try to use 'stop/accounting' often in batch under RSX11M+, and either killed the system or after 1/2 hour of degraded performance, is dies? V2.1

ANSWER: Send in a SPR.

36.

Roger Jenkins, Wycliffe Bible Translators

LPP and QMG V4.1 define 'special symbiont numbers', 'high and

low limits of special symbionts', and 'special symbiont forms'. Can you explain hoe these interrelate, what will happen if I reuse the form numbers myself and how to het rid of the whole thing?

ANSWER: No one knows!

37.

T. Mobberley, Eocom

I need to make bootable mag tapes for a TS-11 but have only TMB-11s at my site. Can we have a switch on VMR's save command to write bootable MS tapes from MS device?

ANSWER: Submit a SPR.

38.

Allen Jay Bennett, Clark Automated Systems Division

What is DEC's new convention for UIC's to place system tasks on? With RSX11M+ V2.1, we have some on [1,54] and others on [3,54] and some on both. What belongs where? The true question is: Can you have M+ sysgen move non-privileged task from [1,54] to [3,54] after they are task built?

ANSWER: It's a good idea and we'll try to add it in a later release.

39.

Jim Preciado, Advanced Technology Systems

I would like to change the disk type (RM02/03/05/80/RP07) without rebooting the system. Can I just change U.CW3 in the UCB or is device info stored elsewhere?

ANSWER: Info is only kept in UCB.

40.

Milton Lopez, Iattc

What tasks besides HEL and BYE use the Account FIle?

ANSWER: MUP

41.

Kitty Bethe, Bankers Trust Co. I realize it isn't a good idea to change task builder defaults and then do a sysgen, but the only one I changed was to default everyone to external

headers(RSX11M+). I don't think it was very nice of DEC not to document that MCR and LOADER need their headers in pool and why don't I have an answer to my SPR on this subject which I sent in on August 83?

ANSWER: SYSVMR that comes with the system, installs LDR and MCR with external headers. Don't know why your SPR wasn't answered.

42.

Bruce Mitchell, Machine Intelligence and Industrial Magic

The M+ command files to to build TKB,TKBRES,TKBFSL and STK now correctly build for /FP default floating point support, but still build for default /AL checkpointing rather than /CP. Will this be changed?

ANSWER: This problem should be corrected. (Comment: /AL makes no sense with external headers on RSX11M+)!

43.

John Vilandre, University of Minnesota

With more and more high capacity disks, directories sometimes become very large. Will sub-tree directories ever be implemented in RSX?

ANSWER: No!

44.

S. Reid Madsen, Weidner Communications Corporation

We are running RSX11M V4.0 on an 11/34 and 11/70. Periodically the home block of our RK06 and RM03 disks disappears. Always occurs when disk space is low. I understand this might be related to the 'Phantom Write' problem which occurs when extending contiguous files. It also has occurred on RSX11M+.

ANSWER: Submit a SPR.

45.

Alan Frisbie, Fred's Pizza Delivery Service CREF lists line numbers over 32767 as negative line numbers!

ANSWER: Submit a SPR!

46.

Vince Perriello, Composition Systems Inc.

Our application involves a substantial number of installed tasks which RESCOM to shared regions in M+. These tasks are not always installed under and semblance of operator control and when we want to install a new copy of such a region, we have the problem of tracking down the RESCOM'd tasks. Can you either allow 'reverse checkpointing' to refresh the memory resident copy or give us a way to clean up RESCOMs(ie 'remove this region and I mean it!')?

ANSWER: CDB display is being expanded to show statically attached tasks. To automate the procedure, use a privileged task to scan the ADB's.

47.

Jim Bostwick, Cargill Inc.

How do I get a stand-alone BRU(BRUSYS) to talk to DY: in image mode?

ANSWER: No!

48.

Barton Bruce, Cambridge Computer Assts. Inc.

INI gives some 'illegal' or 'invalid' message when initializing very small VD: or FX: disks with explicit small MXF and INF counts. BRU will initialize is with the same numbers(all though the switches are different).

ANSWER: DEC just noticed it. INI should be made consistant with BRU.

49.

Paul Repacholi, Analytical Engine Co.

Will you put autoload system sources in all kits and a RSX11M.TSK in M kits? And since MTAACP,CDA, and VMR are are coupled to the executive, they would be nice to have included also.

ANSWER: We'll look into it.

50.

Anthony Scandora Jr., Science Applications Inc.

Non privileged users used to be able to "Run file/uic=[ggg,mmm]" starting in V4.1, that gives a privileged violation, but "

Ins file/run=rem/uic=" works. This is inconsistent. It should keep the protection uic but set the default uic.

ANSWER: Autopatch B fixes it by only allowing /uic for privileged users on RUN and INS. I maintain that the correct action is to set the default uic but not the protection uic!

51.

T. Mobberley, Eocom

When using the EDT V2.0 on RSX11M V4.0 and the terminal(video)

is set to VT-101/102/125 or 131, EDT shows the terminal as hardcopy. When will this be fixed?

ANSWER: In V4.1/2.1 with EDT V3.0

52.

Ed Winfield, General Electric

On an 11/23 128kw system running RSX11M V4.1, working with 11s, I VMR'd a 11S image of 498. blocks, installed and fixed tasks then saved to a TU58. I got a message saying 'saved system file truncated to 492 blocks'. why?

ANSWER: SPR was already submitted on this problem and is being fixed. Problem arose due to a change between V4.0 and 4.1 .

53.

David Johnson, Tektronix

When are you going to implement a mail box driver on RSX11M?

ANSWER: No plans.

54.

Henry Gruenemeier, Garrett Turbine Engine Co.

Is there any method to accept escape sequences from a keyboard using half duplex terminal driver?

ANSWER: No!

55.

T. Mobberley, Eocom

RSX11M V4.0/FORTRAN IV V2.5 data file and uic have protection '[RWED,RWED,RWED,R]'. A fortran program open the data file for

read only and program aborts with protection violation. Changing World to 'RWED' on data file solves problem. Why?

ANSWER: Submit a SPR.

56.

Jim Neeland, Hughes Research Labs

System (M+ V2.0) hangs occasionally during a broadcast to a slaved port(with printer attached). All terminals are dead but processor is not halted. Why?

ANSWER: Submit a SPR.

57.

Winfried Sander, Finnijan Mat

In RSX11M V4.0, appeared officially the resident libraries for the RSX utilities! Surprisingly not as many RSX utilities were elected to link to the resident library FCSRES as we were used to. Is there a reason for that?

ANSWER: No. Send us a list of tasks which could be linked to FCSRES.

58.

S. Reid Madsen, Weidner Communications Co.

We sysgen systems for use both in Europe and the USA. We need some easy way to change from 50 to 60 cycle power for identical systems. Is this available on a sig tape. Could this be supplied by DEC as a supported utility?

ANSWER: Open the system image at location $TPHTZ(in module SYSCM.MAC) and change the contents to the desired line frequency. This is the offset in the task image where the line frequency is found. Using ZAP, this location can then be changed. Suggest you change the .SYS version 1st, then after verification, change the .TSK file.

59.

Larry Baker, USGS/HP Labs

Attempts to open a Decnet remote file using the new transparent network file access in RMS V2.0, fails when the task already has the network open,eg; a network server object that processes remote plot requests by reading the file over the network. Any work around or fixes possible? Also RMS V2.0 chokes when the current node is specified as part of a

qualified network file name.

ANSWER: Since Decnet returns an indication that the net is already open, RMS should be able to be fixed to do something intelligent. Second problem is new and should not happen, therefore it should get fixed.

60.

Pete Balkus, GenRad

RSX11M V2.1 has its Dynamic Regions load in 'first available memory' starting at low core. Could we please have an attribute that would cause the region to be loaded 'High' like RSX11M V4.0?

ANSWER: Stump the stars! Dec replied that there is a good reason, but could not remember why!

61.

Pete Balkus, GenRad

RSX11M V2.1 DYDRV will crash the system if the RX02 is unplugged. This was fixed in RSX11M V4.0 and M+ V2.0, but somehow got broken again. Also the motor control on a DSD440 will cause MOU to issue a 'Bad Home Block' error.

ANSWER: Fixed in autopatch B of M+ V2.1 .

62.

Vince Perriello, Composition Systems, Inc.

Batch processing often causes a significant degradation in system interactive performance. Could a parameter be added to the system to implement a priority drop at task start time(or at least in $CRETCB) for virtual terminals?

ANSWER: We'll look at it. Maybe in a future release.

63.

Gibert Grodsky, Xerox Special Information Systems

In an indirect command file the sequence: 'eli old.log/sw, eli /log' gives an error message although it seems to work correctly. I am told that a '.delay 15 or .wait errlog' is not sufficient.

ANSWER: Fixed in V4.1

64.

J. Frederick Bartlett, Fermilab

Could there be a sysgen option for RSX11S which would allow XDT to be included without having to type 'G' every time the system is booted? I am tired of having to Zap the RSX task image.

ANSWER: They will think about it.

65.

Tom Dembury, Survey Sampling Inc.

Why has the DEC Bookstore stopped selling books at Decus? This is a vital function since we can never get up to date information about documentation from local offices. Also, can we get a central 800 number to call on latest versions of publications?

ANSWER: Decus should be asked.

66.

Bob Agresta, GM- Cadillac Motor

I have DT-07 Unibus switches on two 11/44's. According to the RSX manuals, I should be able to use 'link' and 'unlink' to make these units hookup. At no time during the sysgen process am I asked for the DT-07 configuration, the unibus runs or the peripheral devices on the runs. Why?

ANSWER: Looking at supporting this w/o multiprocessors. We would look at you being a test sight.

67.

Gary Zoker, University of Texas at Austin

On an 11/70 with a Massbus TE16, do I tell sysgen I have a MM or RH? Also how about Unibus RP04 disks, when they would normally be on the Massbus on an 11/70?

ANSWER: You tell sysgen what you really have, which is a MM: no mater what the controller is. The RP04's don't care if they are on a Massbus or a Unibus.

68.

Hans Jung, Associated Press-NYC

Is there a Cobol-81 Ots manual similar to the F4P or F77 Ots manual with module and data structure descriptions? If not,

why, and what can I do about it?

ANSWER: No. Will talk to Cobol-81 group.

69.

Jim Preciado, Advanced technology Systems

Explain the 'boot' restriction that a virgin boot requires the physical unit and logical unit of a disk drive be the same for the initial Save command to work!

ANSWER: Don't know. Submit a SPR to make documentation more complete.

70.

Gary Maxwell, Scientific Research Management Co.

If i mount a magtape as /foreign with a specified record size and blocksize, then Pip will not write a file to that tape unless (I assume) it is a fixed record file with record length equal to the tape's record length. Why can't Pip pad out variable length record to the tape's record length and issue a warning and continue uf the file's record is too long?

ANSWER: We will look into the problem.

71.

Bob Rock, Northern Telecom Inc.

In a RSX11M+ system is there a way to make Syscan Record the SAB (System Account Block) at regular intervals? Useful for plotting system performance.

ANSWER: Noted as a suggestion for system improvement.

72.

Bruce Mitchell, Machine Intelligence and Industrial Magic

When BRU is copying from a RM05 to a TE16, if aborted, BRU goes into I/O rundown and waits anywhere from 5 sec. to 1 min. before the tape drive stops forward writing. Why?

ANSWER: Interesting problem. Should not happen when writing; may be doing a 'space file' operation for unknown reason.

73.

Kitty Bethe, Bankers Trust

We finally got V2.0 of M+ working well enough to put it into production this past July, so I cleared my desk off and sent 6 SPRs in during August. Why have only 3 been answered? Looking thru our files, our past experience with SPR turn around time was much better.

ANSWER: TSC processing adds 1 month(TSC claims only 2 weeks at the most). Also many SPRs are poorly written. Suggestion would be to have a session on SPR preparation.

74.

Alan E. Frisbie

When doing an 11S sysgen on a VAX, if the .SYS file is not contiguous, why does VMR trash the file?

ANSWER: VMR does logical block I/O. This is guaranteed to corrupt your disk. It will be looked at.

75.

Vince Perriello, Composition Systems Inc.

M+ seems to have problem in mounting unformatted disks 'foreign'. I think it tries to read something from the disk? Could you fix this so that I can format my disk please?

ANSWER: We'll check this out. It may be a relic of Rk05 support.

76.

Barton Bruce, Cambridge Computer Associates

What standalone utility is on my 11M kit that lets me format disks on my single disk drive system? BRU64K doesn't do it. BRUSYS's extra size is ok if you could include it on the kit or just return 'Preserve'.

ANSWER: Will look at it. Maybe put BRUSYS on M kits.

77.

Paul Repacholi, Analytical Engine Co.

When will M+ support the DC11 as a console and the DW: as a system disk?

ANSWER: No.

78.

Anthony E. Scandora, Science Applications Inc.

Is concatenation part of the Ansii Fortran-77 specification? Could you put it into PDP-11 F77 and how about 'Inquire'?

ANSWER: Whether ansii or not is unclear. F77 concatenation and 'Inquire' are expensive and on wish list.

79.

Jim Neeland, Hughes Research Labs

Does EDT V3.0 support 'strike-over/type-over' mode? I can't find any reference to the capability on the VMS systems.

ANSWER: Ask John Sauter.

80.

T. Mobberley, Eocom RSX11M+ V2.1 supports checkpointable commons. Is there an alternate(TKB) such that the commons will not be checkpointed and/or will not be written back to the task image when unloaded?

ANSWER: Everyone concurs that this in not a desirable situation and must be fixed in the very near future.

81.

Henry Gruenemeier, Garrett Turbine Engine Co.

Is there any chance of SLP supporting the TU58 in RSX11S V2.2?

ANSWER: Does in V4.0 possibly or for sure in V4.1 .

