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The Wombat

EXAMINER and 4GL Dispatch

"Increases the Circulation of Anyone in America" Volume 8 Number 9

DTR

Contributions

Submissions to this newsletter are constantly sought. A submission can be an article, a letter to the Wombat Wizard, a technical tip, or anything of interest to people using or considering DATATRIEVE or any 4GL product. Technical articles about the use of 3rd party 4GL's which run on Digital hardware are also welcome.

Submissions on magnetic media are preferred but hardcopy material can be handled. Authors can direct their submissions to either of the following addresses.

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DTR-2 - Advanced Report Writing Techniques in VAX DATATRIEVE
DTR-21 - Ask the Wombat Wizard: Accessing Rdb's System Relations with DATATRIEVE

Advanced Report Writing Techniques in VAX Datatrieve

Lynn D. Duncan, Oak Ridge National Laboratory operated by Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee 37831

1.1 Review of Report Writer

1.1.1 Functions

The DTR Report Writer produces formatted, paginated reports. It picks up where PRINT and SUM leave off. It provides an easy way to create both simple and complex reports. Because of the many defaults, a novice can become productive in very little time. But users often find they need something different from the standard default formats. When that occurs, the user may take control of many aspects of the Report Writer including:

- sort the records into desired order
- select the fields to be printed
- order the fields to be printed
- format the fields to be printed
- print statistical information based on the data
- specify control groups
- direct the report to a device or file
- format the report title and column headings
- control pagination

1.1.2 Statements

The DTR Report Writer consists of only five statements; that is all.

REPORT	-	begins the definition of a report; required
PRINT	-	defines the content and format of all detail lines; optional, no more than 1 allowed, at least 1 PRINT or AT required
AT	-	defines the location, content and format of header and summary lines; optional
SET	-	specifies report parameters; optional
END-REPORT	-	terminates report definition; required

1.2 Examples

1.2.1 A Simple Report

```
DTR> REPORT YACHTS
RW>  PRINT BOAT
RW>  END-REPORT
```

In the above report specification, all the defaults are in effect. The only thing specified is the data to be reported. Included below is the first portion of the report created by those three statements. Notice that the date and page numbers are automatically included on each page, that the data is spread out to fill the page evenly, and that the column headers are printed at the top of each page. The PRINT statement won't do that for you.

MANUFACTURER	MODEL	RIG	LENGTH OVER ALL	WEIGHT	BEAM	PRICE
ALBERG	37 MK II	KETCH	37	20,000	12	$36,951
ALBIN	79	SLOOP	26	4,200	10	$17,900
ALBIN	BALLAD	SLOOP	30	7,276	10	$27,500
ALBIN	VEGA	SLOOP	27	5,070	08	$18,600
AMERICAN	26	SLOOP	26	4,000	08	$9,895
AMERICAN	26-MS	MS	26	5,500	08	$18,895
BAYFIELD	30/32	SLOOP	32	9,500	10	$32,875
BLOCK I.	40	SLOOP	39	18,500	12	
BOMBAY	CLIPPER	SLOOP	31	9,400	11	$23,950
BUCCANEER	270	SLOOP	27	5,000	08	
BUCCANEER	320	SLOOP	32	12,500	10	
C&C	CORVETTE	SLOOP	31	8,650	09	
CABOT	36	SLOOP	36	15,000	12	

1.2.2 A Simple Report - with control breaks and statistics

```
DTR> REPORT YACHTS WITH PRICE GT 0 SORTED BY BUILDER, DESC PRICE
RW>  SET REPORT-NAME = "YACHT PRICE REPORT - BY BUILDER"
RW>  AT TOP OF BUILDER PRINT BUILDER
RW>  PRINT MODEL, RIG, PRICE
RW>  AT BOTTOM OF BUILDER PRINT COL 40, "NUMBER OF MODELS:", COUNT,
[Looking for next element in list]
RW>  SKIP
RW>  END-REPORT
```

In this report specification, a few more Report Writer features are used. A record selection expression is included in the REPORT statement which selects and orders the records to be printed. A report title is assigned. Only selected fields are printed in the detail lines. Control breaks are used to print summary information. Some format control is done with COL and SKIP but this is still a basic, standard DTR report.

Included below is the first portion of the report created by the preceding RW statements.

YACHT PRICE REPORT - BY BUILDER

MANUFACTURER	MODEL	RIG	PRICE
ALBERG			
	37 MK II	KETCH	$36,951
	NUMBER OF MODELS:		1
ALBIN			
	BALLAD	SLOOP	$27,500
	VEGA	SLOOP	$18,600
	79	SLOOP	$17,900
	NUMBER OF MODELS:		3
AMERICAN			
	26-MS	MS	$18,895
	26	SLOOP	$9,895

```
                    NUMBER OF MODELS:          2

BAYFIELD
                30/32          SLOOP        $32,875
                    NUMBER OF MODELS:          1
```

1.3 Saving the report specification

ALWAYS, ALWAYS, ALWAYS save your report specification in a procedure or command file. In creating reports, it generally takes several passes to get the report looking right. Even if you think you'll never use a particular report again, you probably will and it is very handy to have old report procedures to cannibalize when creating new ones.

There have been several methods suggested for typing in the report specification and getting it into a procedure. The following method allows DTR to perform syntax checking line by line as each is typed in and still gets the entire report into a procedure without retyping.

1.) Create the report interactively.

    DTR> REPORT YACHTS ....
    RW> .... any valid report statements ...
    RW> END-REPORT

2.) After viewing the report, edit your last command.
    (Your last command is the entire report specification.)

    DTR> EDIT (with NO object)

3.) While in EDT, add 1 line at the beginning and end of the report.

    Insert "REDEFINE PROCEDURE report-name" as first line.
    Insert "END_PROCEDURE" as last line.

4.) EXIT from EDT, and a procedure containing the report specification is automatically defined in the dictionary.

Important Note: This also works if you encounter an error before completion of the report specification. When you type in EDIT the entire last command, beginning at REPORT will be in the buffer for editing. At that point, you can correct the error, insert the REDEFINE PROCEDURE and END_PROCEDURE commands and insert the remainder of your report statements. Once the report is defined as a procedure, you can invoke the report with :report-name and edit it repeatedly until it is just what you want.

2.0 Using control groups

2.1 Establishing Sort Order

In order to use control groups, the record stream for the report must be in some sorted order. Establish sorted order in any of 3 ways:

1.) report on a sorted collection
2.) use SORTED BY in the REPORT statement
3.) use the primary key of an indexed file

2.2 Using Statistical Operators

DTR will summarize the data in each control group, and for the entire report. Establish groups by breaking data with AT TOP/BOTTOM statements. These must refer to a field that was in the sort key. They may contain any DTR statistical operators but choice of placement can produce different results, as in the following example:

```
DTR> FIND YACHTS WITH BUILDER CONT 'AL' SORTED BY BUILDER
[15 records found]
RW>  REPORT ON EX.RPT
RW>  AT TOP OF BUILDER PRINT COL 1, BUILDER, COL 15, COUNT ("NUMBER") -
RW>  USING ZZ9 , COL 26, AVERAGE BEAM ("AVG"/"BEAM")
RW>  PRINT MODEL, RIG, BEAM, LOA
RW>  AT BOTTOM OF BUILDER PRINT COL 15, COUNT USING ZZ9 , COL 26,
RW>  AVERAGE BEAM, SKIP
RW>  END-REPORT
```

Notice that the values for COUNT and AVERAGE BEAM printed in the sample output below are the same in every header (AT TOP OF BUILDER) line. That is because these values are computed from the entire collection. The values in the summary (AT BOTTOM OF BUILDER) lines are different because they are based on the groups by BUILDER. Also interesting is the fact that when no column specifiers were used, there were 2 columns for COUNT and 2 for AVERAGE BEAM. You might suspect that DTR "knows" these values do not represent the same things.

```
                                                                  5-Sep-84
                                                                  Page 1

                                                                  LENGTH
                          AVG                                      OVER
MANUFACTURER  NUMBER      BEAM        MODEL          RIG       BEAM     ALL

 ALBERG         15        09
                                    37 MK II       KETCH       12       37
                1         12

 ALBIN          15        09
                                    79             SLOOP       10       26
                                    BALLAD         SLOOP       10       30
                                    VEGA           SLOOP       08       27
                3         09

 CAL            15        09
                                    2-27           SLOOP       09       27
                                    2-34           SLOOP       10       33
                                    29             SLOOP       09       29
                                    3-30           SLOOP       10       30
                                    35             SLOOP       11       35
                5         09
```

2.3 Multiple Level Breaks and Totals

Multiple AT TOP/BOTTOM statements can be included in the report specification, as in the example below, to produce multiple levels of subtotals and grand totals.

```
DTR> SHOW LOA-REPORT
DELETE LOA_REPORT;
DEFINE PROCEDURE LOA_REPORT
REPORT FIRST 30 YACHTS WITH PRICE > 0 AND LOA BT 25 AND 30 SORTED
   BY LOA, BEAM ON TT:
   SET REPORT_NAME="MY VERY OWN LISTING"/"OF"/"INTERESTING SAILBOATS"/
       "(BY LENGTH AND BEAM)"
!OK to set multiple elements in 1 SET statement
   SET LINES_PAGE=55, COLUMNS_PAGE=72
   AT TOP OF LOA PRINT LOA ("LENGTH")
```

```
   AT TOP OF BEAM PRINT BEAM
   PRINT TYPE, RIG, DISP, PRICE
   AT BOTTOM OF BEAM PRINT COL 25, "*** Average for beam ***",
      AVERAGE DISP, AVERAGE PRICE
   AT BOTTOM OF LOA PRINT SKIP, COL 25, "*** Average for LOA ***",
      AVERAGE DISP, AVERAGE PRICE
   AT BOTTOM OF REPORT PRINT SKIP, COL 25, "*** REPORT AVERAGES ***",
      AVERAGE DISP, AVERAGE PRICE
   AT BOTTOM OF PAGE PRINT SKIP 3, COL 20,
      """ANOTHER SERVICE OF QUERY ENTERPRISES"""
END_REPORT
END-PROCEDURE
```

The above report specification produces the report which is included below. The dashed line indicates that a portion of the report has been omitted to save space.

```
                          MY VERY OWN LISTING                19-Sep-1984
                                OF                           Page 1
                          INTERESTING SAILBOATS
                           (BY LENGTH AND BEAM)

LENGTH    BEAM    MANUFACTURER       MODEL        RIG     WEIGHT     PRICE

 25
           07
                   CAPE DORY          25           SLOOP    4,000    $8,995
                   SALT               19           SLOOP    2,600    $6,590
                         *** Average for beam ***             3,300    $7,793
           12
                   IRWIN              25           SLOOP    5,400   $10,950
                         *** Average for beam ***             5,400   $10,950

                         *** Average for LOA ***              4,000    $8,845
-------------------------------------------------------------------------------
  30
           09
                    GRAMPIAN          30           SLOOP    8,600   $17,775
                    PEARSON           30           SLOOP    8,320   $12,000
                          *** Average for beam ***            8,460   $14,888
           10
                    IRWIN             30           SLOOP   10,000   $19,950
                    HUNTER            30           SLOOP    9,500   $21,500
                    ISLANDER          30           SLOOP    8,600   $20,990
                    ALBIN             BALLAD       SLOOP    7,276   $27,500
                          *** Average for beam ***            8,844   $22,485

                          *** Average for LOA ***             8,716   $19,953

                          *** REPORT AVERAGES ***             6,462   $19,029

                     "ANOTHER SERVICE OF QUERY ENTERPRISES"
```

3.0 Reporting Information NOT in the Domain

Reports can include information that is not contained in the source domain. In addition to field values, statistics and literals, which have already been demonstrated, RW can print calculated values, declared variables, values from tables, and values from additional domains.

3.1 Calculated Values

One way to report data that is not in the domain is to include calculations within the PRINT statement itself, as shown below.

```
DTR> REPORT YACHTS WITH RIG = "KETCH" AND LOA GT 36 AND PRICE NE 0 -
RW>    SORTED BY LOA, BEAM, PRICE
RW>  SET REPORT-NAME = "PRICE PER FOOT REPORT"/"ON BIG KETCHES"
RW>  PRINT TYPE, BEAM, PRICE, LOA, PRICE/LOA ("PRICE"/"PER"/"FOOT") -
RW>    USING $$,$$9
RW>  AT BOTTOM OF REPORT PRINT SKIP, COL 7, "NUMBER OF BOATS:", -
RW>    COL 25, COUNT (-) USING 9 , SKIP, COL 25, "AVERAGE PRICE:", -
RW>  AVERAGE PRICE (-) USING $$$$,$$9 , COL 40,
RW>    "AVERAGE PRICE PER FOOT:", AVERAGE (PRICE/LOA) (-) -
RW>    USING $$$$,$$9
RW>  END-REPORT
```

Note that a column header and edit-string is supplied in each statement that calculates and prints the value. COL specifiers are used to align the columns of the detail and summary lines. The resulting report is displayed below.

```
                                PRICE PER FOOT REPORT                    4-Sep-84
                                   ON BIG KETCHES                        Page 1

                                                                LENGTH      PRICE
                                                                 OVER        PER
MANUFACTURER        MODEL          BEAM        PRICE             ALL        FOOT

 IRWIN              37 MARK II       11        $36,950           37          $998
 NORTHERN           37               11        $50,000           37        $1,351
 ALBERG             37 MK II         12        $36,951           37          $998
 GULFSTAR           41               12        $41,350           41        $1,008
 CHALLENGER         41               13        $51,228           41        $1,249
 ISLANDER           FREEPORT         13        $54,970           41        $1,340
 PEARSON            419              13        $65,000           42        $1,547
 OLYMPIC            ADVENTURE        13        $80,500           42        $1,916

 NUMBER OF BOATS:  8
                   AVERAGE PRICE:           $52,118
                                  AVERAGE PRICE PER FOOT:          $1,301
```

3.2 Variables

Another way to accomplish the same thing is to declare a variable before invoking the Report Writer.

```
DTR> DECLARE PRICE-PER-FOOT COMPUTED BY PRICE/LOA QUERY-HEADER IS -
CON>   "PRICE"/"PER"/"FOOT" EDIT-STRING IS $$$$,$$9.
DTR> REPORT YACHTS WITH RIG = "KETCH" AND LOA GT 36 AND PRICE NE 0 -
RW>    SORTED BY LOA, BEAM, PRICE
RW>  SET REPORT-NAME = "PRICE PER FOOT REPORT"/"ON BIG KETCHES"
RW>  PRINT TYPE, BEAM, PRICE, LOA, PRICE-PER-FOOT .
RW>  AT BOTTOM OF REPORT PRINT SKIP, COL 6, "NUMBER OF BOATS:",
RW>    COL 25, COUNT (-) USING 9 , SKIP, COL 25, "AVERAGE PRICE:",
RW>    AVERAGE PRICE (-) USING $$$$,$$9 , COL 42,
RW>    "AVERAGE PRICE PER FOOT:", AVERAGE PRICE-PER-FOOT (-) USING
RW>    $$$$,$$9
RW>  END-REPORT
```

Notice here that the column header and edit strings are defined in the DECLARE command and are not required in any of the RW statements. It may be only a small savings in keystrokes in this example but could be significant if there were several levels of sub-totals. Again, COL specifiers were used to align the detail and summary columns.

```
                              PRICE PER FOOT REPORT                    4-Sep-84
                                 ON BIG KETCHES                        Page 1

                                                          LENGTH        PRICE
                                                           OVER          PER
MANUFACTURER          MODEL          BEAM       PRICE      ALL          FOOT

 IRWIN            37 MARK II          11       $36,950      37           $998
 NORTHERN         37                  11       $50,000      37         $1,351
 ALBERG           37 MK II            12       $36,951      37           $998
 GULFSTAR         41                  12       $41,350      41         $1,008
 CHALLENGER       41                  13       $51,228      41         $1,249
 ISLANDER         FREEPORT            13       $54,970      41         $1,340
 PEARSON          419                 13       $65,000      42         $1,547
 OLYMPIC          ADVENTURE           13       $80,500      42         $1,916

NUMBER OF BOATS:   8
                    AVERAGE PRICE:          $52,118
                                  AVERAGE PRICE PER FOOT:          $1,301
```

3.3 Tables

One more way to report data not in the domain is to use the VIA clause to reference information in tables. The RW PRINT works just like a normal PRINT statement in this manner.

The definition of the RIG table is included below for reference.

```
DTR> DEFINE TABLE RIG_TABLE
DFN> QUERY_HEADER IS "RIG"/"DESCRIPTION"
DFN> EDIT_STRING IS X(15)
DFN> "SLOOP"    :    "ONE MAST"
DFN> "KETCH"    :    "TWO MASTS"
DFN> "YAWL"     :    "TWO MASTS"
DFN> "M/S"      :    "SAILS AND MOTOR"
DFN> ELSE "SOMETHING ELSE"
DFN> END_TABLE
```

The following report specification references the RIG table to get information that does not exist in the domain.

```
DTR> REPORT YACHTS WITH PRICE > 0 SORTED BY DESC PRICE ON VIA.RPT
RW> PRINT COL 1, BUILDER, COL 20, RIG VIA RIG_TABLE USING X(16),
[Looking for next element in list]
RW> BEAM, PRICE
RW> END_REPORT
```

The three RW statements above produce a report which starts out like the following example. The remainder of the report has been omitted to save space.

MANUFACTURER	RIG DESCRIPTION	BEAM	PRICE
OLYMPIC	TWO MASTS	13	$80,500
PEARSON	ONE MAST	12	$79,000
PEARSON	TWO MASTS	13	$65,000
ISLANDER	TWO MASTS	13	$54,970
CHALLENGER	TWO MASTS	13	$51,228
NORTHERN	TWO MASTS	11	$50,000
PEARSON	ONE MAST	10	$49,500
COLUMBIA	ONE MAST	11	$48,490
PEARSON	ONE MAST	11	$45,999
PEARSON	ONE MAST	08	$45,999
PEARSON	ONE MAST	09	$45,890

3.4 Other Domains

By using CROSS in the REPORT statement, information from other domains can be made available. All that is required is a field in both domains with a common value so that the records can be linked together. The definition of the OWNER record below shows us that there is a common field, TYPE, in OWNERS and YACHTS.

```
DTR> SHOW OWNER-RECORD
DEFINE RECORD OWNER_RECORD
01 OWNER.
   03 NAME PIC X(10) QUERY_HEADER IS "OWNER"/"NAME"
      EDIT_STRING IS X(5).
   03 BOAT_NAME PIC X(17) QUERY_HEADER IS "BOAT NAME".
   03 TYPE.
      06 BUILDER PIC X(10).
      06 MODEL PIC X(10).
;
```

The following report specification shows how to use CROSS and the common field to make data available from multiple domains.

```
DTR> SO OWNER-REPORT
DELETE OWNER_REPORT;
DEFINE PROCEDURE OWNER_REPORT
READY OWNERS, YACHTS
REPORT OWNERS CROSS YACHTS OVER TYPE SORTED BY TYPE, BOAT_NAME
SET REPORT_NAME = "Owners of Yachts"/"By Builder and Model"
SET LINES_PAGE = 65, COLUMNS_PAGE = 75
AT TOP OF TYPE PRINT COL 10,
  BUILDER||"'S"|||MODEL ("Builder/Model")  USING X(15),
  PRICE  ("Purchase Price")
AT TOP OF BOAT_NAME PRINT BOAT_NAME ("Boat Names")
PRINT NAME ("Owner's Names")
AT BOTTOM OF BOAT_NAME PRINT COL 20,
  "Number of Owners (this boat):"|||COUNT (-), SKIP
AT BOTTOM OF TYPE PRINT COL 20,
  "Number of Owners (this type):"|||COUNT (-), SKIP
!Use same EDIT_STRING for each item to guarantee alignment
AT BOTTOM OF REPORT PRINT COL 20, "Total Number of Owners:", SPACE,
  COUNT (-) USING ZZZZ,ZZ9, COL 20, "Minimum Purchase Price:",
  SPACE, MIN PRICE (-) USING $$$$,$$9,
```

```
  COL 20, "Maximum Purchase Price:", SPACE,
  MAX PRICE (-) USING $$$$,$$9
END_REPORT
END-PROCEDURE
```

The beginning and end of the resulting report is summarized below.

```
                          Owners of Yachts                    18-Sep-1984
                        By Builder and Model                  Page 1

 Builder/Model    Purchase Price      Boat Names      Owner's Names

ALBIN'S VEGA          $18,600
                                      DELIVERANCE
                                                        STEVE
               Number of Owners (this boat): 1

                                      IMPULSE
                                                        HUGH
               Number of Owners (this boat): 1

               Number of Owners (this type): 2

C&C'S CORVETTE        $25,000

                                      EGRET
                                                        JIM
                                                        ANN
               Number of Owners (this boat): 2

               Number of Owners (this type): 2

RHODES'S SWIFTS       $35,500
                                      STRIDER
                                                        JOHN
               Number of Owners (this boat): 1

               Number of Owners (this type): 1

               Total Number of Owners:       11
               Minimum Purchase Price:   $6,500
               Maximum Purchase Price:  $54,730
```

4.0 Using the CHOICE Value Expression

4.1 Printing Different Detail Lines

The RW allows only 1 PRINT statement which controls the printing of all the detail lines. At times there is a need to print different detail lines depending on the values of certain items. The CHOICE value expression provides the mechanism for doing that. As an example, the following report specification prints a notation which highlights the most expensive yachts and the bargains.

```
DTR> REPORT YACHTS WITH LOA GT 30 AND BEAM GT 10 ON RANGES.RPT
RW> SET REPORT_NAME = "YACHT PRICE REPORT"
RW> PRINT TYPE, PRICE, CHOICE
RW>   PRICE = 0 THEN "UNKNOWN"
RW>   (PRICE > 0 AND PRICE < 20000) THEN "BARGAIN"
```

```
RW>   ELSE "EXPENSIVE"
RW> END_CHOICE ("PRICE"/"RANGE")
RW> AT BOTTOM OF REPORT PRINT SKIP, COL 26,
[Looking for next list element]
RW> "*** END OF PRICE REPORT ***"
RW> END_REPORT
```

The first and last few lines of the resulting report are summarized below.

```
                              YACHT PRICE REPORT                    11-Sep 1984
                                                                    Page 1

                                                                    PRICE
MANUFACTURER                    MODEL                 PRICE         RANGE

 ALBERG                         37 MK II              $36,951       EXPENSIVE
 BLOCK I.                       40                                  UNKNOWN
 BOMBAY                         CLIPPER               $23,950       EXPENSIVE
 CABOT                          36                                  UNKNOWN
 CAL                            35                                  UNKNOWN
 CARIBBEAN                      35                    $37,850       EXPENSIVE
 CHALLENGER                     32                    $31,835       EXPENSIVE
-------------------------------------------------------------------------------
 ROBERTS                        36                                  UNKNOWN
 ROGGER FD                      M/S                                 UNKNOWN
 WESTSAIL                       32                                  UNKNOWN

                          *** END OF PRICE REPORT ***
```

4.2 CHOICE in Control Groups

In addition to using the CHOICE value expression in the PRINT statement of the Report Writer, it can be used in a variable which serves as a control break. The field that the CHOICE is computed from must be used to order the record stream used for the report, as PRICE and PRICE_RANGE in the sample below.

```
DTR> DECLARE PRICE_RANGE COMPUTED BY CHOICE
DTR>  PRICE = 0 THEN "UNKNOWN"
DTR>  PRICE < 20000 THEN "BARGAIN"
DTR>  PRICE < 50000 THEN "MODERATE"
DTR>  ELSE "EXPENSIVE"
DTR> END_CHOICE
DTR> EDIT_STRING IS X(9).
DTR> REPORT YACHTS WITH RIG = "KETCH" SORTED BY PRICE ON KETCH.RPT
RW> SET REPORT_NAME = "KETCH PRICE RANGE REPORT"
RW> AT TOP OF PRICE_RANGE PRINT PRICE_RANGE|||"PRICED KETCHES" (-)
RW> PRINT TYPE, DISP, LOA, BEAM
RW> AT BOTTOM OF PRICE_RANGE PRINT SKIP
RW> AT BOTTOM OF REPORT PRINT SKIP, COL 26,
[looking for next list element]
RW> "*** END OF PRICE REPORT ***"
RW> END_REPORT
```

The following report provides the same types of information as the previous example, but using the CHOICE value expression to trigger the control breaks leads to a more readable report.

```
                    KETCH PRICE RANGE REPORT                    11-Oct-1984
                                                                  Page 1

                                                                LENGTH
                                                                 OVER
                    MANUFACTURER      MODEL      WEIGHT        ALL      BEAM

UNKNOWN PRICED KETCHES
                     PEARSON        365          17,700        36        11
                     PEARSON        419          21,000        42        13
                     FISHER         37           30,000        37        12
BARGAIN PRICED KETCHES
                     GRAMPIAN       34           12,000        33        10
                     FISHER         30           14,500        30        09
MODERATE PRICED KETCHES
                     IRWIN          37 MARK II   20,000        37        11
                     ALBERG         37 MK II     20,000        37        12
                     I. TRADER      37           18,600        36        12
                     GULFSTAR       41           22,000        41        12
EXPENSIVE PRICED KETCHES
                     NORTHERN       37           14,000        37        11
                     CHALLENGER     41           26,700        41        13
                     ISLANDER       FREEPORT     22,000        41        13
                     OLYMPIC        ADVENTURE    24,250        42        13

                  *** END OF PRICE REPORT ***
```

5.0 Reporting Hierarchical Data

Dealing with hierarchical data can be difficult in DTR and can get worse within RW. One of the easiest ways to deal with hierarchical data, using nested FORs, is not available in RW. The remaining options include using the CROSS clause in the RSE of the REPORT statement, using an inner print list, or issuing the SET SEARCH command before the REPORT statement.

5.1 Retaining the Hierarchical Structure

Of course, a report can be created with the hierarchy intact. This can be done by using the 01 group level field name in the PRINT statement. For reference, the FAMILY record definition is included below. Note that the 01 level group field is FAMILY.

```
RECORD FAMILY_REC
01 FAMILY.
   03 PARENTS.
      06 FATHER PIC X(10).
      06 MOTHER PIC X(10).
   03 NUMBER_KIDS PIC 99 EDIT_STRING IS Z9.
   03 KIDS OCCURS 0 TO 10 TIMES DEPENDING ON NUMBER_KIDS.
      06 EACH_KID.
         09 KID_NAME PIC X(10) QUERY_NAME IS KID.
         09 AGE PIC 99 EDIT_STRING IS Z9.
;
```

A simple report retaining the hierarchical structure of the data is included below. Note that the field FAMILY is included in the RW PRINT statement. An alternate statement to achieve the same results would be "PRINT PARENTS, NUMBER_KIDS, KIDS", but "PRINT PARENTS, NUMBER_KIDS, KID-NAME" results in an error

```
DTR> REPORT FAMILIES ON FAMILY.RPT
RW> SET REPORT_NAME = "Family Report"
RW> PRINT FAMILY
RW> END_REPORT
```

The first portion of the resulting report follows.

```
                              Family Report                    16-Sep-1984
                                                               Page 1

                                   NUMBER          KID
  FATHER            MOTHER          KIDS           NAME          AGE

JIM               ANN                2          URSULA           7
                                                 RALPH            3
JIM               LOUISE             5          ANNE            31
                                                 JIM             29
                                                 ELLEN           26
                                                 DAVID           24
                                                 ROBERT          16
JOHN              JULIE              2          ANN             29
                                                 JEAN            26
JOHN              ELLEN              1          CHRISTOPHR       0
ARNIE             ANNE               2          SCOTT            2
                                                 BRIAN            0
SHEARMAN          SARAH              1          DAVID            0
TOM               ANNE               2          PATRICK          4
                                                 SUZIE            6
```

This report is fine if you want all the information in the domain and nothing extra. Unfortunately, that rarely is the case.

5.2 Using CROSS in the REPORT statement

The CROSS clause can be used to join the domain to the list, which essentially flattens the hierarchy. Be sure to use individual field names in the print list, as in the example below, instead of the group field FAMILY. Now the individual fields that were in the list are accessible for totals,
etc.

```
DTR> SHOW FLAT-FAM
DELETE FLAT_FAM;
DEFINE PROCEDURE FLAT_FAM
REPORT FAMILIES CROSS KIDS SORTED BY PARENTS, AGE ON TT:
SET REPORT_NAME = "Flat Family Report"
AT TOP OF PARENTS PRINT COL 1, FATHER, COL 15, MOTHER
AT BOTTOM OF PARENTS PRINT COL 52,
  COUNT ("Number"/"Of Kids") USING Z9,
  COL 62, TOTAL AGE ("Total"/"Age") USING ZZZ9,
  COL 72, AVERAGE AGE ("Avg"/"Age") USING Z9
PRINT COL 30, KID_NAME, COL 45, AGE
END_REPORT
END-PROCEDURE
```

One feature of the CROSS demonstrated by the sample output below is that families with no children do not show up on the flat report. This may be a problem in certain applications.

Flat Family Report 19-Sep-1984
Page 1

FATHER	MOTHER	KID NAME	AGE	Number Of Kids	Total Age	Avg Age
ARNIE	ANNE					
		BRIAN	0			
		SCOTT	2			
				2	2	1
BASIL	MERIDETH					
		WREN	17			
		JILL	20			
		JAY	22			
		ROBIN	24			
		BROOKS	26			
		BEAU	28			
				6	137	23
EDWIN	TRINITA					
		SCOTT	11			
		ERIC	16			
				2	27	14

5.3 Summary Info from Lists

It is not always necessary to flatten the hierarchy to get at the individual fields that make up a list. In the following example "AT BOTTOM OF FATHER" is used to total values from the list fields in a single record. Although the TOTALs may seem redundant, they are required to make the report work.

```
DTR> SHOW FAM-STATS
DELETE FAM-STATS;
DEFINE PROCEDURE FAM-STATS
DECLARE TOT_AGE COMPUTED BY TOTAL AGE OF KIDS.
!Families without kids can be included or excluded
REPORT FIRST 5 FAMILIES WITH (NUMBER_KIDS NE 0) AND
 (NOT ANY KIDS WITH AGE = 0) SORTED BY FATHER, MOTHER  ON *.WHERE
SET REPORT_NAME = "Report of Kids and Ages"
PRINT FAMILY
AT BOTTOM OF FATHER PRINT "Family statistics:",
 TOTAL (TOT_AGE) ("Total"/"Age") USING ZZZ9,
 (TOTAL (TOT_AGE)) / (TOTAL NUMBER_KIDS) ("Aver"/"Age") USING ZZZ9,
  SKIP
AT BOTTOM OF REPORT PRINT SKIP, "Report statistics:",
 TOTAL NUMBER_KIDS USING ZZZ9,
 TOTAL (TOT_AGE) USING Z999,
 (TOTAL (TOT_AGE)) / (TOTAL NUMBER_KIDS) USING ZZZ9
END_REPORT
END-PROCEDURE
```

The resulting report, complete with accurate statistics, is included below.

FATHER	MOTHER	NUMBER KIDS	KID NAME	AGE	Total Age	Aver Age
BASIL	MERIDETH	6	BEAU	28		
			BROOKS	26		
			ROBIN	24		
			JAY	22		
			WREN	17		
			JILL	20		
Family statistics:					137	23
EDWIN	TRINITA	2	ERIC	16		
			SCOTT	11		
Family statistics:					27	14
GEORGE	LOIS	3	JEFF	23		
			FRED	26		
			LAURA	21		
Family statistics:					70	23
HAROLD	SARAH	3	CHARLIE	31		
			HAROLD	35		
			SARAH	27		
Family statistics:					93	31
JEROME	RUTH	4	ERIC	32		
			CISSY	24		
			NANCY	22		
			MICHAEL	20		
Family statistics:					98	25
Report statistics:		18			425	24

6.0 Special Formatting

6.1 Nonstandard Outputs

The Report Writer can be used to create documents with nonstandard layouts and with very little data supplied from a domain. In the following example a domain with student names is used to create a set of diplomas.

This example also shows how a cover page can be produced, use of prompting expressions, specialized date handling, and concatenation.

```
DTR> DEFINE RECORD STUDENT_REC USING
DFN> 01   STUDENT_NAME.
DFN> 05   FIRST_NAME     PIC X(10).
DFN> 05   LAST_NAME      PIC X(20).
DFN> ;

DTR> DEFINE PROCEDURE DIPLOMA
DFN> READY STUDENTS
DFN> !Format the ending day of class.
DFN> DECLARE END_DATE USAGE DATE.
```

```
DFN> DECLARE DAY_FORMAT PIC XX COMPUTED BY
DFN> CHOICE
DFN> FN$DAY(END_DATE) = 1 THEN "st"
DFN> FN$DAY(END_DATE) = 21 THEN "st"
DFN> FN$DAY(END_DATE) = 31 THEN "st"
DFN> FN$DAY(END_DATE) = 2 THEN "nd"
DFN> FN$DAY(END_DATE) = 22 THEN "nd"
DFN> FN$DAY(END_DATE) = 3 THEN "rd"
DFN> FN$DAY(END_DATE) = 23 THEN "rd"
DFN> ELSE "th"
DFN> END_CHOICE.
DFN> !Declare other temp variables.
DFN> DECLARE CLASS_LENGTH PIC 99.
DFN> DECLARE INSTRUCTOR PIC X(30).
DFN> DECLARE COURSE_NAME PIC X(30).
DFN> DECLARE STAR40 PIC X(40).
DFN> DECLARE STAR80 PIC X(80).
DFN> !Prompt for values
DFN> END_DATE = *."date class ended"
DFN> CLASS_LENGTH = *."number of class days"
DFN> INSTRUCTOR = *."instructor (max. 30 chars)"
DFN> COURSE_NAME = *."course name (max. 30 chars)"
DFN> !Start with 40 columns and concatenate to avoid EOL
DFN> STAR40 = "****************************************"
DFN> STAR80 = STAR40|STAR40
DFN> !Create the diplomas, ordered by name
DFN> REPORT STUDENTS SORTED BY STUDENT_NAME ON DIPLOMA.RPT
DFN> SET NO DATE
DFN> SET NO NUMBER
DFN> !Print cover page
DFN> AT TOP OF REPORT PRINT SKIP 28, STAR80 (-), SKIP, COL 20,
DFN>   "Diplomas for"|||COURSE_NAME (-), SKIP, STAR80 (-)
DFN> !Print each diploma on a separate page
DFN> AT TOP OF STUDENT_NAME PRINT SKIP 2, STAR80 (-),
DFN>   SKIP 5, COL 12,
DFN>    "Martin Marietta Energy Systems - Computing Education Group",
DFN>   SKIP 3, COL 30,"Proudly Presents This",
DFN>   SKIP 5, COL 27,"CERTIFICATE OF ACHIEVEMENT",
DFN>   SKIP 2, COL 39,"to",
DFN>   SKIP 3, COL 33,FIRST_NAME|||LAST_NAME (-),
DFN>   SKIP 5, COL 10,"For Successfully Completing a"|||CLASS_LENGTH||
DFN>    "-day Course of Instruction in" (-),
DFN>   SKIP 3, COL 23, "***"|||COURSE_NAME|||"***" (-),
DFN>   SKIP 5, COL 25, "this", SPACE 1, FN$DAY(END_DATE) (-) USING Z9,
DFN>    SPACE 0, DAY_FORMAT (-), SPACE 1, "day of", SPACE 1,
DFN>    END_DATE (-) USING M(9), SPACE 1,
DFN>    END_DATE (-) USING Y(4),
DFN>   SKIP 8, COL 5, "_____",
DFN>   SKIP 1, COL 15, INSTRUCTOR (-),
DFN>   SKIP 5, COL 1, STAR80 (-)
DFN> AT BOTTOM OF STUDENT_NAME PRINT NEW_PAGE
DFN> END_REPORT
DFN> END-PROCEDURE
```

The above procedure is run as needed to create course diplomas, as indicated below.

```
DTR> :diploma
Enter date class ended: 24-Sep-84
```

Enter number of class days: 4
Enter instructor (max. 30 characters): Lynn Duncan
Enter course name (max. 30 characters): End-User Introduction to DTR

The resulting report starts with a new page containing:

****

Diplomas for End-User Introduction to DTR

****

And then a single page is printed to construct the diploma for each student, like the example below.

****

Martin Marietta Energy Systems - Computing Education Group

Proudly Presents This

CERTIFICATE OF ACHIEVEMENT

to

Al Carpenter

For Successfully Completing a 4-day Course of Instruction in

*** End-User Introduction to DTR ***

this 24th day of September 1984

_____
Lynn Duncan

****

6.2 Formatting for the Terminal

The Report Writer allows you to set the page length for either a standard printer page or for a terminal display. VMS also allows a user to stop terminal scrolling to view data on the screen. BUT have you ever had a report scroll off the screen before you finished reading it? There is a way in DTR to hold each page of the report on the screen until you're finished with it. This can be done with a combination of SET LINES-PAGE and a prompting expression, as in the example below.

```
DTR> SHOW SCREEN-YACHTS
DELETE SCREEN_YACHTS;
DEFINE PROCEDURE SCREEN_YACHTS
READY YACHTS
REPORT YACHTS ON TT:
SET REPORT_NAME = "Report of All Yachts"/"One Full Screen at a Time"
SET LINES_PAGE = 24
PRINT  BOAT
AT BOTTOM OF PAGE PRINT *."any character to continue" USING X
END_REPORT
END-PROCEDURE

DTR> :SCREEN-YACHTS
```

Running the procedure results in the printing of one screen full of information and a prompt for the user to control progression throughout the report.

```
                          Report of All Yachts                  17-Sep-1984
                       One Full Screen at a Time                Page 1

                                          LENGTH
                                           OVER
MANUFACTURER       MODEL        RIG        ALL      WEIGHT     BEAM     PRICE

 ALBERG         37 MK II      KETCH        37        20,000      12     $36,951
 ALBIN          79            SLOOP        26         4,200      10     $17,900
 ALBIN          BALLAD        SLOOP        30         7,276      10     $27,500
 ALBIN          VEGA          SLOOP        27         5,070      08     $18,600
 AMERICAN       26            SLOOP        26         4,000      08      $9,895
 AMERICAN       26-MS         MS           26         5,500      08     $18,895
 BAYFIELD       30/32         SLOOP        32        9,500       10     $32,875
 BLOCK I.       40            SLOOP        39        18,500      12
 BOMBAY         CLIPPER       SLOOP        31         9,400      11     $23,950
 BUCCANEER      270           SLOOP        27         5,000      08
 BUCCANEER      320           SLOOP        32        12,500      10
 C&C            CORVETTE      SLOOP        31         8,650      09     $25,000
 CABOT          36            SLOOP        36        15,000      12
 CAL            2-27          SLOOP        27         6,700      09
 CAL            2-34          SLOOP        33         9,500      10
Enter any character to continue:X
```

7.0 Summary

7.1 Putting It All Together - An Example

A lot of different techniques and methods have been covered. As a summary, one final example will use several of them in a single report. Also, a few miscellaneous goodies are included.

The PERSONNEL record definition and department table are included below for reference.

```
DTR> SHOW PERSONNEL-REC
DELETE PERSONNEL_REC;
```

```
DEFINE RECORD PERSONNEL_REC USING
01 PERSON.
   05 ID                    PIC IS 9(5).
   05 EMPLOYEE_STATUS       PIC IS X(11)
                            QUERY_NAME IS STATUS
                            QUERY_HEADER IS "STATUS"
                            VALID IF STATUS EQ "TRAINEE","EXPERIENCED".
   05 EMPLOYEE_NAME         QUERY_NAME IS NAME.
      10 FIRST_NAME         PIC IS X(10)
                            QUERY_NAME IS F_NAME.
      10 LAST_NAME          PIC IS X(10)
                            QUERY_NAME IS L_NAME.
   05 DEPT                  PIC IS XXX.
   05 START_DATE            USAGE IS DATE
                            DEFAULT VALUE IS "TODAY".
   05 SALARY                PIC IS 9(5)
                            EDIT_STRING IS $$$,$$$.
   05 SUP_ID                PIC IS 9(5)
                            MISSING VALUE IS 0.
;

DTR> SHOW DEPT-TABLE
DELETE DEPT-TABLE;
DEFINE TABLE DEPT-TABLE
C82  :    COMPTROLLER
D98  :    MARKETING
E46  :    ACCOUNTING
F11  :    FINANCE
G20  :    COMPUTING
T32  :    TRAVEL
TOP  :    CORPORATE
END-TABLE
```

The procedure below creates a report showing the years of service and amount of vacation for each employee in each department. It uses variables and a CHOICE value expression, references information in a table, allows two levels of control breaks, and includes specialized formatting.

```
DTR> SHOW COMP-SER-RPT
DELETE COMP_SER_RPT;
DEFINE PROCEDURE COMP_SER_RPT
!Compute number of years completed; FN$FLOOR gives
!integer portion only, drops decimal portion
DECLARE COMPANY_SERVICE_YEARS COMPUTED BY
FN$FLOOR(("today" - START_DATE)/365.25) EDIT_STRING IS ZZ9.
DECLARE WEEKS_OF_VACATION COMPUTED BY
 CHOICE
  COMPANY_SERVICE_YEARS GE 20 THEN 5
  COMPANY_SERVICE_YEARS < 20 AND COMPANY_SERVICE_YEARS GE 15 THEN 4
  COMPANY_SERVICE_YEARS < 15 AND COMPANY_SERVICE_YEARS GE 10 THEN 3
  COMPANY_SERVICE_YEARS < 10 AND COMPANY_SERVICE_YEARS GE 5 THEN 2
  COMPANY_SERVICE_YEARS < 5 AND COMPANY_SERVICE_YEARS GE 1 THEN 1
  ELSE 0
 END_CHOICE.
!Store in file and display on terminal with one pass
ON CSR.RPT
REPORT PERSONNEL SORTED BY DEPT, START_DATE ON TT:
SET COLUMNS_PAGE = 70
```

```
SET REPORT_NAME = "Accrued Vacation Report"/"By Department"
!Get department name from table;  automatically center by
!preceding with SKIP
AT TOP OF DEPT PRINT SKIP, (DEPT VIA DEPT_TABLE)|||"Department" (-)
!OK to break on computed-by variable if based on field in sort key
AT TOP OF WEEKS_OF_VACATION PRINT COL 5,
 "Employees with"|||WEEKS_OF_VACATION|||"week(s) of vacation:" (-)
PRINT COL 5, NAME, START_DATE,COMPANY_SERVICE_YEARS ("Years"/"Service")
AT BOTTOM OF WEEKS_OF_VACATION PRINT SKIP
END_REPORT
END-PROCEDURE
```

The procedure results in a report like the one below.

```
                    Accrued Vacation Report          19-Sep-84
                         By Department               Page 1

     FIRST          LAST              START            Years
     NAME           NAME              DATE            Service

                      COMPTROLLER Department
  Employees with 3 week(s) of vacation:
  ANTHONY        IACOBONE           2-Jan-1973          11
  Employees with 2 week(s) of vacation:
  BRUNO          DONCHIKOV          9-Aug-1978           6
  RANDY          PODERESIAN        24-May-1979           5
  DAN            ROBERTS            7-Jul-1979           5
  Employees with 1 week(s) of vacation:
  JEFF           TASHKENT           4-Apr-1981           3

                      MARKETING Department
  Employees with 2 week(s) of vacation:
  MARY           NALEVO             3-Jan-1976           8
  DEE            TERRICK            2-May-1977           7
  Employees with 1 week(s) of vacation:
  CASS           TERRY              2-Jan-1980           4
  BART           HAMMER             4-Aug-1981           3

                      ACCOUNTING Department
  Employees with 2 week(s) of vacation:
  GAIL           CASSIDY            2-May-1978           6
  Employees with 1 week(s) of vacation:
  JOANNE         FREIBURG          20-Feb-1980           4
```

7.2 Closing Remarks

The Report Writer is made up of just a few simple commands but the options and variations that can be produced are almost limitless. The Report Writer defaults make it easy to get started; the power and flexibility of DATATRIEVE make it possible to do almost anything you can imagine.

When developing a new report, there is always a certain amount of trial and error. The developer must put time, thought and effort into formatting the report to get the desired product. It pays to try new things: Be creative.

The examples included have been simplified for the sake of discussion but still demonstrate some of the more advanced or unusual applications of Report Writer. These examples can be easily changed, expanded upon, or adapted to fit your applications.

The Wombat Wizard

Philip A. Naecker, Consulting Software Engineer, Altadena, CA

Exploring Rdb System Relations

One of the requirements of correctly applied relational technology is that a relational database is completely self-describing. That is, the database must itself be described using the same data structures used to describe the user data in the database. The system relations contain information that describes all the relations in the database, including themselves. In Rdb, there is a relation that describes the fields in the database, another for all the indexes, and so forth. These relations are collectively called the system relations. In database parlance, one says that the system relations contain the database metadata.

For example, VAX Rdb/VMS uses a relation (a domain in DTR terminology) called RDB$RELATIONS to store information about the relations themselves. Rdb writes this relation into the CDD and we can look at the relation definition in Datatrieve by READYing that database in a special way. In the following Datatrieve session, we will READY the system relations and examine the values of some of the fields.

```
DTR> show databases
Databases:
        SECURITIES_DATABASE

DTR> ready securities_database using rdb$relations
DTR> show ready
Ready sources:
   RDB$RELATIONS:  Relation, Rdb, snapshot read, consistency
           <_CDD$TOP.USERS.PAN.SECURITIES_DATABASE>
No loaded tables.

DTR> show fields
RDB$RELATIONS
   RDB$RELATIONS
      RDB$RELATION_NAME<Character string, indexed key>
      RDB$RELATION_ID  <Number, indexed key>
      RDB$STORAGE_ID   <Number>
      RDB$SYSTEM_FLAG  <Number>
      RDB$DBKEY_LENGTH <Number>
      RDB$MAX_VERSION  <Number>
      RDB$CARDINALITY  <Number>
      RDB$FLAGS<Number>
      RDB$VIEW_BLR     <Segmented string>
      RDB$DESCRIPTION  <Segmented string>
      RDB$VIEW_SOURCE  <Segmented string>
      RDB$ACCESS_CONTROL       <Segmented string>
No global variables are declared.
```

```
DTR> print rdb$relation_name of rdb$relations

         RDB$RELATION
             NAME

RDB$RELATIONS                                        |These are Rdb's
RDB$FIELD_VERSIONS                                   | system relations
RDB$INDICES                                          |
RDB$INDEX_SEGMENTS                                   |
RDB$FIELDS                                           |
RDB$RELATION_FIELDS                                  |
RDB$DATABASE                                         |
RDB$CONSTRAINTS                                      |
RDB$CONSTRAINT_RELATIONS                             |
RDB$VIEW_RELATIONS                                   |
COMPANIES                                            | These are user
COMPANY_TYPES                                        | relations...
CURRENCIES                                           |
.
.
.

DTR> rollback                          ! Either ROLLBACK or COMMIT is required
                                       ! before we can do another READY
                                       ! from the same database.
DTR> ready securities_database using rdb$fields
DTR> show ready
Ready sources:
   RDB$FIELDS:  Relation, Rdb, snapshot read, consistency
            <_CDD$TOP.USERS.PAN.SECURITIES_DATABASE>
   RDB$RELATIONS:  Relation, Rdb, snapshot read, consistency
            <_CDD$TOP.USERS.PAN.SECURITIES_DATABASE>
No loaded tables.

DTR> show fields for rdb$fields
RDB$FIELDS
   RDB$FIELDS
      RDB$FIELD_NAME   <Character string, indexed key>
      RDB$FIELD_TYPE   <Number>
      RDB$FIELD_LENGTH <Number>
      RDB$FIELD_SCALE  <Number>
      RDB$SYSTEM_FLAG  <Number>
      RDB$EDIT_STRING  <Character string>
      RDB$FIELD_SUB_TYPE       <Number>
      RDB$QUERY_NAME   <Character string>
      RDB$SEGMENT_LENGTH       <Number>
      RDB$VALIDATION_BLR       <Segmented string>
      RDB$COMPUTED_BLR <Segmented string>
      RDB$MISSING_VALUE<Segmented string>
      RDB$DESCRIPTION  <Segmented string>
      RDB$VALIDATION_SOURCE    <Segmented string>
      RDB$COMPUTED_SOURCE      <Segmented string>
      RDB$QUERY_HEADER <Segmented string>
      RDB$DEFAULT_VALUE<Segmented string>

DTR> print rdb$field_name, rdb$field_length of first 5 rdb$fields
```

```
        RDB$FIELD              RDB$FIELD
          NAME                  LENGTH

RDB$RELATION_NAME                 31
RDB$RELATION_ID                    2
RDB$STORAGE_ID                     2
RDB$SYSTEM_FLAG                    2
RDB$DBKEY_LENGTH                   2
```

These system relations contain all the information about the database I have defined. The information about the fields is stored in RDB$FIELDS. Information about the relations is stored in RDB$RELATIONS. Information about which fields are in which relations, and in what order, is found in RDB$RELATION_FIELDS.

What is the difference between RDB$FIELDS and RDB$RELATION_FIELDS, and why does Rdb need both of them? In an Rdb relational database, fields are defined globally. That is, when you define a field, it is associated with no particular relation. To associate a field with a relation, you must include it explicitly. Here is some RDO definition text:

```
DEFINE FIELD EMPLOYEE_NUMBER   DATATYPE IS SIGNED LONGWORD
                               QUERY_HEADER FOR DTR IS "Empl."/"No."
                               QUERY_NAME FOR DTR IS "EMPNO"
                               EDIT_STRING IS Z(5).

DEFINE RELATION SALARY_HISTORY.
       EMPLOYEE_NUMBER.
       REVIEW_DATE.
       SALARY.
END SALARY_HISTORY RELATION.

DEFINE RELATION MENTORS.
       MENTOR_EMPNO BASED ON EMPLOYEE_NUMBER.
       STUDENT_EMPNO BASED ON EMPLOYEE_NUMBER.
       LAST_REPORT_DATE.
END MENTORS RELATION.
```

Here we have defined a field (EMPLOYEE_NUMBER) and have used it in two relations. Each field in the relations would have to be defined before the relation is defined, but for simplicity I've left some out. Note that in the first relation (SALARY_HISTORY) we simply reference the field to include it in the Rdb relation. In the second relation (MENTORS) this would not work, because we want to use the same global field (EMPLOYEE_NUMBER) for both the mentor and the student. Here we use the BASED ON field attribute. This makes the relation fields take on the attributes (field length, query-header, and so forth) of the global field. Similarly, if we change the global field the based-on fields will be changed automatically.

Now we can see the reason for RDB$FIELDS and RDB$RELATION_FIELDS. RDB$FIELDS contains the information about all the global fields in the database - their size, datatype, and so forth. RDB$RELATION_FIELDS contains both the field name of the local fields (e.g., MENTOR_EMPNO) as well as the name of the global field on which it is based (e.g., EMPLOYEE_NUMBER.) (This is the type of classical data normalization that all Datatrieve users should be applying in their own applications!)

Since we can READY these relations with Datatrieve, why not do some DTR manipulation of the data? We can't STORE or MODIFY these relations (usually) because those sort of operations require additional functions be performed that cannot be performed using DTR. But we can REPORT on the relations and get useful information that way. Consider the following three reports.

The first report describes the fields in each relation. We use an RSE that excludes the system relations (which all start with RDB$) we sort the records by relation name and field name so we can do some AT BOTTOM of processing. We also use a virtual field called SOURCE_FIELD that prints the name of a source field (RDB$FIELD_SOURCE) only when the source field is different than the field itself.

```
DELETE FIELDS_BY_RELATION_REPORT;
REDEFINE PROCEDURE FIELDS_BY_RELATION_REPORT
!
READY SECURITIES_DATABASE USING RDB$RELATION_FIELDS READ
!
DECLARE SOURCE_FIELD COMPUTED BY CHOICE
       RDB$FIELD_SOURCE EQ RDB$FIELD_NAME THEN ""
       ELSE RDB$FIELD_SOURCE
END_CHOICE.
!
ON FIELDS_BY_RELATION.LIS
ON TT:
REPORT RDB$RELATION_FIELDS WITH RDB$RELATION_NAME NOT CONT "RDB$" SORTED BY
             RDB$RELATION_NAME, RDB$FIELD_NAME
       SET REPORT_NAME = "Fields by Relation"
       AT TOP OF RDB$RELATION_NAME PRINT COL 1, RDB$RELATION_NAME ("Relation")
             PRINT  COL 5, RDB$FIELD_NAME ("Field Name"),
                    COL 40, SOURCE_FIELD ("Source Field")
       AT BOTTOM OF RDB$RELATION_NAME PRINT SKIP 1
END_REPORT
!
END-PROCEDURE
```

```
                              Fields by Relation                  15-Mar-1987
                                                                  Page 1


           Relation                              Source Field

COMPANIES
    COMPANY_DESCRIPTION
    COMPANY_NAME
    COMPANY_NUMBER
    COMPANY_TYPE
    COUNTRY_OF_INCORPORATION              COUNTRY
    FISCAL_YEAR_END
    LATEST_UPDATE
    PARENT_COMPANY                        COMPANY_NUMBER
    SIC_CODE
    STATE_OF_INCORPORATION

COMPANY_TYPES
    COMPANY_TYPE
    COMPANY_TYPE_DESCRIPTION
    COMPANY_TYPE_NAME

        .
        .
        .
```

In the next report, we are going to report on which relations use each field. This sort of report is a simple way to find out which fields are candidates for foreign keys, because only fields that appear in more than one relation are good candidates for keys to be used in a relational join. Note that both COMPANY_NUMBER and COMPANY_TYPE are thus good candidates for a join key. Note also that LATEST_UPDATE contains multiple references, but since that is simply the date of last update of the relation, there is not a lot of value in doing a join on that field!

```
DELETE RELATIONS_BY_FIELD_REPORT;
REDEFINE PROCEDURE RELATIONS_BY_FIELD_REPORT
!
READY SECURITIES_DATABASE USING RDB$RELATION_FIELDS READ
!
DECLARE SOURCE_FIELD COMPUTED BY CHOICE
       RDB$FIELD_SOURCE EQ RDB$FIELD_NAME THEN ""
       ELSE RDB$FIELD_SOURCE
END_CHOICE.
!
!
ON RELATIONS_BY_FIELD.LIS
ON TT:
REPORT RDB$RELATION_FIELDS WITH RDB$RELATION_NAME NOT CONT "RDB$" SORTED BY
              RDB$FIELD_NAME, RDB$RELATION_NAME
       SET REPORT_NAME = "Relations by Field"
       AT TOP OF RDB$FIELD_NAME PRINT COL 1, RDB$FIELD_NAME ("Field")
              PRINT COL 5, RDB$RELATION_NAME ("Relation Name")
       AT BOTTOM OF RDB$FIELD_NAME PRINT COL 40,
                                    COUNT ("Number of"/"Relations"),
                                    SKIP 1
END_REPORT
!
END-PROCEDURE
```

```
                              Relations by Field                15-Mar-1987
                                                                Page 1


                                          Number of
            Field                         Relations

COMPANY_DESCRIPTION
    COMPANIES
                                                1

COMPANY_NAME
    COMPANIES
                                                1

COMPANY_NUMBER
    COMPANIES
    SECURITY_ID_TRANSLATIONS
                                                2

COMPANY_TYPE
    COMPANIES
```

```
    COMPANY_TYPES
                                                    2

COMPANY_TYPE_DESCRIPTION
    COMPANY_TYPES
                                                    1

COMPANY_TYPE_NAME
    COMPANY_TYPES
                                                    1

LATEST_UPDATE
    COMPANIES
    CURRENCIES
    DISTRIBUTIONS
    MARKETS
    PRICE_HISTORY
    SECURITY_ID_TRANSLATIONS
    SECURITY_INFO
                                                    7

       .
       .
       .
```

The third and last report is very similar to the second report, except that the field is analyzed based on the original source field instead of the field name in the relation. It provides analysis of the use of the global fields in the database. Note that this analysis reveals two more relations that contain references to the global field COMPANY_NUMBER, fields that have local field names which are different from the global field name.