82.

Paul Repacholi, Analytical Engine Co.

Bliss on RSX11M?

ANSWER: No.

83.

David W. Johnson, Tektronix

Is there a PLAS OTSRES for F4P?

ANSWER: No written response from David Johnson.

84.

Yan-tai Shu, Plasma Physics Lab. UCLA

Why do you use F4P for F77's file names?

ANSWER: They use for customer convenience.

85.

Anthony E. Scandora, Science Applications, Inc.

I would like to see subforms in the QUEMGR Print Spooler, ie: FORM 1A=10CPI,BUF=80;1B=12CPI,BUF=96. Where Lpp would send out the right escape sequence at the top of each file of job. How hard is this to do?

ANSWER: It's under consideration.

86.

Gary Maxwell, Scientific Research Management

With all the great help diles on RSX, the [1,2] directory is huge now. Wouldn't is be more efficient to add Universal Library support to the HELP command to speed up access and shorten directories?

ANSWER: It's been on our wish list.

87.

Barton Bruce, Cambridge Computer Associates Inc.

In Macro-11 .Library is great, thank you. '.Include' would be very handy too,except it seems to need a whole page for the included code regardless of how small it is.

ANSWER: Owned by RT people. Send in a SPR.

88.

Paul Repacholi, Analytical Engine Co.

Boot/dev and MVT to work for all devices with a hardware VU bit?

ANSWER: It's under consideration.

89.

Bruce R. Mitchell, Machine Intelligence and Industrial Magic

There is a problem on hardcopy terminals when a user logs in using the form HELLO user/password. It is relatively simple to strike over this line in HELLO; Kmskit does this and there is a patch for 11M+ on the Sig Tape. Any chance of making this official?

ANSWER: The next release of RSX will have more security functionality. This is very likely to be there.

90.

Larry Baker, USGS/HP Labs

Any possibility of implementing the volume verification features as is done in VMS to recover from a write-locked disk, a failed drive, or an accidentally spun down disk now that stalled I/O is here?

ANSWER: Maybe.

91.

Anthony E. Scandora Jr, Science Applications,Inc

Please put enough stuff on M and M+ kits to be able to build a BRUSYS or to run tasks without a disk!

ANSWER: Noted. Your not the first.

92.

Denny Walthers, American McGaw

On-line DSC V4.0/4.1 and standalone DSC V4.0 give 'Device Offline'. It can be mounted, read and written to. Can this be rectified?

ANSWER: Submit an SPR with DSC .

93.

Michael Malfatti, Bonneville Power Administration

A few years ago, there was a System Logic Manual for RSX11M V3.1 . Any plans to update and issue it again for a future version of RSX11M?

ANSWER: There are no plans at this time.

94.

Barton Bruce, Cambridge Associates Inc.

With no 'paper patches', the new update process may not seem as big a step forward to users, as it must to Dec if a 6 month lag is what we expect to see for delivery.

ANSWER: See Software Services on their booth.

95.

Paul Repacholi, Analytical Engine Co.

As TKB is patched, M and M+ version diverge. If you copy across systems, problems arise! One common patch set would sure be nice!

ANSWER: It's under consideration.

96.

Anthony E. Scandora Jr, Science Applications Inc.

On ODS-1 disks, Vax utilities can only do wildcard names and types. No wildcard UICs at all and no wild characters either. PIP works ok.

ANSWER: Bug the VMS guys.

97.

David W. Johnsons, Tektronix

Expiration dates on ANSII tapes?

ANSWER: Good point.

98.

Barton F. Bruce, Cambridge Computer Associates

Any chance for programable baud rate support on Q-bus DLs?

ANSWER: Look into it.

99.

Bruce R. Mitchell, Machine Intelligence and Industrial Magic

Is there a way for a running task to find out his file ID or filename, and what happens in the worst case if he deletes

himself?

ANSWER: (1) Examine T.LBN and blow out the first few blocks the task image's device. (2) (Alan Frisbie) There is a utility on the SIG tapes to retrieve filenames given the LBN of a file. (3) It is possible to damage a running system under special circumstances. (4) Blow out the first few blocks of the task headers, set the remove on exit bit in the task header and exit. (5) T.LBN can be chased back to the filename, but it involves exhaustive search of the Index file. (6) All of these solutions assume a privileged task. (7) Possible to write garbage all over the whole disk!

100.

Larry Baker, USGS/HP Labs

Futures for RSX: I would like to see a Romable RSX flavor system from Dec, not an RT-11/Pascal System. RSX suit me fine.

ANSWER: Might be possible.

101.

Paul Repacholi, Analytical Engine Co.

When will the DMF-32 be supported, or at least have the code in place?

ANSWER: No!

102.

Anthony E. Scandora Jr, Science Applications Inc.

Does Vax Dscl read current RSX Dsc tapes?

ANSWER: No.

103.

Jim Neeland, Hughes Research Labs

Any way to chain out of Ind into a task?

ANSWER: Do it yourself.

CHARACTER DESIGN UTILITY

Paul Rutz
Lee Enterprises, Inc.
130 East Second St.
Davenport, IA 52801
(319) 383-2363

PURPOSE: CHAR is an aid for designing characters for the VT-200 family. CHAR interactively displays the character, a representation of the character cells, and the octal character representation.

USE: RUN CHAR on a VT-200 series terminal A display screen will be shown. Type one of the commands. The screen and character will be changed accordingly. The cursor will be over the current cell.

COMMANDS

Cursor keys	moves the cursor to a different cell.
Find	sets the cell active (*)
Select	sets the cell inactive (-)
Next screen	resets the character to all cells inactive
CTRL/Z	exits the utility.

SCREEN DISPLAY:

```
line    1       CHARACTER DESIGN UTILITY
2
3       A                       (The displayed character)
4
5       - - - - - - - - -
6       - - - * - - - - -
7       - - * - * - - - -
8       - * - - - * - - -
9       * * * * * * * - -       (character cell matrix)
10      * - - - - - - * -
11      * - - - - - - * -
12      - - - - - - - - -
13      - - - - - - - - -
14      - - - - - - - - -
15
16
17      157 147 143 141 143 147 157 077
18      102 077 077 077 077 077 102 077
19
20      ENTER COMMAND
```

NOTES

1. This utility was written in MACRO under RSX-11M V4.0

2. This utility only programs the first programmable character for display purposes. The octal sequence for each character should be programmed by the application task.

3. This utility requires 8 data bit communication with the VT-200 series terminal.

4. For more information on programming character sets refer to the: "VT 220 PROGRAMMER REFERENCE MANUAL", Section 4.16

ANOTHER SYSTEM-WIDE EDTINI FILE FOR RSX

Paul Rutz
Lee Enterprises, Inc.
130 E. 2nd St,
Davenport, IA 52801
(319)383-2363

In the November, 1983 issued of THE DEC PROFESSIONAL, Allen Watson described a method of implementing a system wide EDTINI.EDT file. I have also discovered a way of having only one EDTINI.EDT file by modifying the EDT task image.

The EDT task image is changed so that EDT searches for the initialization file named "SY:[1,2]I.EDT" instead of "SY:EDTINI.EDT". The EDT task image is changed with the ZAP utility.

The first step in modifying EDT is to print the EDT map which was created during Sysgen Phase III. An excerpt of an EDT map is displayed below.

Next, locate the ARITH root segment. This segment is labeled "Note 1" on the example map. Locate the $PLIT section which is labeled "Note 3" below. In this section, there is a module labeled EDTDAT from EDTLIB. This module is labeled "Note 4". The first number on this line is the starting address of the module and has a value of 040416 in the example.

Each EDT overlay segment has a different base disk block. The base disk block can be found in the DISK BLK LIMITS line of the segment header. In the example below, this line is labeled "Note 2". The first number on this line is the base disk block and has a

value of 2 in the example.

By using ZAP, the contents of this module can be examined and changed. The first six bytes of this module is the initialization file name.

ZAP is started by entering:

```
RUN $ZAP
```

which will give the prompt

```
ZAP>
```

```
Enter the EDT task name
```

```
EDT.TSK
```

and ZAP will prompt

At this point the base disk block (2) and module starting address (040416) are entered separated by a colon. The ASCII contents of this location can be displayed by appending a single quote (')

```
2:40416'
```

The address and ASCII contents will be displayed followed by a prompt

```
002:040416' E
```

The new octal value for this location can be entered

```
133
```

The next byte can be displayed by entering a carriage return

```
002:040417' D
```

And the new octal value can be entered. A summary of the octal values for [1,2]I follows:

```
[  133
1  061
,  054
2  062
]  135
I  111
```

The changes can be examined by re-entering

```
2:40416'
```

and carriage returning through the locations.

ZAP is exited by entering a CTRL/Z.

After this modification, EDT will look in account [1,2] on the users SY: device for the file I.EDT. If different users have different system disks, the I.EDT file must be on every system disk.

EDT Map Example:

```
Note 1      *** Root segment: ARITH
   R/W mem  limits: 000000 063323 063324 26324.
Note 2      Disk blk limits: 000002 000065 000064 00052.

   Memory allocation synopsis:
   Section                                          Title  Ident  File
   -------                                          -----  -----  ----
   . BLK.:(RW,I,LCL,REL,CON)      001176 000106 00070.
                                  001176 000106 00070. B16SAV        EDTLI
   IOCOD :(RO,I,LCL,REL,CON)      001304 002026 01046.
                                  001304 002026 01046. IOMOD  02.01  EDTLI
   IODATA:(RW,D,LCL,REL,CON)      003332 016044 07204.
            .
            .
            .
   $GLOB :(RW,D,LCL,REL,CON)      031364 006242 03234.
                                  031364 001450 00808. KEYPAD 02.01  EDTLI
Note 3     $PLIT :(RO,D,LCL,REL,CON)     037626 001050 00552.
                                  037626 000570 00376. KEYPAD 02.01  EDTLI
Note 4                                    040416 000030 00024. EDTDAT 02.0
                                  040446 000066 00054. EDTCTR 02.06  EDTLI
                                  040534 000116 00078. RSXSYS 02.02  EDTLI
                                  040652 000024 00020. FORMAT 02.02  EDTLI
   $$ALER:(RO,I,LCL,REL,CON)      040676 000024 00020.
            .
            .
            .
```

RP06 DISK CORRUPTION -- RSX-11M V3.2

Ken Otto
E I DuPont de Nemours & Co, Inc
Box 2626
Victoria, TX 77902

ABSTRACT

On most if not all of RP06 drives the contents of the disk address register (RPDA) is incorrect following correctable errors during certain sectors. If the transfer is continued following error correction without loading a correct value into RPDA, two types of problems result. The driver for RSX11M V3.2 and earlier does not load RPDA in this circumstance. In the first problem RPDA contains a non-existent sector causing a fatal error (illogical disk address) when the transfer is continued. In the second problem RPDA contains a legal value but one that is either 9 or 10 sectors greater than the correct value. The transfer continues with no apparent error but the buffer is corrupted. Writing the buffer back to disk then corrupts the file. If the buffer happens to be the volume bitmap, serious problems will follow. Fortunately these problems can be avoided by slight modification of the driver. The modifications increase the use of shared code and thus shorten the driver.

It is hoped that the findings reported here explain the emperical conclusion of many shops that virtually no soft errors could be tolerated with RP06 disks and Version 3.2.

These problems may also exist with RP04 and RP05 drives since they use the same controller and driver.

HARDWARE THEORY OF OPERATION

When the transfer of a sector from disk to memory is completed and the error correction code (ECC) calculated during the read matches that read from the two words following the 256 data words, the value of the RPDA register is incremented unless it was already at the maximum sector value (octal 25) in which case it is cleared and the track (surface) is incremented. This operation is completed within microseconds after the two-word ECC has been read. If the word count register (RPWC) is not zero and the track did not overflow to the next cylinder, transfer of the next sector continues during the same revolution. Thus a maximum of 418

sectors can be transferred without any revolutions being skipped and with each sector taking about .75 milliseconds. After the transfer of each word is completed, the memory address register (RPDA) is incremented twice and the word count register is incremented once.

If the ECC calculated during the read does not match that read from the disk, a lengthy hardware calculation is started. This calculation uses the two ECC values to determine which bit or bits of the 4096 are in error. If any incorrect bits fall outside of an 11-bit range, the calculation fails and a bit in the error register is set to show an uncorrectable ECC error. When the error is correctable, two registers give the position of the 11-bit sequence within the 4096 bits and which bits within the 11 are to be complimented. The hardware assumption is that software will correct the bits without rereading the sector and will resume the transfer with the next sector if RPWC is non-zero. Since the resolution of the ECC error takes a minimum of 7 milliseconds (9.3 sectors pass under the head), resumption of the transfer is during the next revolution. The hardware does not generate the end-of-sector pulse until the ECC resolution has been completed.

FIRST TYPE OF PROBLEM

The first type of problem occurs when a correctable ECC error is detected in the last sector of a track (21. or octal 25) and more data remains to be transferred. In this case the RPDA register contains octal 26 ("26) which is illogical. In dozens of error log records on four different RP06 drives and two CPU's and spanning a two-year period no case was found where the RPDA contained the correct value after a last sector ECC error. In every case the RPDA contained "26. It is easy to be mislead by only casual examination of those cases where the error log records show RPDA to contain sector 0. In every one of these cases the error did not occur in sector "25 as will be explained in the section entitled "SECOND TYPE OF PROBLEM". A machine language program was toggled in and run until an ECC error occurred in sector "25 at which time a halt was executed. Console examination of the RPDA register showed sector "26.

It is hypothesized that the hardware is making the decision to increment RPDA rather than clear the sector in RPDA based on the last sector seen rather than the last sector transferred. When no ECC error is present, there is no difference; but, when an ECC error is present there is a nine sector difference due to the 7 millisecond resolution time. Whatever the mechanism the RPDA is wrong.