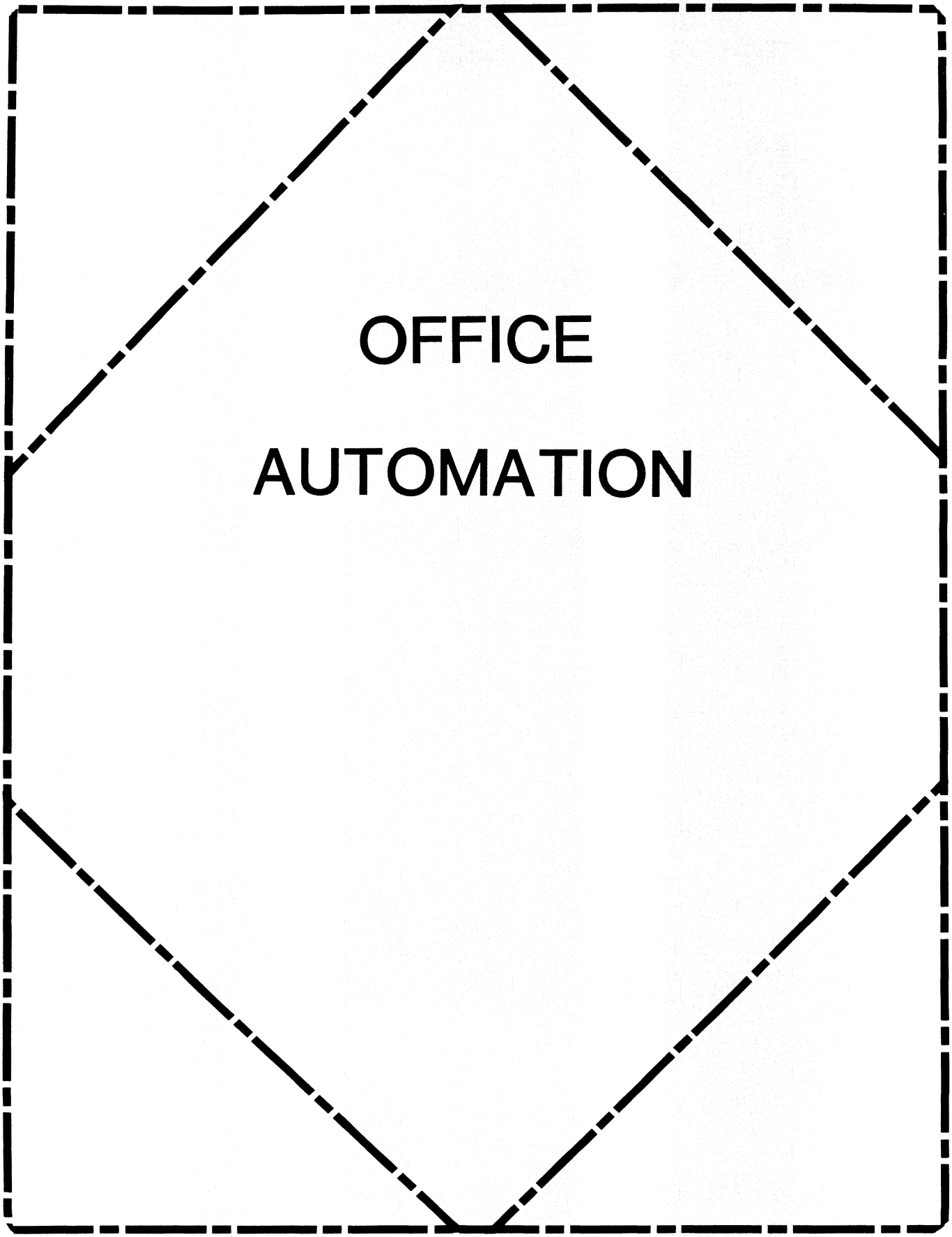
```
DELETE RELATIONS_BY_SOURCE_REPORT;
REDEFINE PROCEDURE RELATIONS_BY_SOURCE_REPORT
!
READY SECURITIES_DATABASE USING RDB$RELATION_FIELDS READ
!
ON RELATIONS_BY_SOURCE.LIS
ON TT:
REPORT RDB$RELATION_FIELDS WITH RDB$RELATION_NAME NOT CONT "RDB$" SORTED BY
            RDB$FIELD_SOURCE, RDB$RELATION_NAME
       SET REPORT_NAME = "Relations by Source Field"
       AT TOP OF RDB$FIELD_SOURCE PRINT COL 1, RDB$FIELD_SOURCE ("Source
Field"/"and Relation")
            PRINT  COL 5, RDB$RELATION_NAME,
                   COL 40, RDB$FIELD_NAME ("Actual Field")
       AT BOTTOM OF RDB$FIELD_SOURCE PRINT COUNT ("Number of"/"Relations"),
SKIP 1
END_REPORT
!
END-PROCEDURE
```

```
                        Relations by Source Field              15-Mar-1987
                                                               Page 1

         Source Field                                                Number of
```

```
        and Relation                    Actual Field            Relations

COMPANY_DESCRIPTION
    COMPANIES                       COMPANY_DESCRIPTION
                                                                    1

COMPANY_NAME
    COMPANIES                       COMPANY_NAME
                                                                    1

COMPANY_NUMBER
    COMPANIES                       COMPANY_NUMBER
    COMPANIES                       PARENT_COMPANY
    SECURITY_ID_TRANSLATIONS        COMPANY_NUMBER
    SECURITY_INFO                   ISSUER
                                                                    4

COMPANY_TYPE
    COMPANIES                       COMPANY_TYPE
    COMPANY TYPES                   COMPANY_TYPE
                                                                    2

        . . .
```

Obviously, there are many other things that one can do using the Rdb system relations. For example, you might write reports on the usage of your indexes (stored in RDB$INDICES and RDB$INDEX_SEGMENTS), about views (RDB$VIEW_RELATIONS), about constraints (RDB$CONSTRAINTS and RDB$CONSTRAINT_RELATIONS).

Keep those cards and letters coming!


OFFICE
AUTOMATION

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• M Hyde & C.J. Trayser, Digital Equipment Corp.

FROM THE EDITOR...

You may notice a more consistent typestyle and format in this issue. It is the first OA issue put together using the ALL-IN-1 tool 'DECpage'. DECpage produces typeset style output to a laser printer. We will be discussing how to submit electronically in future issues. For now, anyone with articles should contact me first to discuss methods of submission.

We have two highlighted technical articles in this issue: Setting VMS Passwords for Captive Accounts, and Starting the All-In-1 to Message Router Batch Jobs Automatically during System Startup. I am sure you will find these 'how to' type articles useful at your own facilities.

We also have our regular Notes column which I have received some very positive comments about. I am glad to see that our articles are being used to help solve your questions and problems. Please feel free to call or write with comments about articles in the newsletter.

Regards,

Therese

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SETTING VMS PASSWORDS FOR CAPTIVE ALL-IN-1 ACCOUNTS

John Mulhollen, Senior Computer Program Coordinator, TRW, San Bernadino, CA

We have a large complement of captive ALL-IN-1 users and for security reasons have stripped them of DCL and Command privileges and implemented system-generated VMS passwords (GENPWD in AUTHORIZE). We had no problems with this procedure for a little over three months — until passwords started to expire. Users would be told at login time that their VMS password was about to expire (and it finally would), but were never afforded the opportunity to change it!

The system manager did not appreciate being inundated with requests to change VMS passwords (and turn on the accounts of those unfortunate souls who allowed their passwords to expire), so we developed an ALL-IN-1 command file (CPW.COM) to allow the captive ALL-IN-1 user to change his or her own password without the intervention of the system manager.

Copy CPW.COM into OA$LIB2: (or whatever directory you use for site specific ALL-IN-1 enhancements) and modify the menu form you want to be able to call CPW from (we chose MAIN2,, but you could use DEFAULT to allow CPW to be called from any menu). In our specific case, we modified the named data of MAIN2 as follows:

```
CPW
Command OA$LIB2:CPW/CLEAR
```

When called, CPW allows the non-DCL privileged user to utilize the VMS SET PASSWORD command from within ALL-IN-1. A successful change of password results in the message "VMS password changed", while the message "VMS password not changed" will be displayed if the SET PASSWORD command should fail for any reason.

Here is the command file we used:

```
$!      CPW.COM -- command file to change VMS password from ALL-IN-1
$!      6 Aug 1986 J. Mulhollen
$!
$           on error then goto PW_NOT_CHANGED
$           write oamailbox "OA SHOW_FORM BLANK"
$           @dclmailbox
$           write sys$output " "
$           write sys$output "VMS Password Change: "
$           write sys$output " "
$           write sys$output " "
$           assign /nolog sys$command sys$input
$           SET PASSWORD
$!      if this DCL command errors out, control is passed to PW_NOT_CHANGED
$!      if the command is successful, control continues here...
$           write oamailbox "OA CLEAR"
$           write oamailbox "OA DISPLAY VMS Password has been changed"
$           @dclmailbox
$           exit
$!
$           PW_NOT_CHANGED:
$!      comes here if SET PASSWORD errors out
$           write oamailbox "OA DISPLAY VMS Password not changed"
$           @dclmailbox
$           exit
```

Starting the All-In-1 to Message Router Batch Jobs Automatically during System Startup

Bart Z. Lederman, ITT World Communication, New York, NY 10004-2464

All-In-1 V2.1 uses the Message Router and Message Router VMS Mail Gateway to exchange electronic mail between All-In-1 users and VMS Mail users on the same system (node), or on different systems (nodes in a network). In order for this to work, however, there must be two batch jobs scheduled to run at regular intervals which exchange mail between the Message Router and All-In-1. For example, with all of the Message Router products installed and running, a SHOW QUEUE/ALL command should look something like this (you will see two sets of queues here as I have a two node cluster):

```
$ show queue/all
Generic batch queue MB$BATCH

  Jobname         Username        Entry     Status
  MB$MR           MRMANAGER       1765      Holding until 13-MAR-1987 09:17
  MB$MG           MRGATE          1769      Holding until 13-MAR-1987 09:22
  MB$NET          MRMANAGER       1770      Holding until 13-MAR-1987 09:27

Batch queue MB$BATCHSYS30, on SYS30::

Batch queue MB$BATCHSYS31, on SYS31::

Generic batch queue SYS$BATCH

Batch queue SYS30BATCH, on SYS30::

Batch queue SYS31BATCH, on SYS31::

  Jobname         Username        Entry     Status
  MRTOVMS         MRGATE          1777      Holding until 13-MAR-1987 09:20
  OAMTISEND       ALLIN1          1782      Holding until 13-MAR-1987 09:23
  OAMTIMAIl       ALLIN1          1784      Holding until 13-MAR-1987 09:28
  MRTIDY          MRMANAGER       1717      Holding until 14-MAR-1987 03:00
```

The two queues which exchange mail between All-In-1 and the Message Router are OAMTISEND and OAMTIMAIL.

The other jobs (MRTOVMS, MRTIDY, etc.) are automatically started when your system is booted by the Message Router or Message Manager startup command files (if you have followed the installation instructions and added the command files to your SYSTARTUP.COM file), but the two All-In-1 jobs are NOT started: You have to manually start them using All-In-1. I find this inconvenient: I would much rather have everything start automatically when I boot my system. To solve this problem, I have developed a batch procedure which can be invoked during system startup to insure that everything is running.

To invoke this command procedure, you must submit a batch job AFTER the queue manager has been started, and AFTER All-In-1 has been started. Normally, in your SYS$MANAGER:SYSTARTUP.COM file you will have the command to start the queue manager before you invoke the All-In-1 startup command file: Therefore, you can make a simple change to SYS$MANAGER:A1V2START.COM shown here between the rows of exclamation points:

```
$ ! Run ALLIN1 to install the forms and TXL libraries
$ set noon
$ ALLIN1/NOINIT
oa$fbtremovelib oa$lib:memres
oa$fbtremovelib oa$lib:oaform
oa$txlremove
oa$fbtinstalllib oa$lib:memres
oa$fbtinstalllib oa$lib:oaform
oa$txlinstall
$!
$ !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
$!
$! Make certain the mail queues have started.
$! Must be a batch job as it has LIN1 account.
$!
$! B. Z. Lederman
$!
$ submit/user=ALLIN1 sys$manager:a1mailstart.bat
$!
$ !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
$!
$ set on
$ !
```

The batch file A1MAILSTART.BAT looks like this:

```
$! This should startup the All-In-1 to Message Router
$! batch queues.
$!

$! B. Z. Lederman                    12-Mar-1987

$!
$ ALLIN1/USER=MANAGER/NOINIT
COMMAND EMCONTROL SS
COMMAND EMCONTROL SF
$!
$ PURGE A1MAILSTART.LOG
$!
$ EXIT
```

The reason for making this a batch job is because you usually have to be in the (All-In-1) MANAGER account, or another privileged account, to invoke commands like starting and stopping mail. The default profiles for All-In-1 require that you be in the (VMS) ALLIN1 account in order to use the (All-In-1) MANAGER account, so by submitting the batch job with the /USER=ALLIN1 qualifier, I insure that the job will be done in the proper account. Also, my system startup is a little faster because I don't have to wait for All-In-1 to do the work of starting the queues.

It was stated earlier that the All-In-1 batch jobs don't start automatically. In practice, this depends upon what state the batch queues are in when the system shuts down and re-boots. It is possible for a batch job which was scheduled before the system shuts down to still be scheduled when the system re-boots: But it is also possible for batch jobs to be "lost", especially if you have to re-initialize the queue manager. This procedure is intended to insure that all of the necessary batch jobs are started when the system is re-booted regardless of the state of the queue manager.

Notes on Notes

— Discussions on VAX Notes - Volume 1, Number 6

by Mark Hyde and C J Trayser, VAX Notes Support Specialists, Digital Equipment Corporation

VAX Notes has been announced for almost a year, has been shipping for over nine months and this begins our sixth month of this article. Hopefully you should all have had time to get Notes installed and running and to have become familiar with its features and functions. By now you have probably had the opportunity to use a VAX Notes' conference for a real business situation. Somebody mentions that the information that might be discussed is pretty sensitive and wants to know how secure the Notes environment is. VAX Notes, much like VMS, can be made more or less secure at the discretion of the system manager. Our goal this month is to clarify some of the issues surrounding conference security.

Some of the questions that usually come up are:

- Do I want people (anyone) to be able to create a conference in the NOTES$LIBRARY directory?
- Do I need to secure the file(s) from any individual, group or class of user?
- Should I have conferences restricted based on a membership list?
- Should people on only one certain node have access?
- Can I restrict certain people from accessing specific conferences?
- Should the file be read only for some people and read/write for others?
- Should certain users have certain privileges in a conference?

As you can see, the choices can be both difficult and confusing. So
to properly address solutions to address these questions we must first understand about the different ways VAX Notes accesses the conference files.

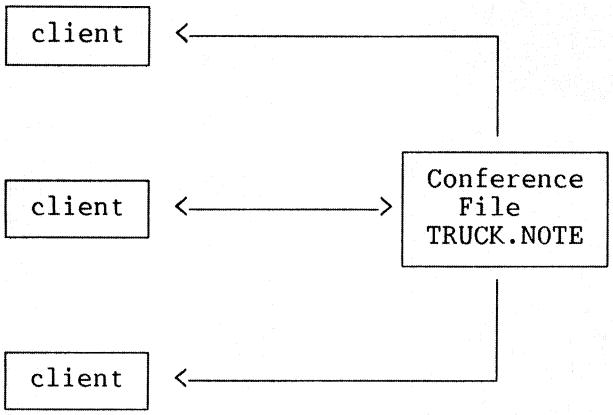
File Access

Notes allows access to conferences in two different ways, by either a direct RMS open of the conference file or by the use of the Notes server (a detached DECnet job, much like a generic NETSERVER). The 'standard' file open, that everyone should be familiar with, is what we refer to as 'direct' access. This is where the Notes program that the user runs (usually called the 'client' software) will issue the file open and does all the reading and writing to the conference file. When using this mode, each person accessing the conference has the file open and is reading and writing at the same time. The following diagram illustrates direct access concept:

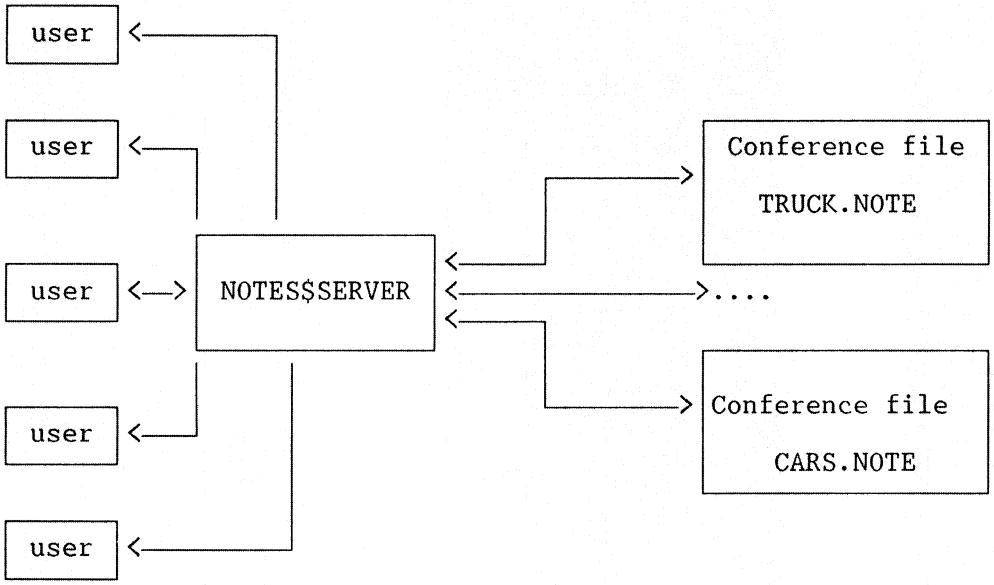
Direct access is only allowed to conferences which reside on the same machine as the user, and, like any RMS access to a file, is subject to UIC based protection, user privileges, as well as ACL's. Dealing with direct access means having to consider the many variations of those items that might occur in the typical VMS system.

Direct access is accomplished by NOT using the DECnet node name as a part of the conference file specification when adding the entry to your notebook:

```
Notes> ADD ENTRY TRUCK              ! For direct access
Notes> ADD ENTRY MYNODE::TRUCK      ! For server access
```



If Notes finds the node name as part of the file specification, it will invoke "server" access to the file. The server is a job running on the remote system that is able to accept connects and process requests from the users for the conference file. The server can accept connects an process requests from multiple users at the same time to the same or different conference files. The following diagram illustrates in a simple manner the concept of using the Notes server:



The server is a detached DECnet job that runs from an account named NOTES$SERVER. This was created during the installation of VAX Notes. If you prefer server access to all conferences, you will then have all access to the conferences taking place via a single UIC, which greatly simplifies the security effort. Requiring the use of the server for all accesses, both local and remote, is probably the best and easiest method for controlling conference security.

Server access is always used for accessing conferences on a remote node. It can also be used to access conferences on the local VAX. Of course, using the server means that your system must be running DECnet.

File Protection

As installed, NOTES$LIBRARY.DIR is owned by SYSTEM and has an ACL that disallows any NETWORK access to the directory and, specifically allows access for NOTES$SERVER.

```
NOTES$LIBRARY.DIR;1          [1,4]          (RWE,RWE,RE,RE)
     (IDENTIFIER=[NOTES$SERVER],ACCESS=READ+EXECUT)
     (IDENTIFIER=NETWORK,ACCESS=NONE)
```

This protects against anyone outside your node getting to the actual notes files themselves, and prevents non-privileged users from creating conferences directly in NOTES$LIBRARY directory. However, it does not control privileged users.

Notes offers a command procedure that you will find in SYS$MANAGER: called NOTES$MOVE_CONFERENCE.COM. This will take care of creating a relatively secure conference environment, but again, does not fully address privileged users. To use this procedure:

- First create the conference file in one of your own directories (i.e. SYS$LOGIN).
- Have a privileged user move the conference by executing the SYS$MANAGER:NOTES$MOVE_CONFERENCE.COM file.

This command procedure queries you for the location and name of the conference file, the username of the moderator, and whether or not you want to require server access. It then:

- moves the conference file to NOTES$LIBRARY
- changes its ownership to SYSTEM if server only access
- sets file protection and applies an ACL based on whether or not you require server access.

If you require server access, the file itself is protected from all access except by the server, the moderator, and privileged users, and looks like this:

```
TRUCK.NOTE;1        [SYSTEM]                (RWE,RWE,,)
      (IDENTIFIER=[NOTES$SERVER],ACCESS=READ+WRITE+EXECUTE)
      (IDENTIFIER=INTERACTIVE,ACCESS=NONE)
      (IDENTIFIER=BATCH,ACCESS=NONE)
      (IDENTIFIER=NETWORK,ACCESS=NONE)
      (IDENTIFIER=[HYDE],ACCESS=READ+WRITE+EXECUTE+CONTROL)
```

If you do not require server access, the file itself is still protected from network access, but is not protected from local users. The conference may be opened via the server or direct access and looks like this:

```
TRUCK.NOTE;1        [HYDE]                  (RWE,RWE,RWE,RWE)
      (IDENTIFIER=[NOTES$SERVER],ACCESS=READ+WRITE+EXECUTE)
      (IDENTIFIER=[HYDE],ACCESS=READ+WRITE+EXECUTE+CONTROL)
      (IDENTIFIER=[DECNET],ACCESS=NONE)
      (IDENTIFIER=NETWORK,ACCESS=NONE)
```

In some cases, such as on MicroVMS, users may not have or may not choose to use the ACL protection mechanism. Here is an alternative protection scheme that does not make use of ACL's.

- Set the ownership of the NOTES$LIBRARY.DIR file and all of the conferences in NOTES$LIBRARY to be owned by the [NOTES$SERVER] UIC.
- Set the protection mask on the NOTES$LIBRARY.DIR file to (S:RWE,O:RE,G:RE,W:RE), which, if you noticed, does NOT allow OWNER to WRITE!
- Set the protection mask on all of the conference files to be (S:RWE,O:RWE,G,W).
- Add a (large) diskquota entry on the NOTES$LIBRARY disk for the [NOTES$SERVER] UIC.

This scheme does the following:

- Allows the system manager to track disk usage easier since all Notes related files now have a Notes UIC instead of a System UIC.
- Allows access to the Conferences to ONLY the SERVER and privileged users.
- Prevents users from creating conferences in the NOTES$LIBRARY directory be not allowing Owner to Write (O:W).

Certain users can be allowed to only read while other users are allowed to write or read for local conferences. This is not a built-in feature, but is easily achieved by:

- Creating a Rights Identifier in Authorize for 'Writers' via Authorize.
- Granting that identifier to 'Writers' via Authorize.
- Adding an ACL with the Rights Identifier (just created) to the conference gives the holders of that identifier file access as defined by the ACL.
- Set the file protection to (S:RE,O:RE,G:RE,W:RE) and require the 'writers' to use direct access (i.e. NOT through the server).

All of this will allow those people with the rights identifier to be able to write to the conference and restricts others to read-only mode.

Another idea is to create separate library directories, perhaps on different disks and to define the NOTES$LIBRARY logical at the group level. This requires that the conferences be accessed directly, not using the server access, since it has its own UIC. This scheme allows different groups to only access conferences in their 'group defined' Notes library. This idea can be expanded to include system search-lists for the Notes$library logical.

Membership Protection

Thus far we have only talked about physical access to the conference files themselves. Earlier in our 'questions' we alluded to the fact that you could give members privileges. The two privileges that are available with the current version of Notes are 'keyword_create' and 'moderator'. The keyword create allows you to define a keyword that other noters may attribute to different entries in the conference. Any user may associate an existing keyword with a note via the ADD command, but only users with the create privilege can cause a new keyword to exist.

The other privilege is the Moderator privilege. This privilege, when assigned to a member of the conference, allows that user to do the following:

- Add and/or modify members and their privileges. This includes making other members a moderator.
- Set any note to 'hidden'. This sets a note so that ONLY the author and moderators can see the text. The banner (which includes title, author, date, etc.) is still visible.
- Modify the title of any note.
- Write to a conference or a note that has been set to NOWRITE.
- Delete ANY topic or reply.

Using this information and your own needs, you should be able to construct a protection scheme to meet your conference security needs. The ability to offer more of this kind of control from within the product itself is high on the wishlist for a future version.

Happy noting :-)

ARTIFICIAL INTELLIGENCE

(THE (LINKED LIST))
The Newsletter of the DECUS Artificial Intelligence
Special Interest Group

". . . It's The Real Thing"

Vol. 3 No. 4 May 1987

From The Editor:

This issue of (THE (LINKED LIST)) marks the beginning of the newsletter's third year of publication. Although the newsletter has a somewhat sporadic publication record, it's hard to say that the growth of the DECUS Artificial Intelligence Special Interest Group has been anything but consistent. Given Digital's stance on applied artificial intelligence as a corporate asset, the AISIG's continued growth is a virtual certainty.

During the past two years, AI has become a commercially viable tool instead of a journalistic buzzword. LISP machine vendors whose hardware provided the first AI application development and delivery platforms have been joined by manufacturers of conventional data processing equipment. During the brief period that (THE (LINKED LIST)) has tracked Digital's significant contributions to the field of AI, even IBM, no friend of unproven technology, has decided that the time is right to begin delivering AI solutions to its users.

Digital Equipment Corporation is, quite understandably, tight-lipped about future product directions and corporate strategies. While I'm not privy to the details of Digital's game plan, I did happen to notice that Ken Olsen used the phrases "networking" and "artificial intelligence" in the same sentence when he addressed the attendees at Digital's annual stockholder's meeting . . .

(THE (LINKED LIST)) is the only medium through which the AISIG can manifest itself to the thousands of DECUS members who cannot attend symposia. A newsletter cannot, however, do justice to the DECUS volunteers whose efforts have transformed the AISIG from a nascent concept into a dynamic special interest group. Page count limitations preclude me from listing each individual contributor, but the efforts of SIG Chair Cheryl Jalbert, Assistant Chair Don Rosenthal, Digital Counterpart Art Beane, Symposium Coordinator Pam Vavra and SIG Guru Dr. David Slater warrant special recognition. And, given my position as SIG newsletter editor, I'd be remiss if I didn't convey my appreciation to my readers and contributors. Thanks much!!!

Terry C. Shannon

As usual, (THE (LINKED LIST)) welcomes your articles, book reviews, comments and suggestion. For further information, give me a call at (617) 375-4321.

AI KNOW HOW

Edited by D. Frydenlund

"AI Know How" is a brand new column in this newsletter. Its purpose is to allow a forum for the free exchange of information about the world of Artificial Intelligence and its contributions. This column will draw on the collective wisdom of the AISIG's members and steering committee, contacts at Digital and additional sources to answer virtually any question about AI.

"AI Know How" grew out of discussions at various symposia which fundamentally addressed the issue of "Where can I go or who can I talk to to get additional information about AI?"

This column is here to provide you an opportunity to "talk to the wizards" and at least get pointed in the right direction. Of course, the DECUS commercialism policy and other standards will apply to the questions and answers published here.

To get more "AI Know How", address your questions to me and I will help you find an answer.

David Frydenlund
10839 Broadwater Dr.
Fairfax, VA. 22032

Question 1:

My Department has been using a Public Domain OPS for doing quick feasibility studies involving various pattern matching problems. We are considering the purchase of a fully supported OPS (or equivalent INEXPENSIVE rule-based system), to run on our VAX running VMS, and need some guidance.

I have used OPS5 before, and like it, but don't really know how it compares to OPS83, etc. I am less concerned with performance than functionality, in general. I'd like to see a comparison table listing important features and limitations of various production systems, from a guru rather than from a vendor or well-intentioned novice researcher. Often times, I'll be told that a particular feature does not exist in OPS5, for example, but later learn from my OPS5 guru friend that, while it is not immediately evident, the feature is very easily constructed. Thanks for any 'AI Know-How' you can provide.

Pam Vavra

Report on IEEE Database and Knowledge Base Conference

By Becky Selke

The Dallas Chapter of the IEEE Computer Society sponsored a conference here at the University of Texas at Dallas, entitled New Directions in Database and Knowledge Management systems. In addition to speakers from several local universities, companies such as Texas Instruments contributed as well. The talks addressed topics in both relational database and knowledge based systems areas. Several talks addressed methods of combining knowledge based systems with conventional DBMS's. Applications were discussed in VLSI design, gate scheduling for airports, and telecommunications.

Issues such as the special problems of spatial and temporal databases and knowledge bases were also addressed. It was apparent from the conference that there is no universal right answer to any of the questions posed. There is however, an impressive diversity of solutions being proposed.

It is encouraging for there to be cooperation between the database and the AI people. Several papers examined the transfer of technology between these two fields to solve problems. It must be recognized that solutions to AI problems need not be discovered strictly in AI research.

The conference was the first sponsored by the local chapter. There were over 40 papers scheduled for presentation. It was an impressive first attempt for a conference from the group. We are hopeful that other conferences such as this will be offered in the area.

IEEE Conference on Artificial Intelligence Applications Report

By Jim Sims

The IEEE Conference on applications of Artificial Intelligence was held at the Hyatt Orlando Feb 23-27, 1987. Feb 23rd and 24th consisted of two half-day tutorials each day on various topics. Each of the three remaining days included a keynote address by a well known AI researcher or implementer, followed by a morning and afternoon session of user-presented papers.

I attended the tutorials on Analyzing Expert System Building Tools and Managing Knowledge System Development on Feb 23rd and the AI & Computer Integrated Manufacturing and AI Programming on Parallel Machines tutorials on Feb 24th. The tutorials were of average quality except the last which was very good. The first two talks were given by consultants and were oriented towards a novice level audience. The talk on AI and CIM was really a talk about Carnegie Group's attempt to

solve all the problems of CIM by scheduling things based on constraints. This was a typical solution looking for a problem. The last talk on AI and Parallel machines was quite informative and rapidly escalated from a definition of basic terms to a discussion of complex problems and solution approaches. The speaker, Joe Brandenburg of Intel, was very interesting and obviously enjoyed talking about his work. His style was very energetic and facilitated user ideas and interaction in an organized manner.

The first keynote address was given by Gary Hendrix of Semantec on AI and Natural Language in the Real World. It was quite humorous and informative, illustrating many of the common pitfalls in the development of an AI product. The major lesson to be learned was to do AI because it solves a problem, not because it's AI. Other points included not getting yourself tied too tightly to venture capitalists, properly defining what you are going to build and how (and not swaying for money), and the value of proper marketing.

The Wednesday morning session I attended was for several invited talks. Both talks concerned the use of qualitative models for knowledge bases and the integration of separate KBs into functioning systems, much in the manner that CAD systems are currently evolving into CIM systems. The model-based reasoning paradigm seems to be emerging as a forerunner of the AI reasoning methods. It seems natural since humans reason about everything in this manner.

The afternoon session was on Manufacturing. I attended the Knowledge-based Imaging system for NDT and the Object Based programming system for parts routing. The first session was interesting in that it provided an example of a method for determining properties of a system based on knowledge of the structure and a test signal. This inversion process is not solvable analytically. The second system allows manufacturing engineers to route parts based on Group Technology utilizing a rule based Expert System. The last talk was on visual based inspection of solder joints. This paper discussed statistical fits of data, use of an expert system to grade the joints, comparison of the statistical, Expert System, and human evaluators, and the use of computer generated rules to populate the expert system. It was very interesting.

The keynote address on Thursday was given by John Laird of the University of Michigan on Expert Systems in a General Cognitive Architecture. This talk was informative in a general sense, but not in a concrete, specific manner.
The first paper session was concerned with Explanation-Based Learning systems. The talks centered around the weaknesses of EBL systems and methods for overcoming these problems. This is an area which appears to need quite a bit of research before any major paybacks are realized in general systems applicability.

The afternoon sessions I attended were on Robotics & Perception and Diagnosis Systems. The first paper was about terrain acquisition for a mobile robot among polyhedral obstacles. The subject was well covered and seemed trivial when approached from the proper perspective. The next talk was given by David Rolston of Honeywell on a system for diagnosis of mainframe peripherals. This talk illustrated some of the untenable payoffs of using Expert Systems, including consistency of policy application.

The Honeywell field service expert system is not yet fielded in a production mode but has already paid for itself. This is unusual as you might guess. The reason stems from the field service procedure for disk drive repair. When there is a problem that you can't fix and the customer is staring over your shoulder, the unwritten rule is to do something that looks busy and meaningful. This means replacing the Head Disk assembly which takes a couple of hours and costs about $3000. This used to be very effective since many strange problems were in fact located in this assembly. Honeywell recently redesigned the HDA. The field service personnel were still employing the old word-of-mouth rule for replacing HDAs but it doesn't help very much. The Expert System was able to bring this out very clearly, at a cost savings of approximately $250,000.

The keynote on Friday was given by Doug Lenat of MCC on their approach to overcome the brittleness barrier in knowledge based systems. The commercialization of AI technology began in the early seventies when Ed Feigenbaum of Stanford realized that even though no one could (or can) build an AI system to operate on the so called strong methods of reasoning, there were a wealth of applications in very narrow domains that could be addressed very adequately (and profitably) by the weak reasoning methods. This was the birth of the Expert System. Expert Systems are very brittle though, when based on these methods. The systems do not "understand" what they are "reasoning" about.

For example, MYCIN, an expert system for infectious blood disease diagnosis, can diagnose blood diseases better than about 90% of the doctors it was tested against. However, if you told MYCIN that the patient was 7 years old and exhibited reddish brown skin spots, it would conclude that the problem was measles with some degree of certainty and recommend some course of treatment, even if you told it the "patient" was your rusting 1980 Chevrolet. This is because it really does not understand the concepts of disease, patient, or anything else for that matter. The system merely has been "told" how to replace variables and calculate probabilities. It has no "common sense".

The CYC project at MCC is attempting to overcome this limitation by building a truly massive knowledge base. This will also aid researchers in investigating problems of scaling systems and has already made significant progress. This system is being built in several steps, in the classic AI tradition. The first idea was to take an encyclopedia and input it into a massive knowledge base. This soon proved to be infeasible because of the common sense knowledge knowledge required to understand any of the articles. The researchers discarded this prototype and decided to use a desktop encyclopedia, after first "teaching" the system what facts, rules, concepts, etc are. The system is progressing well and will soon enter the second phase in which knowledge-enterers will use the copy-and-edit facilities to expand the knowledge base in a massive manner. One of the interesting concepts in the construction of the KB is that CYC itself is allowed to update its knowledge base, thereby extending the power of the system immensely.

AI EVENTS CALENDAR

By Jim Sims

May 1987

May 13-15

Seventh Annual International Workshop on Expert Systems and Their Applications - Avignon '87, Avignon, France

New implementations, basic tools and techniques, practical guidelines for applications.

Jean-Claude Rault
Workshop Chairman
Agence de l'Informatique
Tour Fiat Cedex 16
92084 Paris-La Defense, France 331-47964314

May 25-30

International Workshop on Parallel Algorithms and Architectures, Suhl, GDR

Thomas Zeugmann
Mathematics Dept
Humboldt University Berlin
P.O. Box 1297
Berlin 1086, GDR Telex 011 2823

May 27-29

AAAI Workshop on Qualitative Physics, Univ of Illinois at Urbana-Champaign

Foundational Research, Implementation techniques, Applications, connections to other areas of AI.

Kenneth D. Forbus
Qualitative Reasoning Group
Dept of Computer Science
University of Illinois
1304 W. Springfield Avenue
Urbana, Illinois 61801

June '87

June 4-5

4th Annual Workshop on Theoretical Issues in Conceptual Information Processing, Washington, D.C.

Exploration of issues common to representation and organization of knowledge and memory for natural language understanding, planning, problem solving, explanation, learning, etc.

James Hendler
Computer Science Dept.
University of Maryland
College Park, Md. 20742

June 22-25

Second Annual Symposium on Logic in Computer Science, Ithaca, N.Y.

Abstract data types, foundations of logic programming, software specifications, logic-based languages, logic in complexity theory.

David Gries
Program Chairman-LICS
Dept. of Computer Science
Cornell University
Ithaca, N.Y. 14853 (607) 225-9207

June 28-July 1

ACM/IEEE Design Automation, Fountainbleau Hilton Hotel, Miami, Fla

Design Automation Conference
1730 Massachusetts Ave., N.W.
Washington, D.C. 200036-1903 (202) 371-0101

July '87

July 12-18

AAAI-87 Sixth National Conference on Artificial Intelligence Seattle, Washington

AAAI-87
American Association for Artificial Intelligence
445 Burgess Drive
Menlo Park, Ca. 94025-3496

July 13

Blackboard Systems: Implementation Issues, Seattle, Washington

Invited workshop on blackboard systems implementation issues; Control issues, Organization issues, Parallelism, Performance, Development environment.

Workshop Chair:

V. Jagannathan
MS 71-64
Boeing Advanced Technology Center
Boeing Computer Services
P.O. Box 24346
Seattle, Washington 98124-0346 (206) 865-3240

July 16

Workshop on Planning for Autonomous Mobile Robots, University of Washington, Seattle, Washington

This workshop will discuss planning and knowledge requirements of an autonomous exploratory robot, such as Mars Rover. The topics include: Spatial Rep, Risk Analysis, Planning in Dynamic domains, Map Building, Spatial and Temporal Reasoning, Physical Reasoning, Planning under Uncertainty, Experience based Planning, Sensor Coordination, and Route Planning.

CFP to:

David P. Miller
Dept. of Computer Science
562 McBryde Hall
Virginia Tech
Blacksburg, VA. 24061 (703) 961-5605

August '87

August 23-28

IJCAI-87 10th International Joint Conference on Artificial Intelligence, Milan, Italy

Conference Information:

Alan Bundy
Dept. of Artificial Intelligence
University of Edinburgh
80 South Bridge
Edinburgh, EH11HN, UK

September 1987

September 21-25

European Congress on Simulation Conference and Exhibition, Prague, Czechoslovakia

ECS '87
c/o Director , Institute of Computer Sciences
Czeckoslovak Academy of Sciences
182 07 Prague
P.O. Box 5, Czeckoslovakia 846669

October 1987

October 5-7

AAAI Spatial Reasoning and Multi-Sensor Fusion Conference, Pheasant Run Resort, St Charles, Ill.

Spatial Reasoning, Multiple sensor inputs, Spatial Planning, Formal Theory, Fusion of sensory inputs, Evidential Reasoning.

CFP to:

Su-shing Chen
Dept of Computer Science
University of North Carolina
Charlotte, NC 28223

NEW AI SOFTWARE AVAILABLE FOR VAX HARDWARE

By Terry C. Shannon

CAMBRIDGE, MASS-- Heralding a move from dedicated AI hardware into the mainstream data processing marketplace, AI software vendor Applied Expert Systems, Inc. (APEX) has announced the availability of APEX Client Profiling, a sophisticated VAX-based AI software package designed to help insurance agents tailor financial packages to meet the needs of potential clients.

According to APEX public relations specialist Lynn Smith, the Client Profiling System gives insurance companies, banks and other financial institutions a new means to provide their field agents with expert advice. The Client Profiling software, which incorporates the expertise of tax, investment, estate, retirement and insurance specialists into a knowledge-based expert system, runs in batch mode on DEC VAXes, with remote data entry from an IBM PC-compatible microcomputer.

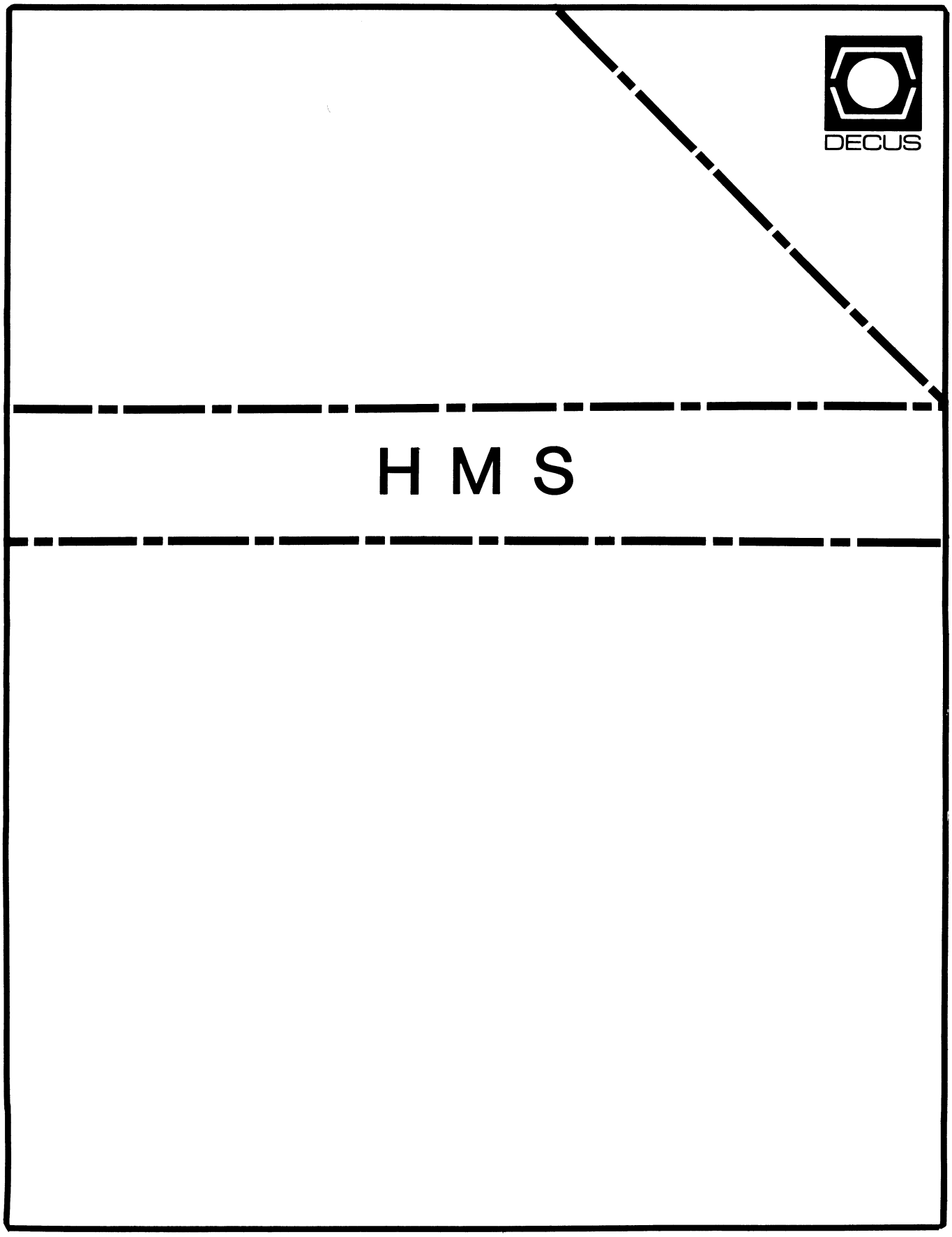
The development of an AI application that runs on conventional hardware instead of a dedicated symbolic processor is a first for the Cambridge software developer. APEX's first product, Planpower, is a Lisp-based expert decision support system that runs on dedicated Xerox AI workstations which rely software hooks to access information stored on corporate mainframes. The Client Profiling system, by contrast, relies on a VAX-resident expert system module to more tightly integrate AI capabilities with conventional data processing resources. Jointly developed with a major insurance company, the Client Profiling System uses knowledge-based intuitive processing to match corporate product and marketing strategies to specific client needs and objectives. Because the software helps field agents better understand client's needs, institutions can design and offer a broader range of financial products to its customers.

Noting that the Client Profiling system can process at least 1,000 individualized recommendations per month, Smith maintained that the new software is a strategic asset that can help a firm broaden its market share by increasing the number of customers it services without a corresponding personnel increase.

To use the Client Profiling system, a field agent enters the client's financial information on a personal computer at the field office. After the information is uploaded and processed on the VAX-resident Client Profiling system, the agent downloads a presentation-ready file containing 15 to 20 pages of customized financial recommendations for the client, as well as a suggested sales strategy that reflects the client's situation.

Smith contrasted APEX's new knowledge-based software package with traditional decision support programs by emphasizing the specificity of the information provided by the Client Profiling system. "Unlike conventional financial planning software packages which analyze needs and make generalized recommendations, the Client Profiling system takes into account expressed customer priorities and develops specific recommendations supported by clear implementation strategies," Smith said.

The Client Profiling system is currently in field test and customer installations are expected to begin in May 1987. Applied Expert Systems is located at Five Cambridge Center, Cambridge, MA 02142.



H M S

FROM THE EDITORS -- Bill Walker/Carmen Wiseman

DEADLINE FOR THE NEXT ISSUE: 24 MAY 1987

For some reason, the bulk of this issue of the newsletter emanates from Ohio -- March must be a slow time in the rest of the country.

Since we didn't have a large volume of material this month, I had the time to do a little bit of clean-up. The "Hardware Submission Form" is back -- slightly revised. It is in the "Questionnaire" section of the combined newsletters (it disappeared a few months ago for some reason). If you have a short note, a "war story" or just a problem that has you stumped, you can send it in on this form.

Also, I would like to remind everybody (hint, hint) that there are many other ways to send material in to the HMS SIG Newsletter. If you flip back to the "How To" section, you will find a description of several methods to get stuff to either myself or Carmen. Basically, if you write it, we'll figure out some way to get it in print.

-- Bill Walker, Editor

CALL TO NASHVILLE PRESENTERS!

If you gave a hardware-related session at DECUS South in Nashville, why not send us an article summarizing your presentation for publication in the HMS SIG Newsletter?

Actually, we're not just begging for material here! Spreading information, particularly information that only hard-won experience can provide, is what an organization like DECUS is all about. The HMS SIG Newsletter is a very effective channel for disseminating such information: It reaches a lot of people, including DECUS members who don't have the time or the bucks to attend both national symposia every year. You'd be doing those folks a real favor by publishing an article giving the high points of your talk.

The stuff you send us doesn't have to be too long, but it should contain more detail than the synopsis in the program book. If you're self-conscious about your literary talents or feel you just don't have the time to reconstruct your notes, relax! You can send in your raw, seething index cards or overheads, and we'll take care of cooking it all up into a legible article for the newsletter. (The important thing is substance, not style.) We'll gladly return any graphics or other materials when we're through with them.

If you have any questions about submitting a presentation article, give me a buzz at (617) 375-4361 between 9 a.m. and 6 p.m. EST.

-- Carmen D. Wiseman, Assistant Editor

HARDWARE HINTS AND KINKS

BA23 Power Cable Problem

[Terry Compton submitted this note over CompuServe. -- Ed.]

This month's service fiche lists a problem with all BA23-Ax and BA23-Bx boxes. I would assume that this information would also apply to all products that use the BA23 like MicroVAXen, and VAXstations.

It seems that the connectors on the DC power cable from the power supply to the backplane are underrated to carry the current involved. The current rating of the components involved were derated by the manufacturer.

This could result in overheating of the connector and possible system failure. The original cable is part number 70-20450-01; it has been replaced by part number 17-01311-01. You can also order the entire FCO for this fix, which is part number EQ-01427-01 for the FCO instructions with parts, or FA-04712-01 for the FCO only.

If you want DEC to come out and take care of this problem for you, they will be glad to--at "the then current hourly rate".

Terry Compton
Comp3, Inc.
2500 Onyx Ct.
Grove City, OH 43123

Using An LA120 As Operator's Console

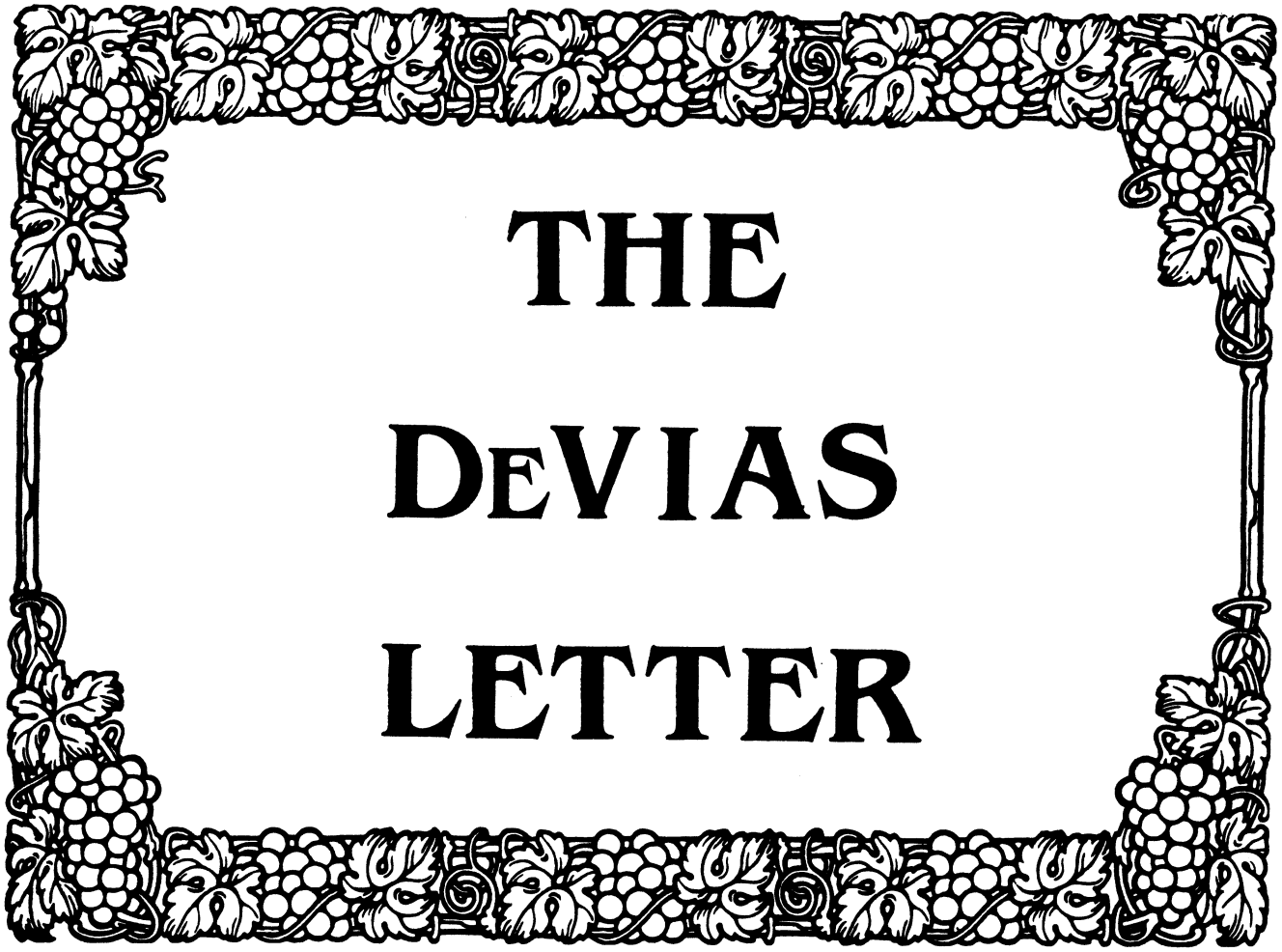
[Steve Murphy sent in the following note. He is using an 11/34A running RSX-11M V4.2D. -- Ed.]

Warning: If you have an LA120 as your operator's console and it is on a switchable power source, the boot PROM code execution will be confused with the following results:

1. The registers will not be printed on the console at power-up.
2. Tapes which are normally bootable on MT: and MU: devices (TE10-W and TK50) will no longer boot.

Fix: Put LA120 on a nonswitchable line.

Steve Murphy
Goodyear Aerospace Corp.
1210 Massillon Road
D/691 B/2
Akron, OH 44315



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CONTRIBUTION GUIDELINES

Contributions for the newsletter should be sent to:

Frank R. Borger
Michael Reese Medical Center
Department of Radiation Therapy
Lake Shore Drive at 31st St
Chicago, IL 60616

Contributions of letters, articles, important SPR's etc will be accepted in any form, (including notes jotted in pencil on gravy-stained tablecloths.) Contributions will be much more graciously accepted in one of the following formats:

1. Non machine readable sources, (SPR's etc,) should be reasonably dark to insure good photocopying. Text whatever should be the equivalent of 66 lines at 6 lpi, with 4-line top margin, 5-line bottom margin, left-margin 10, right margin 74 at 10cpi. If using a DEC LN03 for output, use left-margin 8. right margin 72.

2. Machine readable sources may be submitted on 9-track Mag-tape, (800,1600, or 6250 BPI,) DEC-tape II, DecMate floppies, or whatever. We're not fussy, we'll even accept paper tape or cards. Preferred format is DOS or BRU for tapes, Files-11 for DEC-tape II.

3. 1200 baud dial-up modems are available on our IAS system and our VAX, with various servers available. Give the editor a call at (312)-791-2515 (preferably later in the day,) to obtain access information, etc.

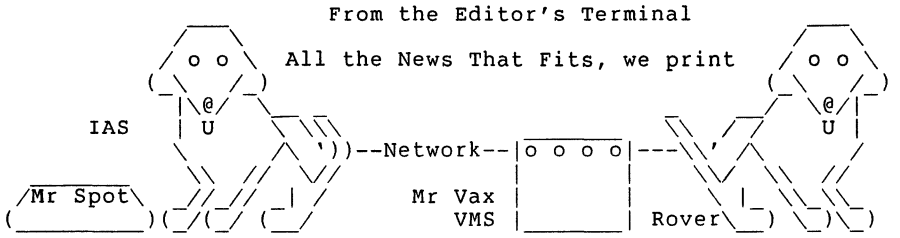
4. If long distance dialout is not possible on your system, we'll be willing to call your system and do the work, (unless you want to transfer the entire manual set at 300 baud.)

Any media sent to us will be promptly returned.

ASK THE DEVIAS WIZARD

If you have a problem you would like to submit to the Devias wizzard, write a letter or fill out a copy of a standard SPR and send it to the Editor at the above address. Answers to problems from members (or anyone) should also be sent to the Editor.

From the Editor's Terminal



All the News That Fits, we print

Spring is finally here, (as I write this,) and with it Spring DECUS is fast approaching, (or just over as you read this.) In any case, it has prompted your editor to get himself involved in a couple more projects (as if I didn't have enough to do already.) They should be of general interest to IAS enthusiasts.

Your editor has agreed to be a test site for Update D. We will attempt to provide information to users about the Update, and hope to get feedback from any other brave adventurers that DEC has talked into being a test site.

Through the kindness of Brian Nelson, we received a full set of sources for Bruce Wright's modifications to RSX kermit to allow it to run under IAS. See the following article for more information.

This month's program of the month is a simple one to program the programmable keys of a VT220 terminal. Before you try it on your system, be aware that we use a brand-x 220 clone that supports programmable unshifted as well as shifted keys, (which I believe the 220s SHOULD also do,) so be aware that you won't be able to re-define the non-shifted function keys on a real VT220.

Much talk has been floating around the SIGs lately about forming a combined PDP11 user's sig. The idea is that the VAX SIG has more impact on DEC due to its size, while the smaller 11 based SIGs don't get enough recognition, and that all the 11 users, if banded together, would provide a much more unified front. DEC seems to be ignoring the PDP11s lately, (face it, VAXes sell for a lot more that 11s.)

Your editor feels somewhat ambivalent. I am already closely involved with GRAPHICS, HMS, VMS, IAS, RT11, DATATRIEVE/4GL, RSX, (probably soon to be a full system, not just the VMS emulator,) and believe that there's nothing wrong about a small SIG or right about a large one. I do feel miffed when my paper on a home grown BASIC interperter (written in machine language,) is heard by 25 people, while down the hall 300 people are avidly listening to someone talk about "programming" in DCL on their VAX. TANJ.

If any of you out there have strong (or even weak) feelings about whether or not its time to circle the wagons and battle the cats, please write.

Summer is only 7430400 clock ticks away, (6192000 in Europe.)

Ten Years Ago Today

The May 1977 Multi-Tasker contained:

A long discussion concerning problems with SPR reporting. It first gave DEC's list of 8 reasons why a SPR would not be published in the dispatch.

1. SPR was for an unsupported version of the software.
2. Problem showed user did not apply previous fixes.
3. SPR attachment is unreproducable or too long.
4. Problem has been previously published.
5. Problem is unclear and could cause confusion to readers.
6. SPR is marked "Do not publish."
7. Problem is considered to be of limited interest.
8. SPR is a "Suggestion only."

A survey of 44 SPRs sent to the SIG since the first of the year showed that only 5 had made it to the Software Dispatch. The Software Communications office was "Researching the 39 (other) SPRs to determine exactly how they were disposed of and what reasons were given for non-pubication. (I would be surprised if the percentages have changed much in the last 10 years, ed.)

George Hamma (of the BAYLUG,) had a nice table comparing 11M version 2 versus 11D version 6, showing what 11D system directives were fully supported, and which ones were not supported, or weren't supported in all three forms, ($, $C and $S.) It was a nice guide on how to develop code on larger 11D systems that would run on smaller 11M systems. (Quite the reverse of today's conditions, as we wait for RMS version 2 ed.)

Rebuttal, support and comments followed concerning the upcoming question of charging for the SIG newsletters. (The more I re-read the discussions and squabblings that were going on 10 years ago, the more I appreciate the simplicity of the single SIGs newsletter, ed.)

Chapter happenings reported that a Pacific Northwest Real-Time LUG had been formed, with Ray French as co-ordinator.

Finally: a forum article that probably should have been on the editorial page by Mark Lewis deplored the "new DECUSSCOPE" format. He felt that the emergence of the SIG newsletters as the primary means of distributing system or application specific technical articles had left DECUSSCOPE with "A tone that is not dissimilar from the public relations pap that issues forth from Digital at similarly infrequent intervals."