Continuing a transfer (by resetting the go bit in the RPCS1 register) with RPDA containing sector "26 produces an immediate fatal error of illogical disk address. The effect this has on the issuing task depends on the task.

SECOND TYPE OF PROBLEM

The second type of problem occurs when a correctable ECC error is detected in either sector "14 or "15 and more data remains to be transferred. In many of these cases the sector in the RPDA register is erroneously cleared and the track incremented. It is postulated that the hardware decides to clear the RPDA sector because at the completion of the ECC error resolution the last sector of the track has just passed under the head. Since the delay is about 9.3 sectors, one might expect 70% of the sector "14 errors and 30% of the sector "15 errors to result in faulty RPDA values. Our statistics show 85% for sector "14 and 30% for sector "15.

This second type of problem is much more serious than the first type since the faulty RPDA value is logical just wrong. Casual examination of the error log records finds no obvious problem. To see the problem you have to take the sector number and transfer size at the start of the transfer and the words remaining to be transferred after the ECC error was detected and calculate the sector at which the transfer should continue. If this does not match the value in RPDA, there is a problem. Continuing the transfer with a faulty value in RPDA results in incorrect information in the memory buffer following the corrected sector. Corrupted files and disks can result if the buffer is written back to disk.

This type of error was confirmed by writing a special program to read a known multi-sector segment from a portion of the disk known to contain a weak sector "14. The program printed the buffer if it was found to not match known values. The printout showed a ten-sector gap in the buffer. There was an error log record similar to those described above.

RECOGNIZING THE PROBLEMS

Determining whether a given system has these problems may require examining many dozen disk error log records. For the first type of problem look for 26 in the two low-order octal digits of the RPDA entry in the error log record. If the RPWC value is non-zero, the error diagnosis will read "NOT RECOVERED AFTER 0. RETRIES".

For the second type of problem look for 00 in the two low-order digits of the RPDA entry. Calculate the next sector to be transferred by converting the RPWC value to a positive value, doubling it for bytes, subtracting from the transfer size, dividing by octal 1000 for sectors and adding to the sector at IO start. If the result is greater than octal 25, subtract octal 26. If this calculation yields octal 15 or 16 rather than 0, then the second type of problem exists.

MODIFYING THE DRIVER

Since assembly of the V3.2 DB driver is highly conditionallized, modification is described in both general and specific terms. The driver contains code to calculate new values for the RPDA, RPWC and RPBA registers for the case of an uncorrectable ECC error. This code starts at 155$ and assumes that R0 contains the count of bytes successfully transferred, R5 points to the UCB and R4 points to the SCB. The code for correctable ECC errors must be changed to put the count of bytes successfully transferred into R0 and branch to 155$. One additional change is necessary. Just before the test for whether there are any more words to transfer the value if R1 is subtracted from U.CNT(R5). This must be changed to a compare since the subtraction will be done downstream of 155$.

Our specific changes were to 3 lines.

Line 875 the SUB was changed to CMP

Lines 893,894 were changed to

```
MOV     R1,R0     ;BYTES SUCCESSFULLY TRANSFERRED
BR      155$      ;SHARE CODE WITH HARD ECC ERROR
```

Later RP06 drivers such as the M+ driver and the seek optimization driver of M use shared code for both soft and hard ECC errors and thus avoid the problems of the V3.2 driver.

Comparison of Three Versions of Runoff

Allen A. Watson

Disclaimer

The author makes no guarantee of the accuracy or completeness of this comparison. The final arbiter of how any Runoff program works is a computer and a test case. The purpose of this document is to share the results of my research with you so you may perform your own, final evaluations.

Acknowledgements

For their invaluable contribution to the documentation of RSX systems, Charles Spalding and John Clement, authors and maintainers of the two RSX Runoffs discussed in this document, deserve our hearty thanks.

The program Runoff exists in many versions. On our RSX11M-Plus systems we have two: Spalding Runoff, Version S1.4 and Clement Runoff, Version BL3.11. Spalding's version is also the current RSX SIG Runoff Working Group official version. Clement Runoff, Version BL3.11 is available on the RSX SIG tape for Fall, 1983 in UIC [332,13]; Spalding Runoff, Version S1.4 is on the same tape in UIC [307,50] and also may be purchased from the DECUS library.

On our VAX systems, we have these two plus Digital Standard Runoff (DSR), both built in compatibility mode.

All three versions have many basic features in common. The general run-of-the-mill document can be processed by any of the Runoff programs and produce nearly identical results.

Each version, however, has certain unique features not available in one or both of the other versions. This document is intended to help you select which version of Runoff you want to use for a given document.

A comparison chart is given here comparing the features of the three versions. The chart is divided into three sections:

1. Commands
2. Flags
3. Command Line Switches

The chart does not explain what any command does, it merely indicates whether or not the feature is included in the version of Runoff. Some features will have numbers referencing a note that follows the chart, describing how the command differs from other versions or what it does if it is unique to the particular version of Runoff. (Commands unique to DSR are not explained in notes because anyone who has a VAX has DSR and its documentation.)

Commands that are in one version but not in another are printed in bold face; commands that are common to all versions are printed in light type. These are the subset of commands that can safely be used in a text file and run through any of the three versions of Runoff without producing errors.

Lesser differences (such as number of spaces indented, or lines skipped) are not noted. The user should realize, however, that because of these minor differences no two versions of Runoff are likely to produce absolutely identical output even if the input is identical and contains only commands common to the versions.

Following this comprehensive chart are several other smaller charts that list:

Features common to all three versions
Features common to DSR and Clement Runoff, Version BL3.11
Features common to DSR and Spalding Runoff, Version S1.4
Features common to Clement Runoff, Version BL3.11 and Spalding Runoff, Version S1.4
Features unique to DSR
Features unique to Clement Runoff, Version BL3.11
Features unique to Spalding Runoff, Version S1.4

RUNOFF COMPARISON CHART

	RUNOFF COMMANDS		
COMMAND	DSR	CLEMENT	SPALDING
Alternate	no	no	yes[64]
Alternating Title	no	no	yes[64]
Appendix	yes	yes[1]	yes
Autobreak	no	yes[1]	no
Autocontents	no	no	yes[66]
Autohyphenate	no	yes[2]	no[65]
Autojustify	yes	no	no
Autoparagraph	yes	yes	yes
Autosubtitle	yes	yes	yes
Autotable	yes	no	no
Autotitle	no	yes[3]	no
Begin Bar	yes	yes	no
Blank	yes	yes	yes
Block	no	no	yes[67]
Break	yes	yes	yes
Center	yes	yes[4]	yes
Center Text	no	yes[4]	no
Chain	no	no	yes[68]
Chapter	yes	yes[5]	yes
Chapter Layout	no	yes[5]	no
Comment	yes	yes	yes
Contents	no	no	yes[69]
Control Characters	yes	no	no
Date	yes	no	no
Define Command	no	yes[6]	no
Define Escape	no	yes[7]	no
Define Substitute	no	yes[8]	no
Define Subscript	no	yes[9]	no
Define Superscript	no	yes[10]	no
Define Variable Space	no	yes[11]	no
Disable Bar	yes	yes	no
Disable Blocks	no	no	yes[70]
Disable Bolding	yes	no	no
Disable Contents	no	no[12]	yes[71]
Disable Escape	no	yes[13]	no
Disable Equation	no	yes[13]	no[97]
Disable Hyphenation	yes	yes	no[97]
Disable Indexing	yes	yes	yes[75]
Disable Output	no	no	yes[75]
Disable Overstriking	yes	yes	no[76]
Disable Running	no	no	yes[77]
Disable Special	no	no[14]	yes
Disable Substitution	no	yes[15]	no
Disable Tabs	no	yes	no[71]
Disable Toc	yes	yes	no

RUNOFF COMPARISON CHART

COMMAND	RUNOFF COMMANDS DSR	CLEMENT	SPALDING
Disable Underlining	yes	yes	no
Display Appendix	yes	yes	no
Display Chapter	yes	yes	no
Display Elements	yes	yes	no
Display Levels	yes	yes	no
Display Number	yes	yes	no
Display Subpage	yes	yes	no
Do Contents	no	no	yes[72]
Do Index	yes	yes	yes
Dump	no	no	yes[73]
Ellipses	no	yes[16]	no
Else	yes	no	yes
Enable Bar	yes	yes	no
Enable Blocks	no	no	yes[74]
Enable Bolding	yes	no[17]	no
Enable Contents	no	no	yes[78]
Enable Escape	no	yes[18]	no
Enable Equation	no	yes[19]	no[97]
Enable Hyphenation	yes	yes	no
Enable Indexing	yes	yes[20]	yes
Enable Levels	no	yes[20]	no[79]
Enable Output	no	no	yes
Enable Overstriking	yes	yes	no[80]
Enable Running	no	no	yes[81]
Enable Special	no	no[21]	yes
Enable Tabs	no	yes[21]	no[78]
Enable Toc	yes	yes[22]	no
Enable Substitution	no	yes[22]	no
Enable Underlining	yes	yes	no
End Bar	yes	yes[23]	no
End Center	no	yes[23]	no[82]
End Footnote	yes	yes	no
End List	yes	yes	yes
End Literal	yes	yes	yes
End Note	yes	yes	yes[83]
End Option	no	no[24]	yes
End Separated Equation	no	yes[24]	no
End Subpage	yes	yes	yes[83]
Endif	yes	yes[25]	no
End Text	no	yes[25]	no
Entry	yes	yes	yes[89]
Eof	no	no	yes[90]
Even	no	no	yes[91]
Exclude	no	no	yes[84]
Figure	yes	yes	yes

RUNOFF COMPARISON CHART

COMMAND	RUNOFF COMMANDS DSR	CLEMENT	SPALDING
Figure Deferred	yes	yes	no[84]
Fill	yes	yes	yes
First Title	yes	yes	no[85]
Flags Accept	yes	yes	no[86]
Flags Bold	yes	no[26]	no
Flags Break	yes	yes	no
Flags Capitalize	yes	yes	yes[87]
Flags Comment	yes	no[27]	no
Flags Control	yes	yes	no
Flags Escape	no	yes[28]	no
Flags Equation	no	yes[29]	no
Flags Hyphenate	yes	yes	yes[87]
Flags Index	yes	yes	no
Flags Lowercase	yes	yes	no
Flags Overstrike	yes	yes	no
Flags Period	yes	no	no
Flags Space	yes	yes[30]	no
Flags Special	no	yes[30]	no
Flags Subindex	yes	yes	yes[87]
Flags Substitute	yes	yes	no
Flags Underline	yes	yes	no
Flags Uppercase	yes	yes	no
Flags All	yes	yes	no[81]
Footnote	yes	yes	yes[88]
Footnote Line	no	no[31]	yes[92]
Half Spacing	no	yes	no
Header Level	yes	yes	yes[93]
Headers Lower	yes	yes	yes[93]
Headers Mixed	yes	yes[32]	yes[94]
Header No Page	no	yes[33]	no[94]
Header Page	no	yes[34]	no[95]
Header Spacing	no	yes	no[93]
Headers Upper	yes	yes	yes[93]
Headers On	yes	yes	yes[97]
Hyphenation	no	no	yes[96]
If	yes	yes	no[96]
IfNot	yes	yes[35]	no
Immediate Test Page	no	yes[36]	no
Immediate Test Text	no	yes	no[91]
Include	no	no	yes
Indent	yes	yes[37]	no
Indent Levels	no	yes	yes
Index	yes	yes	yes[98]
Justify	yes	yes	no
Keep	yes	yes	

RUNOFF COMPARISON CHART

COMMAND	RUNOFF COMMANDS DSR	CLEMENT	SPALDING
Layout	yes	yes[38]	no[99]
Left	yes	yes	no[100]
Left Margin	yes	yes	yes[101]
Level Style	no	no	yes
List	yes	yes	yes[102]
List Element	yes	yes	yes[103]
Literal	yes	yes[39]	yes
Lock	no	yes[39]	no
Lower Case	yes	yes	yes[64]
No Alternate	no	no	yes[64]
No Alternating Title	no	no[40]	yes
No Autobreak	no	yes[41]	no
No Autohyphenate	no	yes[41]	no
No Autojustify	yes	no	no
No Autoparagraph	yes	yes	yes[106]
No Autosubtitle	yes	yes[42]	no
No Autotitle	no	yes[42]	no
No Control Characters	yes	no	no
No Date	yes	no[43]	no
No Ellipses	no	yes[43]	no
No Fill	yes	yes	yes[77]
No Flags	no	no	yes[104]
No Flags flag-name	yes	yes	yes[77]
No Flags All	yes	yes[44]	no
No Half Spacing	no	yes[44]	no[93]
No Headers On	yes	yes	yes[97]
No Hyphenation	no	no	yes
No Justify	yes	yes	yes
No Keep	yes	yes	no
No Number	yes	yes[45]	yes
No Number Chapter	no	yes[45]	no
No Paging	yes	yes	no
No Period	yes	yes	yes
No Space	yes	yes	no[105]
No Subtitle	yes	yes[46]	no
No Title	no	yes[46]	no
No Underline	no	yes[47]	no[115]
Note	yes	yes	yes[116]
Number	no	no	yes[117]
Number Appendix	yes	yes	yes[117]
Number Chapter	yes	yes	yes
Number Index	yes	no	no
Number Level	yes	yes	no
Number List	yes	yes	no[116]
Number Page	yes	yes	no

RUNOFF COMPARISON CHART

COMMAND	RUNOFF COMMANDS DSR	CLEMENT	SPALDING
Number Running	yes	no	no[80]
Number Subpage	yes	yes	no[118]
Odd	no	no	yes[119]
Option	no	no	yes
Page	yes	yes	yes[121]
Page Format	no	no	yes[122]
Page Name	no	no	yes[120]
Page Size	yes	yes	yes[120]
Paper Size	yes	yes	no[123]
Paging	yes	yes	yes[134]
Paragraph	yes	yes	yes[48]
Period	yes	yes[48]	no[48]
Permanent Footnote	no	no	yes[124]
Print	no	no	yes[125]
Print Contents	no	no	yes[126]
Print Index	yes	yes	yes[127]
Quote Character	no	no	no
Repeat	yes	no	yes[128]
Require	yes	yes[49]	no
Reset Escape	no	yes[50]	no
Reset Substitute	no	yes[129]	no[129]
Right	yes	yes[129]	yes[129]
Right Justify	no	no	yes[69]
Right Margin	yes	yes	no
Send Toc	yes	yes[51]	no
Separated Equation	no	yes[51]	no
Set Date	yes	no	no
Set Level	yes	no	no
Set Paragraph	yes	yes	no
Set Time	yes	no	yes
Skip	yes	yes	yes[130]
Spacing	yes	yes	no
Standard	no	no[52]	no
Style Chapter	no	yes[52]	no
Style Headers	yes	yes	yes
Subpage	yes	yes	yes
Subtitle	yes	yes[53]	no
Tab Left	no	yes[54]	no
Tab Right	no	yes	yes[131]
Tab Stops	yes	yes	yes
Test Page	yes	yes[55]	no
Test Text	no	yes[56]	no[132]
Text	no	yes[56]	yes[133]
Title	yes	yes[57]	no
Top Margin	no	yes[57]	

RUNOFF COMPARISON CHART

RUNOFF COMMANDS

COMMAND	DSR	CLEMENT	SPALDING
Underline	no	yes[58]	no
Underline Spaces	no	yes[59]	no
Underline No Spaces	no	yes[60]	no
Upper Case	yes	yes	yes
Variable	yes	no[61]	no
Variable Spacing	no	yes[62]	no[62]
Variant	no	yes[62]	no[62]
Xlower	yes	no	no
Xupper	yes	no	no

RUNOFF COMPARISON CHART

RUNOFF FLAG CHARACTERS

FLAG TYPE	CHARACTER	DSR	CLEMENT	SPALDING
Accept or Quote	_	yes	yes	yes
Bold	*	yes	no[26]	no
Break	|	yes	yes[63]	no
Capitalize	<	yes	yes	yes
Comment	!	yes	no[27]	yes
Comment	.;	yes	yes	yes
Control	.	yes	yes	yes
Hyphenate	=	yes	yes	yes
Index	>	yes	yes	no
Subindex	>	yes	yes	yes[87]
Lowercase	\	yes	yes	yes
Overstrike	%	yes	yes	no
Period	+	yes	no	no
Explicit space	#	yes	yes	yes
Substitute	$$	yes	yes[107]	no
Underline	&	yes	yes	yes
Uppercase	^	yes	yes	yes
Equation 1	{	no	yes[29]	no
Equation 2	}	no	yes[29]	no

RUNOFF COMPARISON CHART

RUNOFF COMMAND LINE SWITCHES

In the case of switches the versions differ greatly in syntax, but often offer similar functionality. RSX versions use MCR-like switches, whereas DSR uses DCL-like switches. For this reason the actual switch is listed under the appropriate version in the table. Most MCR-like switches can be negated if prefaced with a minus sign, e.g. "/-HY".

SWITCH FUNCTION	DSR	CLEMENT	SPALDING
Underline using Backspace	/BACKSPACE	/UL:B	/UL:B
Underline using overprint	default	/UL:L	/UL:L
Simulate underline	/SEPARATE[108]	/UL:S	/UL:S
Disable underlining	/NOUNDERLINE	/UL:N	/UL:N
Specify non-spacing character for underline	/NONSPACING	--	--
Identify program version	--	--	/ID
Append output to file	_	_	/AP
Output indicated chapter range /CH:l:h		--	/CH:l:h
Output indicated appendix range --		--	/AP:l:h
Output CR, LF's in file	--	/CR[109]	--
Output true Form-feeds	/NOSIMULATE	/FF	/FF
Hyphenate output	--	/HY	/HY
Output indicated page range	/PAGES=l:h[110]	/PA:l:h	/PA:l:h
Set page height and width	/FORMSIZE[111]	/PS:h:w	/PS:h:w
Right shift output n spaces	/RIGHT=n	/RI:n	/LE:n
Spool output file to printer	--	/SP	/SP
Force all uppercase output	--	/UC	/UC
Wait at start of pages	/PAUSE	/WA	/WA
Allow alternating title	--	--	/AL
Set number blank lines at top	/DOWN=n	--	/DO:n
Set max lines per page	/FORMSIZE=n	--	/LO:n
Set default right margin	--	--	/WI:n
Set number lines in page header /HL:n		--	--
Set blank lines for chapter	--	--	/BL:n
Set text portions to include	/VARIANT	--[62]	/IN:n[112]
Set text portions to exclude	--	--	/EX:n[112]
Set overstrikes for bold	/BOLD=n	--	--
Enable change bars	/CHANGE_BARS	--	--
Create intermediate TOC file	/CONTENTS	--[113]	--[113]
Output termination message	/LOG	--	--
Control output of error messages --		/MESSAGE	--
Specify output file	/OUTPUT=file	--[114]	--[114]

Generate sequence numbers	/SEQUENCE	--	--
Trace Debugging Options	/DEBUG	--	--

NOTES FOR CHARTS COMPARING THREE VERSIONS

1. AUTOBREAK allows optional line breaks after selected characters such as hyphen.
2. AUTOHYPHENATE allows user to control hyphenation by specifying the minimum number of letters before end of line in a hyphenated word.
3. AUTOTITLE in Clement automatically uses Chapter or Appendix titles as title at top of pages. Spalding does this by default and it cannot be turned off; specific TITLE commands must be given to override it.
4. CENTER TEXT allows centering of multiple text lines.
5. CHAPTER LAYOUT lets user specify layout of first page of a chapter differently than other pages in the document.
6. DEFINE COMMAND allows user to define Runoff command string macros, e.g.

```
.DEFINE COMMAND/SECTION/S2.LM+5.RM-5.C;
```

   The command ".SECTION" will now be recognized as equivalent to the associated command string.
7. DEFINE ESCAPE defines non-printing escape sequences for control of printers and video terminals. lets you make use of special printer features on Diablo, NEC, and other newer printers, such as shadow printing, half-spacing, and graphics. Makes Runoff printer independent.
8. DEFINE SUBSTITUTE defines string for text substitution. Allows development of form letters, etc.
9. DEFINE SUBSCRIPT defines subscript escape sequence for half-spacing.
10. DEFINE SUPERSCRIPT defines superscript escape sequence for half-spacing.
11. DEFINE VARIABLE SPACE defines micro space for implementing variable spacing between words on printers such as Diablo. This is not proportional spacing. Eliminates big interword gaps for more professional appearance. See note 61.
12. DISABLE ESCAPE disables escape sequence recognition. See note 7.
13. DISABLE EQUATION disables equation writing mode. See notes 19 and 29.
14. DISABLE SUBSTITUTION disables output of substitutions. See notes 8 and 22.
15. DISABLE TABS disables tab recognition. Tabs are treated as single spaces.
16. ELLIPSES causes tabbed text to be filled with ellipses (. . . .) rather than spaces.
17. ENABLE BOLDING -- ability to define escape sequences in Clement Runoff, Version BL3.11 eliminates the need for DSR-style bolding by backspacing and retyping. For compatibility with DSR define shadow print escape sequences for "^*" and "*", the DSR bold flags. Bolding will not be possible for printers that do not support shadow printing.

18. ENABLE ESCAPE turns on escape sequence recognition.
19. ENABLE EQUATION turns on equation formatting:

```
{A+B}/{C+D}+X
```

    is output as:

$$\frac{A+B}{C+D}+X$$

NOTE

The above sequence when followed by a NO FLAGS EQUATION command appeared to hang Runoff in a loop; there appear to be bugs in equation formatting.

20. ENABLE LEVELS controls output of header level text to document and table of contents files. In Spalding Runoff, Version S1.4, AUTOCONTENTS gives some similar control.
21. ENABLE TABS enables recognition of tabs if DISABLE TABS has been issued.
22. ENABLE SUBSTITUTION enables output of substitution strings. See note 8.
23. END CENTER ends a CENTER TEXT command. See note 4.
24. END SEPARATED EQUATION end separated equation mode. See note 51.
25. END TEXT ends a TEXT command. See note 55.
26. FLAGS BOLD is not required in Clement Runoff, Version BL3.11. See note 17.
27. FLAGS COMMENT -- Clement Runoff, Version BL3.11 implements the COMMENT command and recognizes semicolon as a comment indicator, but DSR files using "!" as a comment indicator will not process correctly through Clement. Spalding recognizes "!" or ".!", and ".;". Use ".COMMENT" or ".;" for total compatibility.
28. FLAGS ESCAPE defines and enables recognition of escape flags "^" and "\" and a third flag of your choice. See notes 7, 12 and 30.
29. FLAGS EQUATION enable recognition of equation formatting flags (left and right braces). See note 19.
30. FLAGS SPECIAL set up single character escape sequence recognition. See also notes 7, 12 and 28.
31. HALF SPACING allows you to set default spacing (like SPACING command) in half-space increments for printers that support this feature. See notes 9 and 10.
32. HEADER NO PAGE sets Runoff to print headers with page number only, omitting the word "Page". See note 94.
33. HEADER PAGE sets Runoff to print headers with the word "Page" in front of page numbers. See note 94.
34. HEADER SPACING sets spacing between title and first line of text, initially set to 3.

35. IMMEDIATE TEST PAGE is the same as TEST PAGE except that it does not cause a break. Can be used within text without disturbing fill. See note 123.
36. IMMEDIATE TEST TEXT is the same as TEST TEXT (see note 54) but does not cause a break.
37. INDENT LEVELS causes Header Level lines to be indented left and right "n" characters.
38. Clement Runoff, Version BL3.11 has four more LAYOUT styles than DSR: title top left, page bottom right; title top center, page bottom right; title top center, page alternating bottom left and right; and title top, page bottom, both alternating left and right. Thus layouts 0 through 3 are compatible; layouts 4 through 7 are not.
39. LOCK locks in page formatting parameters so they cannot be changed. Useful for merging several documents that were separately formatted.
40. NO AUTOBREAK turns off AUTOBREAK for selected characters. See note 1.
41. NO AUTOHYPHENATION turns off AUTOHYPHENATION. See note 2.
42. NO AUTOTITLE turns off AUTOTITLE. See note 3.
43. NO ELLIPSES turns off ellipses mode. See note 16.
44. NO HALF SPACING turns off HALF SPACING. See note 31.
45. NO NUMBER CHAPTER disables chapter numbering, allows running page numbers. See NUMBER RUNNING command in DSR (similer but not identical).
46. NO TITLE prevents printing of both title and subtitle.
47. NO UNDERLINE specifies characters that are not to be underlined; normally only spaces are not underlined.
48. PERMANENT FOOTNOTE specifies a permanent footnote to appear between the body of text on a page and any footnotes on that page. Use to specify a separator space and line for footnotes. See FOOTNOTE LINE in Spalding Runoff, Version S1.4.
49. RESET ESCAPE clears table of escape sequences. See note 7.
50. RESET SUBSTITUTE clears table of substitute strings. See note 8.
51. SEPARATED EQUATION causes Runoff to generate extra lines to separate an equation from other equations or text.
52. STYLE CHAPTER changes the style of chapter headers, similar to STYLE HEADERS.
53. TAB LEFT causes text following tabs to be left justified on the next tab stop.
54. TAB RIGHT causes text following tabs to be right justified at the next tab terminator. Works with FLAGS BREAK to line up an arbitrary break character such as decimal points.
55. TEST TEXT works like TEST PAGE but tests to see if enough room is on the current page for n lines of text regardless of spacing. Same as TEST LINES in Spalding Runoff, Version S1.4.
56. TEXT begins a section of text you wish to keep all on one page. Similar to BLOCK in Spalding Runoff, Version S1.4 but does not continue to fill present page if text section will not fit.
57. TOP MARGIN sets the number of blank lines at the top of the page to n.

58. UNDERLINE specifies what characters are underlineable in addition to current specifications. Normally only spaces are not underlined. See note 47.
59. UNDERLINE SPACES enables underlining of spaces; identical to .UNDERLINE " ". See previous note.
60. UNDERLINE NO SPACES disables underlining of spaces.
61. VARIABLE SPACING enable variable interword spacing for Diablo compatible printers. See note 11.
62. VARIANT defines a label which is used to control subsequent IF commands for selective inclusion of input. Serves same purpose as /VARIANT command line switch in DSR and INCLUDE/EXCLUDE in Spalding Runoff, Version S1.4.
63. The BREAK flag character may also be used to align tab columns in Clement Runoff, Version BL3.11.
64. ALTERNATE and ALTERNATING TITLE are commands for Spalding only -- alternating titles are controlled by the LAYOUT command in DSR and Clement Runoff, Version BL3.11. However, Spalding also offsets odd-numbered pages to the right so double-sided documents may be bound more easily.
65. Parameters controlled by AUTOHYPHENATE may be set by a Task Builder option in Spalding Runoff, Version S1.4.
66. AUTOCONTENTS controls what entries are made in Table of Contents: chapters, appendices, and index, or header levels. Clement Runoff, Version BL3.11 uses ENABLE LEVELS for similar control.
67. BLOCK defers output of a block of text to a later page if not enough space remains on the current page. See also TEXT command in Clement Runoff, Version BL3.11, note 55.
68. CHAIN chains to new input file and does not return. See also REQUIRE command.
69. CONTENTS in Spalding outputs text to one of three separate tables of contents. Used to create TOCs for figures and tables. Related but not identical to SEND TOC command in other versions.
70. DISABLE BLOCK turns off output of deferred blocks. See note 67.
71. DISABLE CONTENTS in Spalding Runoff, Version S1.4 turns off processing of contents commands. Same effect as DISABLE TOC in other versions.
72. DO CONTENTS outputs all stored Tables of Contents. Executed automatically at end of input file(s). Explicit command can set different spacing for the three tables.
73. DUMP forces the output of all pending blocks and figures.
74. ENABLE BLOCKS allows output of deferred text blocks (BLOCK and FIGURE). See note 70.
75. DISABLE OUTPUT prevents output from being written to the output file.
76. DISABLE RUNNING disables consecutive page numbering and restores chapter-oriented numbering. See note 80.
77. DISABLE SPECIAL in Spalding Runoff, Version S1.4 disables recognition of Runoff's special characters. Nearly identical to NO FLAGS ALL in other versions. Spalding's NO FLAGS command disables only Capitalize, Hyphenate, and Subindex flags and

there is no corresponding "FLAGS" command to turn all three on again.