MICHAEL REESE MEDICAL CENTER DEPARTMENT OF MEDICAL PHYSICS COMPUTER

LISTING OF DR2:[102,006]TVEDT.BAS ON 27-MAR-87 AT 15:48:19 PAGE 1

```
810 REM SET TELEVIDEO FUNCTION KEYS FOR EDIT
11 DIM A$[3],B$[100]V,c$[100]v,hx$[16]
12 PRINT CHR$(27);"<"; : break                    :! vt52>vt100 mode
13 print CHR$(27);"[63;1";chr$(34);"p"; : BREAK :! vt100>9220 mode
14 print chr$(27);"P0;1|";chr$(27);"\"; : break :! clear fn keys
16 pr$=chr$(27)+"OP"+chr$(27)+"O"+chr$(119)      :! ked cmd prefix
17 fo$=chr$(27)+"OM"                             :! ked cmd trailer
18 hx$="0123456789ABCDEF" : cr$=chr$(13)
20 ky$="37" : b$="BAS SD:[102,1]PROFF/RN"+CR$ : gosub 2000
30 ky$="38" : b$="BAS SD:[102,1]PRON/RN"+CR$ : gosub 2000
40 ky$="39" : b$=pr$+"OP OU " : gosub 2000
50 ky$="40" : b$=pr$+"WR SEL"+fo$ : gosub 2000
60 ky$="41" : b$=pr$+"WR RES"+fo$ : gosub 2000
70 ky$="43" : b$="TER /NOSFF"+CR$+"PIP TI:=SD:[102,1]FF."+CR$ :
       b$=b$+"TER /SFF"+cr$ : gosub 2000
80 ky$="44" : b$=pr$+"CLOSE"+fo$ : gosub 2000
90 ky$="45" : b$=pr$+"EXIT"+fo$ : gosub 2000
100 ky$="46" : b$=pr$+"QUIT"+fo$ : gosub 2000
110 ky$="51" : b$="BAS SD:[102,1]TVEDT/RN"+cr$ : gosub 2000
120 ky$="52" : b$="@SD:[102,1]MKED"+cr$ : gosub 2000
130 ky$="53" : b$="BAS SD:[102,1]TV9220/RN"+cr$ : gosub 2000
140 ky$="54" : b$="BAS SD:[102,1]TVONE/RN"+cr$ : gosub 2000
150 ky$="17" : b$="DAMMIT"+CR$ : gosub 2000
160 ky$="18" : b$="COOKIE"+CR$ : gosub 2000
170 ky$="19" : b$="MURPHY"+CR$ : gosub 2000
180 ky$="20" : b$="MAY"+CR$ : gosub 2000
190 ky$="21" : b$="BAS SD:[102,1]TIMSPOT/RN"+CR$ : gosub 2000
200 ky$="23" : b$="VDI"+CR$ : gosub 2000
210 ky$="24" : b$="DIR"+CR$ : gosub 2000
220 ky$="25" : b$="VTL " : gosub 2000
230 ky$="26" : b$="@LB:[1,1]RUN"+CR$ : gosub 2000
240 ky$="31" : b$="WHO"+cr$ : gosub 2000
250 ky$="32" : b$="@SD:[102,1]MEDT"+cr$ : gosub 2000
260 ky$="33" : b$="WHERE"+cr$ : gosub 2000
270 ky$="34" : b$="WHN"+cr$ : gosub 2000
280 print chr$(27);"(B"; :! select uaascii as primary char set
290 print chr$(27);")O"; :! select graphics as second. char set
300 print chr$(15);      :! turn on primary char set
310 print chr$(27);">"; : break :! select numeric key pad
315 ! Following line commented out to stay as a TV9220
320 ! print CHR$(27);"[61";chr$(34);"p"; : break:! back to vt100
330 exit
2000 c$=chr$(27)+"P1;1|"+ky$+"/"
2010 for j=1 to len(b$)
2020 x=asc(sbs$(b$,j,1))
2030 xh=int(x/16) : xl=x-xh*16
2040 c$=c$+sbs$(hx$,xh+1,1)+sbs$(hx$,xl+1,1)
2050 next j
2060 c$=c$+chr$(27)+"\"
2070 print c$; : break
2080 return
```

IAS Kermit Lives

In a recent issue, your editor asked about interest in supporting KERMIT on IAS. As a result of that question, Brian Nelson and I got together over the phone and discussed Bruce Wright's implementation of the RSX KERMIT under IAS version 3.1. The problems with that version (as distributed on the sig tapes,) are as follows:

1. The programs were linked to a version 3.1 RMSRES resident library, so unless you were running the same version and update as the EPA, the task image was unusable.

2. No sources or objects were provided.

3. Brian Nelson had no access to an IAS system to do updates, etc.

Brian was kind enough to send us the full IAS package from the EPA, and we have committed ourselves to supporting the IAS version. (A trivial bit of work compared to the amount of work Brian has poured into creating a unified RSX, RSTS, RT package. - - - Thanks Brian.)

At the present time we have brought the 3.1 version up under 3.2 and made some minor modifications and bug fixes. Our further goals are to get the IAS version in step with Brian's development, and to include fixes to limitations, (lack of RMS version 2 support, terminal handler limitations, etc.) when IAS enhancements permit.

The following will summarize the modifications and bug fixes we made to KERMIT IAS.

1. Under 3.1, a QIO dpb of the form

```
IODPB:  QIOW$   io.wvb,5,1,,,,<p1>
```

   generated a DPB with all 6 parameters, (five of them null.) If your code filled in the length of transfer later...

```
        mov     #size,iodpb+q.iopl+2
```

   everything worked fine.

   Under 3.2 however, the QIO macro has become more intelligent. Its smart enough now to only allocate p1. Now your code slaps the io transfer size on top of the next thing in your program, and to add insult to injury, the QIO directive is now rejected because the DPB has an improper size. (Isn't it wonderful what a little IMPROVEMENT will do?)

2. Under IAS version 3.2, our TKB seems to have a bug in that it no longer sets up the low memory pointer $VEXT (the vector extension area pointer.) This cause the RMS11 init code to bring kermit to a crashing halt. A patch was added to module K11M41 to set up this area properly.

3. Since we have modem lines that are use both for dialin and dialout, we changed the connect code to change and restore the terminal characteristics Full-duplex and Binary while in connect mode.

4. Due to IAS kermit having to do character at a time IO on incoming data, kermit only worked at 300 baud. Code has been added to the connect code to support control-S control-Q throtteling of incoming data. (It is assumed that this will become simpler with the terminal handler update that supports automatic control-S control-Q done by the handler in response to the size of the read-ahead buffer, and will go away if the capability of reading the number of characters in the read-ahead buffer ever gets into the IAS handler.) The response is jerky, and nowhere near 1200 baud, but its better than 300 any day.

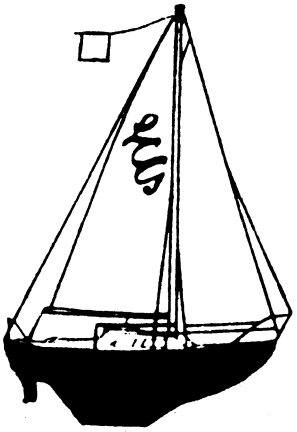
5. The kermit SYS command, (which let you Spawn a system command without leaving kermit,) was modified to try to call a command line munger or flying install task if the ...NAM or $$$NAM task spawn failed.

Working 3.1 and 3.2 versions will be submitted to the Spring SIG tape, and anyone with a desperate need can get copies from us if you give us a call.

DECUS

LARGE SYSTEMS SIG DECUS U.S. CHAPTER

DIGITAL EQUIPMENT COMPUTER USERS SOCIETY



AT LARGE

LS

The Newsletter of the Large Systems SIG

Contributions

Contributions and suggestions for this newsletter are constantly needed. Articles, letters, technical tips, or anything of interest to our SIG are greatly appreciated. The editor prefers submissions be made electronically, but magnetic tape and hard copy will be accepted.

Send your contributions to:

ARPA: ctp@sally.utexas.edu
UUCP: ctp@ut-sally.uucp ({harvard,ihnp4,seismo}!ut-sally!ctp)
CIS: 75226,3135
BITNET: use the Wisconsin Gateway

or if you must, use the U. S. Mails:

Clyde T. Poole
The University of Texas at Austin
Department of Computer Sciences
Taylor Hall 2.124
Austin, Texas 78712-1188

History Project, Digital's 36 Bit Systems

Les Earnest and Joe Dempster

The goal of this project is to publish an analysis and history of the evolution, implementation and use of Digital's 36 bit systems. This period began with the PDP-6 in 1964 and continues today with TOPS-10/20 development, which is scheduled to end in 1988.

We are working aggressively to finish the project, and have it published, by March/April 1988. This will require that the completed manuscript be ready to go into the publication cycle by August 1987!

The project will attempt to answer the following questions:

1. In what markets/applications were these systems used?
2. Who were the users of these systems and what impact did roughly 2,500 TOPS-10/20 systems have on their organizations?
3. Who were the principle system architects of these systems? What features, and if there had been sufficient time to implement them, would have significantly improved the architecture?

4. What impact did the decision to continue to examine design extensions to the architecture have on the usefulness and acceptability of these systems. This is in contrast to a more common practice today to work from a detailed design specification, sometimes dated, building follow-on systems which provide increased performance through the use of new component technologies and packaging techniques.
5. What part of the overall design (TOPS-10/20) was technology dependent and what can still be considered "unequaled" in relation to other computer architectures still undergoing active development?
6. What type of development environment (both HW and SW) supported and contributed to the evolution of 36 bit systems?
7. What influence did TOPS-10/20 have on other vendors system development?

This history will undoubtedly be assembled from many sources and participants. Some information will be anecdotal; there will be interviews with the people involved (users and developers) and technical papers will be solicited. Of course there will also be the packaging and assembly of facts as we see them.

The result will hopefully have sufficient depth to serve as:

1. An introductory or advanced text on system design and hardware/system software implementation.
2. A analysis of the success and difficulties of marketing complex systems into a very crowded market of competing alternatives.
3. A catharsis for those of us who have contributed to the development and use these systems and who will now move onto new computing architectures and opportunities.

In addition to interviewing directly 25-50 developers, users and product managers we will continue to work to identify contributors and significant events up to when the final draft is submitted to the publisher. Two "topics" are already under development:

1. Rob Gingell from SUN is working on a paper which looks at extensions to TOPS-20 which would have enhanced its capabilities.
2. Frank da Cruz and Columbia are summarizing 10 years of experience and development of TOPS-20 systems. Some effort will also be made to detail the process which lead to their selection of a follow-on architecture to TOPS-20.

There is a need to develop additional topics which represent the use and application of the technology (TOPS-10/20) in other areas. Specific recommendations are welcome as are proposals to develop them. A short abstract should accompany any such proposal. Every effort will be made to work with individuals or organizations interested in making such a contribution.

There will be a standalone (no network connections) DECSYSTEM-2020 (YIPYIP) dedicated to supporting the project. This system has a 3 line hunt group, with all lines accessible from a single number ((201) 874-8612).

Both YIPYIP and MARKET will have "public" directories for remote login (<log> DEMPSTER.PROJECT-10262 <Password>LCGLCG). MARKET can be accessed by modem ((617) 467-7437), however disk quota is limited. MARKET's primary purpose

<DEMPSTER.PROJECT-10262> is ARPAnet TELNET access. YIPYIP is a dedicated PROJECT-10262 system. MAIL can also be sent to DEMPSTER on either system.

YIPYIP and MARKET will keep a running summary of ideas and comments up on Columbia's BBOARD software. KERMIT also runs on each system for uploads.

SAIL.STANFORD.EDU will support ARPAnet transfers to a "public" area:

```
FTP<ret>
CONNECT SAIL.STANFORD.EDU<ret>
SEND AFN.EXT<ret>
DSK: AFN.EXT [PUB,LES]<ret>
```

SAIL runs WAITS, an operating system similar to TOPS-10. File names are limited to 6 characters and extensions limited to 3.

Hardcopy information may be sent to the authors at the following addresses:

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Stanford, CA 94305
(415) 723-9729
ARPA: LES@SAIL.STANFORD.EDU

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Digital Equipment Corporation
6 Cherry Hill Executive Campus
Route 70
Cherry Hill, NJ 08002
(609) 665-8711
ARPA: DEMPSTER@MARLBORO.DEC.COM (MARKET)

Implementation details:

1. User input is welcomed and desired from all application and geographic areas.
2. Input from past and present developers is also desired.
3. Throughout the project a secondary goal will be to build a list of users/locations (installation date, duration and disposition) of PDP-6 and KA, KI, KL and KS systems. Serial numbers, if available, are requested.
4. We anticipate that this project will generate a large volume of information (which we hope will arrive electronically). Some information, for any number of reasons, may not be in line with the project's stated goals. Therefore, all notes, interview material and submissions will be donated to the Computer Museum in Boston at the the completion of the project to be available for future reference and research.

Ideas, contributions, suggestions and criticism are welcome. As these 36 bit systems were the products of a multitude of people, so too will be the writing of their history.

From the TOPS-20 Mailing List

Abstracted by: Clive Dawson

The following messages are selections taken from the TOPS-20 interest group, which is a mailing list maintained on the DARPA Internet. These items appear for information purposes only. Neither DECUS nor the authors assume any responsibility regarding the usefulness or accuracy of the information herein.

Date: Mon, 23 Feb 87 17:27:40 PST
From: Mark Crispin <crispin@SUMEX-AIM.Stanford.EDU>
Subject: bug in GTHST% JSYS

This bugfix should be considered a MUST INSTALL for all TCP/IP sites running with multiple interfaces. I wrote the original code, so I know what I'm talking about. I would appreciate an acknowledgement from DEC that it has been TCO'd into DEC's TCP/IP-20 product.

Problem:

Stange behavior in mailsystem, with valid mailing lists rejected as "No such directory name"

Diagnosis:

MMailbox fails to recognize that an address is local, and doesn't recurse on it during mailing list expansion. This is caused by the monitor being confused when the default address occurs after the preferred address in the host table. GTHST% always returns the preferred address when the local host (-1) is given as a host argument. An erroneous test is made that allows the default address to supercede the preferred address in this case.

Solution:

In MNETDV.MAC, at HSTI13+6, delete the two lines:

```
CAMN T1,DEFADR      ;OUR DEFAULT ADDRESS IS ALWAYS BEST
 JRST HSTI15        ;SO SET IT AS BEST UNCONDITIONALLY
```

You may also want to change the comments on the next two lines to be:

```
CAMN T1,PRFADR      ;OUR PREFERRED ADDRESS IS ALWAYS BEST
 JRST HSTI15        ;SO SET IT AS BEST UNCONDITIONALLY
```

That is, the fix is only to allow the ***PREFERRED*** address to be unconditionally selected as the best address.

– Mark –

Date: Sat 28 Feb 87 15:03:37-PST
From: Mark Crispin <MRC%PANDA@SUMEX-AIM.Stanford.EDU>
Subject: DIRFDB bugchks
Postal-Address: 1802 Hackett Ave.; Mountain View, CA 94043-4431
Phone: +1 (415) 968-1052

In DIRECT.MAC, the instruction at DELJF2 should be CALL ADRCHK, not CAMGE A,DIRORA.

Be sure to also have the patch in LOOKUP.MAC to do MOVE A,B before the JUMPE A,R in the GETFDB routine (after the CALL VERLKX succeeds).

By the way, the comments in the code in these areas are total lies. Don't believe any of them. Fortunately, it isn't executed very often.

Date: Sun 1 Mar 87 16:17:26-EST
From: C. P. Yeske <CY13@TE.CC.CMU.EDU>
Subject: RP07 revisited
Home-Phone: (412)422-4667 (422-GOOP, -IONS, -HOOP)
Office: UCC A72 x2647
Organization: Carnegie Mellon Computing Center, Hardware Systems

As promised, a digestified answer is below. Basically the rumor is false. My thanks to all those who replied.

Curt Yeske
Technical Administrator
Carnegie Mellon Computing Center
CY13@te.cc.cmu.edu

Disclaimer: The opinions expressed are my own and are not Carnegie Mellon's. The facts are figments of my imagination anyway.

*** My message ***

Currently we have some RP07's formatted for VMS and several formatted for Tops. We would like to be able to interchange these from time to time as hardware konks out. I am aware that each system needs to see its own formatting (36 bit vs 32 bit). We are aware of how to format each type. However we have heard a rumor that it is not possible to take a Tops-20 formatted RP07 and reformat it for use on a Vax. Can anybody confirm or deny this?

Please let me know and I will digest the answers back to info-vax and tops-20.

*** Exact Information ***

>From: Willis Dair <G.Dair@Score.Stanford.EDU>

Your rumor is wrong. The RP07 has the capability to format itself to 18-bit (TOPS-20) or 16-bit (VAX). The little microprocessor inside will do the actual formatting. Your local field person should be able to do the formatting. We have some TOP-20 RP07 disks that were converted to be VAX disks. These are pretty smart drives.

Willis

*** Exact Information ***

>From: Carl Fussell <G.FUSSELL@Score.Stanford.EDU>

That is not true. We have two RP07s that were running on our TOPS20 there were reformatted (on site) and are now running on our VAX/VMS system. The operation amounts to removing a jumper from the backplane of the drive and then formatting.

Carl Fussell

*** Other information ***

>From: "ROBERT CURLEY" <curley@wharton-10>

I recently purchased the RP07 from the Medical School Computer Facility here at Penn. It had been connected to a DEC10. I wanted it connected to my 780. During the installation process the Field Service person mumbled something about the format problem - but overcame it. I will ask him about the details if you wish.

*** Other ***

>From: <SYSTEM@CRNLNS.BITNET>

Curt,

I don't know about TOPS-20 format packs, but we had no trouble at all when converting our RP07 first from VMS format to TOPS-10 and later from TOPS-10 format to VMS format. In addition to a different block size (TOPS-10 has 128 36bit words per block: 640 bytes instead of 512) the disk was formatted without interleaving while we used it on the 10, but we are using it with interleaving on our 8600.

As I recall, the DEC VAX diagnostic that did the reformatting had to run stand-alone because of the stringent timing requirements.

I hope this helps.

Selden E. Ball, Jr.

*** Other Information ***

>From: 114RONAN%UK.AC.LIVPOL.VAX@AC.UK

Hi. Sorry I can't really help you with your RP07 problem, but we had an RA81 delivered for our VAXcluster which had been formatted for 36 instead of 32 bits, and we had to wait weeks while DEC took it back and got another one - they did NOT re-format the original, so maybe it's a hardware thing.

On another topic, I notice that your message was also sent to TOPS-20 at Stanford. Can I assume that this is a TOPS-20 version of INFO-VAX? If so, how can I get myself registered on it? We also have a 2065, and if TOPS-20 is anything like INFO-VAX, it will prove a fountain of useful information. I presume there would be no problem getting messages through to here in the U.K.?

[try TOPS-20@SCORE.STANFORD.EDU -curt]

Ronan Flood

*** Other Information ***

>From: lsmith.pasa@Xerox.COM

This is not a direct answer to your question of can you reformat an RP07. However, we were faced with getting data from a DEC10 RP06 disk to a VAX and solved it by using a dual-access RP06 disk drive and developing code to run under TOPS10 to access the RP06 in the VAX' Files-11 format. We were thus able to format the disk from the VAX, then dismount it from the VAX, mount it from the DEC10, write DEC10 files to it, dismount from DEC10, mount from VAX and read the data. If you'd like further details let me know. Leigh Smith

---

Date: 13 Feb 87 18:53 +0100
From: Jan_Michael_Rynning%QZCOM.MAILNET@MIT-MULTICS.ARPA
Subject: DECnet SINR%, SIBE%, and MTOPR% .MORLS problems with zero-length record.

I'm trying to read from DECnet (SRV: or DCN:) asyncronously, using the interrupt system. Everything works fine, until I receive a zero-length record. This is what happens:

1) I get the interrupt, as usual. During the interrupt I must read ALL the records queued up for me, or I will not get any more interrupts.

2) I check the link status with the MTOPR% function .MORLS, which returns with MO%EOM set (link has entire message to be read).

3) I check the number of bytes in the message with SIBE%, which skips, returning 0 (SIBE% seems to return the number of bytes in the next record, not the total number of bytes). Is this a correct behaviour? Though the next record is zero-length the input buffer is not empty really.

4) I read the record with SINR% (negative count and byte pointer don't change, indicating zero length).

5) I check the link status with the MTOPR% function .MORLS, which again returns MO%EOM, whether there is more to read or not. THIS IS A BUG.

6) Once again I check the number of bytes to read, with SIBE%, which again skips, returning -1 (minus one byte!?), whether there is more to read or not. THIS IS ANOTHER BUG.

Reading a zero-length record screws up TOPS-20 DECnet, but everything gets back to normal after reading the next record, whether that is also zero-length or not.

My problem is that I can't determine if there is anything more to read after reading the zero-length record. If I try to read another record with SINR% I will hang until I receive another record of input. If I don't try to read another record and there is one I woun't get any more interrupts. Any suggestions?

According to the TOPS-20 Monitor Calls Reference Manual, SIBE% should not skip if "The device is not a terminal, is open for read, and the input buffer is not empty. AC2 contains a count of the bytes remaining in the input buffer." This indicates that SIBE% should really take the non skip return, with a zero in AC2, if the next record to be read is zero-length. The current behaviour of SIBE%, not being able to differ between the next

record being zero-length and an empty input queue, is both impractical and contrary to the documentation. It should be changed.

MTOPR% function .MORLS returning MO%EOM, when there is nothing to read, is a bug which should be corrected.

Date: Mon 2 Mar 87 10:36:40-PST
From: Mark Crispin <MRC%PANDA@SUMEX-AIM.Stanford.EDU>
Subject: Re: DECnet SINR%, SIBE%, and MTOPR% .MORLS problems with
Postal-Address: 1802 Hackett Ave.; Mountain View, CA 94043-4431
Phone: +1 (415) 968-1052

It isn't at all clear that using the interrupt system to do asynchronous I/O is the way to go. It is easily possible for PSI's to be doubled or missed entirely under the right conditions.

The standard way of doing this is to have two forks running, one handling input and one handling output. Then you can let the input fork block to its heart's content without hanging the other fork. You also guard against deadlocks that are caused by attempting to do output that won't go through until you do input.

– Mark –

Date: Mon 2 Mar 87 19:38:49-PST
From: Stu Grossman <GROSSMAN@Sierra.Stanford.EDU>
Subject: Re: DECnet SINR%, SIBE%, and MTOPR% .MORLS problems with

Mark,

I don't think that his problem has anything to do with PSIs. From his description of the problem he is not doing anything inherently incorrect. As long as he attempts to empty the input queue before DEBRKing, he should wake up at the correct time. Even if the queue becomes non-empty between the time he checks it (with an MTOPR) and the DEBRK, DECnet will still deliver a PSI to him.

The 'standard way' you talk about is may be your standard way to drive input and output streams, but it ain't necessarily mine, or anybody elses. I have seen (and used) quite a few techniques to accomplish the goal of driving seperate input and output streams, and the method you mention is no more standard than any of the others. If I really wanted to be picky, I could talk about the system impact of running the streams in seperate forks versus internally timesharing the streams in one fork.

Since I have no idea what Jan's constraints are, I will not turn this into a programming lesson. I can say however, that what he wants to do is perfectly reasonable, and from his description of the problem it sure sounds like he found a bug in (gasp! Oh my gosh!) DECnet!

By the way Jan, what version of TOPS-20 are you running? With respect to DECnet, there is quite a difference between version 6.1 and anything before that. If it's 6.1, you would have a much better chance of getting your problem fixed.

Stu Grossman

Date: Tue, 3 Mar 87 13:57:09 -0100
From: enea!kuling!victor@seismo.CSS.GOV (Bjorn Victor)
Subject: DECnet solutions?

Hi fellows,

We're having some kind of problem here, I think. Let me explain our situation:

Our site, ICU of Uppsala University, Sweden, is going to join the Swedish University Network (SUNET), which is built up with DECnet all over the country. We seem to have a couple of choices as to how to do it, and I'd like to hear your opinion. Any suggestions, or experiences of similar situations, are very welcome!

SUNET is built in areas, with central routers for each area. The Uppsala area router is downtown, about 5km from our building. Our possible DECnet machines are our two 2060s and a MicroVAX-II running Ultrix. Since the default ways of running DECnet on 2060s is that you either run it on Ethernet (too short cables) or with a DN20, and since a MicroVAX can run it without a new FE, it seemed clever to attach the router to the MicroVAX, and have the 20s talk to the MicroVAX on Ethernet.

Now, obviously, DECnet for Ultrix is only end-node, so it can't route things for the 20s. We don't want to buy DN20s because they're too expensive, so we seem to have two or three choices:

1) Have the uVAX on SUNET, and have the 20s talk DECnet or TCP/IP with some amount of software on the uVAX to simulate routing for parts of the "application layer" (NFT, FTP, SMTP etc). If we were to choose this model and the TCP/IP case, we'd be able to use SUNET from any machine in-house (since everybody talks TCP/IP). It would probably be very hard for people on SUNET to reach anything but the uVAX, though.

2) Have the uVAX on SUNET, and basically only use it as a mail gateway as far as the 20s are concerned. File transfers done by hand, logging in on Ultrix...

or maybe...

3) Have a 20 on SUNET through the normal FE, routing things for the other over DECnet on Ethernet. Is this possible? How poor performance would we get? Etc etc.

Things that might be of importance: When we get our NIA-20s, we won't be using the standard FE for terminals (more than one or two). Both DECnet-36, TCP/IP and NIA-20s are ordered for the 20s, but we still haven't decided whether to get DECnet for Ultrix or not. It's more important for us to get the 20s on SUNET than the uVAX (at least I think so).

Any ideas? Please include me explicitly in replies, since my entry on the list (Victor%AIDA.UPPSALA.SE@SEISMO.CSS.GOV) is off the "net" for yet another week or two.

– Bjorn Victor
Dept. of Computer Systems
ICU, Uppsala University
SWEDEN

Date: Tue, 3 Mar 1987 16:07 EDT
From: Mark H. Wood <IMHW400%INDYCMS.BITNET@wiscvm.wisc.edu>
Subject: Routing off an Ethernet

Regarding your mail to the TOPS-20 mailing list, which concerns your need to hook an Ethernet to SUNET: I'm not exactly a DECnet expert, but it seems to me that you have another option (if you have some money). You can buy a DECSA-EA for just about half the cost of a DN20. The box will run synchronous lines at up to 500kb/s (with an add-in DCSAX-LA or -LB) and should do all the routing for your Ethernet. This is one of the primary functions of the DECSA, so support should be good; you may get no more than sympathy if you report problems with a DN20. Also, I think that the DN20 code is still at Phase III, so it may not be able to understand the network on the other side of your local area-router.

I have no actual EXPERIENCE with a DECnet, but judging from the product bulletins and catalogs, I would avoid both the DN20 approach (because of the area-routing) and the MicroVAX approach (because DECnet/Ultrix is end-node-only). Maybe some real experts can tell you how to make one of those methods work. I wish you good luck in any case.

Date: Tue 3 Mar 87 17:33:52-EST
From: Ken Rossman <sy.Ken@CU20B.COLUMBIA.EDU>
Subject: Re: Routing off an Ethernet
Address: 715 Watson Labs, 612 W. 115th St, NY NY 10025
Phone: (212) 280-4876

Re: DECSA Routers:

The DECSA might not be long for this world either. Although it does currently run Phase IV DECnet (we run one here, currently configured to talk to up to 41 areas), and it seems to do its job fairly well (except when we get bad Ethernet jams, which we've been seeing lately for some other reasons), I've heard from various places that there'll be some kind of VAX-based follow-on to replace it before long. So far all I have is some rumors and word of mouth stuff, so don't take any of this as fact. However, the distinct *impression* I'm getting is that the DECSA will be another thing that will fade away. I can only hope that support for the DECSA will not evaporate as fast as TOPS-20 support seems to be.

Anyway, there's certainly no reason to pick up a DN20 at this point (other than that you can probably pick up used ones dirt cheap). Since DEC only went up to Phase III routing with them, unless you write your own code, it's probably not worth it. Also, DECSA's are a LOT smaller (we have ours sitting on top of one of our KL's, instead of next to it taking up floor space). Except for some problems trying to run the DECSA fully configured for 63 areas and 1023 nodes per area, I'm very happy with it. /Ken

Date: Tue 3 Mar 87 17:51:29-EST
From: Ken Rossman <sy.Ken@CU20B.COLUMBIA.EDU>
Subject: Re: DECnet solutions?
Address: 715 Watson Labs, 612 W. 115th St, NY NY 10025
Phone: (212) 280-4876

Forgot to mention about the DECSA before, there are only two DEC supported machines that can download this box: a VAX/VMS system and an RSX-11 system.

We do neither, however. We download here from our TOPS-20 systems, and it seems to work just fine. The software gen process still has to take place on a VAX/VMS system, however.

Anyone from DEC care to comment on how likely it will be that Ultrix will support DECSA's (or whatever the follow-on VAX router will be)??? /Ken

---

Date: Thu 5 Mar 87 00:47:42-PST
From: David Roode <ROODE@BIONET-20.ARPA>
Subject: file archiving
Phone: (415) 962-7322

I saw a message that talked about a primitive system of file archiving. We need on VMS what we enjoy on TOPS-20: an integrated file archiving and retrieval system.

1. System manager can identify files not read or written in a specified period (i.e. deadwood). Users can optionally be sent message listing such files. After potentially waiting for them to respond, the system manager can move the files to tape, leaving a pointer behind for the user, ONLINE.

2. Users can have two quotas, working and permanent. Users over their permanent quota at a pre-defined time (2 a.m. MWF) are subject to forced migration of files to offline storage, with pointers left behind ONLINE. Users can identify files to leave on line at all costs, and specify the order for selection of files to move offline.

3. Users can selectively request archive of files in offline storage, with ONLINE POINTERS. A queue is maintained of files to be processed, with movement to offline status (ONLINE pointers) at a pre-defined time, i.e. 1AM MTWThF), as a part of normal system tape procedures, e.g. backup.

4. Retrievals are requested at users' convenience. An interactive command issued to review files currently in offline storage and to request retrieval of same. A queue is maintained, with files retrieved according to system policy, i.e. continuously during the day, within 1 hour, within 4 hours, daily at night, etc.

5. All of this benefits from operational practice that once moved offline, 90% of files are never sought again by their owners. However, users are many times more amenable to removing data from online storage when online pointers and a retrieval path are maintained. Disk usage can be reduced by up to 50%, with minimal increase in operational overhead. And, DIGITAL HAS IT NOW, in TOPS-20, order number QT100.

Date: Sun 8 Mar 87 14:40:41-PST
From: William "Chops" Westfield <BILLW@Score.Stanford.EDU>
Subject: bug in 6.1 ap14: re: incompletely created files...

Our monitor, based on tops20 v6.1 ap14 or so, does not seem to properly get rid of "incompletely created files" when a fork is reset. Do other people have this bug, or is it suppsoed to be somehow considered a feature (related to CFS, I presume) We do not have a CI, and we do not use CFS...

Enjoy BillW

Date: Sun 8 Mar 87 18:38:13-EST
From: Ken Rossman <sy.Ken@CU20B.COLUMBIA.EDU>
Subject: Re: bug in 6.1 ap14: re: incompletely created files...
Address: 715 Watson Labs, 612 W. 115th St, NY NY 10025
Phone: (212) 280-4876

We have 6.1, a CI, and CFS, and I believe we've seen that problem also in the past, although I was unable just now to recreate it. I even tried doing exactly what you did, Bill, and FTPed a chunk of SCORE's monitor over here before ↑C-ing out (figured maybe it was just SCORE's MONITR.EXE that was causing the whole problem :-), but couldn't get it to break. I know I've seen this plenty of times before though. /Ken

---

Received: by INDYCMS (Mailer X1.23b) id 0937; Wed, 11 Mar 87 08:11:08 EDT
Date: Wed, 11 Mar 1987 07:59 EDT
From: Mark H. Wood <IMHW400%INDYCMS.BITNET@wiscvm.wisc.edu>
Subject: Re: bug in 6.1 AP14: incompletely created files

I wonder if this is in any way related to my observation that ANY file, when deleted, may hang around for a few minutes before relinquishing its portion of one's quota? Several of our users have complained that they have deleted a large file and found no immediate change in their quotas. The space always seems to be deallocated eventually. The file disappears from the directory immediately, but still takes up space. I suspect that this problem is related to OFN caching. Do the incompletely-created files EVER go away if you wait for a few minutes?

Also, can anybody think of a good reason not to turn off OFN caching when the boot code determines that there is no KLIPA? For non-CFS sites (pronounced "most sites"), it looks like a waste of time and page frames.

Date: Tue, 10 Mar 87 22:49:05-1000
From: uhccux!uhmanoa!uhmanoa.ICS.HAWAII.EDU!jeff@nosc.mil (Jeffrey Blomberg)
Subject: Re: bug in 6.1 ap14: re: incompletely created files...

We have encountered the incomplete file problem quite a bit lately. We have students writing programs which manage to consume their directory allocations and stop. A RESET does not free the allocated space and EXPUNGE, PURGE must be used. I called CSC and got the impression that they thought thats the way it was supposed to work. I plan to research and possibly SPR the problem soon (a little side tracked lately). I might add that depending on the programming language (Pascal vs. FORTRAN), the problem may not occur. I suspect its related to the way OPENF is done.

We are running v6.1 ap14 (w/tcp). I believe the problem started after ap14.

To reproduce the problem, I simply tried using a program like REV to copy a big file to a small directory. Sorry I can't offer a solution, but I wanted to at least mention that we are having the same thing happening.

-jeff-

Date: Wed 11 Mar 87 11:00:22-PST
From: Stu Grossman <GROSSMAN@Sierra.Stanford.EDU>
Subject: Re: bug in 6.1 AP14: incompletely created files

It sounds like the quota anomalies experienced by your users may be caused by the fact that they still have the files in question opened by some fork. They should try doing a RESET * followed by an EXPUNGE. It's also possible that their file may be opened by someone else (in another job). If either of these cases is true, then you should be able to see the files in question as being deleted (the command DIR,<return>DEL will show them).

Re: OFN cacheing, To clear the air a little (actually before it gets fogged up), OFN cacheing (conceptually) has nothing to do with CFS. Essentially, what it does is it keeps the monitor from flushing out all of it's information about a file when nobody is currently accessing it. This means that the next reference to a file will be able to take advantage of the cached data. This is a big win for frequently accessed files. It also is (again conceptually) independant of CFS. It interacts with CFS to the extent that OFNs are managed by CFS, and the consistency of the cached OFNs is maintained by CFS interlocking.

To wit, my system does not have CFS, but when I put up AP14 I noticed an appreciable improvement in disk I/O bound stuff.

The resource consumption due to OFN cacheing is pretty minimal. The OFNs get swapped out when nobody is using them. In addition, I think that there is a little extra table space (one or two words per OFN maybe?).

Stu Grossman

Date: Wed, 11 Mar 87 10:12 MST
From: <RFORSTER@UNCAEDU.BITNET>
Subject: Re: bug in 6.1 ap14: re: incompletely created files...

We too have encountered the incomplete file problem here. Its almost a virus. Our environment is primarally students. We found that our problems are directly related to the .TMP files created by COBOL (at ap14). The student will C out of COBOL and will find that all there space is used up. We go through the same ritual of RESET, CLOSE, EXPUNGE with PURGE to clear the problem. Its so bad here that I mailed the to procedure to the students just to keep them off my back.

Until it was mentioned here, I thought we just had the problem so I put to student carelessness in their coding.

/Russ

Russell M Forster

Date: Mon 23 Mar 87 16:41:20-EST
From: Ittai Hershman <NYU.ITTAI@CU20B.COLUMBIA.EDU>
Subject: Re: bug in 6.1 ap14: re: incompletely created files...

A friend who has a TSC contract passed along the following patch:

```
delfil+17/move a,.fbctl(d)
```

for AP14 monitors. It is appearently fixed in AP15. I have not tested it...

-Ittai

Date: Mon 9 Mar 87 09:48:59-MST
From: "Nelson H.F. Beebe" <Beebe@UTAH-SCIENCE.ARPA>
Subject: Unix tar (tape archive) implementations on Tops-20

A few years ago, Marshall Rose and John Romine at UC-Irvine wrote an implementation of the Unix TAR (tape archive) utility in MACRO. I acquired a copy about 3 yr ago with our PCC-20 distribution, and have been intermittently adding features. It has now gotten to the point of being quite useful, with automatic byte size recognition and relative directory paths. In recent correspondence with John Romine, I obtained their most recent version, plus a copy of an independent one, also in MACRO, done by Chris Maio at Columbia in June 1983.

At the top of my wishlist for future work is the conversion of this facility to C, to facilitate porting to other non-Unix systems. Neither the AT&T Unix TAR nor a public domain implementation posted on net.sources last fall seem to be suitable starting points, because (a) they lack the nice TOPS-20 COMND JSYS interface (for which I propose to use Kermit code), and (b) they know too much about Unix shells and directory structure.

Since my version of the Rose/Romine TAR is now perfectly useful to me, a recoding and merging of features of the three MACRO versions is a lower-priority project which may or may not take place over the next several months, as time permits. The question I am posing here is,

Has anyone else already done this, or developed yet another Tops-20 TAR, that they would be willing to share for the purposes of producing a version of wide utility and availability (I intend to support at least VAX VMS and IBM PC DOS, in addition to Tops-20)?

Any modifications to either of the cited implementations would also be of interest.

If a recoded version of TAR is prepared, I will certainly place it in the public domain. Presumably the GNU project will be producing a TAR too, but it may be closely tied to the underlying Unix operating system too.

Date: Mon 9 Mar 87 16:01:53-EST
From: Ken Rossman <sy.Ken@CU20B.COLUMBIA.EDU>
Subject: Re: Unix tar (tape archive) implementations on Tops-20
Address: 715 Watson Labs, 612 W. 115th St, NY NY 10025
Phone: (212) 280-4876

If you plan to COMNDize a C program, don't use the existing Kermit code. You might want to use instead a more general interface written here at Columbia, called CCMD. I say "might" because it's really still in beta test, although for the most part, it seems to be working fine. The CCMD distribution can be found on CU20B.COLUMBIA.EDU in WS:<SOURCE.CCMD>, and should be anonymously FTPable. /Ken

---

Date: Thu 12 Mar 87 14:24:08-PST
From: Mark Crispin <MRC%PANDA@SUMEX-AIM.Stanford.EDU>
Subject: TOPS-20 MACSYMA
Postal-Address: 1802 Hackett Ave.; Mountain View, CA 94043-4431
Phone: +1 (415) 968-1052

Jeff -

I was forwarded a message from you regarding TOPS-20 MACSYMA, to the effect that "[Symbolics does't] offer MACSYMA [for the DEC-20]. [Symbolics] stopped shipping DEC-20 MACSYMA at least a couple of years ago."

There are, however, a number of organizations with DEC-20's that would like to get ahold of DEC-20 MACSYMA.

Can I construe Symbolics' position on DEC-20 MACSYMA to be one of abandonment, and that Symbolics is willing to forgo its proprietary rights on DEC-20 MACSYMA so that it may be placed in the public domain?

Alternatively, if Symbolics continues to claim ownership of DEC-20 MACSYMA, will it be willing to grant various interested parties, such as myself, a no-fee licese to use and redistribute MACSYMA?

If either is the case, I request a statement from Symbolics in writing so that everyone's legal rights are protected.

I propose, provided Symbolics permits it, to distribute DEC-20 MACSYMA as part of a general large volume of public-domain and semi- public-domain tools which I already distribute at very close to my cost. A MACSYMA distribution would probably be about $50, although if I have to deal with making people sign license agreements I'll have to up the cost to $100 to cover my overhead. That is still quite within the cost of "freeware" and "shareware" distribution.

My preference would be for Symbolics to get out of the DEC-20 business altogether and abandon its ownership of DEC-20 MACSYMA. This would be the best means to facilitate maximum possible distribution of MACSYMA.

I am willing, as a concession to Symbolics' commercial interests, to acknowledge your donation to our community in all associated documentation and to emphasize that more advanced versions of MACSYMA with larger capacity are available for other CPU's from Symbolics. The impact to Symbolics may end up being positive, as this would provide free advertising (consider how DEC-20 EMACS provided the base for consumer demand

for commercial versions of EMACS on other CPU's).

Thank you very much for you consideration.

Regards,

– Mark –

Date: Sun 22 Mar 87 23:36:38-PST
From: Mark Crispin <MRC%PANDA@SUMEX-AIM.Stanford.EDU>
Subject: %Error reading HOME block on device

If you get the subject message ever time you spin up a disk drive in the new monitor you've just built, it may be because the CHBHB1/CHBHB2 vector (200 words in all) is split across a page boundary. I don't know if this happens on KL's, but on 2020's this seems to provoke the RH11 into getting a channel NXM. A possible fix is to move CHBHB1 and CHBHB2's definitions in STG.MAC to after the definition of CST5.

Date: Mon 2 Mar 87 12:04:42-EST
¿From: Vince.Fuller@C.CS.CMU.EDU
Subject: Daylight savings time

A few months ago, it was mentioned that TOPS-20's concept of Daylight Savings Time will need to be updated this year to agree with the latest Congressional decision. Has anyone written the code to check for year >1987 and apply the new rule? I'd like to know before I go and implement something myself...

–Vince

Date: Wed 18 Mar 87 16:26:42-CST
From: Betsy Ramsey <G.Ramsey@R20.UTEXAS.EDU>
Subject: Daylight Savings Time
Organization: American Mathematical Society

Apparantly there *is* a daylight savings time patch; it's in the AP15 monitor. Here's the extract from the T26V61.D15 file:

EDIT 7388 FOR MONITOR V6.1

[SYMPTOM]

New law states that daylight savings time in 1987 will start on the first Sunday in April as to the current law of last Sunday in April.

[DIAGNOSIS]

Currently, daylight savings time starts in last Sunday in April and there is no code to implement the new law.

[CURE]

Add code in routine NLSS to check whether the new or the old law applies (base on the year) and return the first or last Sunday in April as the day DST is to be started.

(Does anyone know if this patch has been published? I couldn't find it in a quick skim of the dispatches.)

For non-source sites running pre-AP15 monitors, TSC provided the following patch:

In module DATIME, change the contents of location DSTON from 167 octal to 141 octal.

Here's a photo of this patch using my AP13 monitor:

```
@ENABLE
$GET SYSTEM:MONITR.EXE
$START 140
DDT
datime$:
dston/  INCODL+2  =167  141
↑Z
$SAVE SYSTEM:NEW-MONITR.EXE
<SYSTEM>NEW-MONITR.EXE.1 Saved
$DISABLE
```

I have not actually applied or tested this patch.

Date: Wed, 18 Mar 87 16:51:02 CST
From: Billy Brown <Billy@Mcc.Com>
Subject: Re: Daylight Savings Time

We're using the following patch (5.4 monitor) that works...

```
NLSS:   MOVE E,BB           ;DATE TODAY
        SUB E,D             ;-DAY OF YEAR TODAY = BEG OF YEAR
        ADD E,DSTON         ;LAST POSSIBLE DAY FOR DST START
        HLRZ F,B            ;[*] GET YEAR
        CAIL F,↑D1987       ;[*] 1987 OF AFTER?
         SUBI E,↑D23        ;[*] YES, USE FIRST SUNDAY INSTEAD OF LAST
        ADDI E,DWFUDG+↑D701 ;+1 TO MAKE SUNDAY, NOT MONDAY, =0.
```

[The difference between this patch and the previous one is that this one will preserve accurate date/times for files created in early April of previous years. -CD]

Date: Sun 22 Mar 87 15:46:36-PST
From: Mark Crispin <MRC%PANDA@SUMEX-AIM.Stanford.EDU>
Subject: latest and greatest summer time patch!
To: TOPS-20@Score.Stanford.EDU
Postal-Address: 1802 Hackett Ave.; Mountain View, CA 94043-4431
Phone: +1 (415) 968-1052

Here is the fix I use for the new law. Note that all you have to do when Congress plays around again is make an addition to the RULES macro.

This patch accounts for the two "war times" during WWI and WWII and also fixes a bug in NLSS where F (the index into the rules) was clobbered by an IDIVI. So install this patch instead of the one I sent earlier. Note that the second edit is installed in two places in the code, one for IDTIM and one for ODTIM.

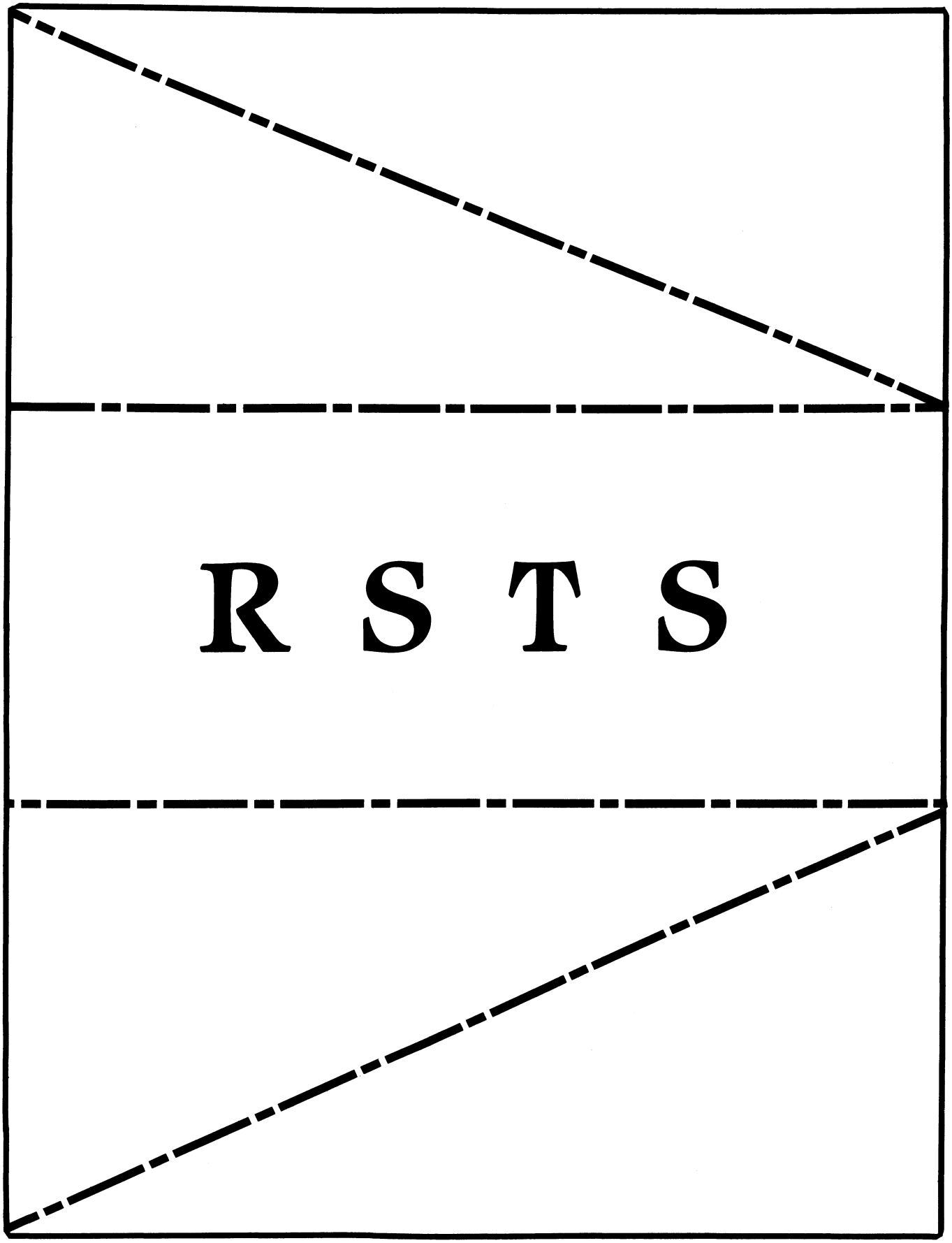
Enjoy! - Mark -

```
***** DATIME.DEC
sDSTBGN::↑D1975
DSTON::  ↑D<31+29+31+30>-1 ;LAST SUNDAY IN APRIL
DSTOFF:↑D<31+29+31+30+31+30+31+31+30+31>-1
                        ;LAST SUNDAY IN OCTOBER
***** DATIME.MAC
;;; This represents an attempt to make it easier to change the
;;; summer time rules to reflect the latest games Congress chooses
;;; to play with when summer time starts and ends.  In theory, you
;;; should be able to make an appropriate addition to the RULES
;;; macro.  Of course, if your country doesn't play along by US law,
;;; you will have to make some additional modifications.
;;; Note that VAX/VMS doesn't have any algorithm for summer time!

        RADIX <5+5>         ;DECIMAL RADIX

;;; First and last Sundays of certain useful months
FSTJAN==7-1 ;FIRST SUNDAY IN JANUARY
LSTFEB==31+29-1 ;LAST SUNDAY IN FEBRUARY
LSTMAR==31+29+31-1 ;LAST SUNDAY IN MARCH
FSTAPR==31+29+31+7-1 ;FIRST SUNDAY IN APRIL
LSTAPR==31+29+31+30-1 ;LAST SUNDAY IN APRIL
LSTSEP==31+29+31+30+31+30+31+31+30-1 ;LAST SUNDAY IN SEPTEMBER
LSTOCT==31+29+31+30+31+30+31+31+30+31-1 ;LAST SUNDAY IN OCTOBER
DEFINE RULES <
        DST 1987,FSTAPR,LSTOCT  ;; Changed again
        DST 1976,LSTAPR,LSTOCT  ;; Energy conservation legislation expired
;; Note:  contrary to what some people (and certain operating systems)
;; believe there was not year-round DST in 1974.  At the last minute
;; Congress restored the end-of-October restoration of standard time.
        DST 1975,LSTFEB,LSTOCT  ;; Rule changed in October 1974
        DST 1974,FSTJAN,LSTOCT  ;; Energy conservation emergency
        DST 1967,LSTAPR,LSTOCT  ;; Congress established national standard
;;; Prior to 1967 there was no uniform application of DST in the USA,
;;; although many areas used the ''last Sunday in April until last Sunday
;;; in October'' rule.  These entries cannot be taken seriously.
        DST 1946,LSTAPR,LSTOCT  ;; assumes you had DST
;       DST 1946,400,400        ;; this would probably be better
        DST 1945,0,LSTSEP       ;; WWII ''War Time'' ended Sunday 30 Sep 45
        DST 1943,0,400          ;; WWII ''War Time'' was all year 1943-1944
        DST 1942,31+9,400       ;; WWII ''War Time'' started Monday 9 Feb 42
        DST 1920,400,400        ;; no real standard existed
        DST 1918,LSTMAR,LSTOCT  ;; temporary summer time during WWI
>;DEFINE RULES

        DEFINE DST(YEAR,START,END) <YEAR>
DSTBGN:: RULES
        DEFINE DST(YEAR,START,END) <START>
DSTON::  RULES
        DEFINE DST(YEAR,START,END) <END>
DSTOFF:: RULES
NRULES==.-DSTOFF

IFE NRULES,<PASS2
```

```
PRINTX ?THERE MUST BE AT LEAST ONE DST RULE
END> ;SANITY CHECK

        RADIX <4+4>             ;BACK TO OCTAL

***** Note!!  This change is installed in TWO places in the code *****
***** DATIME.DEC
        CAMGE E,DSTBGN          ;AFTER CURRENT LAW WENT INTO EFFECT?
         JRST ODAY9             ;NO, NO DST
***** DATIME.MAC
        MOVSI F,-NRULES         ;INDEX INTO RULES TABLE
        DO.
          CAML E,DSTBGN(F)      ;IS THIS RULE VALID FOR THIS YEAR?
           EXIT.                ;YES, USE IT FOR SUMMER TIME
          AOBJN F,TOP.          ;TRY NEXT RULE
          JRST ODAY9            ;NO SUMMER TIME
        ENDDO.
***** Remember!!  Install this twice *****

***** DATIME.DEC
NLSS:   MOVE E,BB               ;DATE TODAY
        SUB E,D                 ;-DAY OF YEAR TODAY = BEG OF YEAR
        ADD E,DSTON             ;LAST POSSIBLE DAY FOR DST START
        ADDI E,DWFUDG+|D701     ;+1 TO MAKE SUNDAY, NOT MONDAY, =0.
                                ;700 IS ARBITRARY MULTIPLE OF 7 TO MAKE SURE
                                ;QUANTITY IS POSITIVE DURING DIVISION EVEN
                                ;IN 1858, WHEN NLSAPR AND NLSOCT ARE NEGATIVE.
        IDIVI E,7               ;DIVIDE INTO WEEKS AND DAY OF WEEKS
        IMULI E,7               ;CONVERT BACK, DISCARDING DAY OF WEEK
        SUBI E,DWFUDG+|D701     ;UNFUDGE AND WE'VE GOT IT!

;DATE OF LAST SUNDAY IN OCTOBER (NLSOCT) THIS YEAR TO F.

        MOVE F,BB
        SUB F,D
        ADD F,DSTOFF            ;LAST POSSIBLE DAY FOR DST END
        ADDI F,DWFUDG+|D701
        IDIVI F,7
        IMULI F,7
        SUBI F,DWFUDG+|D701
        RET
***** DATIME.MAC
NLSS:   MOVE E,BB               ;DATE TODAY
        SUB E,D                 ;-DAY OF YEAR TODAY = BEG OF YEAR
        ADD E,DSTON(F)          ;LAST POSSIBLE DAY FOR DST START
        CALL NLEAP              ;IS IT A LEAP YEAR?
         SKIPA                  ;YES
          SUBI E,1              ;NO, CAN'T BE SUNDAY, MAY 1!
        PUSH P,DSTOFF(F)        ;SAVE RETURN TIME
        MOVE F,DSTBGN(F)        ;GET YEAR
        CAIE F,|D1942           ;WAR TIME STARTED ON A MONDAY
        IFSKP.
          ADDI E,DWFUDG+|D700   ;SO DON'T ADJUST FOR SUNDAY FOR THIS YEAR!
          IDIVI E,7
          IMULI E,7
          SUBI E,DWFUDG+|D700
```



```
        ELSE.
          ADDI E,DWFUDG+|D701   ;+1 TO MAKE SUNDAY, NOT MONDAY, =0.
                                ;700 IS ARBITRARY MULTIPLE OF 7 TO MAKE SURE
                                ;QUANTITY IS POSITIVE DURING DIVISION EVEN
                                ;IN 1858, WHEN NLSAPR AND NLSOCT ARE NEGATIVE.
          IDIVI E,7             ;DIVIDE INTO WEEKS AND DAY OF WEEKS
          IMULI E,7             ;CONVERT BACK, DISCARDING DAY OF WEEK
          SUBI E,DWFUDG+|D701   ;UNFUDGE AND WE'VE GOT IT!
        ENDIF.

;DATE OF LAST SUNDAY IN OCTOBER (NLSOCT) THIS YEAR TO F.

        POP P,F                 ;LAST POSSIBLE DAY FOR DST END
        ADD F,BB
        SUB F,D
        CALL NLEAP              ;IS IT A LEAP YEAR?
         SKIPA                  ;YES
          SUBI F,1              ;NO, CAN'T BE SUNDAY, NOVEMBER 1!
        ADDI F,DWFUDG+|D701
        IDIVI F,7
        IMULI F,7
        SUBI F,DWFUDG+|D701
        RET
```


R S T S

1986 Fall DECUS
San Francisco

Ethernet and DECnet/E V4.0

Dave Freund
RSTS Development

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RSTS/E

October 6-10

History

- Phase 1 - Didn't exist on RSTS
  (thank goodness)
- Phase 2 - Can only talk to neighbors
  V1.0 - RSTS V6C
  V1.1 - RSTS V7.0
- Phase 3 - Can talk to anyone in network
  V2.0 - RSTS V7.1
  V2.1 - RSTS V9.0
- Phase 4 - Larger easier to manage networks
  V4.0 - RSTS V9.3

Note: There is NO V3 of DECnet/E. We are skipping it to avoid any further version/phase confusion.

V4.0 Features

- Ethernet support
- Larger networks
  63 areas
  1023 nodes per area
- Higher speeds
  Ethernet = 10 Mbits/second

What is Ethernet?

- High speed communications link
  - 10 Megabits/second
- Local area network
  - within 2.8 Kilometers
- Shared wire
  - 1023 nodes per ethernet wire
  - Results in lower cost interconnect

The Phase IV Network

- Phase 3 limits to 255 nodes in the network
- Phase 4 limits increased
  - 1023 nodes per area
  - 63 areas
- Using more than 1 area requires a non-RSTS system
  - VAX/VMS
  - RSX
  - DECSA

Using DECnet/E V4.0

- o Can be an End Node
  - Saves memory
  - Saves CPU cycles
- o Can be a Level 1 router
  - Uses more memory
  - Uses more CPU cycles
  - Route to anyone within same area
  - Can access other areas using a Level 2 router
- o Level 2 router
  - Routes between areas
  - Can not be the RSTS system, must be VAX/VMS, RSX, or DECSA

Installation

- o Removed from SYSGEN
- o Installation is the same as any standard RSTS/E layered product
- o Can be added at ANY time
- o Does not require re-SYSGEN

SYSGEN

- o DECnet/E question removed
- o No DEUNA/DELUA device questions
- o No DEQNA device questions
- o Drivers included in all monitor disk images
- o Only loaded into memory if DECnet is installed and hardware is present
- o DMC/DMR/DMP questions still present

Performance

- o Ethernet provides a high speed communication channel
  - SET HOST looks more like a local terminal
- o Reduced buffer handling within the monitor
  - Performance is improved
- o NFT/FAL performance improved.
  - Flow control is no longer required.

Restrictions (at least for this release)

- o NO Level 2 (Area) Routing
  - Must have a non-RSTS system to route between areas
- o NO LAT support
  - Terminal servers will not be supported in this release
- o NO non-DECnet access to Ethernet
  - Non-DECnet access will not be supported in this release

1986 Fall DECUS
San Francisco

Supporting "Large" Disks on RSTS

Dave Freund
RSTS Development.

RSTS/E

October 6-10

The information in this document is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation. Digital Equipment Corporation assumes no responsibility for any errors that may appear in this document.

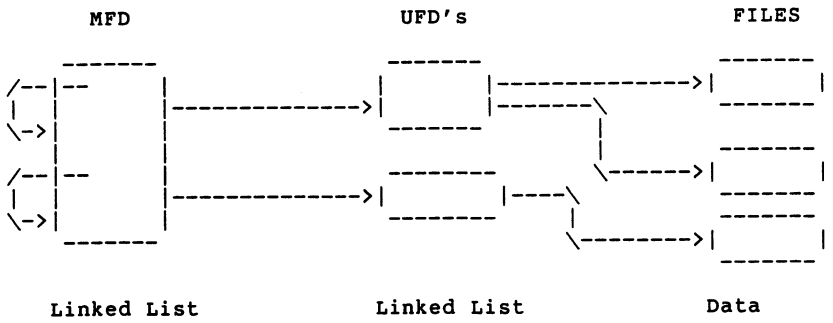
Multiple structure levels

RDS 0.0 - Read/Only in V9.0 and later

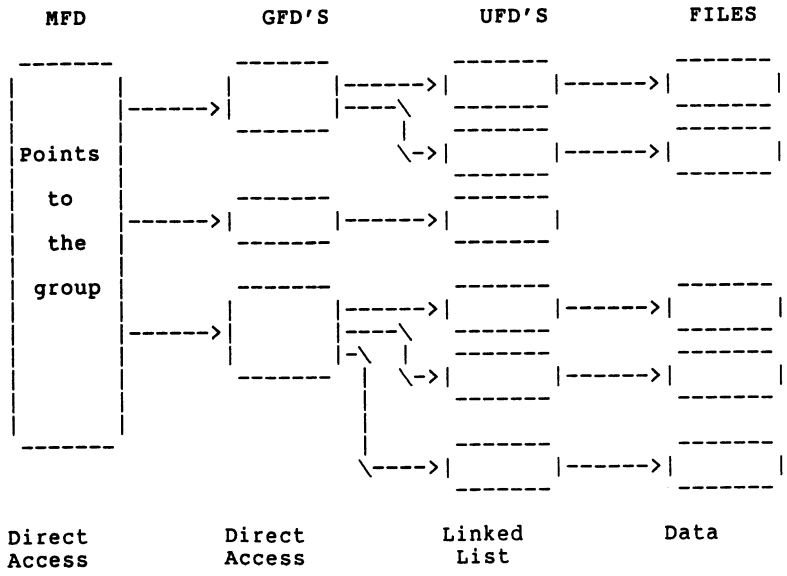
RDS 1.1 - Read/Write (non-system/public in V9)
Not accessable previous to V8.0

RDS 1.2 - Read/Write (any disk)
Read/Only in V8.0
Not accessable previous to V8.0

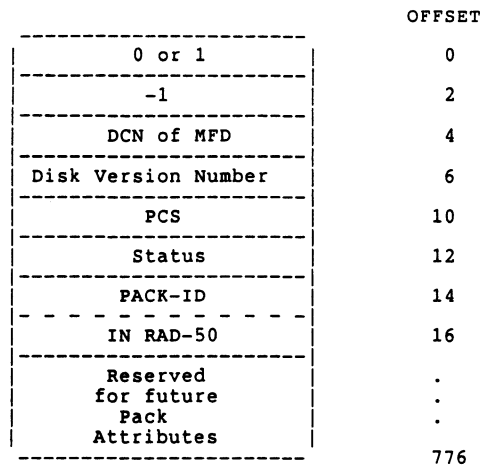
RDS0



RDS1

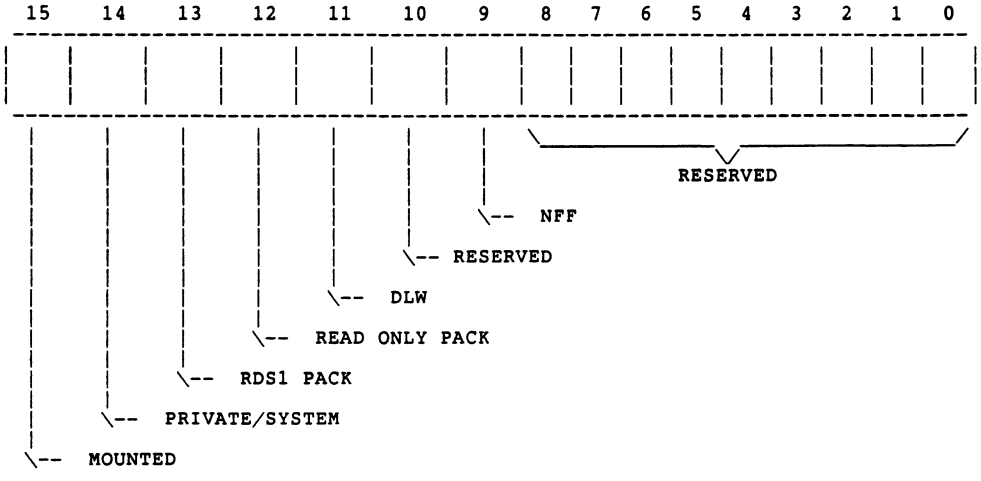


PACK LABEL

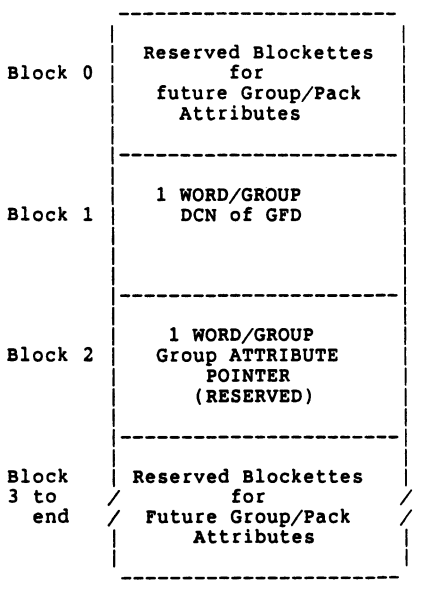


BLOCK 1 of RDS1 DISKS

PACK STATUS WORD



RDS1 MFD



MFD CLUSTERSIZE = 4,8,16

BLOCK 0 IN THE MFD

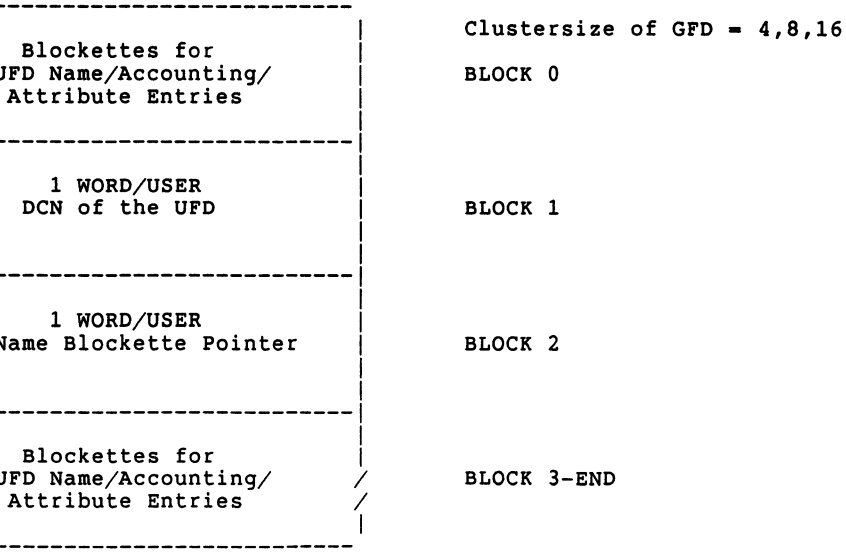
	OFFSET
0	0
-1	2
0	4
0	6
0	10
Pack Attribute Pointer	12
255. | 255.	14
'MFD' in RAD-50	16
reserved for blockettes	.
	.
	.
1 | Clustersize	760
DCN 0 of MFD	762
DCN 1 of MFD	764
DCN 2 of MFD	766
DCN 3 of MFD	770
DCN 4 of MFD	772
DCN 5 of MFD	774
DCN 6 of MFD	776

BLOCK 1 IN THE MFD

	OFFSET
DCN for Group 0 GFD	0
DCN for Group 1 GFD	2
DCN for Group 2 GFD	4
DCN for Group 3 GFD	6
.	.
.	.
DCN for Group 253 GFD	772
DCN for Group 254 GFD	774
0	776

Contains the DCN for each group file directory that exists. If 0, then that group does not exist.

RDS1 GFD



Clustersize of GFD = 4,8,16

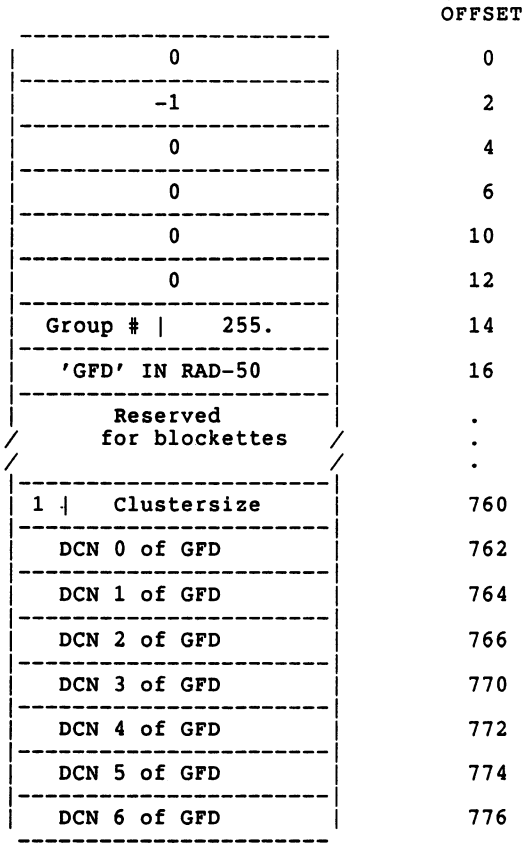
BLOCK 0

BLOCK 1

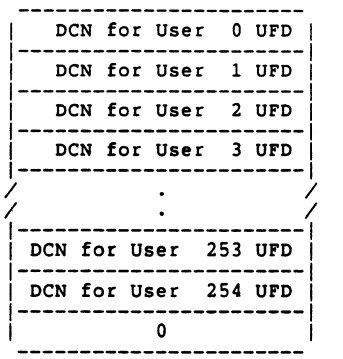
BLOCK 2

BLOCK 3-END

BLOCK 0 IN THE GFD

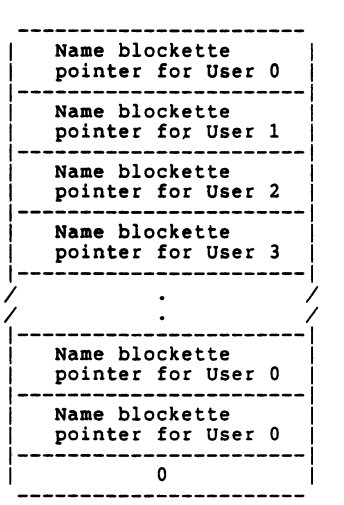


BLOCK 1 IN THE GFD



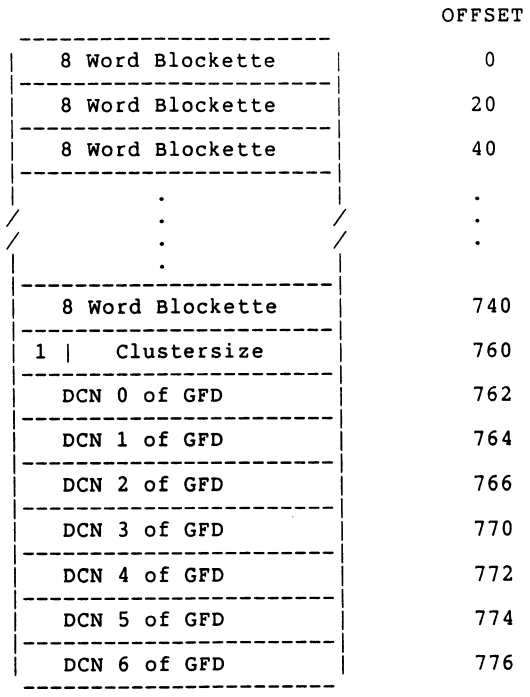
Contains the DCN for each user file directory in this group. If 0, then that user does not have a UFD. That account may still exist however.

BLOCK 2 IN THE GFD

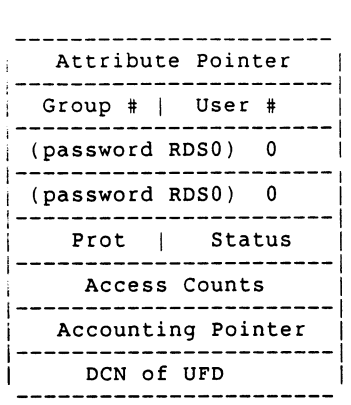


Contains the Name blockette pointer for each User in this group. If 0, then that account does not exist.

BLOCK 3 TO END of THE GFD

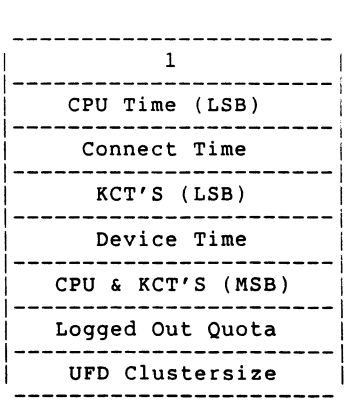


MFD/GFD Name Blockette

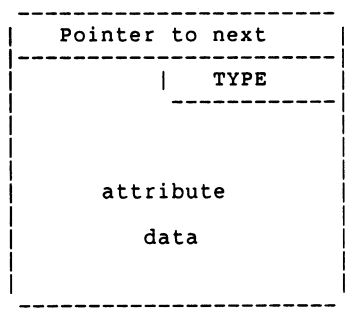


DCN MUST agree with block 1 of GFD

MFD/GFD Accounting Blockette

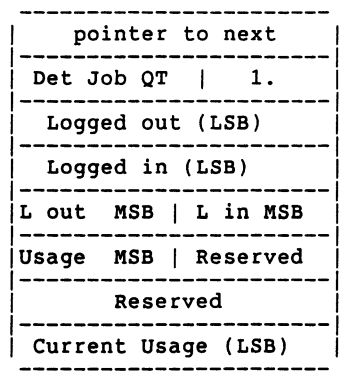


GFD ATTRIBUTE BLOCKETTE

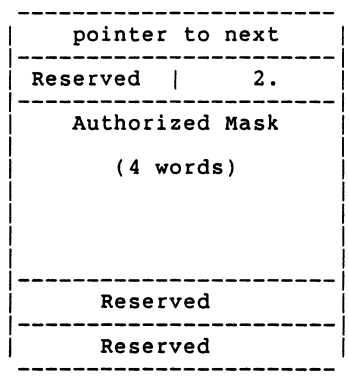


Type 1 = Disk quota
Type 2 = Privilege
Type 3 = Password
Type 4 = Account date/time
Type 5 = Account name
Type 6 = Quota part 2
Type 7-199 = Reserved for DEC
Type 200-255 =
Reserved for Customers

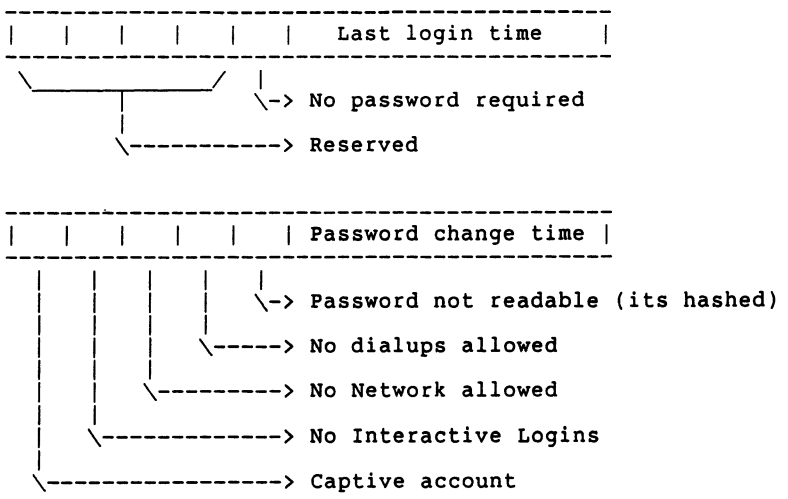
Quota Attribute Blockette



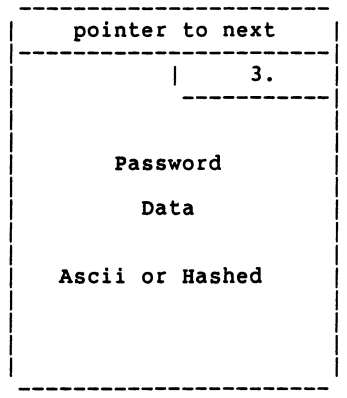
Privilege Attribute Blockette



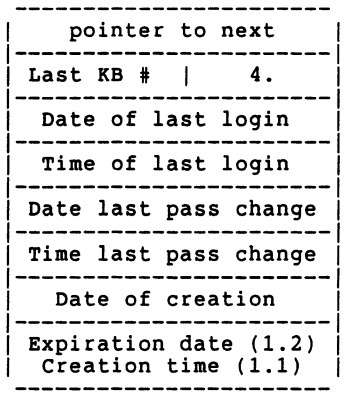
Extra Hidden Information



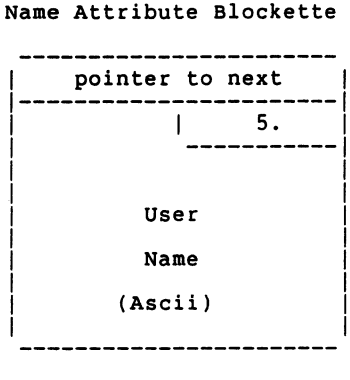
Password Attribute Blockette



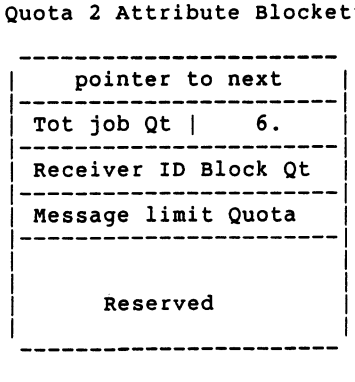
DATE/TIME Attribute Blockette



Name Attribute Blockette



Quota 2 Attribute Blockette



Block 0 in the UFD

	OFFSET
Link to First File	0
-1	2
0	4
0	6
0	10
0	12
Group # | User #	14
'UFD' in RAD-50	16
Reserved for blockettes	.
	.
	.
Clustersize	760
DCN 0 of UFD	762
DCN 1 of UFD	764
DCN 2 of UFD	766
DCN 3 of UFD	770
DCN 4 of UFD	772
DCN 5 of UFD	774
DCN 6 of UFD	776

Block 1 to end of UFD

	OFFSET
8 Word Blockette	
	:
8 Word Blockette	20
.	
.	
.	
.	
.	
8 Word Blockette	740
Clustersize	
DCN 0 of UFD	
DCN 1 of UFD	
DCN 2 of UFD	
DCN 3 of UFD	
DCN 4 of UFD	
DCN 5 of UFD	
DCN 6 of UFD	

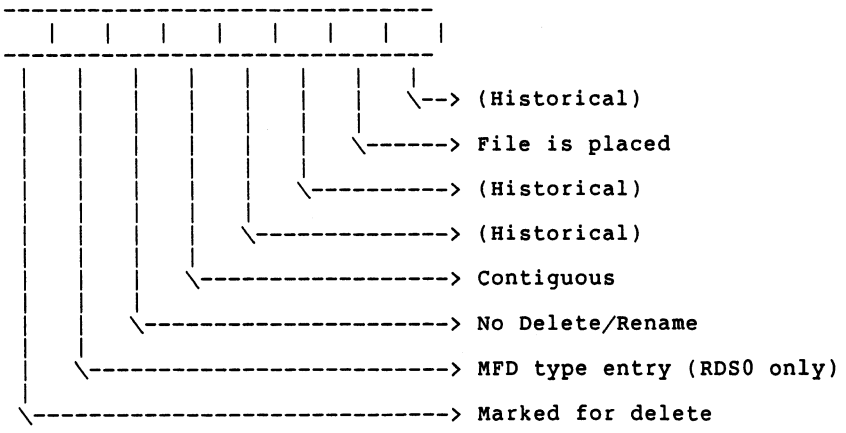
UFD Name blockette

	OFFSET
Next file pointer	0
File name	2
in (RAD50)	4
File type (RAD50)	6
Prot | Status	10
Access counts	12
Accounting pointer	14
Retrieval pointer	16

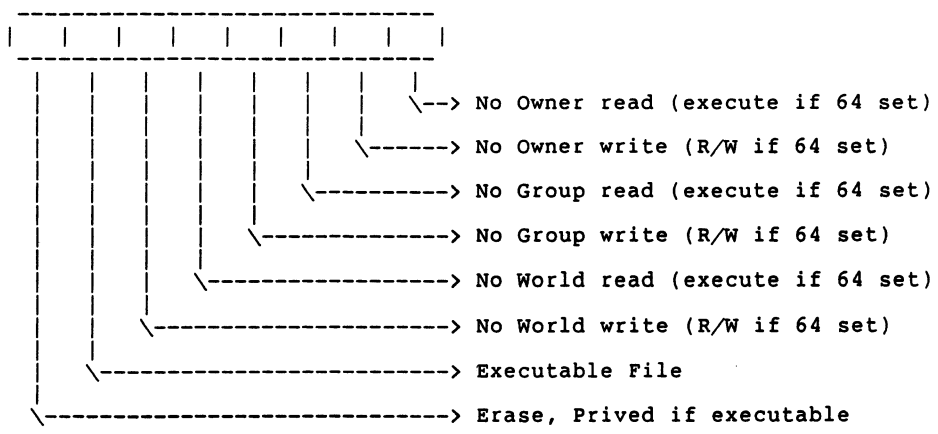
UFD Accounting blockette

	OFFSET
Link to attributes	0
DLA or DLW	2
File Size (LSB)	4
Creation Date	6
Creation Time	10
RTS pt 1 or 0	12
RTS pt 2 or size (MSB)	14
File Clustersize	16

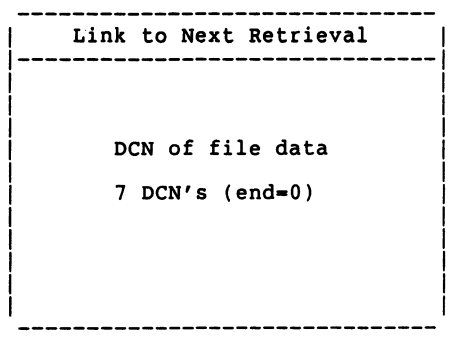
Status Byte



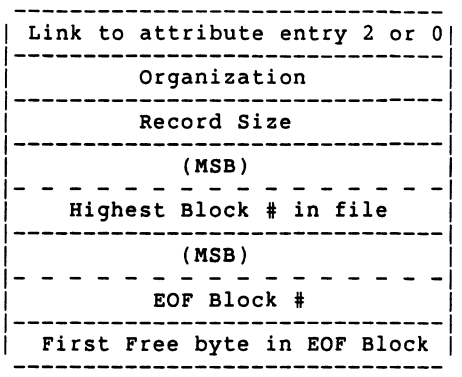
Protection Code Byte



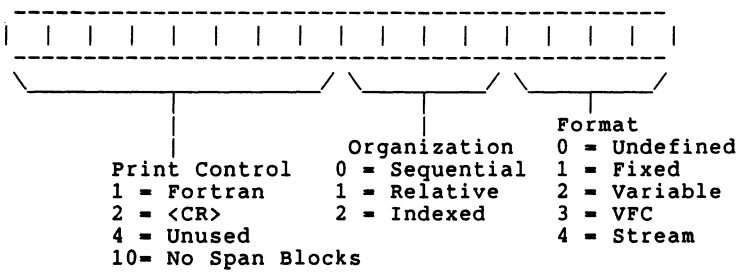
Retrieval Entry



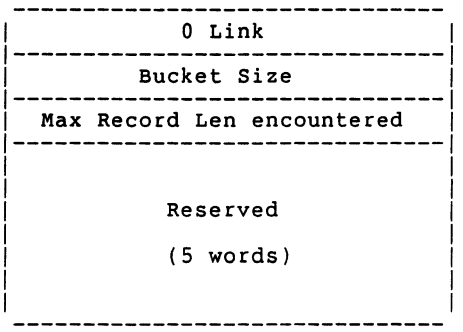
File attribute Entry



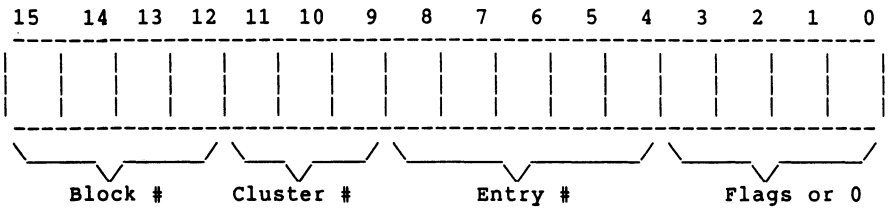
Organization Word



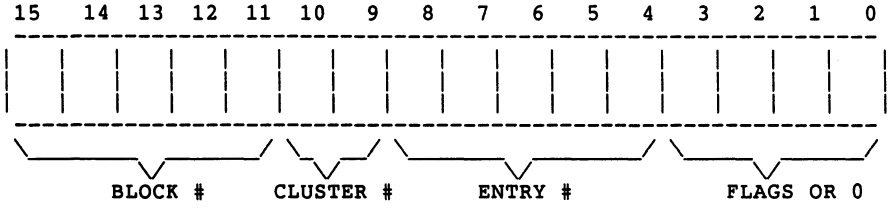
File attribute Entry part 2



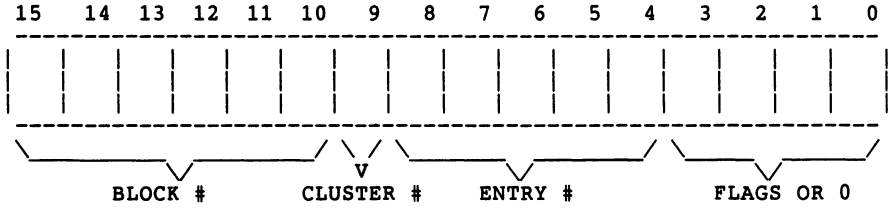
Directory Link Words (UFD Clustersize 1-16)



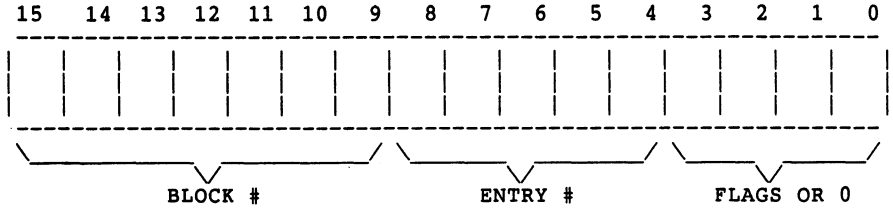
Directory Link Words (UFD Clustersize 32)



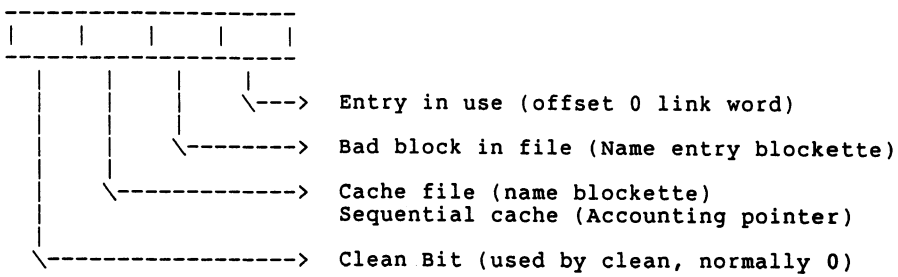
Directory Link Words (UFD Clustersize 64)



Directory Link Words (UFD Clustersize 128)



Flag Bits



RSX

MULTI-TASKER

The RSX Multi-Tasker
May, 1987

"Semper Drunk"

Fine Realtime Commentary Since 1975

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Opinions expressed in the editorial section of the Multi-Tasker are those of the Editor. They do not represent the official position of the RSX SIG or that of DECUS leadership in general.

Food for Thought

"The fears of man are many. He fears the shadow of death and the closed doors of the future. He is afraid for his friends and for his sons and of the specter of tomorrow. All his life's journey he walks in the lonely corridors of his controlled fears, if he is a man. For only fools will strut, and only cowards dare cringe."

- *James Warner Bellah*
Spanish Man's Grave

The Editor's Corner

Bruce R. Mitchell

This issue is hitting the streets just about the time that the Spring Symposium is ending. As we go to press, I'm sure there will be many interesting, exciting and significant things happening at Nashville. Recantation of those things would be timely in this issue.

Unfortunately, it's late March now, and I seem to have misplaced my crystal ball. The earliest articles from the Spring Symposium will be in the July issue.

We have a wunnerful, wunnerful selection of articles this month. The European contingent weighs in strong with two articles. Way to go, guys! Keep up the good work.

For those readers intrigued with last month's mention of the ODS-2 ACP, we're publishing a support article for reference when the ACP is released. The ODS-2 Files-11 On-Disk Structure, less the file-specific sections, rounds out this month's issue.

Send more articles; there are still about 30 of the prints of the Fall 1986 SIG button artwork to give away. These prints are a limited edition, all signed by the artist and certified. The only way you can get one is to contribute an article. And, as always, if you don't want to write an article, at least drop a line telling what kind of articles you'd like to see in the Multi-Tasker.

Turn the Editor's crank, get an editorial. The Editor's crank was turned quite well this month. So were a few others.

----- Cheap Wine -----

"The Multi-Tasker Editor has eaten sour grapes,
and the users' teeth are set on edge."

I am so angry I could just spit tacks.

Something stinks within DECUS. And generally, when something stinks, it's a sign that the odoriferous something is decaying; sometimes, decaying from within.

By the time you read this issue, the elections for the Board of Directors will be accomplished. Therefore, I can continue with the editorial started last month without fear of "electioneering" accusations.

There probably will be other accusations leveled at me after this hits, but let the chips fall where they may. We're not proud.

I stated in last month's issue that The Multi-Tasker had to remain neutral on the election. I don't know if this is official graven policy; this is what I was told. But why should an official SIG organ not support candidates who are favorable to the aims of that SIG?

I also implied that an unnamed entity may have tried to - hmm, how shall I put this - "influence" the election. That entity is LDEC, the Leadership Development and Election Committee. It is charged with running fair elections, among other things.

The flyer accompanying the ballot just crossed my desk several days ago. I am still having somewhat of a difficult time seeing straight.

There appears to have been another attempt to influence the vote. I mean the references to candidates as "Slated by the Leadership Development and Elections Committee" or "Slated by petition". This is very bad just by itself, but apparently it wasn't sufficient to put it out on the front page in bold print; it was also tagged to the bottom of each candidate's statement.

If this isn't electioneering by making certain candidates appear "blessed and approved", I'll eat my 11/60.

I have done some investigation into this. I have chatted with some of the candidates "slated by petition". Their qualifications appear very good to outstanding. But in one particularly grating case, a candidate who received a national leadership award from LDEC was told, when interviewed by LDEC, those qualifications weren't good enough to run for Board.

It is surely only a coincidence that some candidates forced to petition appear to wish to change the direction of the Society. It doesn't matter whether that viewpoint is "right" or "wrong"; DECUS is a democratic organization. In such an organization it cannot be wrong to seek to return control to the members. But it sure looks to me as though someone thinks it is.

Something stinks within DECUS. I hope it's not too late to cut out the rot.

----- Submitting Articles to the Multi-Tasker -----

Please submit machine readable media if you can. RX01, RX02, RX50, or 9 channel magtape at 800 or 1600 BPI are best. Any RSX volume format is acceptable except ROLLIN or PRESRV. ANSI, BRU and DOS FLX formats are well-liked by the Editor's tape drive.

The Editor can now Kermit articles out of other hosts into the Multi-Tasker host. The reverse is unfortunately not true; the Multi-Tasker host is normally an isolate. If you want to submit an article via Kermit, call beforehand with (1) phone number, (2) login for the host machine and (3) system uptimes.

Submissions which aren't machine readable take longer to get into print. The editor is lazy and types mass quantities only once a month when progress reports are due.

If you preformat a submission in RUNOFF format, please set page size 58,80; left margin 10; right margin 75; and, when changing margins, use incremental changes rather than absolute. The editor blesses you for the consideration.

Send all submissions to:

Bruce R. Mitchell
Machine Intelligence and Industrial Magic
PO Box 816
Byron, MN 55920
(507) 775-6268

----- And That's The Way Things Are -----

... this month in Pool Lowbegone, where the PDP-11 is still going strong, the new doc sets are good-looking, and the tendency of the newsletter editor to flame is above average.

Creative RSX Executive Patching

James A. McGlinchey
Software Engineering Consultant
Post Office Box 81
Essex Junction, VT 05452-0081
(802) 879-6014

RSX has been carefully coded so that many of its SYSgen parameters end up being constants, and all those constants are collected and put into the Exec's SYSCM module. SYSCM contains such items as:

$TKPS	The line frequency, typically 60
$SYSNM	The system's name (DECNET Node Name)
$COMEF	The global event flags (EFNs 33.-64.)
$CKLDC	KW11-P clock countdown
$SYUIC	The system UIC (typically [1,54])
$FMASK	Table of system features, shown as bits
$DYPMN	Days-per-month table
$BTMSK	Table of bit masks
$PKMAX	Maximum number of pre-allocated I/O packets
$PRIHL	POOL monitor task control parameters
$PFRSZ	" " " "
$POLBP	" " " "

A lot of RSX tweaking and tuning can be done by changing various constants in the Exec and its data areas. Admittedly, many of these items can be changed via MCR or DCL commands, but some can be changed only with a new SYSgen.

I hate doing SYSgens. I'd rather apply a patch to RSX to change something that would ordinarily require a SYSGEN. For this reason, I use pregenerated RSX distribution kits for normal RSX systems (if there be such a thing), and often must change something in the Exec.

I prefer to make changes to the Executive after all the bootstrap dust has settled. I apply patches with a program run from STARTUP.CMD rather than ZAPping the Executive. Other wizards might argue that ZAP is better for such things, but I find ZAPping the Exec to be troublesome for several reasons:

- Mistakes made with ZAP can be tragic, as the change is permanent.
- Changes made via ZAP are not documented, and therefore are not guaranteed to be reproducible.
- I can't remember how to run ZAP. I have to learn it every time I use it. So I try not to use it.

My preferred technique is a patcher program, a listing of which is shown below. The program switches to kernel state via the SWSTK$ macro, applies the changes, and then exits. I prefer this because it is reproducible and easily ported from system to system.

The example shown below applies a six character patch to change the system name. The code inserted between the SWSTK$ line and the RETURN line actually does the patching, and this is the only code the user would change to apply other patches. The rest is boilerplate code to switch into kernel state and then exit cleanly after the patch is applied.

```
        .TITLE PATCHER - Apply RSX Exec Patches
        .IDENT /01.00/
        .MCALL SWSTK$,EXIT$S

PATCH:: SWSTK$ 10$

;        Install dynamic system patches
;        All registers are available at this point.

        MOV     #"GL, $SYSNM            ;; Change the System Name
        MOV     #"IN, $SYSNM+2          ;; to "GLINCH"
        MOV     #"CH, $SYSNM+4

;       The patch is now installed. Return to user state.

        RETURN                          ;; Return to user state

10$:    EXIT$S                          ; and split.

        .END    PATCH
```

The following command lines assemble and Task Build the patcher program:

```
MAC PATCHER,PATCHER/-SP=LB:[11,10]RSXMC.MAC,SY:'<UIC>'PATCHER
TKB PATCHER/PR/-CP,PATCHER=PATCHER,LB:[1,54]RSX11M.STB/SS
```

Once the basic PATCHER program is created, it can be used for all sorts of things in the RSX Exec. Examples are included below.

Some are serious, some frivolous. The examples are just those lines to be inserted into the PATCHER program.

‹‹‹ WARNING WARNING WARNING WARNING WARNING WARNING ›››

The examples shown below could cause a system to crash or otherwise malfunction. DO NOT try them just to "see what happens". The examples are for illustration purposes only.

To change the system clock frequency to 50 Hz.:

```
MOVB #50.,$TKPS
```

To permanently set Event Flag 32.:

```
BIS #1,$COMEF
```

To cause the Exec to forget that UMRs (Unibus Mapping Registers) are present:

```
BIC #HF.UBM,$FMASK
```

Several possibilities for creative hacking come to mind as well, such as changing the system clock to 23 Hz, or changing the system name every five seconds, using a rotating table of names. (Fun, but it doesn't show up on RMD).

A more extended use of the PATCHER program is a tweak I have been applying to RSX systems ever since I discovered that the preallocated I/O Packet list isn't really preallocated. I/O packets, up to the limit specified via a SYSGEN question, are left allocated upon their first use. Once an I/O packet is allocated by a device driver it is entered in the list of permanently allocated packets. Two problems are encountered with this feature:

- The preallocated maximum may be too low; if a SET /MAXPKT command responds with two identical numbers, the system could probably use a few more preallocated packets.
- The packets are not really preallocated, but are allocated when needed and then left in a list. While this is a nice run time optimization for RSX, it tends to leave preallocated packets scattered all over primary POOL, leaving POOL more fragmented than it could otherwise be.

My solution to these problems is the following program. It first changes the maximum number of packets to be left preallocated, and then forces their allocation. It then deallocates them, leaving the maximum number entered in the preallocated I/O packet list. Since the allocation/deallocation is done in a loop running in Executive state, the packets are most likely allocated immediately adjacent to each other, and are located in a bunch at the bottom of POOL.

```
        .TITLE FIXPKT - Allocate Preallocated Packets
        .IDENT /01.00/
        .MCALL SWSTK$,EXIT$S,CRASH

;       This program allocates all the possible Pre-Allocated
;       RSX I/O Packets, leaving them in a contiguous bunch
;       at the bottom of POOL.
;
;       It optionally enables the user to adjust the maximum
;       number of packets to be left in the preallocated list.
;
; Command lines for creation:
;
; MAC FIXPKT,FIXPKT/-SP=LB:[11,10]RSXMC.MAC,SY:'‹UIC›'FIXPKT
; TKB FIXPKT/PR/-CP,FIXPKT=FIXPKT,LB:[1,54]RSX11M.STB/SS
;
; Comments begun with double semicolons (;;) indicate code
; which executes in kernel mode.
;
START:: MOV     #PKTS,R5        ; Point at packet list
        SWSTK$  GOTTEM          ; enter system state

        MOVB    #16.,$PKMAX     ;; Change Maximum.
                                ;;
        MOVB    $PKMAX,R4       ;; How many are there?
10$:    CALL    $ALPKT          ;; allocate one.
        BCC     20$             ;; continue if ok.
        CRASH                   ;; else crash system.

20$:    MOV     R0,(R5)+        ;; stash packet address
        SOB     R4,10$          ;; see if more to do.
        MOVB    $PKMAX,R4       ;; now de-allocate packets.
30$:    MOV     -(R5),R0        ;; going backward thru list
        CALL    $DEPKT          ;; and de-allocate 'em
        SOB     R4,30$          ;; all of 'em
        RETURN                  ;; back to user state.

GOTTEM: EXIT$S                  ; all done.


;       Packet address list

PKTS:   .BLKW   256.
```

```
END     START
```

F77 Compiler Bug

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We discovered an interesting problem in the Fortran-77 compiler when we patched it up to RSX 3.0 Update C level. If you have two successive single quotes within a quoted string in a PARAMETER statement, for example -

```
Program QUOTE
Integer X,Y
Character*19 FMT1
Parameter ( FMT1 = '(1X,I2.2,''::'',I2.2)' )
X = 12
Y = 35
Write (UNIT = 5,FMT = FMT1) X, Y
End
```

the quote processing is incorrect. The above program should print "12::35". Instead, it prints "12:35".

Apparently, when the compiler recognizes the second quote, it gobbles both the quote character and the character following it. This can lead to compile errors later, if you're lucky, or just to unexpected results at run time.

We have SPRed this problem, and Digital is working on it. In the meantime, we're working around it, and trying not to make changes which will have to be changed back when the compiler is fixed. Most of our uses of the quotes inside quotes come from FORMAT statements inside PARAMETER statements. For those, we're falling back to Hollerith constants to replace the quoted strings.

Using this technique, the program above becomes:

```
Program QUOTE
Integer X,Y
Character*19 FMT1
Parameter ( FMT1 = '(1X,I2.2,2H::,I2.2)' )
X = 12
Y = 35
Write (UNIT = 5,FMT = FMT1) X, Y
End
```

Letter to the Editor

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I am very concerned by the handling of the recent DECUS Board of Directors election. The treatment of candidates in the flyer which accompanied the election ballot was no less than appalling.

Specifically, the flyer shows favoritism toward the LDEC approved candidates, while carefully implying that the petitioners are somewhat less than equal. This may be in strict keeping with the bylaws, but it is no way to run a fair election. There <u>are</u> certain areas of the globe where one only votes for "approved" candidates, but I refuse to believe that DECUS is among them.

It should also be noted that DECUS specifically prohibits any form of "campaigning" in its official publications. If nothing else, LDEC is guilty of violating this policy in its presentation of the slate of candidates as "approved" or "not approved". If I had sent a pre-election letter to this newsletter stating that I heartily approved of thus-and-so for DECUS board, it would have been in violation of policy and would not have been published. The least LDEC can do is abide by its own policies.

If, in fact, such cavalier treatment of candidates is within the bylaws of DECUS, those bylaws should be changed immediately. Once a candidate has gained a place on the ballot, any distinction between LDEC "approval" and placement by petition should be eliminated. The implication that petitioners are somehow less worthy than "approved" nominees is grossly unfair, not to mention misleading.

The amazing thing about the "dual slate" of candidates in this case is the lack of distinction in qualifications between the "LDEC approved" nominees and those who had to force their names on the ballot. Perusal of the nominees' statements shows the three petitioners to be quite as qualified for consideration as Board members as the other nominees. Why were such eminently qualified

individuals not selected as candidates?

It is disturbing to note that two of the petitioners openly state concerns with the direction of the "New DECUS". Furthermore, with one exception, the "approved" candidates are all intimately connected with the "New DECUS". Could it be that the petitioners are unacceptable for purely political reasons?

Could it be, in fact, that LDEC selects candidates as much for their acceptability to LDEC itself as for their qualifications to sit on the Board of Directors of DECUS? Could it be that LDEC is less than objective in carrying out its role of recruting and nominating candidates for the Board? I certainly hope not. However, the evidence of the election pamphlet raises serious doubts.

Let me state emphatically that I have no problem with ANY of the candidates on the ballot. All appear qualified for the position to which they aspire. My problem is specifically with LDEC and the way in which the candidates were presented to DECUS membership. At a minimum, those sections of the bylaws pertaining to conduct of elections, and the policies which guide LDEC in carrying out election duties require immediate and thorough review. The least that the "New DECUS" can do for its membership is conduct fair and unbiased elections.

Missing TKB Global Symbol "ERRDEF"

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In the November, 1986 issue of The Software Dispatch, DEC documents a problem with the high-level language interface to the Executive directives in which tasks build with an undefined reference to ERRDEF. This problem originated in Update C, and is (allegedly) fixed in Update D.

DEC suggests two ways to work around this problem. The first, and simplest, is to ignore it. We have trouble doing that because the undefined symbol causes TKB to return an exit status other than success, and that upsets our automated application-system builder.

The second solution offered by DEC is to include a GBLDEF option in each task's TKB command file so that the ERRDEF symbol is resolved. We don't like that one either, because we have a large base of installed tasks and associated task-build command files, and adding the GBLDEF to each one is a lot of work.

What we've done is to include an additional module in SYSLIB.OLB which provides a definition for ERRDEF. We created a very short MACRO program:

```
        .TITLE ERRDEF
ERRDEF::
        .END
```

We assemble it, then insert the resulting module into SYSLIB.OLB (LBR LB:[1,1]SYSLIB.OLB=ERRDEF.OBJ/EP/IN). Now our tasks build with their old command files and no unresolved symbols.

Recovery of BRU Multi-Volume Tape Sets

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1. The Problem

Careful reading of the RSX Utilities Manual reveals that the /AP switch with BRU is valid only to append backup sets to the end of a single volume magnetic tape set. Once backup sets extend to more than one tape, the /AP switch is no longer permitted. The manual implies that use of the /AP switch in these circumstances should result in an error message.

Unfortunately, certain versions of BRU (V07.24 of RSX-11M V4.2/B, in particular) do not enforce this restriction. The result, for the unwary, can be a multi-volume magnetic tape set containing backup sets which cannot be restored using BRU, since BRU is adamant that a backup set used in a restore operation must start on the first volume of a multi-volume backup set.

The purpose of this note is to describe a means of recovering these backup sets. The recovery procedure appears to work satisfactorily for backup sets completely contained on a single volume. The recovery of backup sets which not only start after the first volume but also span more than one volume is not solved completely, although a procedure which appears to achieve partial

recovery of such backup sets is described.

The recovery procedure requires access to a VAX/VMS system with two magnetic tape drives of density compatible with the RSX generated BRU tape. Tests have been made using an RSX-11M V4.2/B system and a VMS V4.5 system.

2. The Solution

In the interest of clarity, let us consider the case of a 3-volume magnetic tape set. Assume that the contents of the volumes are as follows:

```
Tape 1:  File 1    /BAC:BB1, part 1 of 2

Tape 2:  File 1    /BAC:BB1, part 2 of 2
         File 2    /BAC:BB2, complete
         File 3    /BAC:BB3, part 1 of 2

Tape 3:  File 1    /BAC:BB3, part 2 of 2
```

Given this volume set, BRU is able to restore backup set BB1 normally, but attempts to restore backup sets BB2 or BB3 fail. In this section, a procedure is described for recovering BB2 (i.e., a backup set which is completely contained on a single volume). The recovery of backup set BB3 is described in section 3.

The recovery procedure for BB2 is to copy the backup set to another tape in such a way that it appears to BRU to be an appended backup set on a single volume tape set. All attempts to perform the required copy using PIP on RSX-11M failed, because, while BRU writes ANSI type labels on magnetic tapes, it does not follow standard ANSI procedure for encoding the record lengths. As a result, the more forgiving VAX/VMS COPY command must be used. The procedure is as follows:

1. On an RSX system, initialize a target magnetic tape using BRU. Assuming that UFD LB:[g,m] is a nonexistent UFD and that MTnn: is a tape drive available on the RSX system, load the tape on the drive and issue the command:

   ```
   BRU /MOU LB:[g,m] MTnn:
   ```

   The following messages will appear:

   ```
   BRU - Starting Tape 1 on MTnn:
   BRU - End of Tape 1 on MTnn:
   BRU -- * WARNING * No files found
   BRU - Completed
   ```


   Note that the target tape must be initialized using BRU on an RSX system. Use of the INI command under RSX or VMS is inadequate.

2. Log in to the VMS system and allocate two tape drives:

   ```
   ALL MTAm:
   ALL MTAn:
   ```

   Load the tape containing backup set BB2 on MTAm: and load the target tape on MTAn:.

3. Mount the two tapes using the commands:

   ```
   MOU MTAm:  /OVER=(OWNER,ID)
   MOU MTAn:  /OVER=(OWNER,ID) /BLOCK=4144
   ```

   Note the specification of the blocksize on the output magnetic tape.

4. Copy BB2 to the target magnetic tape using the command:

   ```
   COPY MTAm:"BB2" MTAn:  /LOG
   ```

   Note that the quotation marks are required syntax.

The resulting target tape can be read by BRU on an RSX system and the backup set, BB2, can be restored to disk in the usual way.

3. Recovery Procedure for a Split Backup Set

If the above recovery procedure is attempted for a backup set such as BB3 which is split between two tape volumes, a VAX operator request to mount the continuation volume of BB3 is obtained at the end of tape 2. Unfortunately, the format of tape 3 is such that it is impossible to satisfy this request, and the recovery procedure fails. No completely successful method of recovering such backup sets has been found, though the following method has achieved partial recovery. It is described here as stimulation for further investigation.

The purpose of the procedure is firstly to modify tape 2 so that VMS COPY believes that there is no continuation tape for BB3. The procedure of section 2 is then followed to copy the first part of BB3 to a target tape which has been initialized with BRU. The target tape is then modified so that it again has a format corresponding to a BRU backup set which has been continued on a second volume. The resulting tape, together with tape 3, is used as input to BRU to restore BB3 to a disk.

The normal format of an ANSI format tape which continues onto a

subsequent tape is, according to the VMS documentation, as follows:

HDR1 HDR2 * ...Data... * EOV1 EOV2

where * represents a tape mark, and EOV1 and EOV2 are 80-byte records containing the ASCII strings "EOV1" and "EOV2" in the first 4 bytes, respectively.

For a tape which does not continue, the format is:

HDR1 HDR2 * ...Data... * EOF1 EOF2

EOF1 and EOF2 are also 80-byte records with the same structure as EOV labels except for the substitution of "F" for "V" in the third byte. The recovery procedure is therefore as follows:

1. Modify tape 2 so that the EOV1 and EOV2 labels are converted to EOF1 and EOF2 labels. This can be done via a simple Macro program. Our method, however, was to use the SIG tape copy program TPC to copy the tape to a disk file. DMP was then used to locate the EOV labels so that they could be patched into EOF labels by ZAP. A new tape was finally written using TPC. (The new tape must be longer than the original so that TPC does not give trouble with end of tape.)

2. Use the procedure of section 2 to copy the first part of backup set BB3 to a new target tape.

3. Reverse step 1 with the target tape to convert the EOF labels back into EOV labels.

4. Use the resulting tape together with the original tape 3 as input to BRU to restore the backup set.

Plausible though it seems, this recovery procedure for a split backup set is not perfect. During tests made at SIN during the preparation of this note (no case has yet arisen here where such a recovery is necessary, so no great amount of time has been invested in finding a complete solution), BRU reported lost data records at the start of the second part of the backup set during the restore operation. Some files were missing on the restored disk. Most files however, were found to be present, correct and complete.

The reason for these problems presumably results from the simplistic patching of the first tape in the backup set which, in turn, is a result of the fact that the BRU tape format is unpublished

(at least for the lesser mortals outside DEC). Despite these limitations, the procedure is published here as incentive to study the problem further should the need be sufficiently pressing.

Response to December "Bag of Tricks"

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The following is a response to the article in the December 1986 issue "Bag of Tricks" about tracking task build dates. Thanks to the submittor for these comments. -- The Editor

The December 1986 issue of The Multi-Tasker, with the "Bag of Tricks: MACRO-11" article by Barton Bruce was very interesting.

It is important to note that the $$DBTS .PSECT and $DBTS global label must be placed in the task's root segment, if the task is overlaid.

Those concerned with the size of the root (all of us?) can place the code which converts the stored date and time to ASCII into a separate module. The resulting module can then be placed in an overlay segment. This approach uses only 40 decimal bytes in the root segment.

RSX SIG Leadership Chart

Ed Cetron
SIG Long Range Planning Coordinator

The SIG leadership chart was revamped at the Spring "Woods" meeting in February. This chart would have accompanied the meeting report, but arrived just one day too late to make it in. Shucks! -- The Editor

Files-11 On-Disk Structure Specification

Digital Equipment Corporation
Maynard, MA

This article is presented to lay the foundation for an article scheduled later this year on an ODS-2 ACP for RSX. -- The Editor

Files-11 On-Disk Structure Specification

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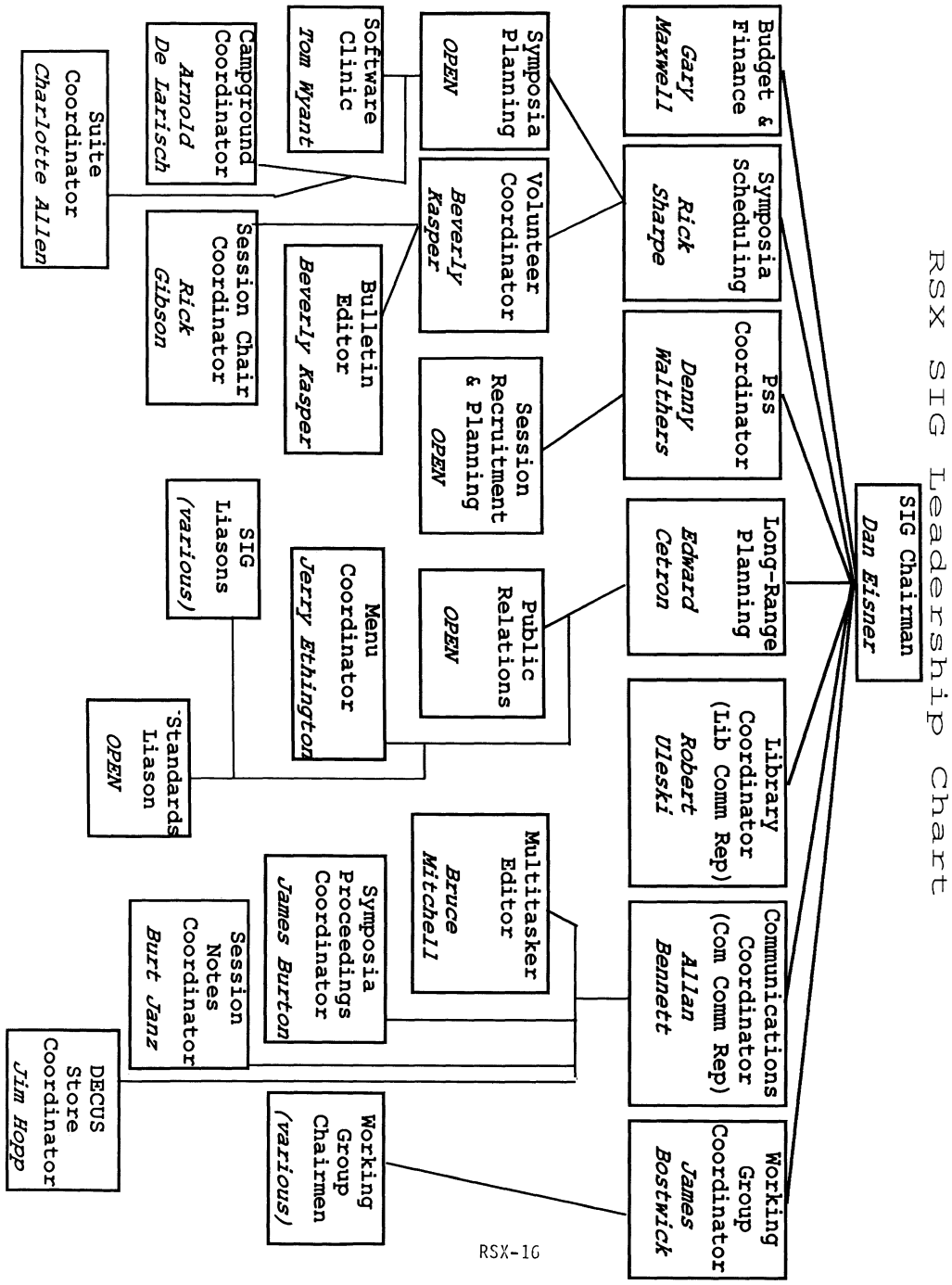
RSX SIG Leadership Chart



1.0 Scope

This document is a specification of the on-media structure used by Files-11. Files-11 is a general purpose file structure intended to be the standard file structure for all medium to large PDP-11 systems. Small systems such as RT-11 are specifically excluded because the complexity of Files-11 imposes too great a burden on their simplicity and small size.

This document describes structure level 2 of Files-11, also referred to as ODS-2 (on-disk structure 2). It contains feature and reliability improvements over structure level 1 (ODS-1). This version of the specification is subsetted to describe only the features implemented at present (VMS Version 1.5).

1.1 Conventions

All numerical values in this document are in decimal radix, unless indicated otherwise.

Within the file structure are fields containing binary integers of various lengths. Unless otherwise indicated, all these fields are in the standard numerical format, which means that the most significant bits are stored in the highest numbered address.

In the descriptions of various structures on the disk, there are fields labelled "not used". These fields must be zero, so that they can be made nonzero for future use. Since they are reserved for future use, programs reading these structures should not assume that these fields are in fact zero.

2.0 Medium

Files-11 is a structure imposed on a medium. That medium must have certain properties, which are described in the following section. Generally speaking, block addressable storage devices such as disks and DECtape are suitable for Files-11; hence, Files-11 structured media are generically referred to as disks.

2.1 Volume

The basic medium that carries a Files-11 structure is referred to as a volume. A volume (also often referred to as a unit) is

defined as an ordered set of logical blocks. A logical block is an array of 512 8-bit bytes. The logical blocks in a volume are consecutively numbered from 0 to (n-1), where the volume contains n logical blocks.

The number assigned to a logical block is called its logical block number, or LBN. Files-11 is theoretically capable of describing volumes up to (2**32) blocks in size. In practice, a volume should be at least 100 blocks in size to be useful.

The logical blocks of a volume must be randomly addressable. The volume must also allow transfers of any length up to 65K bytes, in multiples of four bytes. When a transfer is longer than 512 bytes, consecutively numbered logical blocks are transferred until the byte count is satisfied. In other words, the volume can be viewed as a partitioned array of bytes. It must allow reads and writes of arrays of any length less than 65K bytes, provided that they start on a logical block boundary and that the length is a multiple of four bytes. When only part of a block is written, the contents of the remainder of that logical block are undefined.

The logical blocks of a volume are grouped into clusters. The cluster is the basic unit of space allocation on the volume. Each cluster contains one or more logical blocks; the number of blocks in a cluster is known as the volume cluster factor, or storage map cluster factor.

A volume is identified as a Files-11 volume by the home block. The home block is located at a defined physical location on the volume, and is identified by the presence of checksums and predictable values. The home block contains a volume label, which is a string of up to 12 ASCII characters. The characters are restricted to the printing ASCII set (i.e., excluding control characters and RUBOUT). Further, it is recommended that volume labels be restricted to alphanumerics only to avoid conflicts with the command languages of supporting systems. The volume label of a volume may not be null.

2.2 Volume Sets

A volume set is a collection of related volumes that are normally treated as one logical device in the usual operating system concept. Each unit contains its own Files-11 structure; however, files on the various volumes in a volume set may be referenced with a relative volume number, which uniquely determines which volume in the set the file is located on.

A volume set has an associated structure name, which is a string of up to 12 ASCII characters identifying the volume set. The character set limitations of the volume label also apply to the structure name. The structure name may not be null.

2.2.1 Tightly Coupled Volume Set

A tightly coupled volume set is a volume set which is consistent and self-identifying. The volume labels of the volumes making up the set must be unique within the set, and must be different from the structure name. Relative volume one of the set contains a file which lists the volume labels of all the volumes in the set, thus associating volume labels with relative volume numbers. Each volume is identified as being part of the set by carrying the structure name, its volume label, and its relative volume number.

2.2.2 Loosely Coupled Volume Set

A loosely coupled volume set is a collection of volumes which is not self-identifying. There is no file listing the volume labels. Only one file may cross from any one volume in the set to another, and files in the set which cross volumes may be processed only sequentially. Correct sequencing of the volumes that hold a particular file is the responsibility of the system operator. There are checks that catch most handling errors, but they cannot be foolproof. The purpose of the loosely coupled volume set is to emulate multi-volume magtape, and allow a file to be read or written sequentially with only one volume mounted at a time.