78. ENABLE CONTENTS turns on processing of Table of Contents commands. Same as ENABLE TOC in other versions.
79. ENABLE OUTPUT restores writing of output to the output file after it has been disabled with DISABLE OUTPUT.
80. ENABLE RUNNING enables consecutive page numbering as opposed to chapter-oriented page numbering. Similar to numbering possible through LAYOUT command in other versions.
81. ENABLE SPECIAL turns on recognition of Runoff's special characters. Similar to FLAGS ALL in other versions.
82. Spalding supports footnotes. However, like many earlier RSX versions, the end of a footnote is signalled with an exclamation mark in column 1. In DSR this would flag a comment and be ignored. See also note 88 on FOOTNOTE.
83. END OPTION marks the end of an optional input section; identical to ENDIF in other versions.
84. FIGURE operates in all three versions with significant differences:

    DSR - outputs n blank lines. If there are not n lines left on the current page starts new page and outputs n lines at top of next page.
    Clement - Same as DSR.
    Spalding - Works like FIGURE DEFERRED in other versions. That is, if there are not n lines left on current page, text continues to fill current page and n lines are output on a later page. Also allows specification of offset space from surrounding text, and a figure caption line.

85. In Spalding Runoff, Version S1.4 FIRST TITLE is not required to obtain a title on the first page. The same result can be achieved by placing a TITLE command before any other commands that cause output.
86. FLAGS ACCEPT does not exist in Spalding Runoff, Version S1.4. This version cannot selectively enable and disable recognition of the Accept Flag; however, the Accept Flag character can be changed with the QUOTE CHARACTER command. See note 127.
87. FLAGS commands in DSR and Clement Runoff, Version BL3.11 enable recognition of the flag and optionally specify a new flag character. Spalding Runoff, Version S1.4 does not allow specification of a new flag character (except see QUOTE CHARACTER). Also, in Spalding the Subindex Flag does not function in text but only within INDEX or ENTRY commands.
88. FOOTNOTE in Spalding Runoff, Version S1.4 requires a numeric argument n giving the number of lines to reserve for the footnote. Sometimes this necessitates multiple passes through Runoff to adjust this argument properly. DSR and Clement Runoff, Version BL3.11 do not require or allow the argument; instead they automatically calculate the space required for the footnote. Spalding, however, automatically generates a nice footnote separator line. DSR and Clement do not. DSR

requires the separator, if desired, to be included in the first footnote on each page with footnotes; this too can require multiple passes through Runoff to get it right. Clement allows a separator line to be defined (once for entire document) with the PERMANENT FOOTNOTE command. See note 92 on FOOTNOTE LINE command in Spalding.

89. EOF forces the logical end of the input file.
90. EVEN forces output to next even-numbered page; accepts a text argument as a caption. For example, to insure the next section begins on an odd-numbered page, you could use:

```
.EVEN This page intentionally left blank
.PAGE
```

    Has no effect if current page is even-numbered.

91. EXCLUDE and INCLUDE set options so that corresponding input sections will be ignored or processed. Basically same function as VARIANT in DSR and Clement Runoff, Version BL3.11. EXCLUDE and INCLUDE take numeric arguments; VARIANT takes a variant-name (alphabetic) for an argument.
92. FOOTNOTE LINE allows user to change character used in and length of line generated to separate footnotes from text. Same function but not as flexible as PERMANENT FOOTNOTE in Clement Runoff, Version BL3.11.
93. HEADERS ON and NO HEADERS ON functionally exist in all three versions but with slightly different syntax that prevents full compatibility. The basic, abbreviated commands (.HD and .NHD) function identically, turning page header generation on and off. In DSR the full command is "HEADERS [ON]", where the word "ON" is optional. In Clement Runoff, Version BL3.11 it is "HEADER"; "ON" is not allowed. In Spalding Runoff, Version S1.4 it is "HEADER" also, but in addition the command takes four optional arguments specifying page header style, length, and margins. Thus in Spalding this command serves the added functions of HEADERS UPPER, HEADERS LOWER, and HEADERS MIXED in the other two versions, with an added option of HEADER BLANK. However in DSR one would say "HEADERS MIXED", but in Spalding and Clement one would say "HEADER MIXED". See also the STYLE HEADERS command.
94. The function of HEADER NO PAGE in Clement Runoff, Version BL3.11 is served by HEADER BLANK in Spalding Runoff, Version S1.4. HEADER PAGE in Clement translates approximately as HEADER MIXED (or other option) in Spalding.
95. HEADER SPACING in Clement Runoff, Version BL3.11 may be accomplished in Spalding Runoff, Version S1.4 by the HEADER command, specifying header length as the second parameter.
96. IF and IFNOT exist in Spalding Runoff, Version S1.4 as variations of the OPTION command.
97. HYPHENATION and NO HYPHENATION in Spalding Runoff, Version S1.4 serve the same purpose as ENABLE/DISABLE HYPHENATION in DSR and Clement Runoff, Version BL3.11. HYPHENATION also allows the option of hyphenating only at user-specified break points.

98. In Spalding Runoff, Version S1.4 the NO FILL command causes blank lines in input to be preserved in output, as ".NO FILL.KEEP" would do in other versions.
99. Previous versions of Spalding Runoff had a command called LAYOUT that performed entirely different functions. The name of the command has been changed to PAGE FORMAT in Spalding Runoff, Version S1.4 to avoid confusion with LAYOUT in other versions.
100. Not a real restriction since LEFT is a synonym for INDENT, which exists in all versions.
101. LEVEL STYLE allows control of spaces before and after header level text, number of lines for automatic test page, and use of run-in headers. It must be separately specified for each header level. Useful to eliminate blank lines between consecutive header level commands. Not the same as DISPLAY LEVELS in other versions.
102. LIST ELEMENT in Spalding Runoff, Version S1.4 allows optional inclusion of number of lines for automatic test page before the element; other versions use the test page value from the last PARAGRAPH command.
103. LITERAL functions with slight differences in the three versions:

    DSR - No flags and command recognized except .END LITERAL. Tabs are expanded to spaces.
    Clement - Same as DSR; action taken on tabs is not specified in the manual.
    Spalding - No commands except .END LITERAL recognized. Flag characters are recognized unless disabled. This allows such things as underlining in literal mode. Other versions must use NO FILL and KEEP to achieve this effect. Tabs are not converted to spaces but are output as tabs; form feeds are also literally output.

104. NO FLAGS flag-name in Spalding Runoff, Version S1.4 valid only for Capitalize, Hyphenate, and Subindex flags.
105. NO SUBTITLE cancels subtitles in DSR and Clement; in Spalding you use the SUBTITLE command with no text to cancel subtitles. If AUTOSUBTITLE is in effect in Spalding you must also issue an AUTOSUBTITLE 0 command.
106. In Spalding Runoff, Version S1.4 the equivalent of NO AUTOSUBTITLE is AUTOSUBTITLE 0.
107. In Clement Runoff a single dollar sign may be used to trigger user-defined substitutions as well as the date and time substitutions provided in DSR.
108. DSR allows choice of underline character; other versions use hyphen.
109. The /CR switch in Clement Runoff, Version BL3.11 allows output of files which in turn may be edited and re-passed through Runoff, or which can be copied by FLX.

110. DSR /PAGES switch allows five ranges to be specified.
111. DSR /FORMSIZE switch sets only lines per page.
112. Spalding /IN and /EX switches override INCLUDE and EXCLUDE commands in file. See notes 91, 96.
113. The DSR /CONTENTS switch is not required by the other versions. DSR creates tables of contents only when this switch is used. It then creates an intermediate file (of undefined format) that must be processed with a program called TOC; the resulting file with extension of ".RNT" must then be processed through Runoff again to produce a ".TOC" file. This has the advantage of allowing you to produce a final output file with the table of contents in the appropriate place; it has the disadvantage of having to run several programs.

    Spalding Runoff, Version S1.4 creates tables of contents by default at the end of the output file. No separate program passes are needed. However, to organize the resulting output you normally need to cut and paste the table(s) pages from the end to the beginning of the document. Spalding, in Appendix E of his manual, describes a means of automatically outputting the table in place. This entails two passes through the file, but only one command line.

    Clement Runoff, Version BL3.11 strikes a happy medium. The table is specified as a separate file name in the command line:

        RNO output-file,toc-file=input-file

    This produces a ".RNT" file directly; no TOC program is needed. The file must be processed again by Runoff. You can create a DOC and a TOC file and then append them, and print the combined result.
114. The /OUTPUT switch is not required in the RSX versions. The output file name is specified as part of the command line.
115. NOTE in Spalding accepts an optional numeric indent specifying indent to use on right and left. Default is 5, like other versions.
116. NUMBER n in Spalding starts (resumes) page numbering with n as next page number, if given. Same as NUMBER PAGE in other versions except NUMBER accepts only numeric arguments while NUMBER PAGE will also accept letters.
117. In Spalding NUMBER APPENDIX accepts only a letter for argument, and NUMBER CHAPTER accepts only numbers.
118. ODD forces output to an odd page if current page is even. See Note 90.
119. OPTION n marks the start of a segment of input to be processed or ignored depending on the setting of the indicated option number. See INCLUDE and EXCLUDE. If n is negative the action is reversed, that is, if "INCLUDE 3" is in effect, "OPTION -3" will cause following text to be excluded. Thus, "OPTION n" equals "IF" command in other versions, and "OPTION -n" equals "IFNOT". See notes 91 and 96.

120. PAGE SIZE or PAPER SIZE in Clement takes three additional, optional arguments that set left margin, top margin, and spacing defaults for the duration of the document. PAGE SIZE with no arguments will restore all five previously set defaults. Similar to PAGE FORMAT in Spalding, but parameters are not identical. See next note.
121. PAGE FORMAT in Spalding sets four parameters: top margin, lines per page (not counting top margin), base left margin, and default right margin (or line width). Similar to PAGE SIZE in Clement, see previous note. See also note 99.
122. PAGE NAME in Spalding specifies a text string to output as prefix to page numbers.
123. Spalding adds two parameters to PARAGRAPH to give additional control to the automatic TEST PAGE done for paragraphs. The two added parameters do not affect auto-paragraphing, only explicit PARAGRAPH commands. The added parameters are LENGTH and END; see note 131 on TEST PAGE for meaning. This type of PARAGRAPH command can be used to correct situations where a single short last line of a paragraph falls at the start of a page (this is called a widow line in typesetting). Clement has provided the IMMEDIATE TEST PAGE command to handle the same problem. See note 35.
124. PRINT in Spalding displays a line of text on the user's terminal. This can be used to mark progress, but more importantly, as a prompt to the user for input for form letters, etc. For example:

```
.PRINT Enter name:
.REQUIRE TI:
```

Note that other Runoffs do not allow "TI:" or "TT:" as a file spec.

125. PRINT CONTENTS n prints the contents of a single Table of Contents buffer (range 1 to 3) without any automatic setting of headings or margin, allowing fuller user control of format through preceding Runoff commands. See DO CONTENTS, note 72.
126. PRINT INDEX in Spalding accepts two parameters to control indenting of index items and the spacing between letter groups.
127. QUOTE CHARACTER in Spalding changes the quote character (Accept Flag) to be the specified character. used to allow free use of underbar character in normal text. Similar to FLAGS ACCEPT in other versions but does not change the status of the flag, only changes the character used. See note 86.
128. REQUIRE in Spalding does not take quotes around the file spec; nesting is limited to two levels unless you modify the program at the expense of index buffer space. (The modification is simple: you change the value of an assembly switch). Spalding allows the filespec to be "TI:" thus providing a means of interactive terminal input that does not exist in other versions. See note 124.
129. RIGHT JUSTIFY in Spalding is functionally equivalent to RIGHT in DSR and Clement. Enough subtle differences exist, however, to consider this a separate command in all three versions.

The basic command format is:

```
.RIGHT [JUSTIFY][[+-]n];text
```

In DSR RIGHT causes a break. "n", if omitted, places text flush to right margin. If positive, flush to a point n spaces to left of right margin. If negative, flush to a point n spaces to right of right margin.

In Clement RIGHT does not cause a break. There may be left-justified text on the same output line. "n" behaves as it does in DSR -- except that negative n appears not to work (gets error message because it exceeds right margin).

In Spalding RIGHT JUSTIFY does not cause a break. "n", if omitted, places text flush to the right margin. If unsigned, places text flush right against column n. If signed positive or signed negative, taken as relative to the right margin but in a sense reverse to that of other two versions. (Mr. Spalding would like to point out that this is consistent with the way "n" is interpreted in the CENTER command.)