3.0 Files

Any data in a volume or volume set that are of any interest (i.e., all blocks not available for allocation) are contained in a file. A file is an ordered set of virtual blocks, where a virtual block is an array of 512 8-bit bytes. The virtual blocks of a file are consecutively numbered from 1 to n, where n is the highest numbered block allocated to the file.

The number assigned to a virtual block is called its virtual block number, or VBN. Virtual blocks are mapped to unique logical blocks in the volume set by Files-11. Virtual blocks may be processed in the same manner as logical blocks. Any array of bytes less than 65K in length may be read or written, provided that the transfer starts on a virtual block boundary and that its length is a multiple of four bytes.

For most files, all VBNs less than or equal to the highest VBN allocated map to some LBN in the volume set. Such files are said to be dense. Files which are sparse contain virtual blocks which are not allocated logical blocks.

3.1 File ID

Each file in a volume set is uniquely identified by a File ID. A File ID is a binary value consisting of 48 bits (3 PDP-11 words). It is supplied by the file system when the file is created, and must be supplied by the user whenever he wishes to reference a particular file.

The three words of the File ID are used as follows:

Word 1 File Number

Locates the file within a particular volume of the volume set. File numbers ordinarily lie in the range 1 through 65,535. The set of file numbers on a unit is moderately (but not totally) dense; at any instant in time, a file number uniquely identifies one file within that volume.

Word 2 File Sequence Number

Identifies the current use of an individual file number on a volume. File numbers are reused; when a file is deleted, its file number becomes available for future use for some other file. Each time a file number is reused, a different file sequence number is assigned to distinguish the uses of that file number. The file sequence number is essential since is is perfectly legal for users to remember and attempt to use a File ID after that file is deleted.

Word 3 Relative Volume Number

Identifies which volume of a volume set the file is located on. If the volume in question is not a member of a volume set, this word is zero. If the volume is part of a volume set, then the relative volume number, or RVN, lies in the range from 1 to 65,535. In any context where a particular volume of a volume set can be identified as the "current volume", such as a file extension linkage, a relative volume number of zero means the current volume. When a file is referred to in the context of the volume on which it resides, it should be referred to with a relative volume number of zero, regardless of the RVN assigned to that volume.

File Number Extension

If the maximum number of files permitted on the volume (as recorded in the home block) is greater than 65,535, then the high byte of the relative volume number becomes a high order extension to the file number. The volume set size is then limited to 255 volumes, while the range of allowable file numbers extends from 1 to (2**24)-1. When 24-bit file numbers are used, the file system should not create files

whose file number is an integer multiple of 65,536; i.e., whose low 16 bits are zero. Such file numbers break existing PDP-11 software such as FCS-11.

3.2 File Header

Each file on a Files-11 volume is described by a file header. The file header is a block containing all information necessary to access the file. It is not part of the file; rather, it is contained in the volume's index file. The header block is organized into six areas, of which the first five are variable in size.

3.2.1 Header Area

The information in the header area permits the file system to verify that this block is in fact a file header and is the particular header sought by the user. It contains the file number and file sequence number of the file, as well as its ownership and protection codes. This area also contains offsets to the other areas of the file header, thus defining their size.

3.2.2 Ident Area

The ident area of a file header contains identification and accounting data about the file. Stored here are the primary name of the file; creation date and time; revision count, date and time; and expiration date.

3.2.3 Map Area

The map area describes the mapping of virtual blocks of the file to logical blocks of the volume. The mapping data consists of a list of retrieval pointers. Each retrieval pointer describes one group of consecutively numbered logical blocks allocated to the file. Retrieval pointers are arranged in the order of the virtual blocks they represent.

3.2.4 Access Control List

The access control list is an optional area that contains a list of users allowed access to the file. The access control list makes it possible to describe user communities for a particular file that

cannot be expressed with the regular protection classes.

3.2.5 Reserved Area

This optional area is reserved for used by CSS or special applications. It is not used by standard Files-11 systems.

3.2.6 End Checksum

The last two bytes of the file header contain a 16-bit additive checksum of the preceding 255 header words. The checksum is used to help verify that the block is in fact a file header.

3.3 Multi-Header Files

Since the file header is of fixed size, it is inevitable that for some files the mapping information does not fit in the allocated space. A file with a large amount of mapping data is therefore represented with a chain of file headers. Each header maps a consecutive set of virtual blocks; the extension linkage in the header area links the headers together in order of ascending virtual block numbers. The extension pointer in each file header is the File ID of the next header in sequence.

3.4 Multi-Volume Files

Multiple headers are also needed for files spanning units in a volume set. A header may only map logical blocks located on its volume; therefore, a multi-volume file is represented by headers on all volumes containing portions of that file. In a multi-volume file on a loosely coupled volume set, the File ID of the first header on each continuation volume always has the value 7,7,n, where n is the RVN of the volume on which the file starts plus the number of preceding volumes containing portions of the file.

3.5 File Header - Detailed Description

This section describes in detail the items contained in the file header. Each item is identified by a symbol which represents the offset address of that item within its area in the file header. Any

item may be located in the file header by locating the area to which it belongs, and then adding the value of its offset address. Users who concern themselves with the contents of file headers are strongly urged to use the offset symbols.

The symbols may be defined in PDP-11 (and VAX compatibility mode) assembly language programs by calling and invoking the macro FHDL2$, which may be found in the macro library of any system that supports Files-11. Alternatively, one may find the macro in the file OD2MAC.MAC.

VAX native mode assembly language programs can define a corresponding set of file header offsets by invoking the macros $FH2DEF, $FI2DEF and $FM2DEF. These macros are located in the macro library LIB.MLB. Source for these macros is located in the file F11DEF.MAR.

3.5.1 Validity

A valid file header is defined by the following rules:

1. The contents of H.IDOF is no less that the offset H.FOWN/2.
2. The four offset bytes are related in the manner: (H.IDOF) .LE. (H.MPOF) .LE. (H.ACOF) .LE. (H.RSOF).
3. The high byte of H.FLEV contains the value 2.
4. The low byte of H.FLEV contains a value greater than or equal to 1.
5. The word H.FNUM contains the file number.
6. The word H.FSEQ contains the file sequence number.
7. The high byte of H.FRVN contains the extended part of the file number, if any.
8. The contents of the byte H.USE must be less than or equal to (H.ACOF) - (H.MPOF).

A deleted file header conforms to the format of a valid file header with the following exceptions:

1. SC.MDL is set in H.FCHA.
2. H.FNUM and H.FCHA contain zero.
3. The file header checksum contains zero.

3.5.2 Header Area Description

The header area of the file header always starts at byte 0. It contains the basic information needed for checking the validity of accesses to the file.

3.5.2.1 H.IDOF 1 byte Ident Area Offset

This byte contains the number of 16-bit words between the start of the file header and the start of the ident area. It defines the location of the ident area and the size of the header area.

3.5.2.2 H.MPOF 1 byte Map Area Offset

This byte contains the number of 16-bit words between the start of the file header and the start of the map area. It defines the location of the map area and, together with H.IDOF, the size of the ident area.

3.5.2.3 H.ACOF 1 byte Access Control List Offset

This byte contains the number of 16-bit words between the start of the file header and the start of the access control list. It defines the location of the ACL and, together with H.MPOF, the size of the map area.

3.5.2.4 H.RSOF 1 byte Reserved Area Offset

This byte contains the number of 16-bit words between the start of the file header and the start of the reserved area. The reserved area is not used by Files-11 itself, and may be used by CSS or special applications. Together with H.ACOF, this byte defines the size of the access control list. The size of the reserved area is implied by the contents of H.RSOF and the end of the header block.

The presence of the ident, map, ACL and reserved areas are optional. Absence of any area is signalled not by a zero offset, but by equality of the two offsets that define the area's size. All five areas are variable in length; implementations of Files-11 must check the length of a particular area before attempting to reference a particular entry.

3.5.2.5 H.FSEG 2 bytes Extension Segment Number

This word contains the value n, where this header is the (n+1)th header of the file; i.e., headers of a file are numbered sequentially starting with 0.

3.5.2.6 H.FLEV 2 bytes Structure Level and Version

The file structure level and version are used to identify different versions of Files-11 as they affect the structure of the file header. This permits upward compatibility of file structures as Files-11 evolves, in that the structure level word identifies the version of Files-11 that created this particular file.

This document describes structure level 2 of Files-11. The high byte of H.FLEV must contain the value 2. The low byte contains the version number, which must be greater than or equal to 1. The version number is incremented whenever compatible additions are made to the Files-11 structure that may be safely ignored by an old version of the file system. This document describes version 1 of structure level 2.

3.5.2.7 H.FNUM 2 bytes File Number

This word contains the file number of the file.

3.5.2.8 H.FSEQ 2 bytes File Sequence Number

This word contains the file sequence number of the file.

3.5.2.9 H.FRVN 2 bytes Relative Volume Number

This word holds part of the third word of the File ID when appropriate. This is usually referred to as the relative volume number. When used as such (i.e., to indicate the volume of a volume set), it is not recorded in the file header, since the RVN of a volume may change during a file's life, and the RVN portion of a File ID may be zero or nonzero, depending on the context.

However, when the high byte of the RVN is used as an extension to the file number, it is recorded in the high byte of this word. The low byte of H.FRVN is always zero.

3.5.2.10 H.EFNU 2 bytes Extension File Number

This word contains the file number of the next sequential extension header for this file. If there is no extension header, this word contains zero.

3.5.2.11 H.EFSQ 2 bytes Extension File Sequence Number

This word contains the file sequence number of the next sequential extension header for this file. If there is no extension header, this word contains zero.

3.5.2.12 H.ERVN 2 bytes Extension Relative Volume Number

This word contains the relative volume number of the volume in the volume set that contains the next sequential extension header for this file. If there is no extension header, or if the extension header is located on the same volume as this header, this word contains zero.

3.5.2.13 H.UFAT 32 bytes User Attribute Area

This area is used by the record manager, or any other higher level access mechanism, to store information necessary for processing the file (e.g., record control data, EOF mark, etc.).

3.5.2.14 H.FCHA 4 bytes File Characteristics
H.UCHA = H.FCHA + 0 User Controlled Characteristics
H.SCHA = H.FCHA + 1 System Controlled Characteristics

The user controlled characteristics byte contains the following flag bits:

UC.CON Set if the file is logically contiguous; i.e., if for all virtual blocks in the file, virtual block i maps to logical block (k+i) on one volume for some constant k. This bit may be implicitly set or cleared by file system operations that allocate space to the file; the user may only clear it explicitly.

UC.CNB Set if the file is allocated contiguous best effort; i.e., as contiguous as possible.

UC.DLK Set if the file is deaccess-locked. This bit is a flag warning that the file was not properly closed and may contain inconsistent data. Access to the file is denied if this bit is set.

UC.RCK Set if the file is read-checked. All read operations on the file, including reads of the file header(s), are performed with a read, read-compare to assure data integrity.

UC.WCK Set if the file is write-checked. All write operations on the file, including modifications of the file header(s), are performed with a write, read-compare to assure data integrity.

UC.NID Set if incremental dump (backup) is disabled for this file.

UC.WBC Set if the file is to be write-back cached; i.e., if a cache is used for file data, data written by a user are written back to the disk only when it is removed from the cache. Clear for write-through cache operation.

The second byte of the file characteristics words is historically known as the system controlled file characteristics. It contains the following flag bits, defined as referenced within the byte:

SC.MDL Set if the file is marked for delete. If this bit is set, further accesses to the file are denied, and the file is physically deleted when no users are accessing it.

SC.BAD Set if there is a bad data block in the file. This bit is unimplemented. It is intended for dynamic bad block handling.

SC.DIR Set if the file is a directory.

SC.ACL Set if an access control list exists for this file.

SC.CHK Set if the file header checksum was not computed. If this bit is set, the checksum word must contain the octal value 125252. This "feature" is for small systems that cannot afford the millisecond or two required to compute the header checksum. Its use is strongly discouraged.

3.5.2.15 2 bytes Unused

3.5.2.16 H.USE 1 byte Map Words in Use

This byte contains a count of the number of map area words currently in use.

3.5.2.17 H.PRIV 1 byte Accessor Privilege Level

This byte defines the lowest privilege level at which an accessor must be running to be allowed access to the file. Each privilege level is a two-bit integer; zero is the lowest privilege and 3 is the highest. Privilege levels may be assigned separately to the basic file access modes, using the following bit assignment in this byte:

Read	Bits 0-1
Write	Bits 2-3
Execute	Bits 4-5
Delete	Bits 6-7

An operating system should map its privilege level coding onto this code in the smoothest manner possible. For example, the four access modes of VMS - user, supervisor, exec, and kernel - are codes 0 through 3, respectively. A system such as RSX-11M which has only two levels (privileged and non-privileged) should map the two onto 3 and 0, respectively.

Privilege levels are meant to confine access to the contents of file to suitably trustworthy procedures. Thus, a user might be denied the ability to write a record structured file directly (on a virtual block basis), but would be permitted to write the file through the record manager, which would be suitably privileged.

For a record structured file, an appropriate set of privilege levels is 0,2,0,0, expressed in the order Read - Write - Execute - Delete.

3.5.2.18 H.FOWN 2 bytes File Owner UIC
H.PROG = H.FOWN + 0 Programmer (Member) Number
H.PROJ = H.FOWN + 2 Project (Group) Number

This word contains the binary User Identification Code (UIC) of the owner of the file. The file owner is usually (but not necessarily) the creator of the file.

3.5.2.19 H.FPRO 2 bytes File Protection Code

This word controls what access all users in the system may have to the file. Accessors of a file are categorized according to the relationship between the UIC of the accessor and the UIC of the owner of the file. Each category is controlled by a four bit field in the protection word. The category of the accessor is selected as follows:

System Bits 0 - 3

The accessor is subject to system protection if the project number of the UIC under which he is running is 10 octal or less.

Owner Bits 4 -7

The accessor is subject to owner protection if the UIC under which he is running exactly matches the file owner UIC.

Group Bits 8 - 11

The accessor is subject to group protection if the project number of his UIC matches the project number of the file owner UIC.

World Bits 12 - 15

The accessor is subject to world protection if he does not fit into any of the above categories.

Four types of access are defined in Files-11: Read, Write, Execute and Delete. Each four bit field in the protection word is bit encoded to permit or deny any combination of the four types of access to that category of accessors. Setting a bit denies that access to that category. The bits are defined as follows (these values apply to a right-justified protection field):

FP.RDV Deny read access
FP.WRV Deny write access
FP.EXT Deny extend access
FP.DEL Deny delete access

When a user attempts to access a file, protection checks are performed in all the categories to which he is eligible, in the order: System - Owner - Group - World. The user is granted access to the file if any of the categories to which he is eligible grants his access.

Recommended defaults for file protection for an "open shop"

are [RWD,RWD,RW,R] (expressed in the order of System - Owner - Group - World, where each letter denotes the presence of that permission). Observe that only files which contain executable programs should have Execute protection enabled. Recommended defaults for a "closed shop" system are [RWD,RWD,R,].

3.5.2.20 H.BFNU 6 bytes File Header Back Link

The back link is the File ID of the directory file containing the primary directory entry of the file. If the file header is an extension header, the back link contains the File ID of the primary header.

3.5.2.21 4 bytes Unused

3.5.2.22 S.HDHD 74 bytes Size of Header Area

This symbol represents the total size of the header area containing all of the above entries.

3.5.3 Ident Area Description

The ident area of the file header begins at the word indicated by H.IDOF. It contains identification and accounting data about the file.

3.5.3.1 I.FNAM 20 bytes File Name

This area contains the file name in ASCII. A dot separates name from type, and a semicolon separates type from version; both are always present. If the name is shorter than 20 bytes, it is blank-padded; if longer, it is truncated.

3.5.3.2 I.RVNO 2 bytes Revision Number

This word contains the revision count of the file in binary. The revision count is the number of times the file has been accessed for write.

3.5.3.3 I.CRDT 8 bytes Creation Date and Time

These eight bytes contain the date and time at which the file was created. The time is expressed in the standard internal time format, which is a 64-bit integer representing tenths of microseconds elapsed since midnight, 17 November 1858 ("clunks").

3.5.3.4 I.RVDT 8 bytes Revision Date and Time

The revision date is the date on which the file was last deaccessed after being accessed for write. It is expressed in the same format as I.CRDT above.

3.5.3.5 I.EXDT 8 bytes Expiration Date and Time

These eight bytes contain the date and time at which the file becomes eligible to be deleted. The format is the same as that of I.CRDT and I.RVDT above.

3.5.3.6 I.BKDT 8 bytes Backup Date and Time

These eight bytes contain the date and time at which the file was last backed up. The format is the same as that of those above.

3.5.3.7 S.IDHD 36 bytes Size of Ident Area

This symbol represents the size of the ident area containing all of the above entries.

3.5.4 Map Area Description

The map area of the file header begins at the word indicated by H.MPOF. This area contains the retrieval pointers that actually map the virtual blocks of the file to the logical blocks of the volume.

Each retrieval pointer describes a consecutively numbered group of logical blocks allocated to the file. The count field contains the binary value n to represent a group of (n+1) logical blocks. The logical block number field contains the logical block number of the first logical block in the group.

Thus, each retrieval pointer maps virtual blocks j through (j+n) into logical blocks k through (k+n), where j is the total number plus one of virtual blocks represented by all preceding retrieval pointers in this and all preceding headers of the file; n is the value contained in the count field; and k is the value contained in the logical block number field. Observe that j, k, and (n+1) must always be integer multiples of the volume cluster factor.

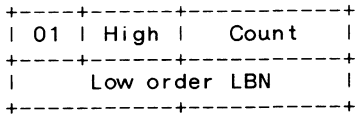
If the LBN field of a retrieval pointer contains all ones (i.e., points to block (2**22)-1 or (2**32)-1, then that retrieval pointer represents an unallocated portion of a sparse file. The count field then describes the number of unallocated virtual blocks in the normal manner.

There are four formats of retrieval pointers, each identified by escape codes. The different formats may be intermixed within a file header

Format 0: Two bytes

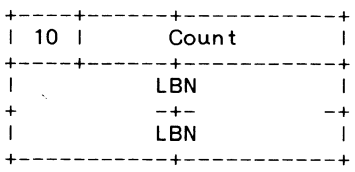
Format 0 is used to store placement data in the file header. It describes the placement control supplied with the allocation that created the following retrieval pointer, allowing the file placement to be replicated when the file is copied or backed up and restored. Coding of the placement data is undefined. Format 0 is identified by bits 15 and 14 of the first word being 00.

Format 1: Four bytes



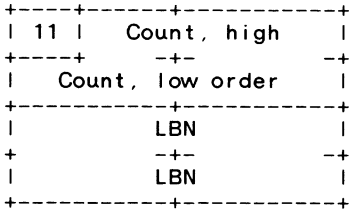
Format 1 provides an 8-bit count field and a 22-bit LBN field. It is therefore capable of representing a group of up to 256 blocks on a volume up to (2**22) blocks in size. Format 1 is identified by bits 15 and 14 of the first word being 01.

Format 2: Six bytes



Format 2 provides a 14-bit count field and a 32-bit LBN field. It is therefore capable of representing a group of up to 16,384 blocks on a volume up to (2**32) blocks in size. Format 2 is identified by bits 15 and 14 of the first word being 10.

Format 3: Eight bytes



Format 3 provides a 30-bit count field and a 32-bit LBN field. It is therefore capable of representing a group of up to (2**30) blocks on a volume up to (2**32) blocks in size. Format 3 is identified by bits 15 and 14 of the first word being 11.

3.5.5 Access Control List

This area is reserved for future use by DEC.

3.5.6 Reserved Area

The reserved area of the file header starts at the word indicated by the byte H.RSOF. This area is not used by standard Files-11 file managers, but is available for use by CSS and special applications.

3.5.7 End Checksum Description

The header check sum occupies the last two bytes of the file header. It is verified every time a header is read, and is recomputed every time a header is written.

If the bit SC.CHK is set in the system controlled characteristics word H.SCHA, then the checksum has not been computed, and the checksum word must contain the octal value 125252.

3.5.7.1 H.CKSM 2 bytes Block Checksum

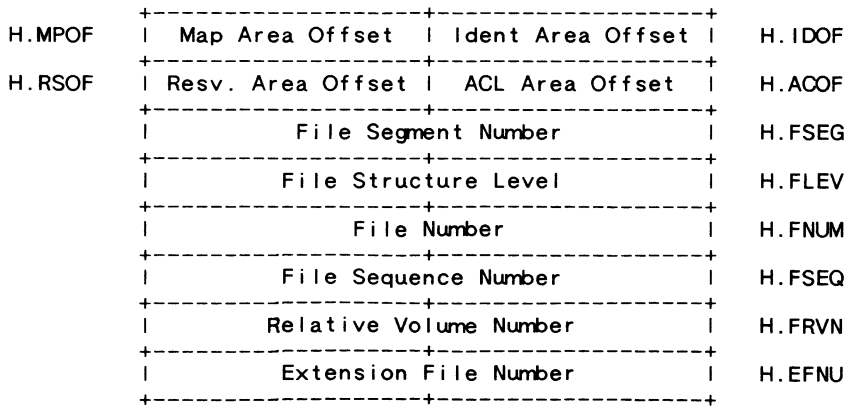
This word is a simple additive checksum of all other words in the block. It is computed by the following PDP-11 routine or its equivalent:

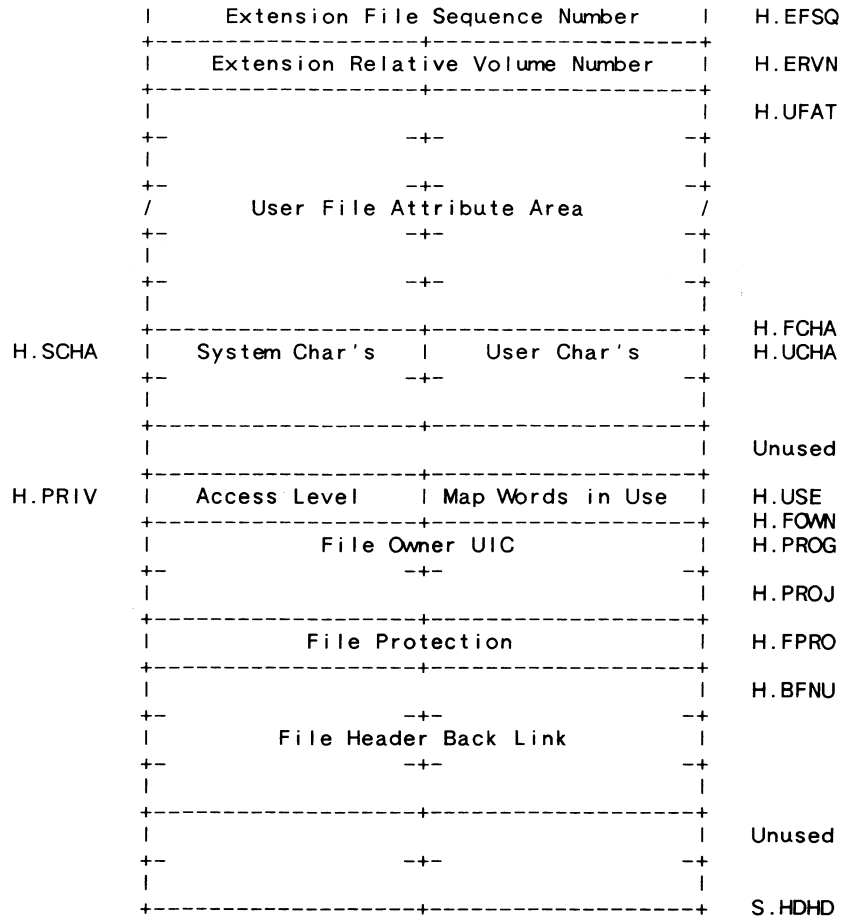
```
        MOV     Header-address, R0
        CLR     R1
        MOV     #255., R2
10$:    ADD     (R0)+, R1
        SOB     R2, 10$
        MOV     R1, (R0)
```

3.5.8 File Header Layout

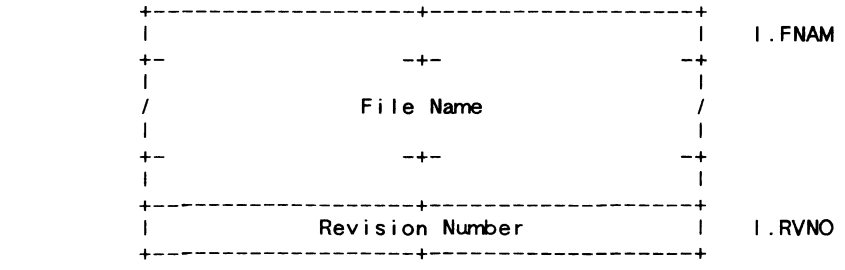
The following is a graphic layout of the fields in the file header.

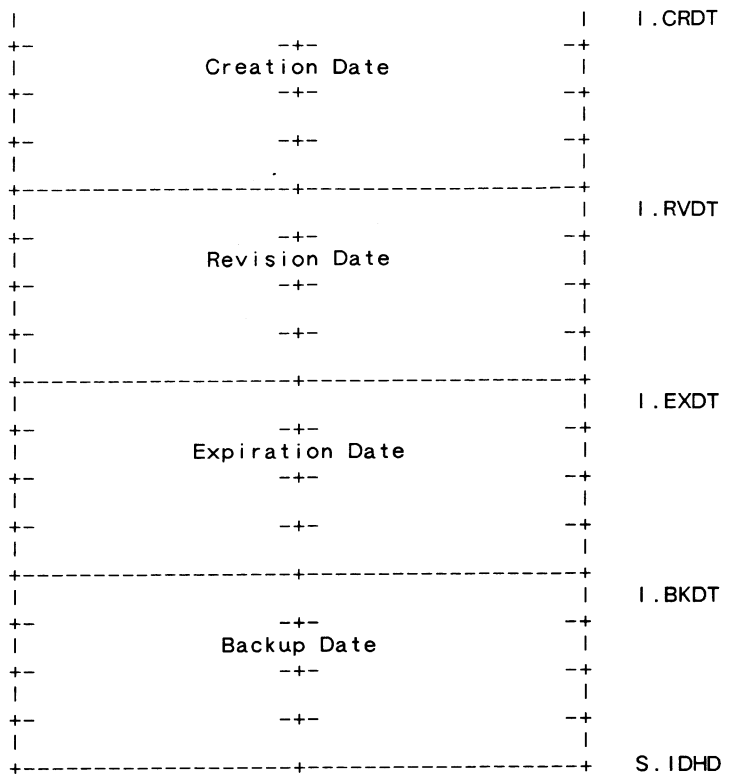
Header Area



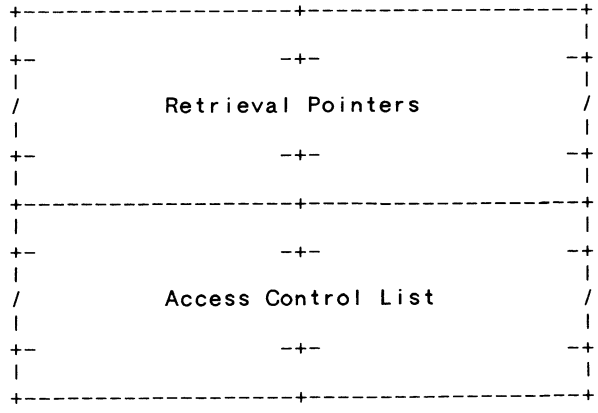


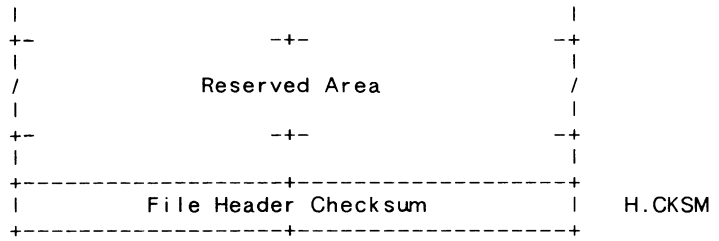
Ident Area





Map, ACL and Reserved Areas





4.0 Directories

Files-11 provides directories to allow the organization of files in a meaningful way. While the File ID is sufficient to locate a file uniquely on a volume set, it is hardly mnemonic. Directories are files whose sole function is to associate file name strings with File IDs.

4.1 Directory Hierarchies

Since directories are files with no special attributes, directories may list files that are in turn directories. Thus, the user may construct directory hierarchies of arbitrary depth and complexity to structure his files as he pleases.

4.1.1 Two Level Directory Hierarchy

Implementations of Files-11 on PDP-11 systems all support a two-level directory hierarchy which is tied in with the user identification mechanism of the operating system. Each UIC known to the system is associated with a user file directory (UFD). References to files that do not specify a directory are generally defaulted to the UFD associated with the user's UIC.

The syntax used to refer to UICs is the same as that used to identify the directory in a file name string. The construct "[g,m]" refers to group number g, member number n. All UFDs are listed in the volume's master file directory (MFD) under a file name constructed from the directory string. A string of "[g,m]" associates with a directory name of "gggmmm.DIR;1", where ggg and mmm are g and m padded to three characters with leading zeroes. Note that all number conversions are done in octal.

Two points should be noted here. The UFD structure described here is not intrinsically part of the Files-11 structure; rather, it is a convenient cataloging system applied by the operating system. Also, there is no hard and fast relationship between the owner UIC of a file and the UFD in which it is listed. Generally they do correspond, but not necessarily.

4.1.2 Multi-Level Directory Hierarchy

New implementations of Files-11 use a multi-level directory hierarchy. In this scheme, the first level below the MFD is referred to as the user file directory (UFD) and subsequent levels are referred to as sub-file directories (SFDs). Users are identified at the command level by ASCII names; the system translates user names into UICs internally. Thus, MFD entries correspond to ASCII user names.

A directory specifier has the format "[name1.name2.name3 ...]". Each name in the list translates to a directory file name of the form "name.DIR;1" and is searched for in the current directory level.

Observe that the directory protocol is not tied to the structure level of the disk. Thus, new systems must always handle the "[g,m]" protocol, which maps to a UFD name of "gggmmm.DIR;1" and provides only two levels of directory. Old systems may not be able to handle volumes written with multi-level directories.

4.1.3 Multi-Volume Directory Structure

In a volume set, the MFD for all user files on the volume set is the MFD of relative volume 1. Its entries can point to UFDs located on any volume in the set, the entries of which in turn may point to files and subdirectories on any volume in the set. The MFDs of remaining volumes in the set list only the reserved files on each volume.

The assignment of volumes to specific directories and files is not covered by this specification. Different systems may implement different policies to trade off factors such as performance, reliability and separability. Optimizing for performance, for example, usually means scattering the files as randomly as possible across the volume set to make the most use of the available multiple positioners. Maximum separability (the ability to make use of only part of the volume set) is achieved by locating files on the same volumes as their directories, and possibly by entering the directories in the MFDs of the volumes on which they reside.

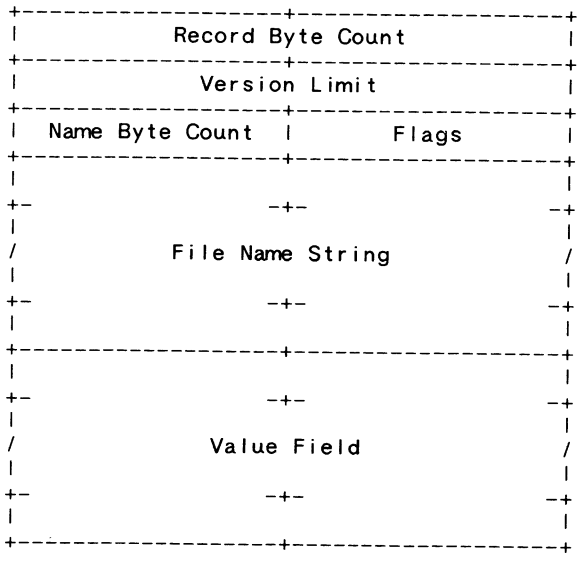
4.2 Directory Structure

A directory is a contiguous file, organized as a sequential file with variable length records, with the attribute set that records do not cross block boundaries, and no carriage control attributes.

Directory entries within each block are packed together to conform to the variable length record format; a -1 byte count signals the end of records for that block.

The entries in a directory are sorted alphabetically, permitting the use of an optimized search. Entries which are multiple versions of the same name and type are arranged in order of decreasing version number to optimize version related operations.

Each directory record consists of the following:



Count This two-byte field is the standard byte count field of a variable length record.

Limit This word contains the maximum number of versions to be retained for this name and type. An attempt to enter more versions than the limit results in deletion of the least recent version or an error return, at the implementing system's option.

Flags This byte contains the type code of the directory entry and assorted flag bits. The type code is contained in the three low bits of the flags byte. It is one of the following values:

DV.FID The value field is a list of version numbers and 48-bit File IDs.

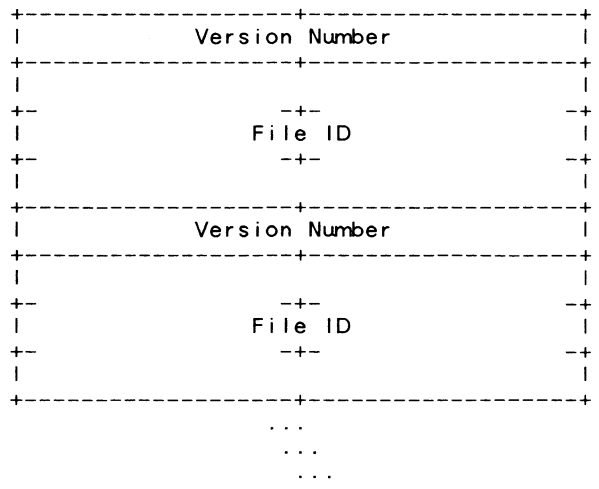
The following flag bits are defined:

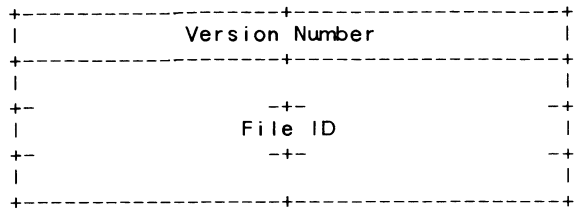
DF.PRV Set if the preceding directory record contains the same name and type as this one.

DF.NXV Set if the next directory record contains the same name and type as this one.

Name This field contains the file name and type in ASCII, separated by a dot. The dot is present even if name, type, or both are null. Only upper case alphabetic and numeric characters may be present in the name and type. If the length of the name is odd, it is padded with a single null.

Value This field contains the "value" of the directory entry; i.e., the information returned to the user from a lookup operation. If the directory record is a File ID list (type field is DV.FID), the value field is a list of version numbers and corresponding File IDs, appearing in descending order by version number. The number of entries in the list is deduced from the record byte count.





Version This word contains the version number of the directory entry in binary. Version numbers must lie in the range 1 to 32767.

File ID These three words are the File ID that the directory entry points to.

5.0 Reserved Files

Clearly, any file system must maintain some data structure on the medium which is used to control the file organization. In Files-11 these data are kept in several files. These files are created when a new volume is initialized. They are unique in that their File IDs are known constants. Note, however, that the relative volume number used when accessing one of these files depends upon the context.

The exact number of these files which are present on a particular volume may vary; however, at least five must be present. All of these files are non-deletable. These files have the following uses:

File ID 1,1 is the index file. The index file is the root of the entire Files-11 structure. It contains the volume's bootstrap block and the home block, which is used to identify the volume and locate the rest of the file structure. The index file also contains all of the file headers for the volume, and a bitmap to control the allocation of file headers.

File ID 2,2 is the storage bitmap file. It is used to control the allocation of logical blocks on the volume.

File ID 3,3 is the bad block file. It is a file containing all of the known bad blocks on the volume.

File ID 4,4 is the volume master file directory, or MFD. It forms the root of the volume's directory structure. The MFD lists the five known files, all first level user directories, and whatever other files the user chooses to enter.

File ID 5,5 is the system core image file. Its use is operating system dependent; its basic purpose is to provide a file of known File ID for the use of the operating system.

File ID 6,6 is the volume set list file. If this volume is relative volume one of a tightly coupled volume set, this file contains a list of the labels of all volumes in the set.

File ID 7,7 is the standard continuation file. If this volume is part of a loosely coupled volume set, this file contains the first segment of the portion of the multi-volume file that resides on this volume.

File ID 8,8 is the backup journal file. This file is used to log and control the use of an incremental backup system.

File ID 9,9 is the pending bad block log file. This file contains a list of suspected bad blocks on the volume that have not yet been turned over to the bad block file.

More File IDs may be reserved in the future; users should not make any assumptions about the values of user created File IDs.

5.1 Index File

The index file is File ID 1,1. It is listed in the MFD as INDEXF.SYS;1. The index file is the root of the Files-11 structure in that it provides the means for identification and initial access to a Files-11 volume, and contains the access data for all files on the volume, including itself.

This file has the FCS record format of 512-byte fixed length records without carriage control.

5.1.1 Bootstrap Block

Virtual block 1 of the index file is the volume's boot block. It is almost always mapped to logical block 0 of the volume. If the volume is the system device of an operating system, the boot block contains an operating system dependent program which reads the operating system into memory when the boot block is read and executed by a machine's hardware bootstrap. If the volume is not a system device, the boot block contains a small program that outputs a message on the system console to inform the operator to that effect.

If block 0 of a volume is bad, it is permissible to map virtual block 1 of the index file to some other block. In this case, obviously, the volume cannot be used as a system volume.

5.1.2 Home Block

Virtual block 2 of the index file is the volume's home block. The purpose of the home block is to identify the volume as Files-11, establish the specific identity of the volume, and serve as the ground zero entry point into the volume's file structure. The home block is recognized as a home block by the presence of checksums in known places and by the presence of predictable values in certain locations.

The home block is located on the first good block of the home block search sequence. The search sequence is of the form

1 + (n * delta), where n = 0, 1, 2, 3 ...

The home block search delta is computed from the geometry of the volume such that, if the volume is viewed as a three-dimensional space, the search sequence travels approximately down the diagonal of the space. Since volume failures tend to occur across one dimension, this minimizes the chance of a single failure destroying both home blocks of the volume.

The search delta is computed from the volume geometry expressed in sectors, tracks (surfaces) and cylinders according to the following rules.

Geometry	Delta
s * 1 * 1	1
1 * t * 1	1
1 * 1 * c	1
s * t * 1	s+1
s * 1 * c	s+1
1 * t * c	t+1
s * t * c	(t+1)*s+1

In most cases, the home block is located on LBN 1.

5.1.3 Cluster Filler

If v, the cluster factor of the volume, is greater than 1, the next (v*2)-2 blocks of the index file are copies of the home block used to fill out the first two clusters of the index file. Note that, for cluster factors greater than 1, this results in a wasted disk cluster. The benefit of this technique is a much simpler rule for finding the VBN of interesting parts of the index file.

5.1.4 Backup Home Block

The backup home block is a second copy of the home block located farther down the home block search sequence. It permits use of the volume even if the primary home block is destroyed.

In general, the backup home block should be allocated on the second good block of the search sequence. If it is not, then all preceding blocks on the sequence must not be available for allocation. This prevents the situation of a malicious user constructing a counterfeit index file, which would be used if the primary home block ever went bad.

The cluster which contains the backup home block is mapped into the index file as virtual blocks (v*2)+1 through (v*3), where v is the volume cluster factor. Observe that the backup home block may be located anywhere within this cluster, because there is no hard and fast relationship between the cluster factor and the volume's track and cylinder boundaries. The entire cluster is therefore filled out with copies of the home block.

5.1.5 Backup Index File Header

The next cluster of the index file contains a backup copy of the index file header, so that data on the volume can be recovered if the index file header goes bad. The cluster occupies virtual blocks (v*3)+1 through (v*4), where v is the volume cluster factor.

The LBN of the backup index file header is stored in location H.IHLB in the home block. The backup index file header occupies the first block of this cluster; the remaining blocks are not used and their contents are undefined.

5.1.6 Index File Bitmap

The index file bitmap is used to control the allocation of file numbers (and hence file headers). It is simply a bit string of length n, where n is the maximum number of files permitted on the volume (contained in offset H.FMAX in the home block). The bitmap spans as many blocks as are necessary to hold it, i.e., maximum number of files divided by 4096 and rounded up. The number of blocks in the bitmap is contained in offset H.IBSZ of the home block.

The bits in the index file bitmap are numbered sequentially from 0 to (n-1) in the obvious manner, i.e., from right to left in each byte, and in order of increasing byte address. Bit j is used to represent file number (j+1): If the bit is 1, then that file is in use; if the bit is 0, then that file number is not in use and may be assigned to a newly created file.

The index file bitmap starts at virtual block (v*4)+1 of the index file and continues through VBN (v*4)+m, where m is the number of blocks in the bitmap, and v is the storage map cluster factor. It is located at the logical block indicated by offset H.IBLB in the home block.

5.1.7 File Headers

The rest of the index file contains all the file headers for the volume. The first 16 file headers (for file numbers 1 through 16) are logically contiguous with the index file bitmap to facilitate their location; the rest may be allocated wherever the file system sees fit. Thus, the first 16 file headers may be located from the data in the home block (H.IBSZ and H.IBLB) while the rest must be located through the mapping data in the index file header.

The file header for file number n is located at virtual block (v*4)+m+n, where m is the number of blocks in the index file bitmap, and v is the storage map cluster factor.

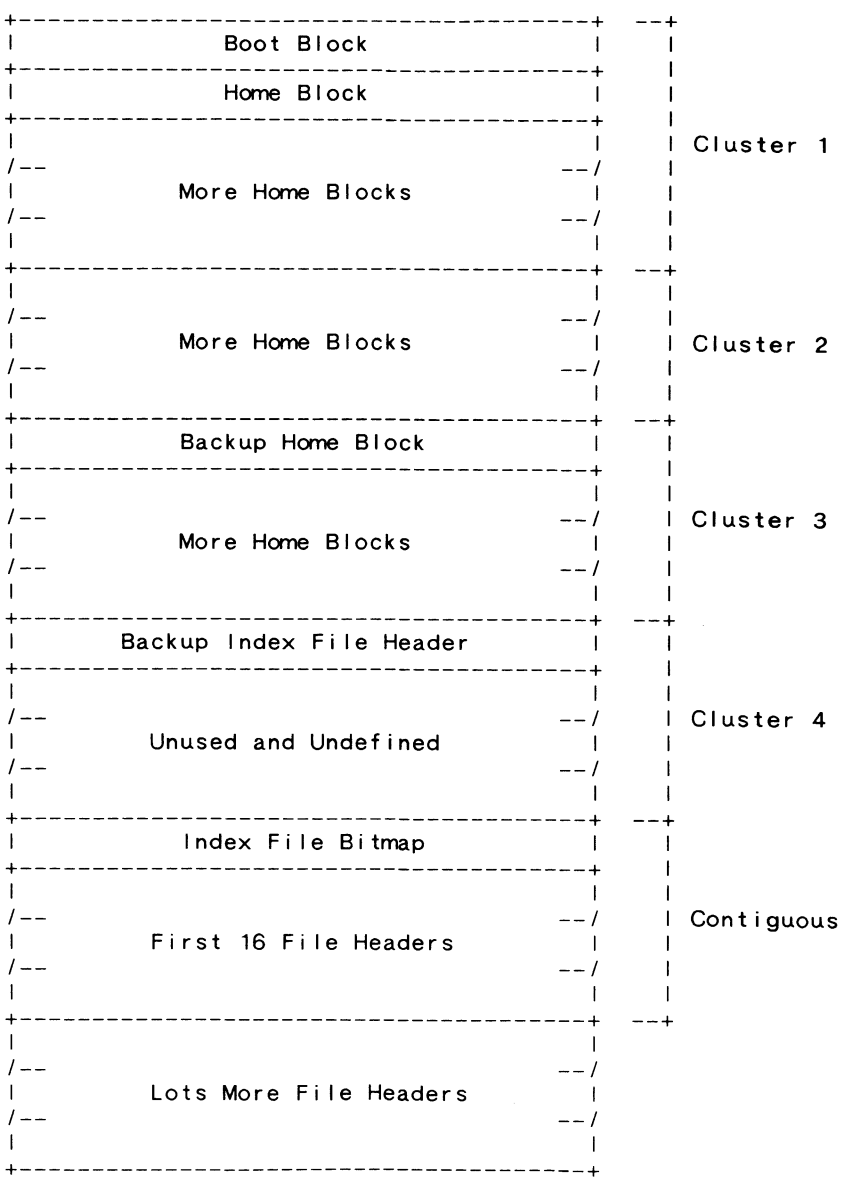
The FCS end-of-file mark for the index file is located at the last file header ever used. All header blocks located before the EOF are subject to validation when used to create a new file.

If the block contains garbage, the new header is assigned a file sequence number of 1, being the first use of the header block. If the block contains a deleted file header, the new header is assigned a sequence number one higher than that contained in the block. A block containing a valid file header must never be used to create a new file, even if it is marked free in the index file bitmap. This prevents files from being lost if bits are dropped in the bitmap.

Index file blocks beyond the EOF are assumed to contain garbage, for the purpose of creating new file headers.

5.1.8 Index File Layout

The following is a sketch of the blocks in the index file. Observe that this illustration assumes a storage map cluster factor greater than 2.



5.1.9 Home Block Details

The following is a detailed description of the home block. Note that all copies of the volume's home block contain the same data, with the exception of the cells containing the block's VBN and LBN.

Items contained in the home block are identified by symbolic offsets in the same manner as items in the file header. The symbols may be defined in assembly language programs by calling and invoking the macro HMBL2$, which may be found in the macro library of any system that supports Files-11. Alternatively, one may find the macro in the file F11MAC.MAC.

5.1.9.1 H.HBLB 4 bytes Home Block LBN

This doubleword contains the logical block number of this particular copy of the home block.

5.1.9.2 H.AHLB 4 bytes Alternate Home Block LBN

This doubleword contains the LBN of the volume's secondary home block. One may determine, when scanning the home block sequence, whether the block read is the primary or secondary home block by comparing H.HBLB and H.AHLB. This value must be nonzero for a valid home block.

5.1.9.3 H.IHLB 4 bytes Backup Index File Header LBN

This doubleword contains the LBN on which the backup index file header is located. This value must be nonzero for a valid home block.

5.1.9.4 H.VLEV 2 bytes Volume Structure Level

The volume structure level and version are used to identify different versions of Files-11 as they affect the structure of all parts of the volume except the file header. This permits upward compatibility of file structures as Files-11 evolves, in that the structure level word identifies the version of Files-11 that created this particular volume.

This document describes structure level 2 of Files-11. The high byte of H.VLEV must contain 2. The low byte contains the version number, which must be greater than or equal to 1. The version number is incremented when compatible additions are made to the Files-11 structure that may be safely ignored by an old version of the file system. This document describes version 1 of structure level 2.

5.1.9.5 H.SBCL 2 bytes Storage Bitmap Cluster Factor

This word contains the cluster factor used in the storage bitmap file. The cluster factor is the number of blocks represented by each bit in the storage bitmap. This value is also referred to as the volume cluster factor.

5.1.9.6 H.HBVB 2 bytes Home Block VBN

This word contains the virtual block number that the cluster containing the copy of the home block occupies in the index file. This value must be nonzero for a valid home block.

5.1.9.7 H.AHVB 2 bytes Backup Home Block VBN

This word contains the virtual block number that the cluster containing the secondary home block occupies in the index file. The content of this word is (v*2)+1, where v is the storage map cluster factor.

5.1.9.8 H.IHVB 2 bytes Backup Index File Header VBN

This word contains the virtual block number that the backup index file header occupies in the index file. The content of this word is (v*3)+1, where v is the storage map cluster factor.

5.1.9.9 H.IBVB 2 bytes Index File Bitmap VBN

This word contains the starting virtual block number of the index file bitmap. The content of this word is (v*4)+1, where v is the storage map cluster factor.

5.1.9.10 H.IBLB 4 bytes Index File Bitmap LBN

This doubleword contains the starting logical block address of the index file bitmap. Once the home block of a volume has been found, it is this value that provides access to the rest of the index file and to the volume. This value must be non-zero for a valid home block.

5.1.9.11 H.FMAX 4 bytes Maximum Number of Files

This doubleword contains the maximum number of files that may be present on the volume at any time. This value must be greater than the contents of H.RSVF for the home block to be valid.

If the maximum number of files is less than 65,536, then the third word of File IDs referencing files on this volume is simply the relative volume number, and the volume set of which this volume is a member may contain up to 65,535 volumes.

If the maximum number of files is greater than or equal to 65,536, then the high byte of the third word of File IDs is the high byte of the file number, and the volume set may consist of up to 255 volumes. Under no circumstances may the maximum number of files be greater than (2**24)-1.

5.1.9.12 H.IBSZ 2 bytes Index File Bitmap Size

This 16-bit word contains the number of blocks that make up the index file bitmap. This value must be non-zero for a valid home block.

5.1.9.13 H.RSVF 2 bytes Number of Reserved Files

This word contains the number of reserved files on the volume. The file sequence number of each reserved file is always equal to its file number. Reserved files may not be deleted. This word must contain a minimum value of 5 to be valid.

5.1.9.14 H.DVTY 2 bytes Disk Device Type

This word is an index identifying the type of disk that contains this volume. It is currently not used and always contains 0.

5.1.9.15 H.RVN 2 bytes Relative Volume Number

This word contains the relative volume number that this volume is assigned in a volume set. If the volume is not part of a volume set, this word contains zero.

5.1.9.16 H.NVOL 2 bytes Number of Volumes

This word contains the total number of volumes in this volume set if the contents of H.RVN is 1 (i.e., if this volume is the first volume of the set). Otherwise, this word contains zero.

5.1.9.17 H.VCHA 2 bytes Volume Characteristics

This word contains bits which provide additional control over access to the volume. The following bits are defined:

CH.NDC Set if device control functions are not permitted on this volume. Device control functions are those which can threaten the integrity of the volume, such as direct reading and writing of logical blocks, etc.

CH.NAT Set if the volume may not be attached, i.e., reserved for exclusive use by one task or user.

CH.RCK Set if the volume is to be read checked. All block reads done on this volume, for both data and file structure, are performed with a read, read-compare to insure data integrity.

CH.WCK Set if the volume is to be write checked. All block writes done on this volume, for both data and file structure, are performed with a write, read-compare to insure data integrity.

5.1.9.18 H.VOWN 4 bytes Volume Owner UIC

This word contains the binary UIC of the owner of the volume. The format is the same as that of the file owner UIC stored in the file header.

5.1.9.19 4 bytes Unused

5.1.9.20 H.VPRO 2 bytes Volume Protection Code

This word contains the protection code for the entire volume. All operations on all files on the volume must pass both the volume and the file protection check to be permitted. Accessors of the volume are categorized into system, owner, group and world with respect to the volume owner UIC in the same manner as for file protection. Each category is controlled by a four bit field. The four access modes are bit encoded as follows:

VP.RDV Deny reading files
VP.WRV Deny writing existing files
VP.CRE Deny creating files
VP.DEL Deny deleting files

5.1.9.21 H.DFPR 2 bytes Default File Protection

This word contains the file protection that is assigned to all files created on this volume if no file protection is specified by the user.

5.1.9.22 2 bytes Unused

5.1.9.23 H.CHK1 2 bytes First Checksum

This word is an additive checksum of all entries preceding in the home block (i.e., all those listed above). It is computed by the same sort of algorithm as the file header checksum.

5.1.9.24 H.VDAT 8 bytes Volume Creation Date

This area contains the date and time that the volume was initialized. It is in the same binary format as that used in the file header.

5.1.9.25 H.WISZ 1 byte Default Window Size

This word contains the number of retrieval pointers used for the "window" (in-memory file access data) when files are accessed on the volume, if not otherwise specified by the accessor.

5.1.9.26 H.LRUC 1 byte Directory Pre-Access Limit

This byte contains a count of the number of directories to be stored in the file system's directory access cache. More generally, it is an estimate of the number of concurrent users of the volume, and its use may be generalized in the future.

5.1.9.27 H.FIEX 2 bytes Default File Extend

This word contains the number of blocks that are allocated to a file when a user extends the file and asks for the system default value for allocation.

5.1.9.28 388 bytes Unused

5.1.9.29 H.SNAM 12 bytes Structure Name

This area contains the ASCII name of the volume set to which this volume belongs, padded out to 12 bytes with spaces. If this volume is not a member of a volume set, this area is filled with blanks.

5.1.9.30 H.INDN 12 bytes Volume Name

This area contains the volume name in ASCII. It is padded out to 12 bytes with spaces. It is placed here in accordance with the proposed volume identification standard.

5.1.9.31 H.INDO 12 bytes Volume Owner

This area contains an ASCII string identifying the owner of the volume. The area is padded out to 12 bytes with trailing spaces. It is placed here in accordance with the proposed volume identification standard.

5.1.9.32 H.INDF 12 bytes Format Type

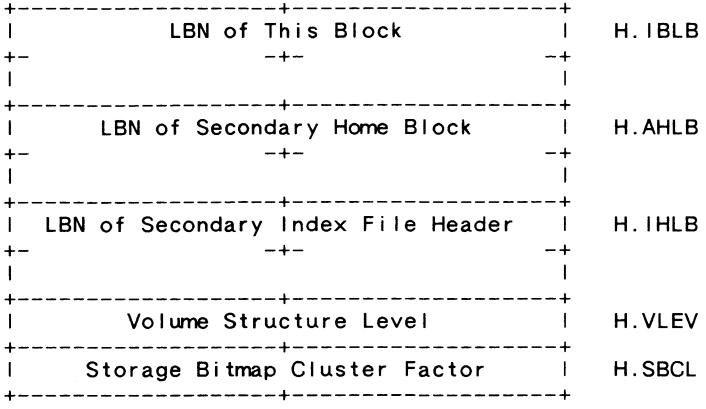
This field contains the ASCII string "DECFILE11B" padded out to 12 bytes with spaces. It identifies the volume as being of Files-11 format, structure level 2. It is placed here in accordance with the proposed volume identification standard.

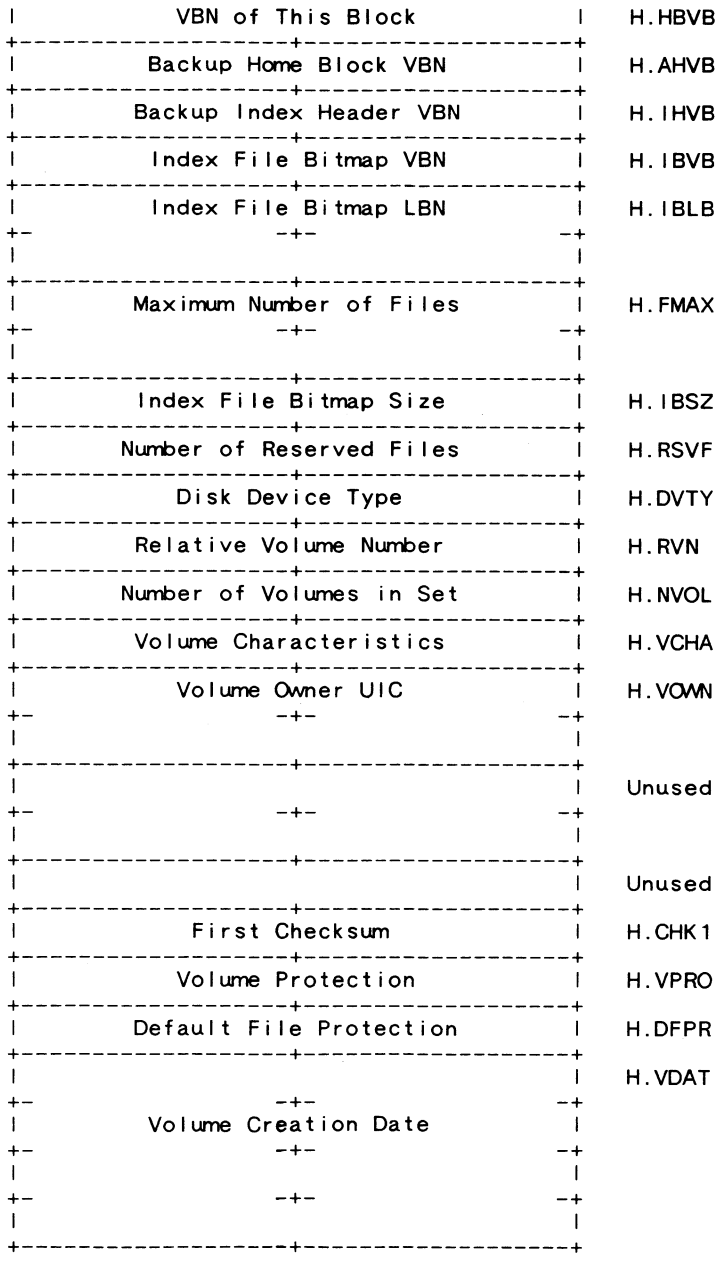
5.1.9.33 2 bytes Unused

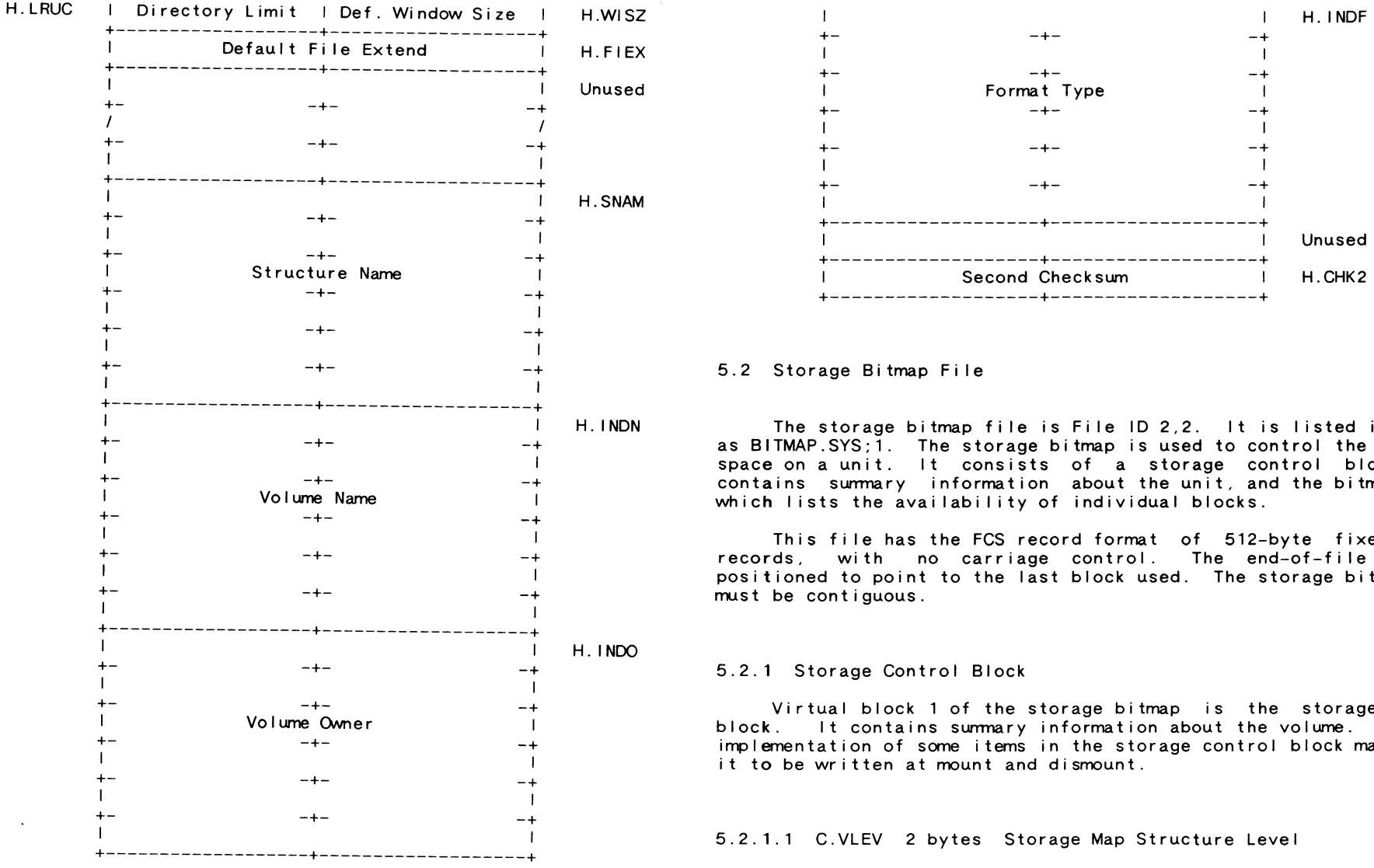
5.1.9.34 H.CHK2 2 bytes Second Checksum

This word is the last word of the home block. It contains an additive checksum of the preceding 255 words of the home block, computed according to the same algorithm as the file header checksum.

5.1.10 Home Block Layout







5.2 Storage Bitmap File

The storage bitmap file is File ID 2,2. It is listed in the MFD as BITMAP.SYS;1. The storage bitmap is used to control the available space on a unit. It consists of a storage control block which contains summary information about the unit, and the bitmap itself which lists the availability of individual blocks.

This file has the FCS record format of 512-byte fixed length records, with no carriage control. The end-of-file mark is positioned to point to the last block used. The storage bitmap file must be contiguous.

5.2.1 Storage Control Block

Virtual block 1 of the storage bitmap is the storage control block. It contains summary information about the volume. Note that implementation of some items in the storage control block may require it to be written at mount and dismount.

5.2.1.1 C.VLEV 2 bytes Storage Map Structure Level

This word contains the structure level of the storage control block. The high byte contains the value 2 to indicate Files-11 structure level 2. The low byte contains the version number, which must be greater than or equal to 1.

5.2.1.2 C.SBCL 2 bytes Storage Map Cluster Factor

This word contains the storage map cluster factor of the volume. Its content is identical to the content of H.SBCL in the home block. It is placed here for convenience.

5.2.1.3 C.VSIZ 4 bytes Volume Size

This doubleword contains the volume size expressed in logical blocks.

5.2.1.4 C.BLKF 4 bytes Blocking Factor

This doubleword contains the blocking factor of the volume, i.e. the number of physical blocks or sectors that make up one logical block.

5.2.1.5 C.SECT 4 bytes Sectors per Track

This doubleword contains the number of logical blocks in each track of the volume.

5.2.1.6 C.TRAK 4 bytes Tracks per Cylinder

This doubleword contains the number of tracks contained in each cylinder of the volume.

5.2.1.7 C.CYLN 4 bytes Number of Cylinders

This doubleword contains the number of cylinders on the volume. This and the preceding three quantities are present to assist optimized allocation of space on the volume.

5.2.1.8 C.STAT 2 bytes Status Word

This word contains the following status bits:

CS.TRN Volume in transition. Set if the volume may be in an inconsistent state because it was not dismounted properly. A system which does write-on-replace caching of the storage map, for example, should set

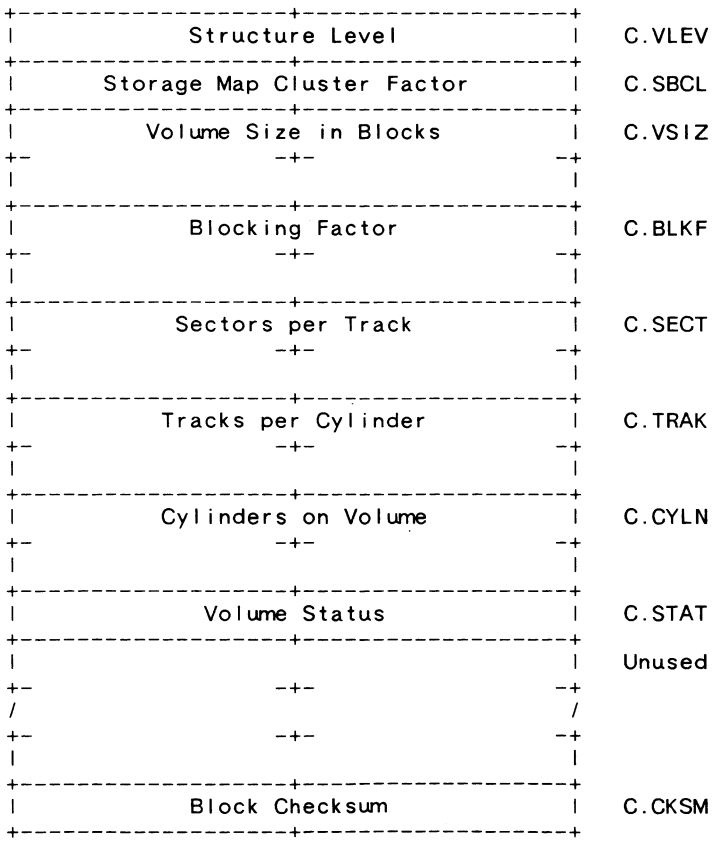
this bit on mount and clear it on dismount.

5.2.1.9 488 bytes Unused

5.2.1.10 C.CKSM 2 bytes Block Checksum

This word contains the block checksum. It is computed using the same algorithm as the file header checksum.

5.2.2 Storage Control Block Layout



5.2.3 Storage Bitmap

Virtual blocks 2 through (n+1) are the storage bitmap itself. It is best viewed as a bit string of length m, numbered from 0 to (m-1), where m is the total number of allocatable clusters on the volume rounded up to the next integer multiple of 4096.

Each cluster contains v logical blocks, where v is the storage map cluster factor (also referred to as the volume cluster factor) contained in home block location H.SBCL. The bits are addressed in the usual manner (packed right to left in sequentially numbered bytes). Since each virtual block holds 4096 bits, n blocks (where n = m/4096) are used to hold the bitmap.

Bit j of the bitmap represents logical blocks (j*v) through ((j*v)-1) of the volume; if the bit is set, the blocks are free; if clear, the blocks are allocated. Clearly, the last k bits of the map are always clear, where k is the difference between the true size of the volume and m, the length of the bitmap.

Rounding the storage map file up to the next multiple of the volume cluster factor may result in unused blocks at the end of the file. The FCS end-of-file mark points to the last block used.

5.3 Bad Block File

The bad block file is File ID 3,3. It is listed in the MFD as BADBLK.SYS;1. The bad block file is simply a file containing all of the known bad blocks on the volume.

This file has the FCS record format of 512-byte fixed length records with no carriage control. The end-of-file mark may be placed as the operating system's bad block handling strategy finds useful. Volume initialization should place the EOF at the end of the bad blocks found during initialization. At all times, the EOF should at least point past the bad block descriptor data described below. This ensures that the bad block data is preserved for future reinitializations of the volume.

5.3.1 Factory Bad Block Descriptor

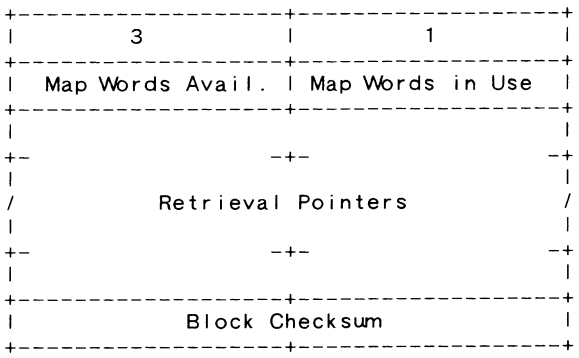
On disks such as the RK07 and RM03, which have factory generated last track bad block data, the first several clusters of the bad block file should include the last track of the volume. This track contains redundantly recorded descriptions of the bad blocks on the volume as described in DEC STD 144, "Disk Standard for Recording and Handling Manufacturing Detected Bad Sectors".

5.3.2 Software Bad Block Descriptor

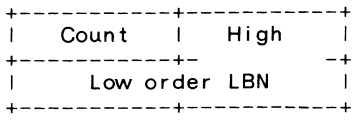
On disks that do not have factory last track bad block data, the first cluster of the bad block file contains the bad block descriptor for the volume. It is always located on the last good block of the volume. This block may contain a listing of the bad blocks on the volume produced by a block scan program or diagnostic.

The software bad block descriptor is most of a Files-11 structure level 1 header map area. The first two bytes contain the constants 1 and 3, respectively. The third byte contains the number of words that contain data. The fourth byte contains the number of words available for bad block data. The last word of the block contains the usual additive checksum. The retrieval pointers are structure level 1 pointers as described below.

5.3.3 Bad Block Descriptor Layout



Each retrieval pointer is four bytes in length. Byte 1 contains the high order bits of the 24-bit LBN. Byte 2 contains the count field, and bytes 3 and 4 contain the low 16 bits of the LBN.



5.4 Master File Directory

The master file directory (MFD) is File ID 4,4. It is listed in the MFD (itself) as 000000.DIR;1. The MFD is the root of the volume's directory structure. It lists the reserved files, plus whatever the user chooses to enter. The format of the MFD is the same as all directory files. The MFD contains entries for all user file directories.

5.5 Core Image File

The core image file is File ID 5,5. It is listed in the MFD as CORIMG.SYS;1. Its use is operating system dependent. In general, it provides a file of known File ID for the use of the operating system for use as a swap area, as a monitor overlay area, etc.

This file has the FCS record format of 512-byte fixed length records with no carriage control. The end-of-file mark is positioned to point to the physical end of file.

5.6 Volume Set List

The volume set list is File ID 6,6. It is listed in the MFD as VOLSET.SYS;1. It is used only on relative volume one of a tightly coupled volume set. It contains a list of the volume labels of the volumes contained in the volume set.

The format of this file is FCS 64-byte fixed length records with implied carriage control. The first 12 bytes of record 1 contain the structure name of the volume set. The first 12 bytes of record n contain the volume label of relative volume (n-1). The remaining 52 bytes of each record are reserved for future use.

5.7 Continuation File

The standard continuation file is File ID 7,7. It is listed in the MFD as CONTIN.SYS;1. It is used as the extension File ID when a file crosses from one volume of a loosely coupled volume set to another. The purpose of this reserved File ID is to allow a multi-volume file to be written sequentially with only one volume mounted at a time.

Ordinarily, when a file is extended to another volume, the new

header must be created first to obtain the new File ID before the extension linkage in the current header can be written. The use of this reserved File ID allows the extension linkage to be written with a known constant before the next volume is even on line.

5.8 Backup Log File

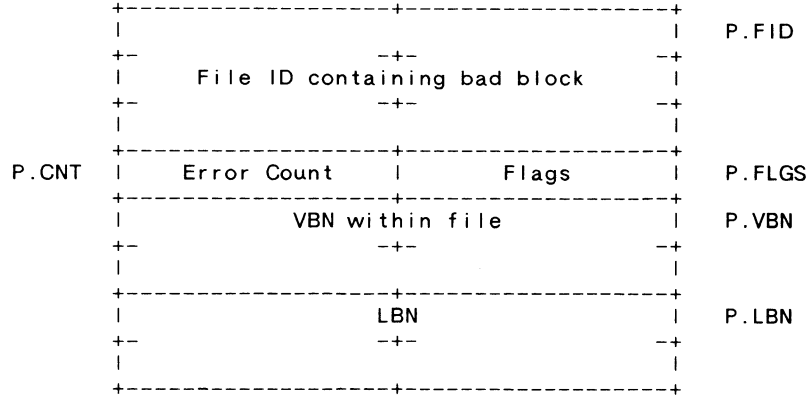
The backup log file is File ID 8,8. It is listed in the MFD as BACKUP.SYS;1. This file contains a history of volume and incremental backups performed on the volume. The format of this file is FCS 64-byte fixed length records. The content is undefined.

5.9 Pending Bad Block Log File

The pending bad block log file is File ID 9,9. It is listed in the MFD as BADLOG.SYS;1. This file contains a list identifying suspected bad blocks that are not currently contained in the volume bad block file.

The format of this file is FCS 16-byte fixed length records. Each record represents one bad block, and has the following format:

5.9.1 Pending Bad Block Record Layout



The following bits are defined in the flags byte:

PF.RDE Set if a read error has occurred on this block.

PF.WRE Set if a write error has occurred on this block.

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RT-11 SIG NEWSLETTER

Notes from the RT-11 World

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The RT-11 SIG DOES solicit signed articles for insertion in the **mini-tasker**, on or about bugs, features, hints, kinks, nifty things, etc., all about the RT-11 and/or RT-32 operating systems and their environments. Write it up, send it to me (with a note to rewrite if you wish), and I will try and get it in an upcoming issue.

- -

IND Programmers Toolbox

Rally Barnard, our erstwhile "Tape Copy Generation" contact, has submitted two items from his "IND Programmers Toolbox". They are pretty much self-documentating.

- -

DBG-11 -- A Symbolic Debugger (SD) for RT-11

This month, I am encluding a paper that Marty Gentry and Linda Banche of the RT-11 Development Team submitted on DBG-11, a symbolic debugger (SD) for RT-11. It briefly covers pertinent features, and is designed to whet your appetite for more. If interested, please call your local DEC representative for more information (and then call Marty or Linda for the REAL poop).

- -

A Letter from a Reader

A little while ago, Scott Harrod wrote me a letter describing VMS on the Micro PDP-11, which I published. Then Scott wrote the most eloquent letter stating that both the first letter and the second letter were only for me to read, and not for publication. Boy, was I tempted to print the second letter, too.

Seriously, I do appreciate and encourage your writing to me, and I hope you also write to the people who have submitted articles to the **mini-tasker** to offer constructive comments. If you do, please send a copy to the **mini-tasker** so we may print it, and maintain an open forum.

- -

Nashville Spring Symposia

As you read this, the Spring Symposia is history. For those who attended, I hope you learned a lot, told your boss, and have encouragement from your company to continue to attend. For those who did not, (and those who did), now is the time to start planning on attending the Fall Symposia in Anaheim, December 7-11, 1987, or the next Spring Symposia in Cincinnatti, May 16-20, 1988, or even the following Fall Symposia in Anaheim, October 17-21, 1988.

If you were able to attend Nashville, please give some thought to writing up your feelings about one of the sessions you attended for the benefit of those who could not attend, and submitting it to the Mini-Tasker.

- -

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- -

And finally, I am always looking for something of interest to print.

Please send your submissions to the **mini-tasker** (on RX-50, 1600bpi mag tape, or pieces of paper) to me at:

Bill Leroy (RT-11 mini-tasker)
The Software House, Inc.
P. O. Box 52661
Atlanta, GA 30355-0661

(OR)

Bill Leroy (RT-11 mini-tasker)
The Software House, Inc.
2964 Peachtree Road, NW #300
Atlanta, GA 30305-2120

Two items for the

IND Programmers Toolbox

by Rally Barnard

--- PARSE.IND ---

```
.;      PARSE.IND  Control file for parsing a filespec.
.;
.;      PARSE is called from another control file.
.;      In calling file, use the following statements:
.;      ...
.;      .enable global
.;      .sets $DEFDV "xxx[:]"    .;You may include a ":" if not null device.
.;      .sets $DEFXT "[.]DSK"    .;You may include "." in default extension.
.;      ...
.;      @PARSE 'INPUT'
.;      ...
.;
.;      In PARSE, P1 is 'INPUT' from the calling routine. Return is $FILSP,
.;      $FILNM and $DEV, where $FILSP contains the entire filespec
.;      (DEV:NAME.EXT), $FILNM contains the name and extension (NAME.EXT),
.;      and $DEV separately contains the device (DEV:), terminated by a :.
.;      If $DEFDV is null, then $DEV will return null.  PARSE will return
.;      just the device if the input does not contain a file name.
.;
.;      Written by:     R. W. Barnard
.;                      BIO/Comp Applications
.;                      Albuquerque, NM 87185
.;
.;      Version 3.5,    19-Mar-87.
.;
        .parse P1 ":" DEV FNAME
        .if <STRLEN> eq 1 .goto 10      .;Only 1 component was entered.
.;
.;        We were supplied both a device and a file.
.;        Be sure we are using the physical name of the device.
.;
        .testdevice 'DEV'
        .parse <EXSTRI> "," $DEV REST
        .sets $DEV $DEV+":"             .;A device was supplied.
        .goto 30
.;
.;        See if we have just a device or just a file.
.;
.10:    .test P1 ":"                    .;See if only a device was given.
        .if <STRLEN> eq 0 .goto 20      .;Just a file - no device.
        .testdevice 'DEV'
        .parse <EXSTRI> "," $DEV REST
        .sets $DEV $DEV+":"             .;Only a device was supplied.
        .sets $FILNM ""         .;Set the file name to blank and return.
        .sets $FILSP ""
        .exit
```



```
.;
.;        Process the file name here and add the default device.
.;
.20:    .sets FNAME DEV                 .;Device was not entered.
        .sets $DEV $DEFDV               .;Use default device name.
        .if $DEFDV eq "" .goto 30       .;Null default device was supplied.
        .test $DEFDV ":"                .;See if : was supplied.
        .if <STRLEN> eq 0 .sets $DEV $DEV+":"
.;
.;        Now see if extension was entered.
.;
.30:    .test FNAME "."                 .;See if . was entered.
        .if <STRLEN> eq 0 .goto 40      .;No extension was given-use default
        .parse FNAME "." FNAME EXT
        .if EXT ne "" .goto 50          .;Extension was provided.
        .sets $DEFXT ""                 .;Make the extension null.
.40:    .test $DEFXT "."                .;See if . was supplied.
        .if <STRLEN> ne 0 .parse $DEFXT "." A $DEFXT
        .sets EXT $DEFXT                .;Use the default extension.
.50:    .sets $FILNM "'FNAME'.'EXT'"    .;Build the file name.
        .sets $FILSP "'$DEV''$FILNM'"   .;Build the complete file spec.
.;
        .exit
```

--- INDFIL.IND ---

```
.;      INDFIL.IND  Control file for determining from which device
.;      an IND control file was run.
.;
.;      This file can be made a subroutine of a larger IND file.
.;      It should be called first (i.e., before any other IND directives
.;      such as .parse, .test, etc) are done.
.;
.;      This routine returns the name of the device from which it was
.;      run (INDDEV), the file name (INDFIL) and any switches which were
.;      specified (SW1, SW2, SW3, SW4).
.;
.;      Written by:     R. W. Barnard
.;                      BIO/Comp Applications
.;                      P. O. Box 5342
.;                      Albuquerque, NM 87185
.;
.;      Version 1.1,    19-Mar-87.
.;
.indfil:
        .sets INDEXT ".IND"             .;Default extension for IND files.
        .parse P0 "/" P0 SWITCH
        .test P0 "."
        .if <STRLEN> eq 0 .sets P0 P0+INDEXT    .;Use the right extension.
        .testfile 'P0'
        .parse <FILSPC> ":" INDDEV INDFIL
        .testdevice 'INDDEV'
        .parse <EXSTRI> "," INDDEV REST
.;
        .parse SWITCH "/" SW1 SW2 SW3 SW4
        .return
```

DBG-11

Commands

Operating parameters

- [qual];R
  _BIN _OCT _HEX _DEC
- [qual];T
  _REG or _NOREG _SYM or _NOSYM
  _ADR or _NOADR _RUB or _NORUB
- [qual];V
  _T4 _T10 _TR _IO

DBG-11

Numeric/symbolic addressing

- Octal address for locations within a program
- Define symbol to refer to location
- Numeric and symbolic can be combined
- Defined by colon character (:)
  - 1000,START: (1000)
  - START+174,ANSWER: (1174)
  - -<START+5>,FOO: (176773)
  - <ANSWER-START>_/2,VALUE: (000076)

DBG-11

A SYMBOLIC DEBUGGER (SD)

FOR RT-11

DBG-11

DBG-11 Features

- Control program execution
- Display in numeric or mnemonic format
- Change contents
  - Memory locations
  - Registers
- Define symbol names for memory addresses

DBG-11

Registers and symbols

- Register grouping
  - PDP-11 machine registers
  - DBG-11 internal registers
- Symbol grouping
  - PDP-11 machine register symbols
  - DBG-11 permanent symbols
  - DBG-11 internal symbols
  - User-defined symbols

RT-6

DBG-11

Expressions

- Can represent an absolute address, offset, or instruction
- Can contain any of following elements
  - PDP-11 machine instructions
  - Numeric value
  - Symbolic value
  - Current location symbol (.)
  - Last typed address symbol (Q)
  - Binary arithmetic operators
  - Unary arithmetic operators

DBG-11

Components

- Pseudo-device handler
  - Software
  - Hardware
- Symbol definition utility

RT-5

DBG-11

Numeric values

- Defaults to OCTAL unless 8, 9, or dot (.)
- Independent of output radix setting
- Prefix operators
  - _$ up to 4 hex digits follow
  - _% up to 3 RAD50 characters follow
  - _" 2 ASCII characters follow
  - _' 1 ASCII character follows

DBG-11

Getting started

5. Debug – setting breakpoints

6. Prompts
   - BE: 1000
     DBG>
   - BE: (U) 1000
     DBG>

Graphics register display

R0	R1	R2	R3	R4	R5
076264	100000	105456	177777	076000	072620
264.174	000.200	056.213	377.377	000.174	220.165
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

PC=	076154	SP=	073374	(SP)	=074234	2(SP) =060000	4(SP) =013700	6(SP)=000054

DBG>

DBG-11

Commands

- Define user symbol [addr,]symbol:
- Set/remove breakpoints [addr][,n];B
- Execute program
  [addr];G [val];P [val];S
- Open and display
  [addr]" [addr]' [addr]%
  [addr]/ [addr][[addr]|
  [addr]\

DBG-11

Commands

- Change contents
  [val]<RET> [val]<LF> [val]^ [val]@
- Display expression values [val]=
- Special characters
  RUBOUT CTRL/C CTRL/Q
  CTRL/S CTRL/U CTRL/W

DBG-11

Special Symbols

- Dot (.)
- Q

DBG-11

Advanced techniques

- Device handlers
- Accessing memory outside program space
- DBGSYM

DBG-11

DBGSYM

- A symbol Definition Utility
- Uses .STB Files as input
- Defines all global symbols for use by DBG

DBG-11

Using DBG-11

- SD pseudo-device handlers
- SET commands
  - SYSGEN
  - ADROFF=val
  - DATOFF=val
  - CSR=val
  - [NO]REG
  - BREAK

DBG-11

Getting started

1. Copy appropriate file to handler name format
2. Tailor environment with SET commands
3. INSTALL SD
4. .LOAD SD
   DBG V01.14 – RT-11 (SOFT PRO SD: GRH)

UNISIG

Editor's Corner

Jim Livingston, **Toolkit** Editor

This editorial will be short, since we're in the process of preparing for the Nashville symposium and there's very little time left. The unfortunate fact of life is that you'll likely not get this until after said symposium, so there's no point in telling you all the wonderful things to expect there. Nevertheless, I'll do my best to give you, who didn't get there, some summary of the events that might be of interest in the **Toolkit** for July.

In any case, this issue includes a number of selections from the Usenet. I've always thought that we might be a useful conduit for information from that source, since many of our subscribers have no access to the network directly. In this issue, we have contact information for the general UNIX community, as well as specific information about standards which affect the UNIX community. You may find those quite useful.

In addition, you'll notice something of an introduction to the mod.sources newsgroup of Usenet, which, for those who're not familiar with it, is a group devoted to collecting public domain software for UNIX systems and making it available to whomever asks for it. I thought this would be a particularly good inclusion for those in our community who don't yet see the value in joining the network.

You'll also find, courtesy of our Digital friends, a brief product description of VAX C for ULTRIX. There's a sort of commercial flavor to it, I'll agree; the difference between a frankly commercial product announcement and this, in my opinion, is that what's being announced is free with the ULTRIX 2.0 kit. I grant that's a kind of pricing information, but I think you'll agree that it's the kind we'd all like to hear. I'd be interested in your feelings about information like this being in these pages.

Last, I'm including a particularly good paper that was presented at the San Francisco symposium. I've waited this long, in part, because I wanted to be sure it didn't appear in the Proceedings of the symposium. Duplicate publication of papers is frowned upon in the organization. In this case, however, I think that, even though it was in the symposium session notes, it deserves wider distribution. Let me know what you think about that.

Selected from the Usenet in March

Submitted by: Rich Salz <rs@mirror.TMC.COM>
Mod.sources: Volume 9, Info 1
Archive-name: index9.1

This is the first of two introductory messages about mod.sources. This one describes how to submit source to mod.sources, where the archive sites are, and how to contact them. The companion articles lists all previously-published mod.sources articles.

I am always looking for suggestions on how to improve the usefulness of mod.sources, and can be contacted as listed below.
-Rich Salz

SUBMITTING SOURCE FOR PUBLICATION

Items intended for posting should be sent to mirror!sources; requests for missing copies or other queries should be sent to mirror!sources-request. In Australia, Robert Elz is a "sub-moderator"; people there can work with him (kre@munnari.OZ) to get postings out more easily.

If you want verification of arrival, so say in a cover note, or at the beginning of your submission, if it is small. I try to verify that a program works, and if I can't get it to work, I may hold up posting it for a couple of days. Please note that, except in rare cases, source without documentation and a Makefile will not be published. The backlog from receival to posting is now about two weeks; this will probably shrink down to one week in the upcoming weeks.

When you send mail, MAKE SURE to include a return address relative to some well-known site(s). When all else fails, my conventional address and phone number are:

Rich $alz
Mirror Systems
2067 Massachusetts Avenue
Cambridge, MA 02140
617-661-0777

THE STRUCTURE OF MOD.SOURCES ARTICLES

Each posting in mod.sources is called an "issue"; there are 100 issues to a volume. The division is arbitrary, and has varied greatly in the past. There are two types of articles in mod.sources; sources and "information postings." They can be distinguished by the subject line:

Subject: v07INF8: Index for Volume 7 and other info

This first word in the title identifies this as the eight info posting in volume seven. Similarly, the subject line shown below:

Subject: v07i081: Public-domain Unix kernel

identifies this as the 81st source article in Volume 7. Large sources are broken up into smaller pieces, and have subject lines that look like this:

Subject: v07i082: System VI Source Distribution, Part03/08

The first few lines of an article are auxiliary headers that look like this:

Submitted by: root@freeware.ATT.COM
Mod.sources: Volume 7, Issue 82
Archive-name: new-login

The "Submitted by" is the author of the program. If you have comments about the sources published in mod.sources, this is the person to contact. When possible, this address is in domain form, otherwise it is a UUCP bang path relative to site "mirror" (my machine).

The second line repeats the volume/issue information for the aide of NOTES sites and automatic archiving programs.

The Archive-name is the "official" name of this source in the archive. Large postings will have names that look like this:

Archive-name: patch2/Part01

Please try to use this name when requesting that sources be mailed to you. Also, note that the "part number" given in the title, and the archive name given in the auxiliary header need not be identical.

ACCESSING THE MOD.SOURCES ARCHIVE

The complete mod.sources archives are fairly large:

Volume	Size (Kbytes)
1	4004
2	1204
3	3434
4	4220
5	390
6	4220
7	3976
8	4416

There are several active archive sites around the net. I am particularly interested in helping set up a BITNET archive. A French archive site is being set up, and it may be extended to provide full European coverage; I will post more information as soon as things are settled.

When you request something before Volume 6, please make sure to be as descriptive as possible as articles before then do not have official names.

Several sites below will send tapes through the mail. For those sites, send a 1/2" mag tape WITH RETURN POSTAGE and RETURN MAILER. Tapes without postage or mailer will not be returned. No other methods (COD, etc.) are available; please don't ask.

Finally, please note that I am Rich $alz, rs@mirror; Rick Adams is rick@seismo, and Rich Kulawiec is rsk@j.cc.purdue.edu; we appreciate the extra effort to get our names right. :-)

1. Phil Burdi has an archive on-line; contact usenet@cuae2.ATT.COM for more info. He has also set up an off-hours UUCP login providing anonymous UUCP access to the archives. The L.sys (Systems file) entry looks like:
(for HoneyDanBer UUCP users)
cuaepd Wk1830-0530,Sa,Su ACU 1200 3129643773 in:--in: pduucp
(for other UUCP users)
cuaepd Any1830-0530 ACU 1200 3129643773 in:--in: pduucp
Retrieve the file cuaepd!~/netnews/mod.sources/howto.snarf and follow the directions therein.

2. Pyramid Technology has an archive arranged topically, and in compressed tar files. They are happy to take new UUCP connections. They are also somewhat willing to make tapes for people to come by and pick up, provided you call WELL in advance and bring lunch money. This is being managed by Claudia Dimmers and/or Carl Gutekunst. Contact pyramid!usenet for more info.

3. Robert Elz (kre@munnari.OZ) keeps mod.sources in different ways depending on his available disk space; contact him for more info.

4. Thos Sumner at UCSF will respond to requests for material, but cannot promise an ongoing commitment. Anyone requesting material via mail should supply a path from ucbvax. Anyone requesting tape should contact me first. Contact him at thos@cca.ucsf.edu, or ucbvax!ucsfcgl!cca.UCSF!thos

5. Tom Patterson at Washington University can make 800/1600/6250 BPI tar tapes. If you give him a "real good reason," he can also make 1600 BPI VMS BACKUP or ANSI tapes. Send your tape, mailer, and postage to Tom at:
Engineering Computer Lab, Bryan 509
Lindell & Skinker Blvd
Washington University
St. Louis, MO 63130
For best results, first send mail to wucs!archive (you stand a better chance of getting processed quickly that way).

6. Jim Thompson (otto!jim) can make 1600 and 6250 tar and cpio tapes, as well as VMS backup in a real pinch. He will also provide a temporary UUCP login for interested parties at 1200 or 2400 baud. His postal address is:
Jim Thompson
c/o Sun Teleguide
2551 Green Valley Pkwy
Henderson, Nv. 89015
(702) 454-4636

7. Of course, I have a complete set of archives. I can mail individual postings, make files available for UUCP, and will send tapes (1600 BPI tar; 6250 or cpio in a crunch). Last time I checked, it cost about $3 to send a 2400' tape across the country in a padded envelope via first-class mail.

8. Rick Adams (rick@seismo.CSS.GOV) provides archive access to those on the Internet. Access is available directly via anonymous FTP (Outside of 9am-7pm EST M-F.) The files are in a directory mod.sources, then a sub-directory Volume[1-7]. They are named as closely as possible to the names in the Index. Files that have not been assigned a "short name" reside in the directory sources/mod temporarily. Send tape, mailer, and postage to Rick at:
Center for Seismic Studies
1300 North 17th Street, Suite 1450
Arlington, VA 22209-3871

9. Internet sites may also retrieve archives from j.cc.purdue.edu via anonymous ftp. The archive is in the directory "mod.sources", subdivided into "volume1", etc. Due to disk space considerations, many of the sources are compressed; these may be recognized by the ".Z" suffix. If you don't have compress & friends, they are in

~ftp/pub/compress.shar for the taking. This is being managed by Rich Kulawiec (Wombat), pucc-j!rsk, rsk@j.cc.purdue.edu. If your host tables don't grok "j.cc.purdue.edu", try "purdue-asc.arpa". They would appreciate it if you would avoid large file transfers in the middle of the day. [Rick also points out that the FTP'able archies also contain mod.amiga, a bunch of kermit sources, news 2.11, rn 4.3, nntp, and whatever else happens to be in ~ftp/pub at the moment.]

10. The CSNET CIC has been doing a fair amount of work to bring their automated retrieval up-to-speed. They now have a complete archive, and are making things available as quickly as possible (they have special legal restrictions on what they can distribute, so everything may not be available). Look in the latest issue of the CSNET Forum, or contact postmaster@sh.cs.net.

VAX C/ULTRIX!

PRODUCT SUMMARY

VAX C for ULTRIX Systems is a port of the VAX C V2.3 product for VMS systems to the ULTRIX-32 operating system run time environment. It is an implementation of the C programming language as described by Kernighan and Ritchie in "The C Programming Language" with some extensions as defined by the proposed ANSI standard for C.

FEATURES

- o VAX C/ULTRIX is a highly optimizing compiler for the C programming language. Many compute-bound C applications will run 1.2 to 2 times faster than when compiled with the Portable C Compiler (PCC) native on ULTRIX-32. Improvement to a lesser degree may result for programs manually optimized for PCC by experienced UNIX programmers who use workarounds to avoid the limitations of PCC.

- o A major goal of the product was to integrate VAX C into the ULTRIX-32 environment such that it can be used in place of PCC whenever possible. VAX C/ULTRIX:

  - supports the PCC command line with the exception of the following options: -go, -p, -t, -R, -S, -B. Additional command line options will be provided to support VAX C extensions.

  - will use the native run time and system libraries on ULTRIX-32. It will also use the native header files (such as stdio.h) and the dbx debugger.

  - VAX C/ULTRIX cannot be used for system level programs requiring the ASM pseudo function or where undocumented or non-standard C features of PCC are used. If necessary, an application can be linked using some object modules compiled with VAX C and others compiled with PCC when the DEC-developed LK linker is used.

  - permits data objects to be aligned on arbitrary boundaries, such as longword or page. VAX C/ULTRIX will support this form of aggregate padding and alignment under command line control. This option will also be added to VAX C under VMS. The default for the command line option such that both systems will get the expected behaviour without specifying any command line options.

  - has been enhanced such that the preprocessor supports the elif and if defined directives.

  - provides a full listing of the source code, including expanded preprocessor substitutions, generated machine code, included header files and symbol cross references, each under command line control.

  - can insert calls to profiling routines during compilation so that execution profiling can be done at execution time, as does PCC.

- o VAX C/ULTRIX is source code compatible with VAX C V2.3 for VMS systems, except for VMS specific extensions such as support for RMS, LSE, SCA, CDD, and VMS system calls.

- o VAX C/ULTRIX supports the "const" and "volatile" keywords, and function prototypes as defined in the proposed ANSI standard X3J11 for C. Finalization of this standard is expected in late 1987 or early 1988.

- o The PCC compiler supports a command line option to specify alternate search paths for named include files. Both VAX C V2.3 and VAX C/ULTRIX V1.0 will support a command line switch to specify a list of directories to be searched for include files. The command line option for VAX C/ULTRIX will the same as that for the PCC compiler.

The C programming language is considered an integral part of a UNIX operating system environment and not merely an optional language compiler. This is one of the major reasons that VAX C/ULTRIX, unlike VAX FORTRAN for the ULTRIX Operating System, is packaged with the ULTRIX-32 operating system.

It is also for this reason that VAX C/ULTRIX is engineered to work in the same manner as PCC so that it can be used to compile C programs on ULTRIX-32 with few or no source code changes. Also, in keeping with the ULTRIX-32 strategy of driving and supporting industry standards, VAX C/ULTRIX has begun to incorporate features of the draft ANSI C standard which is expected to be finalized sometime within the next year. Another goal was that it remain compatible with VAX C V2.3 on VMS systems to provide portability between the two operating systems.

VAX C/ULTRIX should be used for applications development in order to take advantage of the performance gain expected by its use. PCC is still required for system level code requiring the ASM pseudo function or where undocumented or non-standard C features of PCC are used.

SOFTWARE REQUIREMENTS

VAX C/ULTRIX will be packaged with ULTRIX-32 Version 2.0. VAX C/ULTRIX will not run on earlier versions of the ULTRIX-32 operating system nor on any other operating system but ULTRIX-32.

HARDWARE REQUIREMENTS

VAX C/ULTRIX supports all VAX, MicroVAX and VAXstation processors supported by ULTRIX-32 Version 2.0.

ORDERING INFORMATION

Since VAX C/ULTRIX will be packaged with Version 2.0 of ULTRIX-32 it is not sold or priced separately. Media and documentation for VAX C/ULTRIX will be received when the ULTRIX-32 V2.0 H-kit is ordered.

AVAILABILITY

VAX C/ULTRIX is expected to be available from the U. S. Software Distribution Center with ULTRIX-32 Version 2.0 in May, 1987.

* UNIX is a registered trademark of AT&T Bell Laboratories

Selected from the Usenet in March
(Thanks to Kathy Hornbach of DEC)

This is the latest in a series of similar mod.std.unix articles. Corrections and additions to this article are solicited.

Access information is given in this article for the following standards:
IEEE 1003.1 (POSIX), 1003.2 (shell/tools), 1003.3 (verification)
/usr/group working groups on distributed file system, network, interface, graphics/windows, database, internationalization, performance measurements, realtime, and security
X3H3.6 (display committee)
X3J11 (C language)
/usr/group Standard
System V Interface Definition (SVID, or The Purple Book)
X/OPEN PORTABILITY GUIDE (The Green Book)

UNIX is a Registered Trademark of AT&T.
POSIX and IEEE are trademarks of the Institute of Electrical and Electronic Engineers, Inc.
X/OPEN is a licensed trademark of the X/OPEN Group Members.

The IEEE P1003 Portable Operating System for Computer Environments Committee is sometimes known colloquially as the UNIX Standards Committee. They have published the 1003.1 "POSIX" Trial Use Standard in April 1986. According to its Foreword:

> The purpose of this document is to define a standard operating system interface and environment based on the UNIX Operating System documentation to support application portability at the source level. This is intended for systems implementors and applications software developers.

Published copies are available at $19.95, with bulk purchasing discounts available. Call the IEEE Computer Society in Los Angeles

714-821-8380

and ask for Book #967. Or contact:

IEEE Service Center 445 Hoes Ln. Piscataway, NJ 08854

and ask for "IEEE 1003.1 Trial Use Standard" - stock number SH10546.

The Trial Use Standard will be available for comments for a period such as a year. The current target for a Full Use Standard is Fall 1987. IEEE has initiated the process to have the 1003.1 effort brought into the International Organization for Standardization (ISO) arena.

Machine readable copies of the Trial Use Standard are not and will not be available. A machine-readable "representation" of a draft between

the Trial Use and Full Use Standards may be available when it is ready (probably in 1987).

There is a paper mailing list by which interested parties may get copies of drafts of the standard. To get on it, or to submit comments directly to the committee, mail to:

James Isaak Chairperson, IEEE/CS Pl003 Digital Equipment MK02-2/B05 Continental Blvd. Merrimack, NH 03054-0403 decvax!jim 603-884-3692

Sufficiently interested parties may join the working group.

Related working groups are
group subject co-chairs 1003.2 shell and tools Hal Jespersen (Amdahl), Don Cragun (Sun) 1003.3 verification Roger Martin (NBS), Carol Raye (AT&T)

Inquiries regarding 1003.2 and 1003.3 should go to the same address as for 1003.1.

The next scheduled meetings of the Pl003 working groups are, in 1987:

April	20-21	1003.[23]	King Edward Hotel, Toronto	Host: IBM
April	22-24	1003.1	"	
		(Just before the Canadian UNIX Conference)		
June	22-23	1003.1	Seattle (changed from USENIX week in Phoenix to give us better 'working' attendance)	No Host yet
June	24-26	1003.[23]		
Aug/Sept	31-4	East Coast Probably Washington DC area		No Host yet
OR Sept	14-18	Boston (Same Time/loc as X3J11)		

(Sept 7th is Labor day, and that week is ISO TC97 SC22 meeting in Wash DC)

There is also a balloting group (which intersects with the working group). This is more difficult. Contact the committee chair for details. I will repost them in this newsgroup if there is sufficient interest.

Here are some details from Hal Jespersen regarding Pl003.2:

The IEEE Pl003.2 "Shell and Utilities" Working Group is developing a proposed standard to complement the 1003.1 POSIX standard. It will consist of

a shell command language (currently planned to be based on the Bourne Shell),

groups of utility programs, or commands,

programmatic interfaces to the shell (system(), popen()) and related facilities (regular expressions, file name expansion, etc.)

defined environments (variables, file hierarchies, etc) that

applications may rely upon

which will allow application programs to be developed out of existing pieces, in the UNIX tradition. The scope of the standard emphasizes commands and features that are more typically used by shell scripts or C language programs than those that are oriented to the terminal user with windows, mice, visual shells, and so forth.

The group is currently seeking proposals for groupings of commands that may be offered by implementors. As groups are identified, command descriptions will be solicited. There is no requirement that the commands be in System V or BSD today, but they should realistically be commands that are commonly found in most existing implementations.

Meetings are normally held in conjunction with the 1003.1 group and have a large membership overlap. Future meetings will generally be held on the day or two preceding 1003.1.

There are three Institutional Representatives to Pl003: John Quarterman from USENIX, Heinz Lycklama from /usr/group, and John Loman from X/OPEN.

As the one from USENIX, one of my functions is to get comments from the USENIX membership and the general public to the committee. One of the ways I try to do that is by moderating this newsgroup (currently known as mod.std.unix, very soon as comp.std.unix). An article related to this one appeared in the September/October 1986 ;login: (The USENIX Association Newsletter). I'm also currently on the USENIX Board of Directors. Comments, suggestions, etc., may be sent to

John S. Quarterman
TIC
P.O. Box 14621
Austin TX 78761
512-837-7233
usenix!jsq

For mod.std.unix (comp.std.unix):		
Comments:	ut-sally!std-unix-request	std-unix-request@sally.utexas.edu
Submissions:	ut-sally!std-unix	std-unix@sally.utexas.edu

The January/February 1987 issue of CommUNIXations (the /usr/group newsletter) contains a report by Heinz Lycklama on the /usr/group Technical Committee working groups which met in September 1986.

If you are interested in starting another working group, contact Heinz Lycklama:

Heinz Lycklama
Interactive Systems Corp.
2401 Colorado Ave., 3rd Floor
Santa Monica, CA 90404
(213)453-8649
decvax!cca!ima!heinz

Here is contact information for /usr/group working groups as taken from the CommUNIXations article mentioned above.

/usr/group Working Group on Distributed File System:
Dave Buck
D.L. Buck & Associates, Inc.
6920 Santa Teresa Bldg, #108
San Jose, CA 95119
(408)972-2825

/usr/group Working Group on Network Interface:
Gil McGrath
AT&T Information Systems
(201)522-6182

/usr/group Working Group on Internationalization:
Karen Barnes
Hewlett-Packard Co.
19447 Pruneridge Ave.
M/S 47U2
Cupertino, CA 95014
(408) 725-8111, ext 2438

/usr/group Working Group on Graphics/Windows:
Tom Greene
Apollo Computer, Inc.
(617)256-6600

/usr/group Working Group on Realtime:
Bill Corwin
Intel Corp.
5200 Elam Young Pkwy
Hillsboro, OR 97123
(503)681-2248

/usr/group Working Group on Database:
Val Skalabrin
Unify Corp.
1111 Howe Ave.
Sacramento, CA 95825
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The X3H3.6 display management committee has recently formed to develop a model to support current and future window management systems, yet

is not based directly on any existing system. The chair solicits help and participation:

Georges Grinstein
wanginst!ulowell!grinstein

The Abstract of the 1003.1 Trial Use Standard adds:

> This interface is a complement to the C Programming Language in the C Information Bulletin prepared by Technical Committee X3J11 of the Accredited Standards Committee X3, Information Processing Systems, further specifying an environment for portable application software.

X3J11 is sometimes known as the C Standards Committee. Their liaison to P1003 is

Don Kretsch
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190 River Road
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A contact for information regarding publications and working groups is

Thomas Plum
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The current document may be ordered from

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who know X3J11 as X3.159. The price is $65.

The /usr/group Standard is a principal ancestor of P1003.1, X/OPEN, and possibly even X3J11:

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4655 Old Ironsides Drive, Suite 200
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The price is still $15.00.

The System V Interface Definition (The Purple Book, or SVID). This is the AT&T standard and is one of the most frequently-used

references of the IEEE 1003 committee.

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P.O. Box 19901
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Select Code:	Volume:	Topics:
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The price is about 37 U.S. dollars for each volume or $84 for all three.
Major credit cards are accepted for telephone orders: mail orders
should include a check or money order, payable to AT&T.

The X/OPEN PORTABILITY GUIDE (The Green Book)
is another reference frequently used by IEEE 1003.

The X/OPEN Group is "Ten of the world's major information system
suppliers" (currently Bull, DEC, Ericsson, Hewlett-Packard, ICL,
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The book is published by

Elsevier Science Publishers B.V.
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There are currently five volumes:
1) System V Specification Commands and Utilities
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They take a large number of credit cards and other forms of payment.

Selected from the Usenet in March
(Thanks to Kathy Hornbach of DEC)

This is the latest in a series of similar mod.std.unix articles.
Corrections and additions to this article are solicited.
The newsgroup mod.std.unix will very soon be known as comp.std.unix.

Access information is given in this article for the following:
user groups: USENIX, /usr/group, EUUG, AUUG, DECUS
newsletters: ;login:, CommUNIXations, EUUG, AUUGN
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That representative also moderates the USENET newsgroup mod.std.unix, which is for discussion of UNIX-related standards, especially P1003. For more details, see the posting in mod.std.unix about Access to UNIX-Related Standards.

/usr/group is "the commercially oriented UNIX system users organization."

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/usr/group publishes a bimonthly newsletter called CommUNIXations, which includes much current industry news.

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/usr/group has long been deeply involved in UNIX standardization, having sponsored the /usr/group Standard, providing an Institutional Representative to the IEEE P1003 Portable Operating System for Computer Environments Committee, and sponsoring the /usr/group Working Groups on areas that P1003 has not yet addressed. For more details, see the posting about Access to UNIX-Related Standards.

EUUG is the European UNIX systems Users Group.

EUUG secretariat
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Buntingford
Herts SG9 9PL
England
seismo!mcvax!euug

They have a newsletter and hold two conferences a year.

AUUG is the Australian UNIX systems users Group.

AUUG
P.O. Box 366
Kensington
N.S.W. 2033
Australia

seismo!munnari!auug
auug@munnari.oz.au

Phone contact can occasionally be made at +61 3 344 5225

AUUG holds biennial conferences, usually of 2 days each: the next one will probably be in late February 1986. They publish a newsletter (AUUGN) at a frequency defined to be every 2 months.

There are similar groups in other parts of the world, such as Japan and Korea. If such a group wishes to be included in later versions of this access list, they should please send me information.

Also, DECUS, the Digital Equipment Computer Users Society, has a UNIX SIG (Special Interest Group) which participates in its meetings, which are held twice a year. The next one will be in Nashville, Tennessee, 27 April - 1 May 1987.

DECUS U.S. Chapter
219 Boston Post Road, BP02
Marlboro, Massachusetts 01752-1850
617-480-3418

See also the USENET newsgroup comp.org.decus.

The two main general circulation magazines about the UNIX system are

UNIX REVIEW
Miller Freeman Publications Co.
500 Howard Street
San Francisco, CA 94105
415-397-1881

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Tech Valley Publishing
444 Castro St.
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415-940-1500

UNIX BACKUP UTILITIES AND STRATEGIES TO USE THEM
or
WHY BRUSH YOUR TEETH

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Making backups is like brushing your teeth: it takes time, you don't feel any benefit unless a disaster strikes, and then you wish you had taken it more seriously. Both for backups and cleaning teeth, there are several tools which can be used in a variety of ways and some are more effective than others. This paper will describe the Unix backup utilities and discuss strategies for using them.

Backups are useful in a variety of situations including when a systems person accidentally format disks, or run *newfs*, when hardware fails, when a controller breaks and scribbles on the disk, or when an earthquake or fire destroys a whole computer center.

After such a disaster occurs, you may find that you have no backup tapes. The backups may be out of date, or the tapes may be unreadable.

This paper describes ways of avoiding the disastrous situations described above.

1. UNIX BACKUP UTILITIES. Each version of Unix has its own backup utilities. This section describes the utilities available for producing and restoring backups on System V, Version 7, and ≥ 4.2 Berkeley Standard Distribution (*BSD*) UNIX systems. Version 7 systems include Xenix, 2.9 and 4.1 BSD systems.

1.1. SYSTEM V has four programs intended specifically for performing backups: *ff*, *volcopy*, *finc*, and *frec*.

ff produces a table of contents, a list of i-nodes and path names. I-nodes are internal numbers Unix uses to identify files.

volcopy copies an entire filesystem. *finc* is a flexible program that copies only files which have changed within the period of time th operator specifies. *frec* recovers files from a *volcopy* or *finc* backup.

The system V backup utilities are awkward to use because they require i-nodes rather than file names as arguments. Developing a front-end program to *frec* could make it easier to use.

1.2. VERSION 7 backup utilities are easier to use than those of System V, but they are not as flexible. The Version 7 backup utilities are *dump*, *dumpdir*, and *restor*. Note that *restor* is spelled without the expected final *e*.

dump uses the concept of dump levels. Dump level 0 corresponds with a backup of the entire filesystem. Levels 1 through 9 include all changes since the most recent backup with a lower level number. In other words, if you make a level 3 dump, change some files, and then dump at level 4, only the files which have changed since the level 3 dump are saved.

Like the System V utility *ff*, *dump* produces a table of contents. It also stores the time and date of the most recent dump at each level, in the file */etc/ddate*. *dumpdir* lists the files on a tape.

restor retrieves files from a dump, using the actual file names. Unfortunately, the restored files are assigned i-nodes as names. The shell script *rename* in the Appendix reassigns the original names to *restor*'ed files.

1.3. ULTRIX AND ≥ 4.2 BSD Unix have two backup utilities: *dump*, and *restore*. In addition, *rdump* and *rrestore* can dump and restore files across a local area network.

dump is similar to its counterpart in Version 7, except it stores dump dates in */etc/dumpdates* in human-readable form, as shown below. The first column contains the filesystem, the second column the dump level.

```
/dev/hp0g    0    Sun Dec  1 10:14:38 1985
/dev/hp0h    0    Sun Dec  1 10:58:43 1985
/dev/hp0g    3    Tue Dec  3 07:03:54 1985
```

A sample */etc/dumpdates* file.

dump in 4.2 BSD handles tape problems better than the other standard Unix backup utilities. When the program encounters a bad tape, it will request and accept a new tape rather than aborting the entire dump.

Unlike the Version 7 *restor*, *restore* can list the files on a tape and it automatically restores files with their original name. With its interactive mode, you can examine the contents of a backup as if it were on the system. However, first-time users are sometimes confused because files to be extracted are put on a list. To obtain the requested files, type *extract*.

1.4. ARCHIVE UTILITIES. Every UNIX system has utilities for writing on tape. The most common of these utilities are *tar* and *cpio*.

1.4.1. TAR format tapes can be read on most UNIX machines. Unfortunately, *tar* cannot deal with more than one physical volume of backup medium, and there is a limit to the number of characters that can be passed to *tar* as arguments.

Here is an example of how to use *tar* to save all files in the directory */usr* that are at most four days old:

```
tar c 'find /usr -mtime -4 -print \;'
```

1.4.2. CPIO, like *tar*, can backup files in different filesystems. Unfortunately, Version 7 and BSD systems cannot read *cpio* format tapes.

Here is an example of how to use the *cpio* option of *find* to save all files in the directory */usr* less than four days old on tape:

```
find /usr -mtime -4 -cpio /dev/rmt0 ;
```

2. CRITERIA FOR BACKUPS. The next section discusses some of the criteria to consider when when selecting or designing a backup strategy.

2.1. WHAT IF YOUR TAPE GOES BAD? There is always a possibility that the medium on which a backup is stored will go bad. Thus, it is wise to have two copies of each backup file. The probability that both backups would fail at the same time is low. Later sections suggest strategies for acquiring two copies of each backup.

2.2. SELF-CHECKING. Do not wait until a disk goes bad to see if the backups are good. There should be an automated procedure to check that backups are readable.

Reading the last file off a dump tape is a way of verifying a backup. The Appendix contains a shell script which uses this method to verify ≥ 4.2 BSD dumps.

2.3. RETIRE OLD TAPES and FLOPPIES before they reach the end of their useful lives. Put old tapes and floppies into the permanent archives.

2.4. MAKE THE BACKUP SYSTEM EASY TO USE so the task will not be avoided. For a backup strategy to be effective, it must be adhered to.

2.5. BACKUP WHEN there is a minimum of system activity, since files that change while making a backup may be stored incorrectly.

The frequency with which backups to make backups depends on how much information you can afford to lose. Most sites choose to make backups every working day. A complete or epoch dump should be made before replacing your computer.

2.6. WHEN RESTORING FILES, the 4.2 BSD and Version 7 manuals suggest mounting dump tapes in reverse order. *dump* copies files in increasing order of i-node and writes the i-node of the first file in the header of the tape. If the i-node of the file requested is too low to be on the volume mounted, both *restore* and *restor* do not read the rest of the tape.

The 4.2 BSD *dump* program tells the operator the i-node of the first file stored on each tape of a multi-volume backup. Make it a part of your backup procedure to write this information on each tape's label. Use the verbose option of the 4.2 BSD *restore* program, which gives each file's i-node, to determine the tape volumes you need.

2.7. IF YOU HAVE EXCESS DISK SPACE, consider dumping modified files onto disk during a time when few files are changing, and then writing (with *dd*) the dumped files on tape or another storage medium at a more convenient time. Files can then be extract from the tape with the appropriate restore command. There are several advantages to this scheme: (1) Dumped files are more likely to be consistent. (2) Dumps can be run from *cron* late at night. (You might not want to update the file containing dump dates until backups are written to tape.) (3) If a file or filesystem is lost while the backup file is still on the system, it is more convenient to recover from the backup information on disk than from tape. (4) If you devote an entire disk drive for doing backups, that disk can replace a failing disk until repairs can be made.

2.8. SECURITY. If you want your system to be secure, then keep your backups secure. If a user can access the backups, then she can see any file on the backups.

2.9. PORTABLE. Backups are usually read on the machine they are written on. However, if your machine has caught fire or you upgrade to a new computer, it will be useful to be abl to read your backups on another machine.

2.10. EFFECTIVENESS. For a backup scheme to be effective, you must be diligent, label all backups, verify backups, and keep some backups off-site.

3. A BACKUP STRATEGY should minimize possible losses. Be aware that whenever you manage to restore data, the users will have to repeat all work done since the last backup.

This section describes dumping strategies, ways of using the dump utilities to make backups. Although the strategies use the concept of Version 7 and 4.2 BSD dump levels, these strategies can also be used on computers running System V. Level 0 are full or epoch dumps. Levels 1 through 9 are partial or incremental; dumps consisting of the files that have changed since a previous lower level dump.

3.1. THE DAILY TAPES GROW AS THE WEEK GOES BY scheme uses three levels of backup. Level 0 or full dumps are made on the last Friday of the month, level 1 dumps are made on all other Fridays, and level 2 dumps are made on other days. Figure 1 is a graphic representation of this system. The lines show the amount of material that is written to tape, and tape symbols designate days of the week when backups are made.

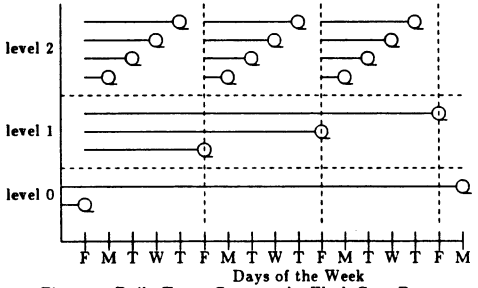

Figure 1. Daily Tapes Grow as the Week Goes By

This simple scheme and offers excessive redundancy. A file made on Monday will be stored on at least four tapes. A file made on the first Monday of the month will be stored on six or seven tapes.

3.2. SMALL DAILY TAPES scheme suggested by the Intel Xenix System Administrator's Guide offers little redundancy.

To implement this system, make an epoch or level 0 dump once a month on a Saturday, when no users are on the system. Skip the weekly dump the following Monday but on successive Mondays make a level 1 dump, then a level 2, and finally a level 3. On Tuesdays, make a level 5 dump, on Wednesdays, a level 6, on Thursdays, a level 7, and on Fridays a level 8, as shown in figure 2.

This scheme is easy to understand and teach. Since there is little redundancy, less data is written to tape than with almost any other scheme, saving CPU time, wall clock time, and possibly tape.