130. STANDARD in Spalding resets all of the following parameters to their original default values (program defaults, not ones set by command): Header Length, Left Margin, Right Margin, Page Format (top margin, lines per page, base left margin, line width), Spacing, Tab Stops, Paragraph (indent, skip, test), List skip, and List Element test page value. Re-enables Fill and Justify. Accepts single parameter to apply to text and header right margins.
131. TEST PAGE in Spalding accepts two additional optional parameters giving greater control over page breaks at the end of the paragraph. You can insure that if a break occurs at least "end" lines will be output on the next page. The three parameters are:

```
start  - minimum lines to appear on current page.
length - estimated number of lines for total text block.
end    - minimum number of lines to appear on the next page if
         length lines will not fit on current page.
```

See also note 123.

132. TITLE in Spalding can output a title on the first page, eliminating need for the FIRST TITLE command present in other versions. See not 85.
133. In Spalding, TOP MARGIN is set with the PAGE FORMAT command.
134. In Spalding, PERIOD controls spacing after any normal sentence terminator including ".", ":", "!", and "?". It also applies to period, question, or exclamation followed by a parenthesis, bracket, brace, or double quote.

FEATURES COMMON TO ALL THREE VERSIONS

This table represents the common ground, the commands that should be "safe" to use in any of the three versions. If you limit yourself to these commands and features you should be able to process your input file through any of the three versions; if any editing is necessary it will be very minor (e.g. changing "HEADERS" to "HEADER"). Some commands included in this list have options in one version or other that do not exist in all versions, but the basic command function is common.

COMMANDS

Appendix	Autoparagraph	Autosubtitle
Blank	Break	Center
Chapter	Comment	Disable Indexing
Do Index	Enable Indexing	End List
End Literal	End Note	End Subpage
Entry	Figure	Fill
Flags Capitalize	Flags Hyphenate	Flags Subindex
Footnote	Header Level	Headers Lower
Headers Mixed	Headers Upper	Headers
Indent	Index	Justify
Left Margin	List	List Element
Literal	Lower Case	No Autoparagraph
No Fill	No Flags name	No Headers
No Justify	No Number	Note
Number Appendix	Number Chapter	Page
Page Size	Paper Size	Paragraph
Period	Print Index	Require
Right Margin	Skip	Spacing
Subpage	Subtitle	Tab Stops
Test Page	Title	Upper Case

FLAGS

1. Accept (_).
2. Capitalize (<).
3. Control (.).
4. Hyphenate (=).
5. Subindex (>).
6. Lowercase (\).
7. Explicit space (#).
8. Underline (&).
9. Uppercase (^).

COMMAND LINE SWITCHES

1. Control of underline mode: backspacing, overprint, simulation or none.
2. Control of form feed mode: actual or simulated with line feeds.

3. Ability to output selected page range.
4. Preset page height in command line.
5. Right shift output from command line.
6. Wait at start of new page.

OTHER

1. Supports conditional processing of input; commands differ in Spalding.
2. Ability to produce alternating titles and page numbers.
3. Produce Tables of Contents.
4. Produce an Index with subindex entries.

FEATURES COMMON TO DSR AND CLEMENT

COMMANDS

Appendix	Autoparagraph	Autosubtitle
Begin Bar	Blank	Break
Center	Chapter	Comment
Disable Bar	Disable Hyphenation	Disable Indexing
Disable Overstriking		Disable Toc
Disable Underlining		
Display Appendix	Display Chapter	Display Elements
Display Levels	Display Number	Display Subpage
Do Index	Enable Bar	Enable Hyphenation
Enable Indexing	Enable Overstriking	Enable Toc
Enable Underlining		End Bar
End Footnote		
End List	End Literal	End Note
End Subpage	Endif	Entry
Figure	Figure Deferred	Fill
First Title	Flags Accept	Flags Break
Flags Capitalize	Flags Control	Flags Hyphenate
Flags Index	Flags Lowercase	Flags Overstrike
Flags Space	Flags Subindex	Flags Substitute
Flags Underline	Flags Uppercase	Flags All
Footnote	Header Level	Headers Lower
Headers Upper	Headers Mixed	Headers On
If	Ifnot	Indent
Justify	Keep	Layout
Left	Left Margin	List
List Element	Literal	Lower Case
No Autoparagraph	No Autosubtitle	No Fill
No Flags name	No Flags All	No Headers On
No Justify	No Keep	No Number
No Paging	No Space	No Subtitle
Note	Number Appendix	Number Chapter
Number Level	Number List	Number Page
Number Subpage	Page	Page Size
Paper Size	Paging	Paragraph
Period	Print Index	Require
Right	Right Margin	Send Toc
Set Paragraph	Skip	Spacing
Style Headers	Subpage	Subtitle
Tab Stops	Test Page	Title
Upper Case	Variant[62]	

FLAGS

1. Accept (_).
2. Break (|).
3. Capitalize (<).
4. Semicolon as comment (.;).
5. Control (.).
6. Hyphenate (=).

7. Lowercase (\).
8. Overstrike (%).
9. Space (#).
10. Subindex (>).
11. Substitute ($) including date substitution for $$DATE, etc.
12. Underline (&).
13. Uppercase (^).

COMMAND LINE SWITCHES

1. Control of underline mode: backspacing, overprint, simulation or none.
2. Control of form feed mode: actual or simulated with line feeds.
3. Ability to output selected page range.
4. Preset page height in command line.
5. Right shift output from command line.
6. Wait at start of new page.

OTHER

1. Ability to produce alternating titles and page numbers.
2. Produce an Index with subindex entries.
3. Ability to produce alternating titles and page numbers.
4. Produce Tables of Contents. Produce separate ".RNT" file for Table of Contents.
5. Produce an Index with subindex entries.
6. Selective conditional input sections using IF, IFNOT, etc.

FEATURES COMMON TO DSR AND SPALDING

COMMANDS

Appendix	Autoparagraph	Autosubtitle
Blank	Break	Center
Chapter	Comment	Disable Indexing
Do Index	Else	Enable Indexing
End List	End Literal	End Note
End Subpage	Entry	Figure
Fill	Flags Capitalize	Flags Hyphenate
Flags Subindex	Footnote	Header Level
Headers Lower	Headers Mixed	Headers Upper
Headers	Indent	Index
Justify	Left Margin	List
List Element	Literal	Lower Case
No Autoparagraph	No Fill	No Flags Capitalize
No Flags Hyphenate		No Flags Subindex
No Headers		
No Justify	No Number	No Period
Note	Number Appendix	Number Chapter
Page	Page Size	Paper Size
Paragraph	Period	Print Index
Require	Right Margin	Skip
Spacing	Subpage	Subtitle
Tab Stops	Test Page	Title
Upper Case		

FLAGS

1. Accept (_).
2. Capitalize(<).
3. Comment (!).
4. Control (.).
5. Hyphenate (=).
6. Subindex (>).
7. Lowercase (\).
8. Explicit Space (#).
9. Underline (&).
10. Uppercase (^).

COMMAND LINE SWITCHES

1. Underline control: backspacing, overprint, simulation or none.
2. Output indicated chapter range.
3. Output true or simulated form feeds.
4. Enable or disable hyphenation.
5. Output selected page range.
6. Preset page height in command line.
7. Right shift output.
8. Wait at start of new page.
9. Control number of blank lines at top of page.
10. Control maximum lines per page.

OTHER

1. FIGURE in Spalding equivalent to FIGURE DEFERRED in DSR.
2. Produce alternating titles and page numbers.
3. Produce index with subindex entries.
4. Enable or disable hyphenation.
5. Selective inclusion of input by variant parameters.
6. Output title on first page if desired.
7. Change accept flag character (different commands).
8. Turn autosubtitle off (different commands).
9. Right justify text in a line (different commands).

FEATURES COMMON TO CLEMENT AND SPALDING

COMMANDS

Appendix	Autoparagraph	Autosubtitle
Blank	Break	Center
Chapter	Comment	Disable Indexing
Do Index	Enable Indexing	End List
End Literal	End Note	End Subpage
Entry	Figure	Fill
Flags Capitalize	Flags Hyphenate	Flags Subindex
Footnote	Header Level	Header Lower
Header Mixed	Header Upper	Header
Indent	Index	Justify
Left Margin	List	List Element
Literal	Lower Case	No Autoparagraph
No Fill	No Flags Capitalize	No Flags Hyphenate
No Flags Subindex	No Headers	No Justify
No Number	Note	Number Appendix
Number Chapter	Page	Page Size
Paper Size	Paragraph	Period
Print Index	Require	Right Margin
Skip	Spacing	Subpage
Subtitle	Tab Stops	Test Page
Title	Upper Case	

FLAGS

1. Accept (_).
2. Capitalize(<).
3. Control (.).
4. Hyphenate (=).
5. Subindex (>).
6. Lowercase (\).
7. Explicit Space (#).
8. Underline (&).
9. Uppercase (^).

COMMAND LINE SWITCHES

1. Underline control: backspacing, overprint, simulation or none.
2. Output indicated chapter range.
3. Output true or simulated form feeds.
4. Output selected page range.
5. Preset page height and width in command line.
6. Right shift output.
7. Spool output file.
8. Wait at start of new page.
9. Force uppercase output.

FEATURES UNIQUE TO DSR

COMMANDS

Autojustify	Autotable	Control Characters
Date	Disable Bolding	Enable Bolding
Flags Bold	Flags Comment	Flags Period
No Autojustify	No Control Characters	No Date
Number Index	Number Running	Repeat
Set Date	Set Level	Set Time
Variable	Xlower	Xupper

FLAGS

1. Bold (*).
2. Period (+).

COMMAND LINE SWITCHES

1. Specify non-spacing underline character, /NONSPACING.
2. Set overstrikes for bolding, /BOLD=n.
3. Enable change bars, /CHANGE_BARS.
4. Create TOC file, /CONTENTS.
5. Output termination message, /LOG.
6. Direct output of error messages, /MESSAGE.
7. Specify output file, /OUTPUT (done without switch in other versions).
8. Generate sequence numbers in output, /SEQUENCE.
9. Debugging options to trace effect of certain commands, /DEBUG.

OTHER

1. Index and Table of Contents must be processed by two additional programs.
2. Index may be double-column.

OBSERVATIONS

DSR has very few unique features that cannot be found in one of the other versions. Bolding by overstriking may be useful if your printer cannot do shadow printing. A two-column index is nice but not a frequent necessity. Other than this, the most useful unique command -- which it seems would be easy to implement in the other versions -- is REPEAT.

FEATURES UNIQUE TO CLEMENT

COMMANDS

Autobreak	Autohyphenate	Autotitle
Center Text	Chapter Layout	Define Command
Define Escape	Define Substitute	Define Subscript
Define Superscript		Define Variable Space
Disable Escape		
Disable Equation	Disable Substitution	Disable Tabs
Ellipses	Enable Substitution	End Center
End Separated Equation		End Text
Flags Escape		
Flags Equation	Flags Special	Half Spacing
Header No Page	Header Page	Header Spacing
Immediate Test Page		Immediate Test Text
Index Levels		
Layout(types 4-7)	Lock	No Autobreak
No Autohyphenate	No Autotitle	No Ellipses
No Half Spacing	No Number Chapter	No Title
No Underline	Permanent Footnote	Reset Escape
Reset Substitute	Separated Equation	Style Chapter
Tab Left	Tab Right	Test Text
Text	Top Margin	Underline
Underline Spaces	Underline No Spaces	Variable Spacing
Variant		

FLAGS -- Equation flags ({ and }).

COMMAND LINE SWITCHES

1. /AP:l:h to output indicated appendix range.
2. /CR or /-CR to control output of CR, LF sequences.

OBSERVATIONS

Clement has many unique features, as can easily be seen from the above chart. To summarize them as best I can, they include:

1. Equation formatting.
2. User-definable text and command strings for substitution.
3. Ability to utilize unique printer features through escape sequences.
4. Improved use of tabs, with ability to tab left or right, or align on a break character. Plus filling with ellipses instead of spaces.
5. Added page layout formats.
6. user-definable Permanent Footnote.
7. user control of what is or is not underlined.
8. Improved user control over hyphenation and end-of-page conditions

Clement has been extremely careful to maintain compatibility with DSR. For instance, he has 113 commands in common with DSR versus 64 for Spalding. If you avoid the commands in this chart and use only those in "Features in Common to DSR and Clement" you should have no difficulty using DSR and Clement interchangeably. Clement even advises using the DSR manual as an additional reference, and provides instructions for building his program on a VAX/VMS system.

Clement has also used his IF command very nicely to provide a means of building extensive RSX and VMS "Help Files" for Runoff directly from the same source file as used to produce his user manual.

FEATURES UNIQUE TO SPALDING

COMMANDS

Alternate	Alternating Title	AutoContents
Block	Chain	Contents
Disable Blocks	Disable Contents	Disable Output
Disable Running	Disable Special	Do Contents
Dump	Enable Blocks	Enable Contents
Enable Output	Enable Running	Enable Special
End Option	Eof	Even
Exclude	Footnote Line	Hyphenation
Include	Level Style	No Alternate
No Alternating Title		No Flags
No Hyphenation		
Number	Odd	Option
Page Format	Page Name	Print
Print Contents	Quote Character	Right Justify
Standard		

The commands underlined in the above table have unique names but their functions are duplicated in the other Runoffs by commands with different names. In the author's opinion Spalding's Runoff could profit by making these commands compatible with DSR and Clement.

FLAGS -- (!) is used to indicate end of footnote.

SWITCHES

1. /ID identifies program version.
2. /AP appends output to existing file.
3. /AL allows/disallows alternating titles.
4. /WI:n sets default right margin (width).
5. /HL:n sets number of lines in page header.
6. /BL:n sets blank lines at start of chapters.
7. /IN and /EX set text portions to include and exclude, overriding commands within the input file.