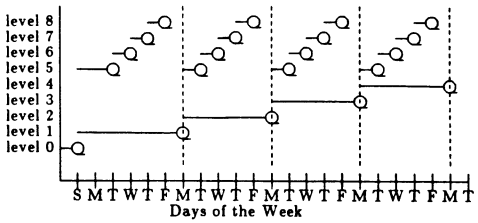

Figure 2. The Small Daily Tapes Dump Strategy

Lack of redundancy increases the chance that a magnetic tape or disk failure will make it impossible to bring everything back. With small tapes restores can involve the mounting of many tapes. For example, if a filesystem is destroyed on the Friday before an epoch dump, eight tape sets will have to be restored.

This strategy though not as robust as other strategies, is reasonable for a microcomputer with a floppy disk drive. Floppies have little capacity and tend to be more reliable than tape.

3.3. THE VERSION 7 TOWER OF HANOI, according to the manual, makes incremental backup "on an exponential progression of tapes." That is, after making a full or level 0 dump, make level 9 dumps using tapes rotated according to the Tower of Hanoi sequence which is illustrated below:

1 2 1 3 1 2 4 1 2 1 3 1 ....

Start with a set of tapes, 5 will be enough for most cases. The first level 9 dump goes on tape 1. The second level 9 dump goes on tape 2, and the third goes on tape 1 again. The fourth level 9 dump goes on tape 3, etc. When the level 9 incremental approaches a full tape, make a level 1 dump. If you have not put it off too long, this will usually fit on a single tape. After making the level 1, continue making level

9 dumps as before, using tapes according to the Tower of Hanoi, until the incremental again nearly fills a single tape. At this point, make a level 2 dump. Continue this progression until you have made a level 8 dump and level 9 dumps no longer fit on a single tape or until you are otherwise ready to make an epoch dump, then start the sequence over again.

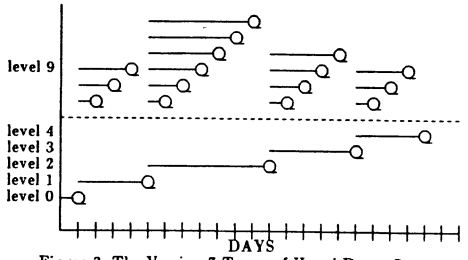

Figure 3. The Version 7 Tower of Hanoi Dump Strategy

As can be seen in Figure 3, this scheme provides redundancy on the incremental backups, which are the tapes subject to the most wear. It also uses tape efficiently in that the lower level dump tapes will tend to be nearly full. If an incremental backups only require a single tape, it is possible to mount a tape at night and run the dump from *cron*.

3.4. HALF REDUNDANT OR THE MODIFIED TOWER OF HANOI is recommended in the 4.2 BSD Unix manual page for *dump*. This scheme consists of performing incremental dumps according to the sequence listed below.

3 2 5 4 7 6 9 8 9 3 2 ...

Weekly dumps are made at level 1 and monthly dumps at level 0.

The sequence is called a modified Tower of Hanoi algorithm even though it has little if anything to do with the Tower of Hanoi.

As is shown in figure 4, with this scheme there are at least two copies of half the files on the system.

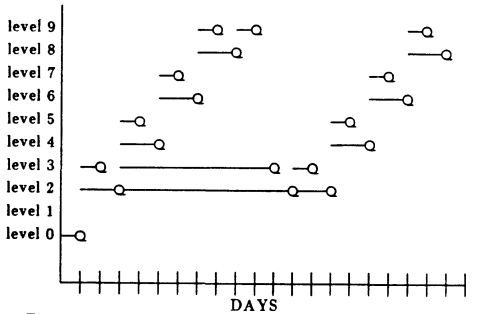

Figure 4. The Half Redundant or Modified Tower of Hanoi.

The shell script *dumplevel* in the Appendix keeps track of the dump levels for this scheme.

3.5. TANDEM DUMPING OR THE MINIMUM FULL REDUNDANCY scheme, shown in figure 9, was inspired by Berkeley's so-called modified Tower of Hanoi. Berkeley's scheme is a step in the right direction but goes only half way.

Some backup schemes store a file on only one tape at some point in their sequence. Others store a file more than twice. Some schemes do both. This scheme only writes two tape images of files added to the system (see Figure 5).

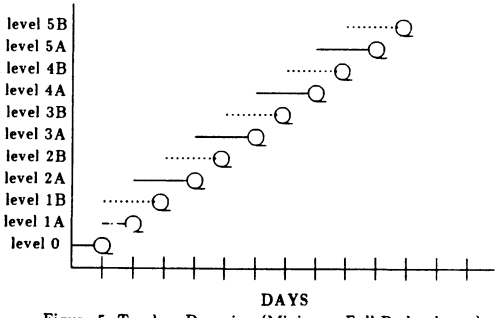

Figure 5. Tandem Dumping (Minimum Full Redundancy)

In Version 7, Ultrix and $\geq$ 4.2 BSD system, implement this scheme by maintain two dump date files. Run dump A with the sequence 0123456789 on even days and dump B with the same sequence on odd days. The shell script *swapdump* in the Appendix shows how to swap between two dumpdate files.

Be sure to copy the level 0 entry for that filesystem to both *dumpdatesA* and *dumpdatesB*.

3.6. THE SINGLE TAPE SCHEME selects the dump level based on how much the filesystem has changed. This scheme dumps at the lowest level possible that will fit on a single tape. If many new files are continually added, then this scheme will dump at an increasingly higher level. If so much changed on the system that the changes do not fit on a single tape, then the system administrator will be notified that it is time to do an epoch dump.

This scheme is most easily implemented with the aid of a spare filesystem or by altering the dump program to provide an estimate of the dump size. If you have a large enough spare filesystem, then you can dump the filesystem to a file on it and check the size of the file. If the dump file could not fit on a single tape, the dump file is removed and the dump level is increased. On the other hand, if you alter the *dump* program to give an estimate of the size of the dump, you could use that option and avoid trial dumps. With this scheme, *cron* can dump from filesystem to filesystem at night. The dump file can be written to tape during the day using the *dd* command.

Redundancy is provided by retaining a dump at each level dumped as well as the previous dump at that level, if it exists.

The advantages of this single tape scheme is that the the number of backup tapes produced per day is predictable. This scheme uses tapes efficiently; saved tapes will be as full as possible.

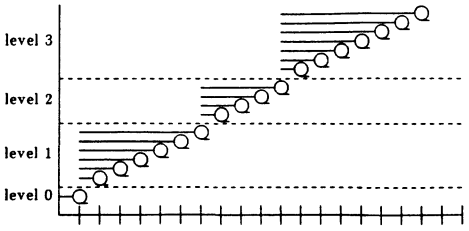

Figure 6. Single Tape

The disadvantages of the scheme are that it uses more CPU time than the other schemes and it is best to have extra disk space to implement this scheme.

The *Single Tape Scheme* is most appropriate for systems with extra disk space, spare CPU cycles that can be used at night. Incrementals will tend to fit on a single tape if you have a high density tape drive or your filesystem does not change much.

4. CONCLUSION. Figures 7 and 8 summarize the backup schemes which have been discussed in this paper. There is no optimal scheme for all environments. If data is crucial or costs a great deal to reproduce, dump frequently. Sites with floppy drives or where data can be reproduced may want to minimize the size of dumps by using the *Small Tape* scheme or a similar strategy. The *Single Tape* scheme is best for sites with extra disk space.

No matter which version of Unix you have on your system, you can to combine the standard backup utilities with good backup practices to create a backup scheme which balances your possible losses with the resources you want to devote to backups.

Remember for a backup scheme to be effective, it is important to be diligent, label backups accurately and clearly, verify backups, and keep copies off-site.

Daily Tapes Grow as the Week Goes by
- •simple
- •provides much redundancy

Small Daily Tapes
- •small tapes
- •little redundancy
- •best for system
  - •with floppy drives
  - •where data not critical

Version 7 Tower of Hanoi
- •efficient tape usage (tapes tend to be full)

Half Duplicating or Modified Tower of Hanoi
- •write files to tape few times
- •two copies of half the files backed up

Tandem
- •write files to tape few times
- •two copies of all files backup up

Single Tape
- •few tapes required to restore file system
- •tapes used efficiently (tapes tend to be full)
- •cpu intensive
- •best for systems with extra disk space

Figure 7. An overview of the backup strategies described in this article.

Scheme	# of Tapes per Incre-mental	Avg # Copies of File on Tape	Avg # Times File Written to Tape	Freq of Epoch Dumps	Avg # of Levels Needed for Restore
Daily Tapes Grow As the Week Goes By	1 or more	1-4	1-4	1 month	2-3
Small Daily	1	1	1	1 month	2-8
Tower of Hanoi	1	1-3	1-many	unknown	2-10 but low
Half Duplicate	1 or more	1-2	1-2	1 month	2-5
Tandem	1 or more	2	2	1 month	2-5
Single Tape	1	1-18	1-many	unknown	2-10 but low

Figure 8. A summary of the backup strategies discussed in this article.

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Unix System Manager's Manual, 4.2 Berkeley Software Distribution, March 1984.

Blachman, Nancy and Phil Ngai, "Part 1a: Backup Issues and Strategies," Unix World, vol. III, no. 2, pp. 67-72, February 1986.

Blachman, Nancy and Phil Ngai, "Part 1b: Backup Issues and Strategies," Unix World, vol. III, no. 3, pp. 69-77, March 1986.

Williamson, J. H., "Incremental Back-up Procedures," Software-Practice and Experience, vol. 13, pp. 1027-1031.

ACKNOWLEDGEMENTS

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APPENDIX

EXAMPLE 1: RENAME

```
: rename
: To rename files retrieved from a Version 7 dump to the original name,
:
: To use, get a list of i-nodes and final pathname from dumpdir, and
: put them in a file.  Then edit the file so it contains only the i-nodes
: and names of the files to be retrieved from the backup.  Feed this
: information to this shell script rename.  Run the output through sh.

while read in
do
        set 'echo $in'
        INODE=$1
        PATHNAME=$2
        FINALNAME=$PATHNAME
        OIFS=$IFS
        IFS=/
        set $PATHNAME
        IFS=$OIFS
        DIR=.
        while test $# -ge 2
        do
                DIR=$DIR/$1
                echo mkdir $DIR
                shift
        done
        echo mv $INODE .$FINALNAME
done | sort -u
```


EXAMPLE 2: DUMPVERIFY

```
#!/bin/sh
# dump.verify   verify that a dump worked (4.2 BSD Unix)
#
if test $# -eq 0
then
        DUMPDEVICE=/dev/rmt8
else
        case "$1" in
        /*)     DUMPDEVICE="$1"
                ;;
        *)      DUMPDEVICE=`pwd`/"$1"
        esac
fi

PATH=/bin:/etc:/usr/ucb:/usr/bin
TMP=/tmp/dump.verify.$$

mkdir $TMP
cd $TMP
# Get the name of the last file on the dump, and restore it.
lastfile=`restore tf $DUMPTAPE | sort -n | tail -f | awk '{print $2 }'`

echo $0 : restoring the file $lastfile
echo '*******************************************************************'
echo '** Even though restore tells you to start with the last volume'
echo '** start with volume 1 and work toward the last volume.'
echo '** In other words, mount the tapes in sequential order.'
echo '*******************************************************************'
if restore xf $DUMPTAPE "$lastfile"
then
        ls -l "$lastfile"
        if test -f "$lastfile" -o -d "$lastfile"
        then
                echo; echo 'dump.verify: verification succeeded'; echo
                rm -frn $TMP
                exit 0
        fi
fi
echo; echo dump.verify': ****** VERIFICATION FAILED ******'; echo
rm -fr $TMP
```

EXAMPLE 3: DUMPLEVEL

```
#!/bin/sh
# dumplevel
# Determine level for next dump, according to the half redundant or so-called
# modified Tower of Hanoi sequence suggested in the 4.2 BSD Unix Manual.
PATH=/bin
LEVEL=.level

if test -f $LEVEL
then
        # Level of previous dump
        level=`awk '{print $1 }' $LEVEL`
else
        level=0
fi
if test $level -eq 0 -o $level -eq 8
then
        # start of Tower of Hanoi
        newlevel=3
else
        if test `expr $level % 2` -gt 0
        then
                # level is odd
                newlevel=`expr $level - 1`
        else
                # level is even
                newlevel=`expr $level + 3`
        fi
fi
# Put new level in file
echo "$newlevel" > $LEVEL
```

EXAMPLE 4: SWAPDUMP

```
#! /bin/sh
# swapdump
# This program swaps dumpdatesA and dumpdatesB.
# Invoke before performing daily dumps to implement tandem dumping.
rm /etc/dumpdates
ln /etc/dumpdatesA /etc/dumpdates
rm /etc/dumpdatesA
mv /etc/dumpdatesB /etc/dumpdatesA
ln /etc/dumpdates /etc/dumpdatesB
```

NEWSLETTER OF THE VAX SYSTEMS SIG

Pageswapper

Our Mascot

VAX SYSTEMS SIG
DECUS U.S. CHAPTER

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Please do not submit program source, as that is better distributed on the VAX SIG tape.

Please do not submit "slides" from DECUS Symposia presentations (or other meetings) as they are generally a very incomplete treatment for those readers of the Pageswapper who are not so fortunate as to be able to travel to Symposia. Please DO write articles based on such slides to get the content across to a wider audience than is able to attend.

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Survey Regarding Tailoring for VAX/VMS V5.0

The VMS development group is considering an alternate tailoring mechanism to be used for both VAX and MicroVAX systems. Such a mechanism could show up in the next major release of VMS. As part of this design effort, they would like to gather information from the current user base. Please, would only the people who feel that they will use tailoring return the form at the back of this newsletter issue to DEC.

The currently proposed design is comprised of three save sets: the base set, the library set, and the optional set. The division of them is roughly:

BASE - components necessary for all systems to boot
LIBRARY - programming support, system programming, etc.
OPTIONAL - UETP, example files, etc.

The BASE save set (approx. 15,000 blocks total) is the one that we need input on. Most of the files will not be tailorable. Only the following categories are being considered for tailoring:

(System-specific files)	
Layered product kit building	(10 blocks)
Console block storage device support	(180 blocks)
VAX 11/725, 11/730 support	(35 blocks)
VAX 11/750 support	(26 blocks)
VAX 11/780 support	(35 blocks)
VAX 8600 support	(53 blocks)
VAX 8200,8300 support	(45 blocks)
VAX 8500, 8700, 8800 support	(52 blocks)
MicroVAX I, VAXstation I support	(46 blocks)
MicroVAX II, VAXstation II support	(85 blocks)
VAXstation 2000/MicroVAX 2000 support	(81 blocks)
(Total:	578 blocks)

(Bus-specific device drivers)	
Realtime device drivers	(6 blocks)
Massbus drivers	(32 blocks)
CI drivers	(64 blocks)
BI drivers	(110 blocks)
Unibus/Qbus drivers	(176 blocks)
MicroVAX 2000, VAXstation 2000 drivers	(78 blocks)
(Total:	466 blocks)

(Files needed to run clusters)
Cluster Support (approx. 1000 blocks)

(approx. grand total: 2000 blocks)

The fine divisions above allow for greater control on saving disk space. However, this fine granularity causes the following problems:

- A user will be unable to build a system disk that will work on other systems from a tailored system disk using VMSKITBLD.COM.
- Users may have to re-install portions of the base save set when they buy new hardware.
- A naive user may potentially delete a file that he needs to reboot his system.

Again, the questionnaire regarding these considerations can be found at the back of this issue. If you are someone who needs to use the tailoring facility, please fill it out and mail it.

Spring 1987 SIR Ballot Results

Mark Oakley
SIR Coordinator

A total of 364 ballots were counted in the latest SIR BALLOT. This is less than the record turn-out for the Fall 1986 ballot, but about the same as the Spring 1986 ballot. For the first time it was possible to cast votes electronically via the Pageswapper Vax. Many thanks to Larry Kilgallen for the use of the Pageswapper Vax and for his "ballot-casting" procedure. I am hopeful that participation will continue to build, and will look for ways to encourage you to vote.

The SIR ballot is the only on-going program by which the SIG provides input to Digital. Top 10 (and other) SIR's continue to be incorporated into VMS. Digital has repeatedly encouraged the use of this channel of communication. I recently met with several Digital managers in Nashua and they emphasized there interest and commitment to this program.

The summary of this voting appears below. Digital's response to the top 10 requests overall will be presented at the Spring 1987 DECUS Symposium in Nashville.

Interpreting the SIR Ballot Results

The results of the System Improvement Request ballot are shown on the following pages. All of the reports have the same one page format. Following the report title is the number of ballots counted for that report. The number shown on the "All Users" report is the total number of ballots which were returned. The ballots on the "11/780 Users" report is the number of ballots which checked the "11/780" blank on the ballot questionnaire, and so on.

The SIR's are listed on the page in order of points received, from highest to lowest. The entry for each SIR begins with the SIR number (from the ballot), a brief description, and the total number of votes (positive and negative) received by that SIR.

The data is summarized in two different ways. First, there are a series of reports broken down by user category. The user categories are defined by the questionnaire portion of the SIR ballot. A ballot was counted in each user category which was checked off, for example "11/780 user". Finally, there are a series of reports ranking the SIR's within SIR category. The SIR categories are those shown on the ballot, for example "DCL and Utilities" and "Commercial". The reports by SIR category use the data from all ballots received.

PAGESWAPPER - May 1987 - Volume 8 Number 10
Spring 1987 SIR Ballot Results

THE TOP 35 SIR's AS RANKED BY ALL USERS

Total ballots in this category: 364 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	215
28	Enforce expired password change	158
27	Remote printing of a LOCAL file	156
20	Provide "date last read" for a file	145
77	Individual field reports from AUTHORIZE	133
71	Support BACKUP over DECnet.	130
1	Additional VAXcluster management tools	119
51	Ability to re-start a process	108
57	Support ACL's on print and batch queues	104
56	Display special characters in TPU	99
16	Queued requests for ALLOCATE command	92
44	Internals and data structures documents	89
19	Standardize format for printable output.	83
49	Determine the source of LAT terminals.	81
21	Support for simple project accounting.	81
24	Installable memory resident images	73
76	Terminal server accounting info	72
6	More detail in VMS accounting records	70
35	More system information on open files	70
60	Enhance COPY to copy ACL's	68
17	Tape automatic volume recognition	68
4	Abbreviated commands in DTR	66
9	Improve VMS Mount service messages	62
74	Printer problem warnings to users	62
2	Better SYSUAF.DAT cluster support	57
82	"Fast" delete for directory structures	57
80	Command procedure capability in STB	55
18	Provide a BACKUP/OPERATOR capability.	54
47	Tape librarian/archive system	50
43	2-way inter-process comm driver	50
65	Security alarm messages to a file.	49
83	"Headers" and "footers" on printed outpu	49
12	Improve form name/number displays	45
62	Enhance file access from user images	45
79	Boot STB from tape drive	43

THE TOP 35 SIR's AS RANKED BY VAX 8700/8800 USERS

Total ballots in this category: 30 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	17
16	Queued requests for ALLOCATE command	15
1	Additional VAXcluster management tools	15
27	Remote printing of a LOCAL file	15
17	Tape automatic volume recognition	14
28	Enforce expired password change	13
49	Determine the source of LAT terminals.	12
20	Provide "date last read" for a file	11
76	Terminal server accounting info	11
65	Security alarm messages to a file.	10
44	Internals and data structures documents	10
21	Support for simple project accounting.	9
14	Selected operator notification queues	8
47	Tape librarian/archive system	8
2	Better SYSUAF.DAT cluster support	8
56	Display special characters in TPU	8
62	Enhance file access from user images	8
3	Process swapping between nodes	8
71	Support BACKUP over DECnet.	8
9	Improve VMS Mount service messages	8
51	Ability to re-start a process	7
6	More detail in VMS accounting records	7
77	Individual field reports from AUTHORIZE	7
40	System service to flush accounting	6
36	LEXICAL to return process identifiers	6
67	Lexical for getting RIGHTSLIST info	6
19	Standardize format for printable output.	5
12	Improve form name/number displays	5
35	More system information on open files	5
4	Abbreviated commands in DTR	5
74	Printer problem warnings to users	5
18	Provide a BACKUP/OPERATOR capability.	5
57	Support ACL's on print and batch queues	5
82	"Fast" delete for directory structures	5
23	Time out mechanism for $REQUEST/REPLY	4

THE TOP 35 SIR's AS RANKED BY VAX 8600/8650 USERS

Total ballots in this category: 88 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	57
1	Additional VAXcluster management tools	54
27	Remote printing of a LOCAL file	47
20	Provide "date last read" for a file	37
44	Internals and data structures documents	30
71	Support BACKUP over DECnet.	30
17	Tape automatic volume recognition	29
51	Ability to re-start a process	28
28	Enforce expired password change	28
56	Display special characters in TPU	27
57	Support ACL's on print and batch queues	27
49	Determine the source of LAT terminals.	27
16	Queued requests for ALLOCATE command	26
77	Individual field reports from AUTHORIZE	25
6	More detail in VMS accounting records	24
76	Terminal server accounting info	20
9	Improve VMS Mount service messages	20
21	Support for simple project accounting.	19
2	Better SYSUAF.DAT cluster support	19
19	Standardize format for printable output.	17
62	Enhance file access from user images	15
65	Security alarm messages to a file.	14
43	2-way inter-process comm driver	14
35	More system information on open files	13
54	Enhance line number support	13
4	Abbreviated commands in DTR	13
83	"Headers" and "footers" on printed outpu	13
3	Process swapping between nodes	12
47	Tape librarian/archive system	12
36	LEXICAL to return process identifiers	12
58	Enhance DECnet remote file access	12
82	"Fast" delete for directory structures	12
18	Provide a BACKUP/OPERATOR capability.	12
74	Printer problem warnings to users	11
75	Queue name language/utility recognition	11

THE TOP 35 SIR's AS RANKED BY VAX 8500/8550 USERS

Total ballots in this category: 13 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	9
16	Queued requests for ALLOCATE command	7
1	Additional VAXcluster management tools	7
27	Remote printing of a LOCAL file	7
51	Ability to re-start a process	7
49	Determine the source of LAT terminals.	6
57	Support ACL's on print and batch queues	6
20	Provide "date last read" for a file	5
2	Better SYSUAF.DAT cluster support	5
17	Tape automatic volume recognition	4
19	Standardize format for printable output.	4
7	Better terminal-printer support	4
56	Display special characters in TPU	4
3	Process swapping between nodes	4
74	Printer problem warnings to users	4
9	Improve VMS Mount service messages	3
12	Improve form name/number displays	3
55	Ignore TPU journal requests for help	3
36	LEXICAL to return process identifiers	3
43	2-way inter-process comm driver	3
65	Security alarm messages to a file.	3
71	Support BACKUP over DECnet.	3
44	Internals and data structures documents	3
75	Queue name language/utility recognition	3
79	Boot STB from tape drive	3
54	Enhance line number support	2
34	Full name translation of DCL files	2
35	More system information on open files	2
13	Form names beyond 127.	2
58	Enhance DECnet remote file access	2
62	Enhance file access from user images	2
23	Time out mechanism for $REQUEST/REPLY	2
18	Provide a BACKUP/OPERATOR capability.	2
73	Additional file attributes in BACKUP	2
47	Tape librarian/archive system	2

THE TOP 35 SIR's AS RANKED BY VAX 8300/8200 USERS

Total ballots in this category: 46 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
27	Remote printing of a LOCAL file	25
26	Command line editing for long commands	23
28	Enforce expired password change	22
1	Additional VAXcluster management tools	20
76	Terminal server accounting info	17
16	Queued requests for ALLOCATE command	16
21	Support for simple project accounting.	16
77	Individual field reports from AUTHORIZE	14
20	Provide "date last read" for a file	13
57	Support ACL's on print and batch queues	12
51	Ability to re-start a process	11
2	Better SYSUAF.DAT cluster support	11
18	Provide a BACKUP/OPERATOR capability.	10
60	Enhance COPY to copy ACL's	10
49	Determine the source of LAT terminals.	10
19	Standardize format for printable output.	10
56	Display special characters in TPU	9
71	Support BACKUP over DECnet.	9
65	Security alarm messages to a file.	8
67	Lexical for getting RIGHTSLIST info	8
44	Internals and data structures documents	8
9	Improve VMS Mount service messages	8
32	Mechanism to ignore ZERO LENGTH FILES.	8
40	System service to flush accounting	7
42	Run-time library routine to purge files	7
4	Abbreviated commands in DTR	7
74	Printer problem warnings to users	7
35	More system information on open files	7
62	Enhance file access from user images	7
83	"Headers" and "footers" on printed outpu	7
3	Process swapping between nodes	6
43	2-way inter-process comm driver	6
36	LEXICAL to return process identifiers	6
58	Enhance DECnet remote file access	6
47	Tape librarian/archive system	6

THE TOP 35 SIR's AS RANKED BY 11/780, 11/782 and 11/785 USER

Total ballots in this category: 229 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	135
27	Remote printing of a LOCAL file	107
28	Enforce expired password change	99
20	Provide "date last read" for a file	98
1	Additional VAXcluster management tools	97
71	Support BACKUP over DECnet.	88
77	Individual field reports from AUTHORIZE	88
51	Ability to re-start a process	78
57	Support ACL's on print and batch queues	78
16	Queued requests for ALLOCATE command	66
56	Display special characters in TPU	61
17	Tape automatic volume recognition	58
49	Determine the source of LAT terminals.	57
44	Internals and data structures documents	57
6	More detail in VMS accounting records	54
76	Terminal server accounting info	49
21	Support for simple project accounting.	49
2	Better SYSUAF.DAT cluster support	46
4	Abbreviated commands in DTR	45
19	Standardize format for printable output.	42
9	Improve VMS Mount service messages	41
18	Provide a BACKUP/OPERATOR capability.	37
35	More system information on open files	37
24	Installable memory resident images	36
47	Tape librarian/archive system	36
65	Security alarm messages to a file.	36
82	"Fast" delete for directory structures	36
60	Enhance COPY to copy ACL's	35
74	Printer problem warnings to users	33
80	Command procedure capability in STB	32
62	Enhance file access from user images	32
5	Dependency networks for print and batch	31
83	"Headers" and "footers" on printed outpu	31
64	End-to-end encryption within DECnet-VAX	29
66	DECnet proxy access for SET HOST command	28

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Spring 1987 SIR Ballot Results

THE TOP 35 SIR's AS RANKED BY 11/750 USERS

Total ballots in this category: 200 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	115
27	Remote printing of a LOCAL file	85
28	Enforce expired password change	85
20	Provide "date last read" for a file	81
77	Individual field reports from AUTHORIZE	71
1	Additional VAXcluster management tools	69
71	Support BACKUP over DECnet.	64
56	Display special characters in TPU	62
57	Support ACL's on print and batch queues	59
16	Queued requests for ALLOCATE command	57
19	Standardize format for printable output.	54
44	Internals and data structures documents	53
51	Ability to re-start a process	52
21	Support for simple project accounting.	45
60	Enhance COPY to copy ACL's	44
24	Installable memory resident images	43
35	More system information on open files	40
74	Printer problem warnings to users	38
49	Determine the source of LAT terminals.	37
17	Tape automatic volume recognition	35
6	More detail in VMS accounting records	34
76	Terminal server accounting info	33
48	Provide disk arm information	32
2	Better SYSUAF.DAT cluster support	31
47	Tape librarian/archive system	31
12	Improve form name/number displays	31
4	Abbreviated commands in DTR	31
80	Command procedure capability in STB	31
79	Boot STB from tape drive	29
43	2-way inter-process comm driver	29
9	Improve VMS Mount service messages	28
66	DECnet proxy access for SET HOST command	28
62	Enhance file access from user images	27
32	Mechanism to ignore ZERO LENGTH FILES.	27
82	"Fast" delete for directory structures	27

THE TOP 35 SIR's AS RANKED BY 11/730 and 11/725 USERS

Total ballots in this category: 80 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	47
27	Remote printing of a LOCAL file	41
28	Enforce expired password change	33
71	Support BACKUP over DECnet.	32
20	Provide "date last read" for a file	29
51	Ability to re-start a process	28
1	Additional VAXcluster management tools	28
44	Internals and data structures documents	23
56	Display special characters in TPU	21
77	Individual field reports from AUTHORIZE	21
49	Determine the source of LAT terminals.	20
16	Queued requests for ALLOCATE command	17
19	Standardize format for printable output.	17
2	Better SYSUAF.DAT cluster support	17
57	Support ACL's on print and batch queues	17
43	2-way inter-process comm driver	17
76	Terminal server accounting info	17
24	Installable memory resident images	17
82	"Fast" delete for directory structures	17
6	More detail in VMS accounting records	16
60	Enhance COPY to copy ACL's	16
4	Abbreviated commands in DTR	15
21	Support for simple project accounting.	15
80	Command procedure capability in STB	15
74	Printer problem warnings to users	15
73	Additional file attributes in BACKUP	14
48	Provide disk arm information	13
83	"Headers" and "footers" on printed outpu	13
3	Process swapping between nodes	12
7	Better terminal-printer support	12
72	Provide "help line" support	11
42	Run-time library routine to purge files	11
45	Provide non-HSC volume shadowing.	11
35	More system information on open files	11
30	Additional TOPS compatibility features	10

THE TOP 35 SIR's AS RANKED BY MicroVAX USERS

Total ballots in this category: 192 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	114
27	Remote printing of a LOCAL file	105
71	Support BACKUP over DECnet.	82
1	Additional VAXcluster management tools	75
28	Enforce expired password change	73
20	Provide "date last read" for a file	69
77	Individual field reports from AUTHORIZE	62
51	Ability to re-start a process	54
16	Queued requests for ALLOCATE command	52
56	Display special characters in TPU	52
57	Support ACL's on print and batch queues	52
44	Internals and data structures documents	52
49	Determine the source of LAT terminals.	52
76	Terminal server accounting info	46
21	Support for simple project accounting.	44
6	More detail in VMS accounting records	43
19	Standardize format for printable output.	42
43	2-way inter-process comm driver	41
17	Tape automatic volume recognition	40
9	Improve VMS Mount service messages	38
24	Installable memory resident images	37
2	Better SYSUAF.DAT cluster support	35
64	End-to-end encryption within DECnet-VAX	34
80	Command procedure capability in STB	33
60	Enhance COPY to copy ACL's	30
18	Provide a BACKUP/OPERATOR capability.	30
35	More system information on open files	28
47	Tape librarian/archive system	26
65	Security alarm messages to a file.	26
4	Abbreviated commands in DTR	26
74	Printer problem warnings to users	24
36	LEXICAL to return process identifiers	24
66	DECnet proxy access for SET HOST command	23
7	Better terminal-printer support	23
12	Improve form name/number displays	23

THE TOP 35 SIR's AS RANKED BY BUSINESS EDP USERS

Total ballots in this category: 126 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	66
28	Enforce expired password change	63
77	Individual field reports from AUTHORIZE	61
27	Remote printing of a LOCAL file	53
1	Additional VAXcluster management tools	49
20	Provide "date last read" for a file	49
71	Support BACKUP over DECnet.	44
51	Ability to re-start a process	37
57	Support ACL's on print and batch queues	35
44	Internals and data structures documents	34
49	Determine the source of LAT terminals.	31
4	Abbreviated commands in DTR	31
76	Terminal server accounting info	31
56	Display special characters in TPU	31
16	Queued requests for ALLOCATE command	29
19	Standardize format for printable output.	28
24	Installable memory resident images	27
35	More system information on open files	26
17	Tape automatic volume recognition	25
7	Better terminal-printer support	24
2	Better SYSUAF.DAT cluster support	23
6	More detail in VMS accounting records	22
60	Enhance COPY to copy ACL's	21
80	Command procedure capability in STB	21
47	Tape librarian/archive system	20
74	Printer problem warnings to users	20
5	Dependency networks for print and batch	20
8	SHOW QUEUE/BRIEF should display forms	20
66	DECnet proxy access for SET HOST command	20
58	Enhance DECnet remote file access	19
21	Support for simple project accounting.	19
82	"Fast" delete for directory structures	18
79	Boot STB from tape drive	17
22	SET HOST/DTE command procedure support	16
10	Provide a fast file scan.	16

THE TOP 35 SIR's AS RANKED BY SOFTWARE DEVELOPERS

Total ballots in this category: 274 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	161
27	Remote printing of a LOCAL file	122
28	Enforce expired password change	120
20	Provide "date last read" for a file	107
1	Additional VAXcluster management tools	98
77	Individual field reports from AUTHORIZE	97
71	Support BACKUP over DECnet.	94
56	Display special characters in TPU	85
51	Ability to re-start a process	84
57	Support ACL's on print and batch queues	79
16	Queued requests for ALLOCATE command	72
49	Determine the source of LAT terminals.	69
44	Internals and data structures documents	67
19	Standardize format for printable output.	64
21	Support for simple project accounting.	61
76	Terminal server accounting info	55
24	Installable memory resident images	54
60	Enhance COPY to copy ACL's	51
2	Better SYSUAF.DAT cluster support	49
9	Improve VMS Mount service messages	46
80	Command procedure capability in STB	46
4	Abbreviated commands in DTR	45
35	More system information on open files	44
17	Tape automatic volume recognition	44
74	Printer problem warnings to users	44
18	Provide a BACKUP/OPERATOR capability.	42
6	More detail in VMS accounting records	42
83	"Headers" and "footers" on printed outpu	42
82	"Fast" delete for directory structures	41
43	2-way inter-process comm driver	41
65	Security alarm messages to a file.	39
48	Provide disk arm information	38
47	Tape librarian/archive system	37
12	Improve form name/number displays	35
62	Enhance file access from user images	34

THE TOP 35 SIR's AS RANKED BY EDUCATIONAL USERS

Total ballots in this category: 62 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	37
20	Provide "date last read" for a file	33
28	Enforce expired password change	33
71	Support BACKUP over DECnet.	24
57	Support ACL's on print and batch queues	22
27	Remote printing of a LOCAL file	22
77	Individual field reports from AUTHORIZE	22
16	Queued requests for ALLOCATE command	20
76	Terminal server accounting info	19
6	More detail in VMS accounting records	19
1	Additional VAXcluster management tools	18
2	Better SYSUAF.DAT cluster support	17
82	"Fast" delete for directory structures	17
17	Tape automatic volume recognition	15
21	Support for simple project accounting.	15
35	More system information on open files	14
60	Enhance COPY to copy ACL's	14
49	Determine the source of LAT terminals.	13
44	Internals and data structures documents	13
73	Additional file attributes in BACKUP	13
4	Abbreviated commands in DTR	12
9	Improve VMS Mount service messages	12
68	Password setting in groups	12
51	Ability to re-start a process	12
8	SHOW QUEUE/BRIEF should display forms	11
18	Provide a BACKUP/OPERATOR capability.	11
74	Printer problem warnings to users	11
47	Tape librarian/archive system	10
75	Queue name language/utility recognition	9
62	Enhance file access from user images	9
64	End-to-end encryption within DECnet-VAX	9
40	System service to flush accounting	9
72	Provide "help line" support	8
36	LEXICAL to return process identifiers	8
65	Security alarm messages to a file.	8

THE TOP 35 SIR's AS RANKED BY COMPUTER SCI. RESEARCHERS

Total ballots in this category: 49 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	35
20	Provide "date last read" for a file	27
28	Enforce expired password change	25
77	Individual field reports from AUTHORIZE	24
71	Support BACKUP over DECnet.	23
27	Remote printing of a LOCAL file	23
51	Ability to re-start a process	20
57	Support ACL's on print and batch queues	15
2	Better SYSUAF.DAT cluster support	14
76	Terminal server accounting info	14
6	More detail in VMS accounting records	14
17	Tape automatic volume recognition	13
44	Internals and data structures documents	13
47	Tape librarian/archive system	13
21	Support for simple project accounting.	13
16	Queued requests for ALLOCATE command	12
9	Improve VMS Mount service messages	12
1	Additional VAXcluster management tools	11
43	2-way inter-process comm driver	11
19	Standardize format for printable output.	11
82	"Fast" delete for directory structures	11
49	Determine the source of LAT terminals.	10
58	Enhance DECnet remote file access	10
75	Queue name language/utility recognition	9
35	More system information on open files	9
73	Additional file attributes in BACKUP	9
74	Printer problem warnings to users	9
65	Security alarm messages to a file.	8
56	Display special characters in TPU	8
72	Provide "help line" support	7
40	System service to flush accounting	7
42	Run-time library routine to purge files	7
60	Enhance COPY to copy ACL's	7
64	End-to-end encryption within DECnet-VAX	7
18	Provide a BACKUP/OPERATOR capability.	7

THE TOP 35 SIR's AS RANKED BY DATA ACQUISITION/CONTROL USERS

Total ballots in this category: 89 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	51
27	Remote printing of a LOCAL file	49
28	Enforce expired password change	41
71	Support BACKUP over DECnet.	36
20	Provide "date last read" for a file	34
51	Ability to re-start a process	33
1	Additional VAXcluster management tools	30
77	Individual field reports from AUTHORIZE	29
16	Queued requests for ALLOCATE command	22
24	Installable memory resident images	21
19	Standardize format for printable output.	21
49	Determine the source of LAT terminals.	21
44	Internals and data structures documents	20
74	Printer problem warnings to users	20
56	Display special characters in TPU	20
60	Enhance COPY to copy ACL's	19
2	Better SYSUAF.DAT cluster support	19
43	2-way inter-process comm driver	18
57	Support ACL's on print and batch queues	18
82	"Fast" delete for directory structures	18
79	Boot STB from tape drive	17
21	Support for simple project accounting.	17
3	Process swapping between nodes	16
9	Improve VMS Mount service messages	16
62	Enhance file access from user images	15
48	Provide disk arm information	14
66	DECnet proxy access for SET HOST command	14
76	Terminal server accounting info	14
10	Provide a fast file scan.	13
83	"Headers" and "footers" on printed outpu	13
42	Run-time library routine to purge files	12
7	Better terminal-printer support	12
32	Mechanism to ignore ZERO LENGTH FILES.	12
6	More detail in VMS accounting records	11
30	Additional TOPS compatibility features	11

THE TOP 35 SIR's AS RANKED BY CAD/CAM USERS

Total ballots in this category: 76 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	45
27	Remote printing of a LOCAL file	43
71	Support BACKUP over DECnet.	35
20	Provide "date last read" for a file	34
1	Additional VAXcluster management tools	34
28	Enforce expired password change	32
77	Individual field reports from AUTHORIZE	32
49	Determine the source of LAT terminals.	30
2	Better SYSUAF.DAT cluster support	24
51	Ability to re-start a process	24
76	Terminal server accounting info	23
57	Support ACL's on print and batch queues	23
16	Queued requests for ALLOCATE command	19
21	Support for simple project accounting.	18
56	Display special characters in TPU	18
44	Internals and data structures documents	16
47	Tape librarian/archive system	16
19	Standardize format for printable output.	16
9	Improve VMS Mount service messages	15
83	"Headers" and "footers" on printed outpu	15
58	Enhance DECnet remote file access	13
65	Security alarm messages to a file.	13
6	More detail in VMS accounting records	13
24	Installable memory resident images	12
35	More system information on open files	11
3	Process swapping between nodes	11
60	Enhance COPY to copy ACL's	11
82	"Fast" delete for directory structures	11
22	SET HOST/DTE command procedure support	11
75	Queue name language/utility recognition	10
15	Enhance callable operator messaging rtn	10
43	2-way inter-process comm driver	10
23	Time out mechanism for $REQUEST/REPLY	10
74	Printer problem warnings to users	10
4	Abbreviated commands in DTR	9

THE TOP 35 SIR's AS RANKED BY SERVICE BUREAU OPERATORS

Total ballots in this category: 19 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
51	Ability to re-start a process	8
26	Command line editing for long commands	7
28	Enforce expired password change	7
20	Provide "date last read" for a file	7
71	Support BACKUP over DECnet.	7
19	Standardize format for printable output.	6
79	Boot STB from tape drive	6
47	Tape librarian/archive system	5
16	Queued requests for ALLOCATE command	5
35	More system information on open files	5
44	Internals and data structures documents	5
80	Command procedure capability in STB	5
1	Additional VAXcluster management tools	4
18	Provide a BACKUP/OPERATOR capability.	4
6	More detail in VMS accounting records	4
77	Individual field reports from AUTHORIZE	4
43	2-way inter-process comm driver	4
7	Better terminal-printer support	4
5	Dependency networks for print and batch	3
49	Determine the source of LAT terminals.	3
32	Mechanism to ignore ZERO LENGTH FILES.	3
62	Enhance file access from user images	3
21	Support for simple project accounting.	3
74	Printer problem warnings to users	3
4	Abbreviated commands in DTR	3
27	Remote printing of a LOCAL file	3
45	Provide non-HSC volume shadowing.	3
9	Improve VMS Mount service messages	2
54	Enhance line number support	2
56	Display special characters in TPU	2
57	Support ACL's on print and batch queues	2
10	Provide a fast file scan.	2
63	Mandatory security controls in VMS.	2
64	End-to-end encryption within DECnet-VAX	2
65	Security alarm messages to a file.	2

THE TOP 35 SIR's AS RANKED BY HARDWARE DEVELOPERS

Total ballots in this category: 34 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	21
27	Remote printing of a LOCAL file	19
20	Provide "date last read" for a file	17
71	Support BACKUP over DECnet.	14
19	Standardize format for printable output.	11
77	Individual field reports from AUTHORIZE	11
44	Internals and data structures documents	10
49	Determine the source of LAT terminals.	10
51	Ability to re-start a process	10
16	Queued requests for ALLOCATE command	10
28	Enforce expired password change	10
57	Support ACL's on print and batch queues	9
1	Additional VAXcluster management tools	8
60	Enhance COPY to copy ACL's	8
24	Installable memory resident images	8
56	Display special characters in TPU	8
54	Enhance line number support	7
21	Support for simple project accounting.	7
43	2-way inter-process comm driver	7
17	Tape automatic volume recognition	7
7	Better terminal-printer support	7
6	More detail in VMS accounting records	7
32	Mechanism to ignore ZERO LENGTH FILES.	6
36	LEXICAL to return process identifiers	6
4	Abbreviated commands in DTR	6
22	SET HOST/DTE command procedure support	6
65	Security alarm messages to a file.	6
9	Improve VMS Mount service messages	6
30	Additional TOPS compatibility features	6
80	Command procedure capability in STB	6
58	Enhance DECnet remote file access	5
2	Better SYSUAF.DAT cluster support	5
62	Enhance file access from user images	5
63	Mandatory security controls in VMS.	5
3	Process swapping between nodes	5

THE TOP 35 SIR's AS RANKED BY SCIENTIFIC/ENGINEERING USERS

Total ballots in this category: 230 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	140
27	Remote printing of a LOCAL file	115
28	Enforce expired password change	96
20	Provide "date last read" for a file	94
71	Support BACKUP over DECnet.	89
51	Ability to re-start a process	80
77	Individual field reports from AUTHORIZE	76
1	Additional VAXcluster management tools	72
57	Support ACL's on print and batch queues	69
16	Queued requests for ALLOCATE command	68
56	Display special characters in TPU	62
21	Support for simple project accounting.	62
49	Determine the source of LAT terminals.	61
19	Standardize format for printable output.	58
44	Internals and data structures documents	58
9	Improve VMS Mount service messages	50
24	Installable memory resident images	49
76	Terminal server accounting info	47
2	Better SYSUAF.DAT cluster support	45
17	Tape automatic volume recognition	44
18	Provide a BACKUP/OPERATOR capability.	42
6	More detail in VMS accounting records	41
82	"Fast" delete for directory structures	40
60	Enhance COPY to copy ACL's	39
47	Tape librarian/archive system	37
74	Printer problem warnings to users	36
83	"Headers" and "footers" on printed outpu	36
35	More system information on open files	34
43	2-way inter-process comm driver	33
62	Enhance file access from user images	33
65	Security alarm messages to a file.	33
4	Abbreviated commands in DTR	32
80	Command procedure capability in STB	32
42	Run-time library routine to purge files	30
79	Boot STB from tape drive	28

THE TOP 35 SIR's AS RANKED BY OFFICE AUTOMATION USERS

Total ballots in this category: 141 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	90
27	Remote printing of a LOCAL file	69
28	Enforce expired password change	63
77	Individual field reports from AUTHORIZE	63
20	Provide "date last read" for a file	61
71	Support BACKUP over DECnet.	55
1	Additional VAXcluster management tools	53
57	Support ACL's on print and batch queues	49
49	Determine the source of LAT terminals.	43
56	Display special characters in TPU	41
51	Ability to re-start a process	41
76	Terminal server accounting info	35
19	Standardize format for printable output.	35
6	More detail in VMS accounting records	33
16	Queued requests for ALLOCATE command	32
24	Installable memory resident images	30
4	Abbreviated commands in DTR	29
44	Internals and data structures documents	29
2	Better SYSUAF.DAT cluster support	29
9	Improve VMS Mount service messages	27
35	More system information on open files	26
21	Support for simple project accounting.	25
17	Tape automatic volume recognition	24
79	Boot STB from tape drive	22
74	Printer problem warnings to users	21
43	2-way inter-process comm driver	21
80	Command procedure capability in STB	21
22	SET HOST/DTE command procedure support	20
12	Improve form name/number displays	20
7	Better terminal-printer support	20
60	Enhance COPY to copy ACL's	19
65	Security alarm messages to a file.	18
64	End-to-end encryption within DECnet-VAX	17
36	LEXICAL to return process identifiers	17
75	Queue name language/utility recognition	16

THE TOP 35 SIR's AS RANKED BY TELECOMMUNICATIONS USERS

Total ballots in this category: 75 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	36
20	Provide "date last read" for a file	31
77	Individual field reports from AUTHORIZE	31
28	Enforce expired password change	29
1	Additional VAXcluster management tools	29
51	Ability to re-start a process	28
27	Remote printing of a LOCAL file	28
44	Internals and data structures documents	26
71	Support BACKUP over DECnet.	25
57	Support ACL's on print and batch queues	23
16	Queued requests for ALLOCATE command	20
6	More detail in VMS accounting records	20
76	Terminal server accounting info	19
21	Support for simple project accounting.	18
9	Improve VMS Mount service messages	17
49	Determine the source of LAT terminals.	15
35	More system information on open files	15
19	Standardize format for printable output.	15
17	Tape automatic volume recognition	14
56	Display special characters in TPU	14
24	Installable memory resident images	13
74	Printer problem warnings to users	13
47	Tape librarian/archive system	12
62	Enhance file access from user images	12
64	End-to-end encryption within DECnet-VAX	12
65	Security alarm messages to a file.	12
60	Enhance COPY to copy ACL's	11
22	SET HOST/DTE command procedure support	11
2	Better SYSUAF.DAT cluster support	11
7	Better terminal-printer support	11
82	"Fast" delete for directory structures	11
15	Enhance callable operator messaging rtn	10
43	2-way inter-process comm driver	10
58	Enhance DECnet remote file access	10
79	Boot STB from tape drive	10

THE TOP 35 SIR's AS RANKED BY OTHER

Total ballots in this category: 20 Spring 1987 Ballot

SIR No.	SIR Description	Total Votes
26	Command line editing for long commands	12
1	Additional VAXcluster management tools	9
28	Enforce expired password change	9
27	Remote printing of a LOCAL file	8
20	Provide "date last read" for a file	8
4	Abbreviated commands in DTR	7
21	Support for simple project accounting.	6
6	More detail in VMS accounting records	6
71	Support BACKUP over DECnet.	6
77	Individual field reports from AUTHORIZE	6
51	Ability to re-start a process	5
57	Support ACL's on print and batch queues	5
67	Lexical for getting RIGHTSLIST info	5
45	Provide non-HSC volume shadowing.	5
76	Terminal server accounting info	5
49	Determine the source of LAT terminals.	5
59	Secondary passwords for DECnet ACS's	4
22	SET HOST/DTE command procedure support	4
5	Dependency networks for print and batch	4
72	Provide "help line" support	4
35	More system information on open files	4
43	2-way inter-process comm driver	4
15	Enhance callable operator messaging rtn	3
23	Time out mechanism for $REQUEST/REPLY	3
24	Installable memory resident images	3
17	Tape automatic volume recognition	3
18	Provide a BACKUP/OPERATOR capability.	3
64	End-to-end encryption within DECnet-VAX	3
65	Security alarm messages to a file.	3
19	Standardize format for printable output.	3
33	Provide full name in MAIL	3
34	Full name translation of DCL files	3
3	Process swapping between nodes	3
8	SHOW QUEUE/BRIEF should display forms	3
83	"Headers" and "footers" on printed outpu	3

INPUT/OUTPUT

A SIG Information Interchange

A form for INPUT/OUTPUT submissions is available at the back of the issue.

To register for on-line submission to the Pageswapper dial:

(617) 262-6830

(in the United States) using a 1200 baud modem and log in with the username PAGESWAPPER.

Note 511.2 Access to USENET from VMS system 2 of 5
"MARK S KRUEGER" 10 lines 3-MAR-1987 19:08
-< Can't wait to get my hands on the tape! >-

Just wanted to keep the Usenet access from VMS thread alive! We're VERY interested in such software, and would be very glad to serve as a trial site.

We may be able to chip in some programming assistance too.

Didn't have a chance to get to San Francisco, but will be at Nashville. Will the Usenet working group meet there?

anxious to get my hands on the software!... - Mark

MARK S KRUEGER
CALIFORNIA UNIVERSITY OF PENN
COMPUTER CENTER
CALIFORNIA PA 15419
412/938-4030

Note 511.3 Access to USENET from VMS system 3 of 5
"Jamie Hanrahan" 38 lines 3-MAR-1987 19:57
-< we're still here >-

The effort is still alive. In San Francisco we agreed on a basic design and identified a few people who were willing to work on it. Since then it has suffered the same fate as many other projects to be done in my "copious free time", but progress is being made. I have autodial batch-mode file transfer using C-Kermit working; the next step is to add a mail interface with multihop forwarding. Netnews comes last. Somewhere in there we also need to write or acquire the "sliding window" extensions to C-Kermit, improve its autodial code to allow for the DMF32 problem, and make it more reliable under VMS. We also need to build stuff that'll run on Unix and talk to us with C-Kermit; at that point we'll just be more nodes on the Unix-based net.

News promises to be a large can of worms. I have the source for the latest version of Netnews and am told that it will compile under VMS (I wasn't told anything about whether it would actually *run*, of course...). But the person who gave it to me (who has been doing some of the more recent maintenance work on it) doesn't recommend using it as a base. "It's a hack, a bad hack at that, and hopelessly over-complicated," he says. I've looked at it and I agree; I also have some ideas for how news could be handled much better on VMS systems, while maintaining compatibility with the existing stuff...

..on the other hand, it's already written.

Let's see, Nashville is ~eight weeks away. We definitely won't have anything on the SIG tape, but we should be able to talk about some real results.

Our Working Group Meeting is not on the schedule in the preliminary program (in fact, NONE of the sessions I submitted at the scheduling meeting in San Francisco were used. I thought working group meetings couldn't be turned down? Maybe they don't like me). Oh well, we can schedule the meeting on site, I guess.

See you there, and thanks for the offer of help.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

Note 511.4 Access to USENET from VMS system 4 of 5
"MARK S KRUEGER" 15 lines 10-MAR-1987 18:57
-< At Nashville then... >-

I've never been to a DECUS symposium before, so I just want to make sure I don't miss you guys. Is there some place I should look for a notice on where to find you?

We're a small university site with a 780 and MicroVAX II for academic computing (both running VMS). I'm system manager/programmer/etc.

We have one faculty member in particular who's a unix guru, and has suffered along so far with SW-TOOLS. He's got unix systems of his own at home, so he's on usenet, but it's too costly for netnews. He'd be VERY happy to help out.

We've got other faculty who want access to BITNET, etc. for research, and we hope that usenet will be the answer.

MARK S KRUEGER
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CALIFORNIA PA 15419
412/938-4030

Note 511.5 Access to USENET from VMS system 5 of 5
"Jamie Hanrahan" 12 lines 11-MAR-1987 16:09
-< look for the daily newsletter >-

Watch the update.daily (a daily newsletter; thousands of copies will be distributed each morning) for both an article about the group and notice of the working group meeting. We did not schedule a regular session because there isn't that much in the way of results to talk about yet... next fall in Anaheim, though, we should be able to pat ourselves on the back (only two years after the first impromptu gathering... sigh.) and announce that we're up and running.

EVERYONE, please have your Unix/netnews gurus examine my previous message re. implementation strategies. I'm interested in feedback!

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

Note 539.6 suppressing an error message in DCL 6 of 6
"Jamie Hanrahan" 16 lines 25-FEB-1987 16:23
-< facility, severity, etc. fields are useful >-

> I use the SET MESSAGE command in my login.com to
> keep the error messages down to something that I
> can understand.

Suppressing the ident portion makes sense if you're not a programmer (if you are, the ident portion is the same as the suffix of the symbolic names of the form facility$_ident which your program should be checking for), but why the facility and severity? It's useful to know what component of VMS reported the error, and whether the error was considered fatal, warning, etc. How hard is it to find the text in the message even if all four parts of the message are present?

In my opinion, the more you try to change VMS to make it "easier to use", the less you will learn, and the more you will be hampered later on.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

Note 548.3 Disc Corruption Problem 3 of 3
"John Saunders" 16 lines 25-MAR-1987 22:24
-< "Better late than never" >-

I have trouble believing this is related, but we have had several episodes of disc corruption on our MicroVAX II. The item in this note which rings a bell is the correlation with system crashes: several of the episodes were noticed immediately after rebooting the system.

Our symptoms also appear to be somewhat different. We were experiencing files containing all zeros, files which seemed to contain images of memory, and, most striking, files which contained a "disk test pattern": 55555555 AAAAAAAA repeated through each block until the last 16 bytes, which were more random.

Field service replaced just about everything but the backplane (which is on order), but nothing helped. The problem seems to have disappeared with VMS V4.5, though, so maybe 4.3 was the problem. I don't know right now whether AUTOGEN changed our ACP parameters.

John Saunders
FEL Computing
PO Box 72
Williamsville, VT, 05362
(802) 348-7171

Note 560.8 DECnet Node Isolation Needed 8 of 11
"Bob Hassinger" 15 lines 7-MAR-1987 16:24
-< We need to connect to other nets - do you? >-

Re need: DEC not withstanding, I see a need in my situation for the ability to interconnect nets - i.e. I want to talk to a system that is also in a whole different set of connections from mine. The key factor is that my system and theirs, as well as the the net they are on, are not managed or controlled by my organization. There are totally separate, and can not be considered "trusted" at all - i.e. a university network!

It seems to me there are likely to be a growing number of people in the same situation as more and more of us develop nets and then a need to interconnect to each other outside our own organizations. Does anyone else see the same need?

Bob Hassinger
Liberty Mutual Research Center
71 Frankland Road
Hopkinton, MA 01748
617-435-9061

Note 560.9 DECnet Node Isolation Needed 9 of 11
"John Osudar" 8 lines 10-MAR-1987 21:54
-< isolation/security IS needed! >-

Are you talking about interconnecting DECnets or other types of networks -- it's not clear from your message... If you ARE talking about DECnets only, then you've hit upon one of the points I've been trying to make: not only is there a need for expanded addressing, there is also a (greater?) need for isolation/security, particularly in "unfriendly" or "non-cooperating" situations. The interim solution I proposed could be used unilaterally and could restrict external access to specific nodes on either side of the "bridge".

John Osudar
Argonne National Laboratory
9700 S. Cass Ave.
Bldg. 205 A-051

Argonne, IL 60439-4837
(312) 972-7505

```
================================================================
Note 560.10         DECnet Node Isolation Needed          10 of 11
"Jamie Hanrahan"                      19 lines  11-MAR-1987 16:31
                -< it won't be all that secure >-
----------------------------------------------------------------
```

I am talking about DECnets only (although there's no reason, other than complexity, why a full-blown DECnet-to-other_net gateway couldn't be implemented at this level, with some assist from an ACP; of course, if your two networks provide different capabilities, there will be problems mapping from one to the other).

I agree that there's a need for this sort of thing. But I caution that restricting all but a few nodes of the other guy's network from touching your network is no guarantee that you've isolated yourself from the untrusted nodes. One of the "untrusted" system managers could change their DECnet configuration data base so as to masquerade as one of the nodes you trust when the "real" trusted node is down. Routing- level passwords don't help, as these are visible throughout a network. The "area number mapper with address restriction" could protect you from casual access by untrusted nodes, but that's all.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865


```
================================================================
Note 560.11         DECnet Node Isolation Needed          11 of 11
"Larry Kilgallen"                     11 lines  11-MAR-1987 21:31
        -< Encryption is the key ("Red Eye of Love") >-
----------------------------------------------------------------
```

In my opinion the only defense against the exposures Jamie outlined in .10 is encryption, with the keys never stored in a VMS-accessible location (the master keys, that is). Pair-wise master keys for every pair of nodes between which communication is allowed should be sufficient.

Don't look for significant end-to-end encryption to happen soon, though. Time and time again when the security working group has put this question on the SIR ballot it has NOT made it anywhere near the top of the list. The user community has spoken, and from all appearances, DEC has listened.

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

```
================================================================
Note 564.2            SYNCHRONOUS AUTODIALING             2 of 5
"keith Chambers"                       4 lines   6-MAR-1987 13:43
              -< Try an asynchronous dialer... >-
----------------------------------------------------------------
```

We have a DMR-11 that we autodial using an autodialer on an asynchronous line. The software turns the circuit on, sends the number to the autodialer, and then waits to make sure the circuit connected.

keith Chambers
General Electric
Mail Drop D38-A
P.O. Box 8106
Charlottesville VA 22906
(804)978-6132

Note 564.3 SYNCHRONOUS AUTODIALING 3 of 5
"Jamie Hanrahan" 3 lines 6-MAR-1987 16:35
-< more info, please? >-

So your autodialer has an async port, and the modem for the line it's attached to has a sync port? What sort of hardware is that? Sounds vaguely related to the old Bell 801 setup.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

Note 564.4 SYNCHRONOUS AUTODIALING 4 of 5
"Jan C Ostendarp" 20 lines 27-MAR-1987 02:36
-< -{ -{ -{-{}-}- }- }- >-

Shot in the dark... (I'm a novice with communications and terminology).