OTHER

1. Allows comma as command separator in addition to semicolon.
2. Allows multiple input files on command line.
3. FIGURE works like FIGURE DEFERRED in other versions, and allows a caption line.
4. TITLE can place title on first page.
5. FLAGS commands do not allow specification of new character for flag.
6. (>) functions only as subindex flag in INDEX and ENTRY commands; does not serve as an Index Flag within text.
7. FOOTNOTE requires a numeric argument giving footnote size; also generates footnote separator line automatically.

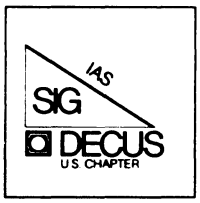
8. NO FILL preserves blank lines.
9. Added parameters to LIST ELEMENT for better control.
10. LITERAL mode recognizes and acts on flag characters such as underline. Tabs are not converted to spaces in literal mode.
11. AUTOSUBTITLE takes numeric parameters.
12. Table of Contents created at end of output file, not as separate file.
13. Some other commands with added parameters to control spacing and margins: NOTE, PAGE SIZE, PARAGRAPH, and TEST PAGE.
14. REQUIRE command does not want quotes around file specification; allows TI: as input file specification for terminal input.

OBSERVATIONS

The major unique features in Spalding can be summarized as follows:

1. Deferred output commands (BLOCK, FIGURE, FOOTNOTE) offer better control of page appearance.
2. The CHAIN and EOF commands provide added control over inclusion of secondary input files.
3. The PRINT command and the ability to REQUIRE input from the terminal add a unique means of interactive prompting and response.
4. Three separate Tables of Contents for text, figures and tables.
5. Greater control of final document appearance through EVEN, ODD, ALTERNATE, PAGE FORMAT, and PAGE NAME commands, and added parameters to LIST ELEMENT, NOTE, PAGE SIZE, PARAGRAPH, and TEST PAGE.

The DeVIAS Letter



Section Two

The DeVIAS Letter

The IAS SIG Newsletter

March 1984

IN THIS ISSUE

Curley's Corner 2

IAS Patches 4

IAS V3.2 Announcement 9

From the Editor

The last issue was fairly sparse but the mail has picked up and the next few months should bring you IAS fans some interesting goodies.

For those of you contemplating moving from RSX-11D to IAS (MultiUser), I am happy to report that our first 3 systems have been upgraded successfully. We have 10 more to go.

Contributions

The DeVIAS Letter needs contributions in order to continue as an effective medium for exchange of information regarding IAS.

Contributions may be submitted in any form you wish. Originals on 8½ x 11 paper are preferred. However, even photocopies of relevant match-book covers would be appreciated.

Send all contributions to:

Ontario Hydro
700 University Avenue
Toronto, Ontario
CANADA, M5G 1X6

Attn: John W. Drummond
Mail Stop-M2E10

Department of Radiation Therapy
School of Medicine
University of Pennsylvania
Room 410
133 South 36th Street
Philadelphia, Pennsylvania 19104
15 February 1984

Dear IAS Enthusiast,

There is a lot of activity, SIGwise, at the moment. Ron Fussell, our "Symposia Coordinator", has done all the preliminary work for Cincinnatti and sent it in. Jim Hoff, the RSX Symposia Coordinator, will schedule our sessions along with the small group of the Symposia Committee next week in Marlboro. Each scheduler works for several SIG's; it was determined quite a while ago that you couldn't have 24 people scheduling 14 simultaneous sessions. We have some interesting sessions proposed, and we should know after next week which ones got onto the schedule.

In addition, Mike Reilly, Allison Nylander and I have submitted a proposed pre-symposium seminar on MACRO-11 for high level language programmers. If enough people sign up so that it pays to run the seminar, we should make a few dollars for the SIG and no longer be the poorest SIG. While it is not clear that SIG's need to make money, it appears that it has not harmed the bargaining position of those that have money. There is such a push to run pre-symposium seminars, however, that there were over 50 submitted this time. It MUST be a good way to make money, many of the proposals were from Digital's Education Services.

Dan Sedlacek, of Informatics General Corporation in Bellevue, Nebraska, has agreed to do a column on MACRO-11 for the DeVIAS Letter. He plans to write a few pages each issue for a few issues and hopes that you'll contribute some ideas too. To get started write your MACRO ideas, nice subroutines, great macros, etc. to him: Dan Sedlacek, Informatics General Corporation, 1508 Kennedy Drive, Suite 8, Bellevue, Nebraska, 68005. MACRO, in my opinion, is a forgotten language; I want to involve more people with it! I thank Dan for volunteering to undertake this section of our newsletter.

Jim Underwood, of Delta Resources, Inc. in Arlington, Texas, has accepted the appointment to the position of Associate Editor of the DeVIAS Letter. He and John Drummond will work to continue bringing you an quality newsletter. Jim's big job will be to provoke you into submitting material of general interest. You'd better do it. Thanks, Jim.

John Drummond has been active and spent a bunch of time working the DECUS publication politics. As you'd expect, this year of Subscription fees has caused everyone a lot of gastric distress. When it's free, no one can complain. Now they can. While the RSX SIG (whose newsletter we leeched onto) has done a good job in producing a newsletter this year (I'd like to think that we helped more than hindered!); there are some newsletters whose performance has been less satisfactory. In a big effort to balance the justice of the situation, John and the other editors have agreed to publish

individual newsletters next year (starting July 1984). We have agreed to produce eight issues for $20. There will be a 'renewal' notice for current subscribers in the near future. Also, there will be a DECUScope article on the changes. In a commercial world it seems only fair to vote in the marketplace. Should the DeVIAS Letter continue?

The Publication group has not settled several other issues, which I hope John will address in his column when he gets a chance. The issue which concerns me the most is getting the newsletter to foreign members of DeVIAS LUG. Would someone call me and volunteer to send a newsletter copy to one, or two, or three foreign members?

The LUG site profile is nearing publication. George Wells has done the work of organizing and coding the forms into a Datatrieve structure and can print them out. He and Steve Illencik of Soule Steel, Carson, California, are working out a mechanism to get them to you. We could use two or three people who could print ten or twenty copies and mail them out. You's get yours first! Please call me. (215-662-3083)

I hear that ERRLOG is "permanently" fixed in the next release of IAS. You all remember how ERRLOG asks you how many buffers to allocate? I always said "2". But that made it so ERRLOG couldn't be included in my "idiot proof" startup file. It must be idiot proof so that I can use it. I think that in V3.0 there was a patch in the Software Dispatch to make the answer "2" without asking the question. It is little things like that that make life easier! Anyway, when V3.1 came out I threw out all my V3.0 dispatches. The V3.0 patch works, but I had to find a generous person to send me a copy. NOW, it comes "fixed" - It does not ask the question. As I said, small things please me.

Ray French, of the Boeing Company in Seattle, has accepted a postion on our Steering Committee. He will act as liason with the RSX SIG and share his experience with us. It is an honor to continue to work with Ray, who has been a huge influence in the growth and success of the RSX/IAS SIG.

I have a request for ADA on IAS. Anyone have it? I have one opinion that says it can't/won't be done.

There was a discussion of the comments in the sources of the Executive modules at one of the sessions in Las Vegas. I inquired into the possibility of publishing the comments, not the sources, in the DeVIAS Letter. The request was turned down.

As usual in a DECUS newsletter, we ask for material to fill our pages. We want good stuff, not junk. But good stuff doesn't have to have a shiny box. I've seen bad papers beautifully prepared and vice versa. Most of us don't have time to polish a subroutine into a gem of journalism. That's not necessary. A newsletter is informal, share between friends, kind of publication, not a physics Journal. It is OK to send a subroutine, macro, command file that does something neat. If you are concerned that it is "not good enough" let John decide - that's his job. We accept polished articles, but like the less formal things as well. Contribute. We'll even put it in without your name if you're shy, or for whatever reason. You have seen that kind of

submission already.

Lastly, please sign up for membership in our SIG. We have been a separate SIG for a while and there are only 51 members signed up. And that's how DECUS keeps score. You MUST contact DECUS and tell them that you wish to be a member of the IAS SIG, and any others you wish to belong to. Unless you do, you will not be counted. I am preparing a definition of a SIG that will require an active membership of around 100 people. We'd be thrown out, and rightly so, with our current membership. Please do it. Thanks.

Happy Winter and a pleasant Spring,

Robert F. Curley

$

IAS PATCHES

Jim Underwood

```
PDS> TYPE MONOV.DOC
OCCASIONALLY, WE HAVE EXPERIENCED TERMINATIONS OF THE MO HANDLER. THESE
FAILURES ARE DUE TO TRANSIENT DISK ERRORS THAT OCCUR DURING AN OVERLAY LOAD.
THE MO HANDLER IS PROBABLY THE MOST CONSTANTLY OVERLAYED TASK IN OUR SYSTEM.
SINCE IT IS A HANDLER,A TERMINATION IS FATAL TO THE SYSTEM SESSION.

THE FILE [11,14]MONOVBLD.CMD IS A TASK-BUILD COMMAND FILE THAT GENERATES A
NON-OVERLAYED VERSION OF THE MO HANDLER. THIS VERSION OF THE PROGRAM
OBVIOUSLY DOES NOT PRESENT THE POTENTIAL FOR THE FAILURE DESCRIBED ABOVE.

ADVANTAGES:
        1. NON-DISK DEPENDENT,UNAFFECTED BY TRANSIENT DISK PROBLEMS.
        2. MUCH FASTER ON AVERAGE REQUEST

DISADVANTAGES:

        1. REQUIRES MUCH MORE MEMORY-
                        OVERLAYED VERSION       3270 (OCTAL)
                        NON-OVERLAYED VERSION   23000(OCTAL)
        2.NOT USEFUL FOR SMALL MEMORY SYSTEMS

PDS> TYPE MONOVBLD.CMD
;
;       [ 1 1 , 1 4 ] M O N O V B L D . C M D
;
;       INDIRECT COMMAND FILE TO BUILD NON-OVERLAYED MO HANDLER
;
[11,1]MONOV/PR/-FP/-FX/-AB/-CP,[111,14]MONOV/-SP/MA=
[11,14]MOROOT,FOMSG,MOOVR,MOFCS,[1,1]SYSLIB.OLB/LB
/
TASK=MO....
STACK=20
ASG=TI:3
PRI=221
LIBR=HNDLIB:RO:2
//
```

```
PDS> TYPE EM05PAT.DOC
        THE FOLLOWING PATCH MAY PROVE VALUABLE TO THOSE OF YOU OUT THERE WHO
LIKE US,RUN WITH A VERY RESTRICTED POOL SIZE.
        MY INSTALLATION RUNS WITH AN EFFECTIVE DYANMIC POOL AREA OF APPROXIMATEL
Y
300 NODES. ALTHOUGH THIS IS USUALLY MORE THAN ENOUGH,THIS SYSTEM,BECAUSE IT
SUPPORTS A LARGE, REMOTE, POLLED-TERMINAL NETWORK, OCCASIONALLY FAILS DUE TO A
DEPLETED POOL.THE CHARACTERISTICS OF THE FAILURE MODE,HOWEVER, BAFFLED US. THE
PROCESSOR SEEMED TO BE (AND INDEED WAS) LOOPING IN KERNEL MODE.
        SEVERAL FORCED CRASHES LATER, WE UNCOVERED A "TIGHT-POOL" GLITCH IN
IAS V3. WHILE THIS DESCRIPTION SPECIFICALLY RELATES TO IAS V3.1, I HAVE
VERIFIED THAT THE PROBLEM DOES AFFLICT V3.0 AS WELL. EARLIER VERSIONS DO NOT
EXHIBIT THE MALFUNCTION SINCE THE PROBLEM HAS ARISEN DUE TO A SIGNIFICANT
CHANGE IN TASK-LOADING PROCEDURE THAT CAME ABOUT IN V3.0. TWO VERSIONS OF THE
PATCH ARE INCLUDED TO TAKE CARE OF BOTH V3.0 AND 3.1.
        TO PROPERLY UNDERSTAND THE PROBLEM, IT IS USEFUL TO HAVE A MODICUM OF
UNDERSTANDING IN TWO AREAS:
        (1) TASK LOADING
        (2) HANDLING OF I/O REQUEST NODES AT I/O COMPLETION

SIMPLIFIED TASK LOADING SEQUENCE --

STEP            OPERATION
----    ------------------------------------------------------------------------

 1      TASK "A" ISSUES A DIRECTIVE REQUESTING TASK "B".WHILE THEY DIFFER IN
        SPECIFICS,THIS COULD BE A RUN$,RQST$,SPWN$.

 2      THE EXECUTIVE DIRECTIVE SERVICE MODULE THAT SERVICES THESE DIRECTIVES
        (EMREQ) THEN DISPATCHES TO OTHER EXECUTIVE ROUTINES THAT:

                A. PICK A NODE FOR THE TASK'S ATL ENTRY (ESREQS)
                B. FIND MEMORY FOR THE TASK ROOT SEGMENT (ESMEM)
                C. SET TASK STATUS TO "LRP"(LOAD REQUEST PENDING)
                D. DECLARE A SIGNIFICANT EVENT(FORCE A NEW ATL SCAN)

 3      THE NEW ATL SCAN CAUSED BY STEP (2) FINDS TASK "B" NOW ON THE ATL
        WITH A TASK STATUS OF "LRP" AND DISPATCHES TO A ROUTINE(ASXLRP)
        WHICH ATTEPTS TO PICK AND QUEUE AN I/O REQUEST NODE TO LOAD THE
        TASK FROM DISK. IF THIS SUCCEEDS,THE TASK STATUS CHANGES TO "LRQ"
        (LOAD REQUEST QUEUED). IF ASXLRP FAILS TO PICK A NODE FOR THE
        EXECUTIVE I/O REQUEST, THE TASK IS LEFT IN AN "LRP" STATUS.
        THE ATL SCAN IS RESTARTED IN EITHER CASE.

 4      DEVICE HANDLER DEQUEUES AND SERVICES THE TASK-LOAD REQUEST. I/O
        COMPLETION PROCESSING (HANDLER LIBRARY MODULE "IODN") CHANGES
        THE TASK STATUS TO EITHER "LRS" (LOAD REQUEST SUCCEEDED) OR "LRF"
        (LOAD REQUEST FAILED) AS INDICATED BY SUCCESS OR FAILURE OF THE I/O
        OPERATION. A SIGNIFICANT EVENT IS DECLARED (NEW ATL SCAN REQUESTED).

 5      THE NEW ATL SCAN FINDS TASK "B" IN "LRS" STATUS AND,IF NO COMMON
        REGIONS MUST BE LOADED FOR THE TASK, CHANGES THE TASK STATUS TO
        "RUN"
```

THE ANOMALY ARISES IN STEP 3. AS SHOULD BECOME CLEAR, THE ATL SCAN SHOULD NOT BE RESTARTED IF THE EXEC FAILS TO PICK AN I/O REQUEST NODE. WHEN A REQUEST IS SUCCESSFULLY QUEUED, THIS NEW ATL SCAN ALLOWS THE DEVICE DRIVER TO RUN AS SOON AS POSSIBLE SO THE TASK LOAD REQUEST CAN BE SERVICED QUICKLY. WHEN THE EXEC FAILS TO GET AN I/O REQUEST NODE FROM THE POOL, HOWEVER, THE NEW ATL SCAN MAY CAUSE A LOOP OR RACE CONDITION IN WHICH WE CANNOT EXIT THE RACE UNTIL WE FIND AVAILABLE NODES BUT WE CANNOT RELEASE ANY NODES BACK TO THE POOL BECAUSE THE ATL SCAN IS BEING RESTARTED CONSTANTLY. THIS LEADS US TO THE SECOND CONTRIBUTING FACTOR, NODE HANDLING AT I/O COMPLETION.

I/O COMPLETION NODE HANDLING--

UNLIKE YOU MIGHT EXPECT, I/O REQUEST NODES ARE NOT RELEASED BACK TO THE POOL WHEN THEY ARE RELEASED BY THE SERVICING HANDLER. THEY ARE, RATHER, PLACED IN THE REQUESTING TASK'S AST QUEUE. THE LISTHEAD FOR THIS QUEUE IS LOCATED IN THE ATL NODE FOR THE TASK.

FOR SOME NODES (THOSE THAT WILL CAUSE AN AST EVENT) THIS IS ALL JUST FINE. HOWEVER,FOR THE MAJORITY OF I/O REQUESTS (THAT DO NOT SPECIFY AN AST) THIS MEANS THE NODES WILL REMAIN IN THE TASK'S AST QUEUE UNTIL THE EXEC GETS A CHANCE TO PROCESS THEM. THAT ONLY OCCURS WHEN THE ATL SCAN EVALUATES THE TASK FOR "RUNNABILITY".

AS MAY BE APPARENT NOW, IF THE ATL SCAN IS NEVER ALLOWED TO EVALUATE OR "SEE" THESE TASKS ON THE ATL, THE NODES ASSOCIATED WITH ALL COMPLETED I/O REQUESTS FOR THE TASK WILL LANGUISH IN ITS AST QUEUE FOREVER. THESE ARE THE NODES THAT CAN SOLVE THE RACE CONDITION. A HIGH PRIORITY TASK (LIKE MCR) IN AN LRP STATE WILL (WITHOUT OUR PATCH) PREVENT THE ATL SCAN FROM PROCEEDING FAR ENOUGH DOWN THE ATL TO SERVICE THE LOWER PRIORITY TASKS WITH COMPLETED I/O REQUEST NODES IN THEIR AST QUEUES. DEATH FOLLOWS.

OUR PATCH SIMPLY ALLOWS THE ATL SCAN TO CONTINUE WITH THE NEXT LOWER PRIORITY TASK WHENEVER THE EXEC FAILS TO PICK AN I/O REQUEST NODE FOR A TASK IN AN "LRP" STATUS. WHILE THIS IS NOT STRICTILY CONSISTENT WITH THE GOAL OF A PRIORITY-SCHEDULED OPERATING SYSTEM, IS SURE BEATS A SYSTEM "LOCK-UP", I'M SURE YOU'LL AGREE. BY PERMITTING THE ATL SCAN TO CONTINUE,WE ALLOW THE EXEC TO SERVICE AND RELEASE THE NODES WHICH WERE PREVIOUSLY TRAPPED IN THE TASK'S AST QUEUE.

SINCE WE APPLIED THIS PATCH, WE HAVE EXPERIENCED NO POOL DEPLETION CRASHES OR LOCK-UPS.

LOOKING FORWARD, IT SEEMS APPARENT TO ME THAT THE I/O NODE HANDLING CAN BE SIGNIFICANTLY IMPROVED WITHOUT TOO MUCH TROUBLE. IF "IODN" RELEASED ALL NODES BACK TO THE POOL (EXECPT THOSE THAT WILL CAUSE GENUINE AST EVENTS) THE LIKELIHOOD OF THIS PROBLEM WOULD DECREASE SIGNIFICANTLY. THIS WOULD ALSO PROBABLY ENHANCE THE DYANMIC UTILIZATION CHARACTERISTICS OF THE POOL AS WELL.

TE PATCH DOES NOT CREATE ANY NEW PATCH CODE NOR DOES IT OVERLAY A PREVIOUSLY PATCHED AREA IN THE EXEC. BECAUSE OF THIS,THIS PATCH MAY BE APPLIED UNCONDITIONALLY TO AN REVISION LEVEL OF EITHER EXECUTIVE (V3.0 OR V3.1).

```
[11,15]EM05LRP.PAT

        .TITLE EM05

;THIS VERSION OF THE PATCH IS FOR IAS V 3.1 ONLY <<<<<

        .PSECT  EXEC,RW,I
CODE=.
.=CODE+730

        CALL    .IONOD
        BCS     CODE+1004
        MOV     R4,-(SP)
        MOV     R5,-(SP)

.END


        .TITLE EM05

;THIS VERSION OF THE PATCH IS FOR IAS V 3.0 ONLY <<<<<

        .PSECT  EXEC,RW,I
CODE=.
.=CODE+710

        CALL    .IONOD
        BCS     CODE+764
        MOV     R4,-(SP)
        MOV     R5,-(SP)

.END
```

25 January 1984

Mr. John Drummond
ONTARIO HYDRO
700 University Avenue
Toronto, Ontario, Canada MG1X6 ME 10

Dear Mr. Drummond:

Enclosed is the announcement of IAS Version 3.2. I understand that you intend to put this article in the IAS SIG Newsletter.

This release of IAS incorporates enhancements to Layered Products, and includes changes to operating system functionality, and extends support to Digital's latest processors, disks, tape drives, and controllers.

New service packages complement this offering. New System Startup Service Packages are designed to allow customers to tailor their level of support to fit specific needs.

I am confident that this release of IAS will be accepted enthusiastically by your readership.

Sincerely,

Norman Booth

Norman G. Booth

NGB:gt
Enclosure

SOFTWARE PRODUCT SERVICES

ANNOUNCING IAS VERSION 3.2

DIGITAL is pleased to announce IAS Version 3.2. IAS is Digital's large general-purpose operating system offering multi-user timesharing, and supporting concurrent interactive, batch, and real-time applications.

The release of IAS Version 3.2 substantiates Digital's commitment to continue to support the IAS product set by delivering cost effective solutions to the installed customer base. Many changes have been made to the product all of which are designed to insure our customers' hardware and software investments are protected and Digital's overall support costs are reduced.

Traditionally, IAS has been sold into markets that include banking, transportation, government, education, manufacturing, insurance, hospitals, service bureaus and more. These markets have used larger PDP-11's to provide large scale data processing services to their users.

DESCRIPTION

Many enhancements are included with IAS V3.2 which improve the usability, reliability and supportability of the product:

* Applies All Known Solutions
  Version 3.2 focuses on solutions to problems identified by the customer base.

* Increased Node Pool
  Version 3.2 changes make available more pool for user tasks.

* Shadow Disk Recording
  Substantially reduces backup requirements and improves data integrity.

* Supervisor Mode Libraries
  Allows extended virtual address space up to twice that previously possible.

IAS UTILITY ENHANCEMENTS

* PIP - Select based on Date and Time. Includes extended wildcard support.

* TKB - Maps multiple libraries into the same address space. Supports supervisor mode libraries.

* BRU - Supports recording of a single large disk volume across numerous smaller volumes.

RMS-11 V2.0

Record Management Services (RMS-11) is a set of general purpose file handling routines for data storage, retrieval and modification, with utilities to aid in the creation and maintenance of files. New features of RMS-11 V2.0 include:

* Support for generally transparent remote file and record access on systems which include DECnet support. This support includes a new memory-resident library (DAPRES) for remote access.

* New directory functions, including wildcard support.

* Support for random access to FIXED-record-format sequential files on disk.

* A new utility (RMSDES) which allows interactive design and creation of files.

* A rewritten CONVERT utility (RMSCNV) performance-optimized with numerous extensions.

* A rewritten Indexed File Load utility (RMSIFL) with revised algorithms for allocating work file space. In most cases, the amount of space needed for the sort should be decreased.

* An enhanced, more readable format for the DISPLAY utility (RMSDSP).

LAYERED PRODUCTS

Updated layered products include:

* DATATRIEVE-11 V3.0

  DATATRIEVE-11 is a data maintenance, inquiry, and report writing system. It provides users with direct access to data in sequential, indexed, and relative RMS-11 files.

  DATATRIEVE-11 V3.0 features a new distributed information management facility that allows access to DATATRIEVE domains on a PDP-11 system from a VAX system connected via DECnet. Thus, VAX users can transparently access data whether on their own system, another VAX, or on a PDP-11 running DATATRIEVE.

* FORTRAN-IV V2.6

  FORTRAN-IV/IAS V2.6 is an extended implementation of the FORTRAN language based on the ANSI FORTRAN 1966 standard. The compiler is a fast, one-pass compiler, allowing program size versus execution speed tradeoffs. Version 2.6 applies all known solutions to problems identified in Version 2.5.

* FORTRAN-77 V5.0

  The major modification to FORTRAN-77 V5.0 allows a customer to indicate at compile time, via a command line switch, that symbol table information from the application is to be placed in the object file created by the complier. This information is then available to FORTRAN-77 DEBUG at run time for access to the variables and subprograms within the application.

* FORTRAN-77 DEBUG V1.0

  FORTRAN-77 DEBUG V1.0 is a fully symbolic debugger for use in locating problems in programs that fail to execute correctly.

NEW HARDWARE SUPPORT

Processors:

PDP-11/23
PDP-11/23 PLUS
PDP-11/24

Tape Drives:

TS11

Controllers:

UDA50

Disks:

RM80 121 Mbytes Fixed Winchester (MASSBUS)
RA80 121 Mbytes Fixed Winchester (UNIBUS)
RA81 456 Mbytes Fixed Winchester
RA60 210 Mbytes Removable Winchester

ORDERING INFORMATION

License and Startup Service Options

The reduced IAS unsupported license became effective with the Q1 Price List dated 5 July 1983. IAS is not available under the PDP-11 General License option.

Order No.	Description
QR330-UZ	IAS LICENSE W/WARR

System Startup Packages are a new addition to Digital's family of services. These packages are composed of two levels.

LEVEL I	LEVEL II
Media and documentation.	Media and documentation.
Basic Service Agreement.	Basic Service Agreement.
Ed Services Promotional Literature.	Ed Services Promotional Literature.
	Installation/Orientation.

MODEL	DESCRIPTION
QR330-5D	IAS LEVEL 1 MT9
QR330-5E	IAS LEVEL 1 RK5
QR330-5H	IAS LEVEL 1 RL2
QR330-7D	IAS LEVEL 2 MT9
QR330-7E	IAS LEVEL 2 RK5
QR330-7H	IAS LEVEL 2 RL2

Updates and Software Product Service Purchases Option

Software Product Services are ordered by substituting for the asterisk (*) in the License/Support position of the order number, the code shown below:

I - Installation	9 - DECsupport Service
8 - Basic Service	3 - Self-Maintenance Service

MODEL	DESCRIPTION
QR330-*D	IAS V3.2 UPD N/S MT9
QR330-*E	IAS V3.2 UPD N/S RK5
QR330-*H	IAS V3.2 UPD N/S RL2
QR330-*Q	IAS V3.2 UPD N/S RL1
QR330-*T	IAS V3.2 UPD N/S RK6
QR330-HZ	IAS RIGHT-TO-COPY UPD

AVAILABILITY

IAS V3.2 availability is scheduled for early June 1984.

DECUS

DECUS SUBSCRIPTION SERVICE
DIGITAL EQUIPMENT COMPUTER USERS SOCIETY
ONE IRON WAY, MRO2-1/C11
MARLBORO, MASSACHUSETTS 01752

Bulk Rate
U.S. Postage
PAID
Fitchburg, MA
Permit No.
21

MOVING OR REPLACING A DELEGATE?

Please notify us immediately to guarantee continuing receipt of DECUS literature. Allow up to six weeks for change to take effect.

( ) Change of Address
( ) Delegate Replacement

DECUS Membership No.: _____

Name: _____

Company: _____

Address: _____

_____

State/Country: _____

Zip/Postal Code: _____

Mail to: DECUS - ATT: Subscription Service
One Iron Way, MRO2-1/C11
Marlboro, Massachusetts 01752 USA

etc.