Racal-Vadic has a modem, model 4850PA, which has built-in auto-dial. It has a single 25-pin connector and operates in asynchronous and (bi?)synchronous modes. With default settings it holds DSR high to trick the software allowing output to get to the modem (i.e. dialing instructions).

I've made use of the modem in a VAX 2780/3780 PE application which runs unattended in batch (nightly data transmission from IBM RJE). The modem drops DSR for 4 seconds on disconnect so software is notified the line was dropped. It's connected to the VAX DUP-11 port (XJDRIVER?) but can also work the sync port on the DMF-32. Unfortunately, the driver for the DMF-32 sync port (XGDRIVER) doesn't monitor DSR continuously and frequently misses the 4 seconds pulse.

Jan O.

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street

Boston, MA 02116

Note 566.2 Re-using VMS Subprocesses 2 of 2
"Edgar Zamora" 7 lines 19-MAR-1987 15:16
-< Re-using VMS Subprocesses >-

We've written a simple routine, callable from high level languages, that spawns a subprocess to execute DCL commands. The subprocess "hangs around" until a LOGOUT string is passed to it. We did not use mailboxes because of terminal I/O problems; instead we used logicals. It's a little tricky, but it works. If you're interested, feel free to contact me.

Edgar Zamora
Manufacturers Hanover Trust Co.
270 Park Ave.,
New York, NY 10017
(212) 286-5279

Note 567.6 BACKUP Hints and Questions 6 of 7
"Bruce Bowler" 18 lines 17-MAR-1987 16:03
-< SDI cable problem? >-

Re: 567.4. After a month of running at default blocksize and with the new TA78, the problem mentioned re-occurred. Our local field service people spent lots of time on the phone with district and (i think) tape engineering. The eventual solution arrived at was to swith to shorter SDI cables, we were using 80 foot cables, and since switching to 25 foot cables we have not had the problem in at least 3 situations were I wold have expected it to happen.

The logic on this was that the K.STI in the HSC50 was not driving the signal lines with enough strength, or the receivers in the TA78 were a little hard of hearing. We have been through at least 5 different sets of these boards (both receivers and STI's) and as such it seems to me that if this is the case, it is a design problem rather than a bad component on one of the boards. Also I would expect that I am not alone in this predicament, but have heard of no other sites that are having similar problems. Are there other sites out there who have

TA78's and 80' SDI cables? If so lets here from you.

Bruce Bowler
General Electric
1 River Road
Bldg 2 Room 609
Schenectady, NY 12345

```
================================================================
Note 567.7          BACKUP Hints and Questions          7 of 7
"Lora Wetherill"                    4 lines  26-MAR-1987 17:17
                    -< /NOCRC on MICROVAX II >-
----------------------------------------------------------------
```

Using /NOCRC on a MicroVAX II with RA disks to TK50 yielded results similar to Frank Nagy's... with disk half full: /NOCRC took 21 minutes less. On a MicroVAX with RA disks to TSV05 (same disks): /NOCRC took 17 min less.

Lora Wetherill
P.O. Box 179
Mail Stop I0096
Denver, Colorado 80201

```
================================================================
Note 571.4          All-In-1 2.1 Looping Problems       4 of 5
"Mark Oakley"                      88 lines   2-MAR-1987 00:20
                    -< All-In-1 Looping Fix >-
----------------------------------------------------------------
```

At last DEC All-In-1 support has provided a patch to the All-In-1 looping problem. The patch is available from TSC in Atlanta. Below is DEC's explanation of the problem and the fix:

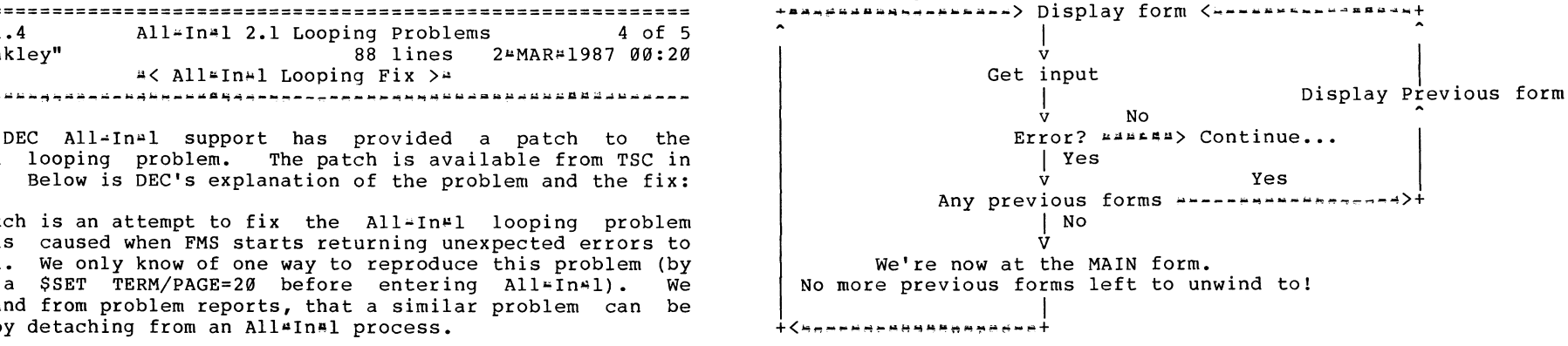
This patch is an attempt to fix the All-In-1 looping problem which is caused when FMS starts returning unexpected errors to All-In-1. We only know of one way to reproduce this problem (by doing a $SET TERM/PAGE=20 before entering All-In-1). We understand from problem reports, that a similar problem can be caused by detaching from an All-In-1 process.

The problem happens if FMS somehow detects that it is unable to display a form. This can happen if

- The terminal characteristics are changed (EG: $SET TERM/PAGE=20)
- a detached All-In-1 process is triggered off by some event to do some work which causes FMS to do something.

When FMS detects that it has been unable to display a form, it also decides that input from a non-existent form is not possible. Thus the FDV$_GET FMS call returns back an error status, which causes All-In-1 to abort the current form and attempt to display the previous form. The menu stack is thus unwound till you get to the MAIN form, which is the first form. There are now no more forms to which All-In-1 can unwind to and it attempts to redisplay the current form and this triggers of the loop.

All-In-1 attempts to display the form and then get input. The FDV$GET call returns an error, and All-In-1 tries to unwind to the previous form. As we're at the MAIN form, there's nowhere All-In-1 can unwind to, so All-In-1 tries to redisplay the current (MAIN) form and get input and now we're really looping! See flow diagram below:



If you switch tracing on then you can actually see All-In-1 winding back the menu stack and then start looping at the MAIN form.

The only fix that we can do at present is to count the number of FMS errors that are given to us during a FDV$GET. If this number goes above a set limit (say 50), then we drop out of All-In-1 by issuing a FATAL error. All-In-1 cannot recover from errors that FMS has encountered, and it cannot display these errors either as that would require calling FMS routines which in itself would cause another loop cycle!

The patch requires three modules:
OAGBL.BLI - This has a new globally defined literal to hold the number of FMS errors that we're prepared to tolerate. If you have customised your OAGBL.BLI, then you'll have to carry over this change to your OAGBL.
OAGBL.OBJ - Compiled version of above in case customer has not customised OAGBL.BLI, and doesn't have a BLISS compiler.
OAMESS.OBJ - Now contains an extra FMSERR Fatal error
OAFMS.OBJ - Increments error count and drops out when count goes above limit set in OAGBL.

Copy the above files onto your system. If you have customised your OAGBL.BLI, then do a difference against your version and make sure that you carry over your customisation to the new version. Compile OAGBL.BLI if you've customised it. If you haven't customised OAGBL.BLI, then you do not have to compile OAGBL.BLI. Replace all the objects in the OALIBR.OLB All-In-1 library by using the command:

```
LIBRARY/REPLACE/LOG OA$BUILD:OALIBR.OLB OAFMS.OBJ
LIBRARY/REPLACE/LOG OA$BUILD:OALIBR.OLB OAGBL.OBJ
LIBRARY/REPLACE/LOG OA$BUILD:OALIBR.OLB OAMESS.OBJ
```

Now relink All-In-1 (see System Managers Guide p 6-18 Sections 1,2 and Installation Guide Chapter 2, steps 6 to 8)

Mark Oakley
Battelle Memorial Institute
505 King Ave.
Columbus, Ohio 43201-2693
614/424-7154


```
================================================================
Note 571.5          All-In-1 2.1 Looping Problems          5 of 5
"Lora Wetherill"                          3 lines  26-MAR-1987 17:41
                        -< OK, but... >-
----------------------------------------------------------------
```

We have the same problem with A1 V2.1, but it ONLY occurs when using a spawned process under All-In-1... and that doesn't seem to fit .4 ... perhaps we have another problem?

Lora Wetherill
P.O. Box 179
Mail Stop I0096
Denver, Colorado 80201

```
================================================================
Note 572.1           DECnet reporting routines             1 of 1
"George Walrod"                          26 lines  12-MAR-1987 15:26
                        -< You had to Ask >-
----------------------------------------------------------------
                    -<Don't Ask For Too Much >-
```

There are two ways I know of.

The first is an undocumented, unsupported QIO to the NETACP, through a Mailbox. Very Difficult!!!

First assign a MAILBOX to the NET device.

Then Issue QIOW with IO-Func of IO$_ACPCONTROL with the P1 being a descriptor of Network Function Block(NFB) with a Length of 5 and the Second Longword being the address of the NFB itself. The NFB should be 5 bytes long containing the Function code of NFB$C_READEVENT. The P3 parameter is Return Length of the event. The P4 parameter is Result Buffer Descriptor declared the follow first long being the length should be EVL$C_EVTBFRSIZE and the second longword address of buffer to hold the raw-event. This raw-event buffer should be at least EVL$C_EVTBFRSIZE bytes long.

After the QIOW as completed the second word of the IOSB will contain the length move this to the first longword of raw-event descriptor buffer.

Then just filter out the events you desire.

The Second and Easiest way is to setup a Event Log file in the NCP, so all events will be logged this file. An run a command procedure or program to read the event log file and process the events you desire.

George Walrod
4260▪b chain bridge rd
fairfax, va 22030

```
================================================================
Note 574.2          Cluster time coordination.          2 of 7
"James R. Ostrosky"                 4 lines  19▪MAR▪1987 13:56
                  ▪< Cluster time coordination >▪
----------------------------------------------------------------
```

The use of these command files for cluster time coordination looks really neat; one of those ideas that is simple and obvious; once someone else figures it out! Thanks much for this one; I will definitely be putting it to good use.

James R. Ostrosky
3910 OLD WM PENN HWY
PITTSBURGH, PA 15235

```
================================================================
Note 574.3          Cluster time coordination.          3 of 7
"Jamie Hanrahan"                   39 lines  19▪MAR▪1987 20:11
              ▪< Who's afraid of a little DCL? >▪
----------------------------------------------------------------
```

This is a reply to 574.1 by Mr. Johnson: Don't be afraid of DCL for this application! We are talking about executing a mere handful of DCL commands, and the ones that take a long time (the OPEN on the remote task specification and subsequent creation of server process and connect confirm, i.e. OPEN SYS$NET) are not time▪critical, since the time at the "master" node is sampled after the connect confirm. I doubt mightily that you could activate images on each side faster than DCL can WRITE and READ a single record through the DECnet logical link. (DCL OPEN, WRITE and READ don't invoke images.)

VMS does the right thing for existing TQEs when a SET TIME changes the time. Those originally requested with delta times are modified so that they still happen the correct number of ticks after the request; those originally requested with absolute times are left alone, so they come due at the original request time (albeit according to the new calibration). (Internals manual, Paragraph 11.1.3.1, page 216.)

If you are doing chargeback by wall▪clock time, you have a problem. The $SETIME system service really should place an entry in the accounting file reflecting the change. Until it does, the best approach is a program which does a $SNDJBC with a SJC$_WRITE_ACCOUNTING function, followed by a $SETIME.

In VMS 4.0 through 4.4 there was a problem in DECnet regarding timer requests. NETACP's timers ran off of absolute▪timed TQEs instead of delta▪timed, so if the system time was set back, all timer▪invoked DECnet operations would cease until the new time caught up with the time at which the time was changed (according to the old time). These operations included the sending of HELLO▪TEST messages, so that adjacent nodes would time out... (see the May 86 VAX/VMS Systems Dispatch, Seq. 25.5.14, page 29). The problem was fixed in V4.5, according to the patch journal files.

It is of course possible that other layered products, not to mention third▪party and end▪user▪written software, might have similar glitches lurking.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619▪565▪1865

```
================================================================
Note 574.4          Cluster time coordination.          4 of 7
"Jan C Ostendarp"                    8 lines  20-MAR-1987 19:19
              -< can proxy logins work here? >-
----------------------------------------------------------------
```

Thanks for contributing this command procedure solution for clock synchronization. I'd like to avoid hardcoding the system password as well as putting the command procedure in the directory of the default decnet account (world write access and all that). Do proxy logins offer a solution for this concern? I'm using a cluster common sysuaf. I think netuaf is also in sys$common:[sysexe]. I'll give it shot... stay tuned.

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

```
================================================================
Note 574.5          Cluster time coordination.          5 of 7
"Jamie Hanrahan"                     9 lines  20-MAR-1987 21:54
                -< proxies should work >-
----------------------------------------------------------------
```

We're not running clusters, but these command procedures work just as well without them (time coordination is important on non- cluster DECnets as well). I created a special account for the timekeeping function, with proxy access on the "master clock" machine. Remember that the batch job in the "slave" machine has to have OPER and LOG_IO privileges to do a SET TIME (in addition to NETMBX). As for proxy logins on a cluster, seems to me that a cluster common NETUAF will work just as well as a cluster common SYSUAF -- but of course I have no way of knowing.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865


```
================================================================
Note 574.6          Cluster time coordination.          6 of 7
"Jamie Hanrahan"                    14 lines  20-MAR-1987 22:08
                -< yet another addendum >-
----------------------------------------------------------------
```

You know, I *still* feel that the cluster time coordination problem should be solved in hardware, at least for CI-based clusters. If the CPUs are all close to each other, it ought to be possible to drive all of their interval and TOY clocks from a common oscillator. To eliminate single-point-of-failure, you could have dual redundant master clocks, and each of the CPU's clocks would be able to run on its own if the master signals weren't present.

For applications that *really* need to know what time it is (aiming radiotelescopes, for instance), you could buy an upgraded master clock of whatever accuracy you could afford, all the way up to a WWVL receiver or cesium-beam clock (don't laugh; they're in the HP catalog (or used to be, anyway)).

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

```
================================================================
Note 574.7          Cluster time coordination.          7 of 7
"Michael R. Pizolato"                12 lines  30-MAR-1987 14:57
                -< We don't use proxies. >-
----------------------------------------------------------------
```

We don't use proxy logins, so I don't know if they would help. The reason we don't use proxies is because we have a huge network (you can't believe how huge this thing is), and our network administrators don't want to allow the following scenario:

1. Node BIGVAX (an 8650) goes down.

2. Node SMLVAX (one of many MicroVAXes) reboots as node BIGVAX, thereby getting all of BIGVAX's proxy access.

I'd be interested to know how the procedures work for you using proxies.

Michael R. Pizolato
AT&T Technology Systems
Dept. 323610
555 Union Blvd.
Allentown, PA 18103
215/439-5500

Note 575.2 SET HOST/DTE blows up with data overrun 2 of 2
"James L. Buckley" 17 lines 16-MAR-1987 11:45
-< Try SYSGEN parameter TTY_ALTYPAHD >-

I am currently using SET HOST/DTE to write this "NOTE" off of a 750 very heavily loaded. I could only get this to work by increasing the SYSGEN parameter TTY_ALTYPAHD. The user in the previous reply was quite correct; SET HOST/DTE does in fact use only the TYPE_AHEAD buffer for receipt of data which can quickly load up input buffers.

These buffer sizes were set up to handle keyboard input. Displaying full screen data at anything above 300 BAUD will require increasing the TTY_ALTYPAHD parameter. On the 750 this was set to 300 from a default of 200. Your performance may vary depending on your driving habits and road conditions.

James L. Buckley
COM/Electric Co.
2421 Cranberry Hwy
Wareham MA, 02571
(617)-291-0950 x3224

Note 577.15 Questions/Comments on TPU 15 of 16
"Stuart Renes" 14 lines 11-MAR-1987 13:56
-< CBI course for EVE >-

For those of you interested in teaching your users about TPU, there is a DEC Ed Services CBI course available for EVE. I just got it last month. Look in your Ed Services catalog for details. The course is pretty good and someone can learn EVE in a couple of hours with this course.

By the way, there are security risks with the use of previous releases of the CAI/CBI courses. This latest course kit includes a patch to resolve the issue. It seems that some VMS users will use their VMS password when asked to register for a course. THis goes in a file that was protected W:RWE. The patch allows the CAI modules to be installed so you can deny World access to the critical file. If you have CAI/CBI courses on your system, take notice.

Stuart Renes
AT&T Technologies, Inc.
Mail Stop: 2793
3000 Skyline Dr.
Mesquite, TX 75149
(214) 288-2286

Note 577.16 Questions/Comments on TPU 16 of 16
"Larry Kilgallen" 4 lines 11-MAR-1987 21:35
-< Another strike(out) for secondary passwords! >-

It would seem the CBI developers are stuck in the same rut they have been in for 6 years. The least they could have done is check their secondary password and NOT ALLOW it to be set equal to the VMS password!

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

Note 584.2 SET HOST/DTE woes. 2 of 4
"James R. Ostrosky" 11 lines 19-MAR-1987 13:52
-< SET HOST/DTE and MODEMS >-

There was a very obscure statement in one of the release notes that came with VMS, stating the problem with the DMF-32 and modems. This statement indicated that the DMF-32 will not recognize any incoming characters until Carrier Detect is seen. The work-around given was to scan the modem status word (via QIO and IO$_SENSEMODE!IO$M_RD_MODEM) and detect Carrier Detect automatically. The DTE_DF112 executable provided with VMS will not work. I have written an autodialer for the DF112 (and a DCL command DIAL) in Fortran-77, and they work just fine for us. NOTE: See IO 579.0 and IO 579.1 in relation to this one. Perhaps I should submit this to the Pageswapper...

James R. Ostrosky
3910 OLD WM PENN HWY
PITTSBURGH, PA 15235

Note 584.3 SET HOST/DTE woes. 3 of 4
"Jonathan M. Prigot" 7 lines 21-MAR-1987 09:42
-< Never overestimate! >-

I think I see two things: first, if memory serves, DTE_DF112 must be INSTALLED like its DTE_DF03 forerunner. Second, and more important, neither DF03 nor DF112 programs provide the control that you think they should. That is, try changing your NUM:1234567 to NUM:T1234567# or NUM:P1234567#. The dialer modules only have the smarts to provide the ^B wakeup and some LIMITED syntax checking of the number you provide.

Jonathan M. Prigot
W R Grace & Company
55 Hayden Avenue
Lexington MA 02173
(617)861-6600

Note 584.4 SET HOST/DTE woes. 4 of 4
"Michael R. Pizolato" 3 lines 30-MAR-1987 15:01
-< I'll try it. >-

I did INSTALL DTE_DF112, and it didn't help. However, I did not try changing the number in the way you said. I'll give it a try. Thanks!

Michael R. Pizolato
AT&T Technology Systems
Dept. 32361
555 Union Blvd.
Allentown, PA 18103
215/439-5500

Note 585.3 Anyone use defragmentation programs? 3 of 4
"Stuart Renes" 33 lines 11-MAR-1987 14:08
-< Beware of defragmentation programs! >-

I have been involved in the development of a ODS-2 disk defragmentation product and will offer this advice. This particular type of program has more product liability than anything else I have personally seen in a long time. There are so many bad things that can happen to your ODS-2 disk files as a result of even the slightest bug in a defragmentation program, that EXTREME caution is the watchword. Most people don't trust them and wind up using them only after an IMAGE backup which negates most of the potential time savings.

Some things to beware of:

A good defragmentation program MUST not alter file-ids! Otherwise your batch and print jobs will abort (they use file-ids). 11/750's that try to boot Stand-alone Backup off disk will not be able to do that WITHOUT warning if the physical location of VMB.EXE is changed because your defragmentation program moved it during its contiguous file gathering process. That's because its physical location is written into the BOOTBLOCK during the STABACKIT procedure.

(Yes, there IS a use for the BOOTBLOCK under VMS!!)

There are many OTHER unexpected things that live under ODS-2 that DEC doesn't expect you to know or care about and they even change some things during VMS updates WITHOUT documenting them!

So, if your defragmentation program works fine on VMS 4.5,.....that doesn't mean that when 4.6 arrives it will STILL work.

I think I've said enough to get you to thinking! Remember, your ODS-2 disks are the heart of your system as far as your users are concerned. I'm not sure the possible time savings promised by these products are worth the damage that could creep in unnoticed until.....!

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```
================================================================
Note 589.6          VAXstar/uVAX2000 Announcement          6 of 6
"Jack Patteeuw"                        17 lines  17-MAR-1987 17:22
                    -< Announcing the LN03R ! >-
----------------------------------------------------------------
```

A LN03R is definitely a LN03 that does Postscript ! Check the latest Sales Update or the March 2, 1987 edition of the DEC U.S. Price Book.

What, you don't have a price book ? The note inside mine says it's for sales reps "and customers", so ask your "order taker" for your own personal copy !

Most everyone knows that the LN03 family of laser printers is built off of a Ricoh copier engine. Ricoh now has a new engine (being used by TI and QMS) that is rated at 15 pages per minute and has two input trays. This certainly would make it the "top-of-the-line" in desktop laser printers. This is faster than the XEROX 2700 engine (which is used in the LN01 and has been the de-facto standard for years in the laser printer) which is rated at 12 pages per minute.

Could there be an LN05 (?) in the future ?!!!

Jack Patteeuw
Ford Motor Co.
Electrical and Electronics Division
31630 Wyoming
Livonia, MI 48150
313-323-8643

```
================================================================
Note 590.2          VAX 11/750 Word Processor              2 of 2
"Stuart Renes"                         23 lines  12-MAR-1987 14:02
                    -< DECtype support woes >-
----------------------------------------------------------------
```

We too use DECtype. It supports many users on an 11/785 without much overhead. Our secretarial staff love it because its so easy to learn.

Unfortunately, DEC doesn't seem to want to support it anymore. There hasn't been another release in 2 years - not even to fix the bugs that remain or crept in under DECtype 4.0

DECtype has problems with LN03 printers - it seems to insert blank lines every page or so - right in the middle of text.

Also, you can tab outside the right margin if you use the right-justified tab stops and this causes DECtype to hang up when you try to print the document.

DECtype 4.0 was supposed to support editing by document #, but it never made it into production - the document numbers are there in the index but no reference is made to them elsewhere.

Anybody know what the future of DECtype is?? I've paid monthly software support for it for 2 years and received nothing (no answer yet to my SPR's either).

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3000 Skyline Dr.
Mesquite, TX 75149
(214) 288-2286

Note 592.4 ALL¤IN¤1/INGRES INTEGRATION 4 of 5
"Jan C Ostendarp" 6 lines 24¤MAR¤1987 Ø1:58
¤< TERM_INGRES identifies term type? >¤

Isn't the TERM_INGRES logical used to identify the terminal type? (i.e. define TERM_INGRES "VT1ØØK"). I'm not aware of any special logical names which Ingres front¤ends look for to route input and output.

Jan O.

Jan C Ostendarp
Massachusetts Financial Services
2ØØ Berkeley Street
Boston, MA Ø2116

Note 592.5 ALL¤IN¤1/INGRES INTEGRATION 5 of 5
"Lora Wetherill" 5 lines 26¤MAR¤1987 17:32
¤< Yes.. that's the trouble! >¤

Yes, that it exactly what it is used for, but if INGRES doesn't get a valid value for that logical, you CANNOT run INGRES. Somehow with INGRES running underneath All¤In¤1, that logical gets messed up and INGRES says that VT1ØØK or VT1ØØF is an invalid terminal type.

Lora Wetherill
P.O. Box 179
Mail Stop IØØ96
Denver, Colorado 8Ø2Ø1

Note 593.3 Memory disk driver going away??? 3 of 7
"Jan C Ostendarp" 5 lines 28¤FEB¤1987 18:42
¤< original article? memory disk drive. >¤

Can you refer me to the PAGESWAPPER article which describes how to use the unsupported memory disk driver? (sysgen,install,etc.) Thanks.

Jan

Jan C Ostendarp
Massachusetts Financial Services
2ØØ Berkeley Street
Boston, MA Ø2116

Note 593.4 Memory disk driver going away??? 4 of 7
"John Osudar" 2 lines 3¤MAR¤1987 19:28
¤< original article >¤

Page VAX¤24 in the October 1986 newsletter contains the article on the memory disk driver.

John Osudar
Argonne National Laboratory
97ØØ S. Cass Ave.
Bldg. 2Ø5 A¤Ø51
Argonne, IL 6Ø439¤4837
(312) 972¤75Ø5

```
================================================================
Note 593.5          Memory disk driver going away???          5 of 7
"Stuart Renes"                        13 lines  12-MAR-1987 14:07
                -< VAX Memory Disk available >-
----------------------------------------------------------------
```

There is at least one small software house that sells a version of a VAX memory disk that outperforms what DEC did by 50 - 75%.

It's cheap and works well. Due to the commercialism policy I cant say anymore here. I'll be glad to talk about it offline.

Hope this helps.

Stuart Renes
AT&T Technologies, Inc.
Mail Stop: 2793
3000 Skyline Dr.
Mesquite, TX 75149
(214) 288-2286

```
================================================================
Note 593.6          Memory disk driver going away???          6 of 7
"Mark Hartman"                         4 lines  19-MAR-1987 21:19
                -< What's wrong with both? >-
----------------------------------------------------------------
```

I don't see why we shouldn't be able to have both disk file cacheing AND the memory disk. Other DEC operating systems do (i.e., RSTS, and we all know how much Engineering hates RSTS), so why not let the "flagship" O/S have both?

Mark Hartman
Jadtec Computer Group
546 W Katella Ave
Orange CA 92667


```
================================================================
Note 593.7          Memory disk driver going away???          7 of 7
"John Saunders"                        5 lines  22-MAR-1987 07:02
                -< Both would be fine >-
----------------------------------------------------------------
```

At our site, we using (trying to use) a MicroVAX II for software product development. We use the PDDRIVER for program listings, and anything else which is temporary. MicroVAX memory is cheap, MicroVAX disks are not. Disk caching would help to speed disk access, but would not solve our temporary file problem.

John Saunders
FEL Computing
PO Box 72
Williamsville, VT, 05362
(802) 348-7171

```
================================================================
Note 595.1            Calling a WOMBAT Wizards              1 of 2
"Bob Hassinger"                        8 lines   7-MAR-1987 16:37
        -< Consider a program if all else fails... >-
----------------------------------------------------------------
```

I am sure the true wizards know how, after all you can do just about anything in DTR! I do not happen to know off hand however. My experience is that in a situation like this it can be a valuable learning experience to work it out, no matter how long it takes or how slow the result is. However, sometimes the cost (time) effective answer for me turns out to be a five or ten line program in FORTRAN, BASIC or whatever. Keep this option in mind.

Bob Hassinger
Liberty Mutual Research Center
71 Frankland Road
Hopkinton, MA 01748
617-435-9061

Note 595.2 Calling a WOMBAT Wizards 2 of 2
"Jack Patteeuw" 18 lines 9-MAR-1987 07:57
-< It's in the book ... !!! >-

After reading through some back issues of the "Wombat Examiner" and more closely examining the documentation I found out that it is possible to "extend" Datatrieve with user written functions !!

The problem mentioned in .0 is really trivial to solve with a program (we used VAX C) but the trick is understanding how DTR is passing parameters to you and how it wants them back. It was really "wild" linking the DEBUGger into DTR and then walking through all the routines (like "Trash Registers") until we got to our routine.

The only problem we had was reading the documentation close enough to understand that that what DTR passed to us for a return string descriptor was a "dynamic" string descriptor. A quick call to STR$GET1_DX to get one and we were all set.

Part of the credit goes to Dan Lanphear my new "Rent-a-DECie" who, although not yet at "Wombat Wizard" status, certainly does know his VMS !!

Jack Patteeuw
Ford Motor Co.
Electrical and Electronics Division
31630 Wyoming
Livonia, MI 48150
313-323-8643

Note 597.0 Having your VAX call you back 3 replies
"Dan Shoop" 13 lines 26-FEB-1987 13:35

Since it's a long distance call from my house to work, I'd like the ability to have my VAX call me back. I know someone mentioned how to do this a few years ago.

Any ideas?

Dan Shoop Citicorp 11th Floor 575 Lexington Ave NY NY 10043
212.906.2403

Dan Shoop
11th Floor DataCenter
Citicorp Credit Services
575 Lexington Ave
New York, New York 10043
212 906 2403

Note 597.1 Having your VAX call you back 1 of 3
"Joel Gallun" 4 lines 27-FEB-1987 17:26
-< call-back program >-

We have a utility that does that here at Goddard Space Flight Center. I will speak to the person who developed it and see if he would be willing to release it to you, unsupported, as-is, etc. I'll reply to this message again later when I know more.

Joel Gallun
oao corp
7500 greenway ctr
greenbelt, md 20770

Note 597.2 Having your VAX call you back 2 of 3
"Bob Hassinger" 7 lines 7▪MAR▪1987 16:51
▪< Check VAXNET on the SIG tapes >▪

Look at the recent versions of VAXNET on the VAX Symposium Tapes (SIG tapes). I have not actually gotten it to work fully yet for callback because of many problems with modems, lines, etc. but all indications are that it has the right answers. Even if you do not use the code the method should be helpful to study.

Bob Hassinger
Liberty Mutual Research Center
71 Frankland Road
Hopkinton, MA 01748
617▪435▪9061

Note 597.3 Having your VAX call you back 3 of 3
"Joel Gallun" 16 lines 10▪MAR▪1987 17:28
▪< call back program source code >▪

I have left the source code for the call back program I mentioned in the other reply in my login directory. The files are: call_back.for call.for subs.for call_back.com

It is set up to work with our Rolm digital PBX and may not be of any use to you. The authors phone numbers are in the source files. The area code here is (301) and our exchange is 286. I belive that only the last 5 digits of their phone numbers are there.

In regard to the other reply, VAXNET has been a very useful program to me, also, and I wouldn't be at all surprised if the latest and greatest version could do what you need.

Joel Gallun
oao corp
7500 greenway ctr
greenbelt, md 20770

Note 598.0 DNA DAP manual order # needed 4 replies
"Jamie Hanrahan" 10 lines 26▪FEB▪1987 17:17

Does anyone have the order number for the Digital Network Architecture Data Access Protocol Functional Spec.?

(It sure would be nice if the Electronic Store let you look up manuals by title substrings... all of the DNA Func Specs that I have order numbers for are in the store, at least I was able to do price lookups on 'em.... but when I did a product lookup by keyword, using keywords that should have found them, none of them appeared.... I guess manuals aren't "products".)

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619▪565▪1865

Note 598.1 DNA DAP manual order # needed 1 of 4
"Larry Kilgallen" 5 lines 27▪FEB▪1987 13:11
▪< AA▪K177A▪TK >▪

DNA Data Access Protocol (DAP) Functional Specification, Version 5.6.0.

It would also be nice if the Electronic Store had sent me this document when I ordered it, many moons ago.

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139▪0901

```
================================================================
Note 598.3          DNA DAP manual order # needed          3 of 4
"Jan C Ostendarp"                    5 lines  16-MAR-1987 19:19
                -< Software Products Doc. Dir. >-
----------------------------------------------------------------
```

DEC publishes a quarterly? Software Documentation Products Directory. Stay tuned for the contact name (address) to get on the mailing list.

Jan

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

```
================================================================
Note 598.4          DNA DAP manual order # needed          4 of 4
"Jamie Hanrahan"                     15 lines  16-MAR-1987 22:29
             -< Thanks, but I already have that! >-
----------------------------------------------------------------
```

I already receive the Software Products Doc. Dir. The Digital Network Architecture and Protocol Specifications do not appear in it.

In Dallas I mentioned this lack to one of the people in the Documentation booth in the display area. Lo and behold, the good folks came up with a little booklet called "Networks and Communications Publications (Fall 1986)", available on the display floor in San Francisco! It listed *almost* all of the DNA A&PS books, *except* for the DAP and DDCMP manuals. (I already had that one, though. For others' benefit, its number is AA-D599A-TC.)

(Alas, this little booklet doesn't seem to have a number, so you can't order it. Maybe they'll have them in Nashville.)

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865


```
================================================================
Note 599.0          Any PSI users out there?           5 replies
"Jamie Hanrahan"                     4 lines  28-FEB-1987 00:51
----------------------------------------------------------------
```

Is anyone who reads this using VAX PSI? If so, what for? Are you using it for task-to-task links, for PSI Mail, X.29 virtual terminal support, DECnet data links, what? What have your experiences been?

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

```
================================================================
Note 599.1          Any PSI users out there?           1 of 5
"Larry Kilgallen"                   14 lines  28-FEB-1987 11:17
          -< One trying to be a former PSI user >-
----------------------------------------------------------------
```

I have a client site which chose PSI for DECnet data links in order to save the cost of renting a full-time circuit to a far-away country. Thus their use is essentially that of a point-to-point link. They have since given up on PSI and are in the process or ordering a full-time circuit due to the excessive staff time required to keep PSI software going on both ends of the link (staff costs and packet costs together exceeded the cost of a full-time circuit).

My summary of this experience would be that there was no need for the design benefit of packet-switch technology (multi-point, etc.) in this situation, and simply using it as a replacement for full-time circuits was not cost effective.

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

Note 599.2 Any PSI users out there? 2 of 5
"Mark Oakley" 8 lines 3-MAR-1987 16:19
-< More PSI Info Requested >-

We are working to provide DECnet service to one of our labs in Europe via PSI. Larry's reply about problems with PSI is very important to us, and we would like more information. Can anyone elaborate on the problems? Is there anyone who can provide us with someone to talk to? I can be reached at (614) 424-7154 and would welcome a call. We plan to implement this DECnet service soon, so whatever information could be provided would be much appreciated.

Mark Oakley
Battelle Memorial Institute
505 King Ave.
Columbus, Ohio 43201-2693
614/424-7154

Note 599.3 Any PSI users out there? 3 of 5
"Jamie Hanrahan" 2 lines 3-MAR-1987 19:43
-< source for PSI. >-

Larry (or anyone else who knows), does PSI V2.n still come with source fiche?

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

Note 599.4 Any PSI users out there? 4 of 5
"Larry Kilgallen" 10 lines 3-MAR-1987 22:28
-< No source today, the fiche have gone away >-

It is my understanding that source fiche are NOT available at any cost to non-DEC personnel (not even BI bus driver writers). They may be available to DEC software specialists. The reason given was that DEC has invested a great deal of time and effort in understanding how 20 different PSDN vendors have separately interpreted the X.25 and X.29 specifications, and DEC views the fruit of that interpretive effort as highly proprietary giving them a competitive edge. Sort of like someone who reverse engineers the BI bus not wanting to share it with the world...

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

Note 599.5 Any PSI users out there? 5 of 5
"Mark Oakley" 3 lines 10-MAR-1987 16:36
-< Still Interested in PSI Info >-

I am still very much interested in anyone's (negative) experiences with PSI. Larry's reply (599.1) suggests that it is a poor approach for trying to DECnet sites that are oversees.

Mark Oakley
Battelle Memorial Institute
505 King Ave.
Columbus, Ohio 43201-2693
614/424-7154

```
================================================================
Note 600.0          UIS Libraries for Modula-2          No replies
"Offline Submission"                 11 lines   2-MAR-1987 20:43
----------------------------------------------------------------
```

Has anyone developed or know where to find UIS libraries for the Hamburg Modula-2 compiler? I would like to use Modula-2 on a VAXstation II/GPX.

Keith Berhard
10608 North East 4th
Bellevue, WA 98009
Telephone: (206) 462-3106
February 23, 1987

```
================================================================
Note 601.0          high-speed dialup modems?            5 replies
"Jamie Hanrahan"                     15 lines   3-MAR-1987 15:52
----------------------------------------------------------------
```

It seems to me that I've seen some ads for modems that run at 9600 bps, full-duplex, (and also 300/1200, Bell 103/212 compatible) over the dial-up network. If I remember right, they hook up to async DTEs, but may actually run in sync mode at 9600 (transparently to the async DTE), and they can be autodialed via commands to the serial port.

Does anyone have any hard information on these? Better yet, does anyone have any experience with them?

"You are trapped in a maze of twisty UUCP connections, all different."

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865


```
================================================================
Note 601.1          high-speed dialup modems?            1 of 5
"Jack Patteeuw"                      12 lines   5-MAR-1987 18:02
                        -< Check Codex >-
----------------------------------------------------------------
```

Although I have no personal experience with them, I see that Codex (a very reputable communication company) has two modems similar to what you are describing.

The 2206 does half-dup sync at 9600 bps (V.29 compliant) and the 2260 does full-dup sync at 9600 bps both over over normal dial-up lines. These units do NOT support async or 300/1200 bps.

I have purchased other equipment from them in the past and rate them excellent ! Codex can be reached at 1-800-446-6336. Ask for a copy of their Direct Order Catalog. It has lots of good info even for the neophyte and include prices on their most popular equipment.

Jack Patteeuw
Ford Motor Co.
Electrical and Electronics Division
31630 Wyoming
Livonia, MI 48150
313-323-8643

```
================================================================
Note 601.2          high-speed dialup modems?            2 of 5
"Bruce Bowler"                        7 lines   9-MAR-1987 13:28
                      -< Try VADIC also >-
----------------------------------------------------------------
```

We have had a pair of Racal-Vadic 9600 VP modems for about 6 months now that have worked quite well even on some really poor phone lines. They are noticeably faster at painting a screen, but you can tell that they are stuffing stuff into packets on each keystroke (this, as the main note pointed out is "transparent" to the user, i.e. no code changes required). These modems will autodial, at least from the keyboard, and we use them in a VT240<-->DMF32 hookup.

Bruce Bowler
General Electric

1 River Road
Bldg 2 Room 609
Schenectady, NY 12345

Note 601.3 high▪speed dialup modems? 3 of 5
"Jan C Ostendarp" 14 lines 16▪MAR▪1987 19:42
▪< Try TELEBYTE (Accelerators) >▪

I have been using a pair of Telebyte Corp's Accelerator series 24's (as in 2400bps) which work very well together and with other modem equipment (V.22bis, Bell212A, Bell2400). They "fall▪back" to the appropriate mode as the remote modem requires.

AT command set, memory (symbol table), security codes, call▪back options, multiple configurations stored in memory, etc.

If I may refer you to then people who can tell you more about them, call me:

Jan Ostendarp 617▪423▪3500 x2207

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

Note 601.5 high▪speed dialup modems? 5 of 5
"David Shepperd" 17 lines 25▪MAR▪1987 19:34
▪< It actually runs at 19,200 too >▪

We did a little research into these and picked the IRMA FASTLINK. It uses the Hayes AT command set and worked perfectly with our programs that speak Hayeseeze. As long as you keep your typing ahead to a minimum, it's just as though you're connected locally at 9600 baud. Although we didn't expect it, they also will connect to and speak at 2400 baud to one of those 2400 baud modems.

I strongly recommend that you get a demo unit and try running EDT or TPU on any of these 9600 baud gizmos before you buy one lest you be VERY disappointed.

D. Shepperd Atari Games (408) 434▪1711

David Shepperd
Atari Games Inc
675 Sycamore
PO BOX 361110
Milpitas, Ca 95035▪1110
(408) 434▪1711

Note 602.0 LK201 Hardware info 1 reply
"Jack Patteeuw" 10 lines 5▪MAR▪1987 17:39

We (Ford Motor Company) are building some custom hardware and would like to use the LK201 keyboard as an input device.

Does anyone know (or know how to get the documentation for) the signals on the four wire going to/from the keyboard (I assume they are power +?V, ground, transmit and receive) and what code the keyboard send to the terminal (is it ASCII with start and stop bit similar to RS232 or what).

Any information would be greatly appreciated.

Jack Patteeuw
Ford Motor Co.
Electrical and Electronics Division
31630 Wyoming
Livonia, MI 48150
313▪323▪8643

```
================================================================
Note 602.1              LK201 Hardware info              1 of 1
"Jamie Hanrahan"                      17 lines   6-MAR-1987 18:56
                        -< this may help... >-
----------------------------------------------------------------
```

We have a copy of the Professional 300 Series Technical Manual. Its order number is EK-PC350-TM-001. It does not give electronic interface information for the keyboard (other than that the line driver for keyboard output needs -10V, which is generated internally from the +12V that's supplied), but it does provide complete information on the data codes. It is serial transmission, eight data bits plus a "0" start bit and a "1" stop bit. The data sent by the keyboard is nothing like ascii, however. For instance, pressing the shift key generates a keycode; it does not modify the keycode sent by the "A" key. Looks like a whale of a lot of fun (?) to use, but all the info you'd need seems to be here.

It shouldn't be all that hard to figure out which of the four wires are which, or what the electrical interface is, either by attaching a scope or by opening the enclosure and looking at the types of driver/receiver chips that are used (or both).

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

```
================================================================
Note 603.0            Using TK50 for BACKUP            8 replies
"LARRY CHIANO"                         9 lines  10-MAR-1987 16:05
----------------------------------------------------------------
```

We are designing a Local Area Vax Cluster, initially consisting of 1 MicroVax II, 1 MicroVax 2000 and 2 disk drives totalling about 750Mb of storage. We are trying to decide between a TK50 and 9 Track tape for the system's only tape drive.

Any opinions or comments on the TK50 would be welcome.

LARRY CHIANO
LEMESSURIER CONSULTANTS, INC
1033 MASS AVE

CAMBRIDGE, MA 02138
617-868-1200

```
================================================================
Note 603.1            Using TK50 for BACKUP              1 of 8
"Joel Gallun"                         12 lines  10-MAR-1987 17:21
                      -< Opinions on TK50s >-
----------------------------------------------------------------
```

DEC is not currently supporting 9 track tapes as distribution media for MicroVMS, which means that you will have to have either a TK50 or a RX50 device to load VMS off of. I have 2 TK50s on MicroVAXes here and haven't had any problems with them. Rumor has it that they are rather fragile, mechanically, that is. They are awful slow running anything but Backup, i.e. Copy. It takes about 45 minutes to backup a rather full RD53 to a TK50 using the command "backup/image/buffer=5 dua0: mua0:file.bck/save". If you disable crc it goes faster because the microVAX does crc in software rater than hardware, and the TK50 does a crc in its hardware anyway. I would say that if you only need a backup device the TK50 is ok, but if you have other uses go for the 9 track.

Joel Gallun
oao corp
7500 greenway ctr
greenbelt, md 20770

```
================================================================
Note 603.2            Using TK50 for BACKUP              2 of 8
"Larry Kilgallen"                     16 lines  10-MAR-1987 18:16
                       -< A TK50 Fan >-
----------------------------------------------------------------
```

I have been quite happy using TK50s for backup in typical MicroVAX situations -- meaning the machine does not have to be up 24 hours. An RD53 may take a long time (I always use /VERIFY) but the whole disk fits on one cartridge and one can leave the backup running at night and reboot in the morning. Even at a site which uses an RD54 for its system disk, I find that arriving after a period of absence (during which the first TK50 was filled) putting in the second cartridge and waiting for it to finish is quite acceptable (the first cartridge having taken the brunt of the data). At this site there is also a TSV05 9 track tape drive, and its is used mainly to make tapes

for distribution to MacroVAX sites. The story might differ if the tape drive in question were a TU81E (plus), but there is about a 25/1 price ratio in the cost of that drive to the TK50 drive.

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

Note 603.3 Using TK50 for BACKUP 3 of 8
"MICHAEL GRATTAN" 6 lines 25-MAR-1987 07:47
-< More on TK50 >-

We have used a TK50 for backups (both incremental and /IMAGE) with very few problems for about nine months. I have read some nasty rumors about the TK50 and various publications (i.e. Digital Review, etc.) but I think that they were written by an IBMer. Overall, we are pleased with the drive and have been toying with the idea of installing a second one on the MicroVAX.

MICHAEL GRATTAN
FAIRHAVEN CORP.
358 BELLEVILLE AVE.
NEW BEDFORD, MA. 02742
617-993-9981 EXT 106

Note 603.4 Using TK50 for BACKUP 4 of 8
"David Shepperd" 11 lines 25-MAR-1987 19:12
-< Still more about TK50 >-

We have 2 MicroVAX II each with a TK50. They have been running for over 1 year now without any trouble. Each MicroVAX has, however, roughly 600Mb so backups run about 4 hours taking between 4 and 6 tapes (each) depending on how full the disk is. I do recommend you use /BLOCK=32768 to save tape. We haven't had any carts break but did notice that about 1 in 50 fail such that tape and/or drive continuously reads (searches?) as though it can't find BOT or something.

David Shepperd
Atari Games Inc

675 Sycamore
PO BOX 361110
Milpitas, Ca 95035-1110
(408) 434-1711

Note 603.5 Using TK50 for BACKUP 5 of 8
"Lora Wetherill" 6 lines 26-MAR-1987 17:27
-< NO MORE TK50's! >-

I am responsible for nine MicroVAXes, and, in the past year have had TK50's replaced on all but three of them, and lost a dozen cartridges. Several systems have had the TK50 replaced multiple times. I'll take a TSV05 ANYDAY (and wouldn't THINK of even touching an IBM...!).

Lora Wetherill
P.O. Box 179
Mail Stop I0096
Denver, Colorado 80201

Note 603.6 Using TK50 for BACKUP 6 of 8
"Frank J. Nagy" 22 lines 28-MAR-1987 11:39
-< TK50 OK, but getting TU81+ anyway >-

1. We have had 4 VAXStation-II/RCs running for several months now. Each has an RD53 and a TK50. We have a batch job setup to do a full backup very early in the morning; the systems manager comes by in the morning and changes cartridges. This has worked quite well and we have had no problems with cartridges nor the TK50 drives.

2. We have also just started using an LAVC of 2 MicroVAXes with 2 RA81s. Each MicroVAX has a TK50. Now problems as of yet. I understand the best way to do BACKUPs is to use a large block size (/BLOCK=32768) and to do /NOCRC (requires less CPU time on the MicroVAX and may give better overall performance by needing less tape repositioning).

3. We plan to add 2 more RA81s this summer on the LAVC. Since our systems manager has other things to do (other than BACKUPs that is) we are also planning to add a TU81-Plus to the system. I saw the QBus TU81+ at Fall DECUS and was impressed. Although the tape was repositioning LOTS, the BACKUP demonstrated was dominated by head motion on the RA81. To the MicroVAX, the TU81+ seems to run at full speed (75 ips). Of course, one does 6250 bpi backups with large blocks and /NOCRC to get best performance.

Frank J. Nagy
Fermilab
PO Box 500 MS/220
Batavia, IL 60510
(312)840-4935

```
================================================================
Note 603.7              Using TK50 for BACKUP              7 of 8
"Larry Kilgallen"                    8 lines  29-MAR-1987 20:20
          -< Backup mileage from your disk may vary >-
----------------------------------------------------------------
```

Regarding .6:

It would seem to me that on a properly defragmented disk, head motion during an image backup would not dominate. Of course using a disk which has not been defragmented recently (according to the frequency and nature of new allocations and deallocations) can make the tape drive not be at fault.

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901


```
================================================================
Note 603.8              Using TK50 for BACKUP              8 of 8
"Jack Patteeuw"                     12 lines  30-MAR-1987 17:20
                      -< Minor problem >-
----------------------------------------------------------------
```

We have had a MicroVAX II with a RD53 and a TK50 for about a year now and have experienced no cartridge failures. Most BACKUPS are done over the network so the only real work the TK50 does is for IMAGE Backups.

I have had a problem where the MOUNT would give an error message that the device was not "software write enabled" or something like that. This usually required rebooting the machine to get VMS to be able to "talk" to the TK50 again.

I have been told that this is a firmware error and has been fixed. Can anyone confirm this ?

Jack Patteeuw
Ford Motor Co.
Electrical and Electronics Division
31630 Wyoming
Livonia, MI 48150
313-323-8643

```
================================================================
Note 604.0              VAX 11/750 Boot ROMs              No replies
"Offline Submission"                17 lines  11-MAR-1987 22:15
----------------------------------------------------------------
```

The VAX 11/750 Boot ROMs permit the CPU to be booted from the indicated device on the master Unibus (UB0). When adding a second Unibus, the system device must stay on UB0. I want to put my system device on UB1 and be able to boot from there, but I need a boot ROM that has the UB1 adapter on it. DEC has said they cannot supply that item. Where can I obtain a boot ROM with RA81 and RK07 devices on UB1 (NEXUS=9)?

J. Bradley Flippin
Raytheon Service Company
2341 Jefferson Davis Hwy (#1200)
Arlington, VA 22202
Telephone: (703) 685-2337
Date: March 9, 1987

```
================================================================
Note 605.0              Barcode on LN03 Plus              1 reply
"Offline Submission"                 13 lines  11-MAR-1987 22:15
----------------------------------------------------------------
```

We want to print barcodes on an LN03 Plus using a VAX750 running VMS V4.4. Can anyone help us to find such a program, if possible a FORTRAN program?

Willy Gomm
INBIFO Institut f. biologische Forschung GmbH
Fuggerstr. 3
D-5000 Koln 90
Federal Republic of Germany
Telephone: (+ 2203) 303396
Date: March 5, 1987

```
================================================================
Note 605.1              Barcode on LN03 Plus              1 of 1
"Jonathan Pinkley"                   14 lines  20-MAR-1987 20:06
          -< Using TeX to produce Barcode on LN03 >-
----------------------------------------------------------------
```

This is a bit of a hack, but we are currently producing bar codes on an LN03 with a font ram cartridge. The software being used to do this is LaTeX (the K & S distribution using the DVI2LN3 driver.)

We defined LaTeX commands for each bar code character. This is not recommended for high volume work, since the LaTeX program is quite CPU intensive. If you are only producing low volume, it will work, and the TeX / LaTeX software is available for distribution costs.

A more elegant approach using TeX would be to use MetaFont to create a font for the barcode. This would make the production of bar codes with TeX very easy. The current approach is to produce the character 'T' bar code with a \BART etc.

Jonathan Pinkley
Gould OSD
Dept. 913, Bld. 2
18901 Euclid Avenue
Cleveland, OH 44117
(216)486-8300 x1335


```
================================================================
Note 607.0  DECserver 200 application ports - how?    4 replies
"Bob Hassinger"                      44 lines  16-MAR-1987 17:12
----------------------------------------------------------------
```

Does anyone have any experience connecting to a DECserver 200 port from a program on a VAX? We have an 11/750 connected to a small Ethernet with a couple of DECserver 200s. A couple of modems are connected to ports on one of them and set up per the book as "dynamic" - you can call in, talk to the server and connect to the VAX fine. The modems are offered as "services" that other ports on the server can connect to and dial out through, also just fine.

Since most of our users are still on conventional VAX ports, it would be nice if they could also connect to the modems and dial out. Before the modems were moved to the server this could be done quite nicely using SET HOST/DTE or better yet via the VAXNET or KERMIT programs. One might think the DECserver 200 would be able to what is required since you can indeed set up remote print queues from the VAX to server ports and I thought it had been implied if not stated that arbitrary programs could do the same. (We are going to need to be able to accept input from a lab instrument connected to a server port soon for example).

Well: I tried CREATEing a port then SETing it /APPLICATION with LATCP as the documentation shows for the remote printer case but when I allocate the port and try SET HOST/DTE or VAXNET in the usual way I get no response from the modem. Colorado Telephone Support broke the news that this is unsupported! They did indicate that VMS V4.6 "had support" or maybe just documented what to do for a case like a program simply sending output to a port like this. I don't have and don't know when I will see V4.6 however and I need to get the modems going on the server if I can.

Does anyone know anything about this? I am interested both in getting a capability going for dialout applications as easily as possible and also in how to write programs to interact with server ports as we have always been able to do with conventional ports.

Bob Hassinger
Liberty Mutual Research Center
71 Frankland Road

Hopkinton, MA 01748
617#435#9061

==========

Note 607.1 DECserver 200 application ports # how? 1 of 4
"Jan C Ostendarp" 15 lines 16#MAR#1987 20:53
#< DS200 # got a waa story? >#

I share your interest in getting the DECserver 200 to do all the things one might expect reverse LAT with modem control to do. Specifically a modem pool for incoming and outgoing calls. DEC wants us to believe that their Ethernet product set can replace and exceed the functionality of data switch products. I'm hoping the DECserver 100 and 200 command set lends itself to use with PC packages which expect to find a hayes modem on COM1: (of course COM1 will be an asynchronous connection to DECserver 200 port) Modem pools work best if the resource is released when when the phone connections drops off. Does anyone out there have some experiences with DECserver 200's they'd like to share?

Jan O

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

==========

Note 607.2 DECserver 200 application ports # how? 2 of 4
"Bob Hassinger" 16 lines 17#MAR#1987 09:32
#< Sharing via ports OK, LAT not so good >#

I am not clear just how transparent you can make the situation you ask about. It may be that you will have to type a command to the server to get connected to the desired modem or group of modems. It depends on the specifics of everything you want to be able to do. In general however it looks like you can do a lot of the kind of sharing you are interested in, except for the case I asked about.

If your computer is going into the server via one of the ports as with a PC, things are fine. It seems the problem is with computers accessing the server via the network # that is via the LAT protocol # as the VAX normally does. It seems as though there are still some problems establishing the logical connection in this case.

Bob Hassinger
Liberty Mutual Research Center
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617#435#9061

==========

Note 607.3 DECserver 200 application ports # how? 3 of 4
"MICHAEL GRATTAN" 5 lines 25#MAR#1987 07:55
#< More on Decserver 200/MC >#

I had set up a modem as you have done using LAT and creating a port, etc. I found that we had to use a full modem cable (a la BC22E) to get any results. It did work but was a little insecure, the service would lock up. I wound up putting the modem back on the DZQ. I hope this helps.

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NEW BEDFORD, MA. 02742
617#993#9981 EXT 106

==========

Note 607.4 DECserver 200 application ports # how? 4 of 4
"Bob Hassinger" 15 lines 27#MAR#1987 09:05
#< More info on .3 please... >#

Re: .3 That is very interesting. One of my modems may have a problem with it's cable but the other seems to have enough pins supported. It would be helpful to know more about your experience such as what software was used to access the port.

Also, by "insecure" what do you mean. Just that the modem gets hung or that there is a security (i.e. unauthorized access) problem? I am seeing some problems here with modems not disconnecting after certain types of line problems and attempts to "disconnect" from them to hang up and clear the problem. The port stays in a "disconnecting" state so you can't use the modem. The only way out seems to be to turn on privileges and logout the port.

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Note 608.0 VMS 4.5A installation - LAVC 1 reply
"Jan C Ostendarp" 20 lines 16-MAR-1987 20:37

Version VMS 4.5A installation initializes the system disk!

Installing this version on an existing VAX (as in converting a VAX-11/780 to the boot node of a Local Area VAXcluster) creates a royal headache restoring site-specific files from the pre-installation backup... not to mention re-installing layered products. Have I convinced you it was a long nightmare of a weekend? It was. A command procedure I wrote helped me identify files which didn't exist on the new system disk. They included user-created symbolic definition files (i.e.VAXC .H in sys$library, Device Control Libraries, V3FORSYSDEF.TLB, netnode.dat etc.

THE QUESTION: Does anyone know DEC's rationale for releasing the distribution with this inconsiderate installation procedure instead of as standard VMS upgrade (as in VMS 4.0, 4.4)? Colorado doesn't know. Apparently, it isn't related to cluster sys disk structure. QUESTION 2: Does anyone want to talk about their experiences with the performance or on-going system management of a local area VAXcluster?

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

Note 608.1 VMS 4.5A installation - LAVC 1 of 1
"David Shepperd" 21 lines 25-MAR-1987 18:54
-< 4.5A is certainly a pain >-

Yep. It's a royal pain to install 4.5A on an existing system. What I did is rename the SYS0 directory where the existing system lived to SYS1 and booted it. Then used online BACKUP to restore the REQUIRED saveset from the distribution tape to [SYS0...] and booted the new SYS0 which proceeded to complete the install as though the disk had been initialised. I had a command procedure look through the SYS1 tree and rename files from SYS1 to SYS0 if they weren't already there. This was done in early January '87. There are a couple of caveats re any alias directories that might exist in [000000]. Call me for details.

Re the "way did they do that?", it is apparent that the 4.5A was mastered between 4.5 and 4.6. Some things in the installation (upgrade) think that it's installing a 4.5 upgrade and some things think that it's doing a 4.6 upgrade. Since VMSKITUPG (or whatever) looks in a directory named after the upgrade kit and version ([.VMS045] for example) for the appropriate files, it fails when it can't find anything in [.VMS046] (guess how I know this). DEC must have "hurried" this to SDC not wanting to take the time to correct it.

David Shepperd
Atari Games Inc
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PO BOX 361110
Milpitas, Ca 95035-1110
(408) 434-1711

```
================================================================
Note 609.0       Utility to read/write IBM tapes       3 replies
"Jack Patteeuw"                        3 lines  17-MAR-1987 17:34
----------------------------------------------------------------
```

I'm certain that somewhere in one of the DECUS libraries there is a utility to read IBM tapes. Can anyone point me in the right direction ?

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Electrical and Electronics Division
31630 Wyoming
Livonia, MI 48150
313-323-8643

```
================================================================
Note 609.1       Utility to read/write IBM tapes         1 of 3
"Bob Hassinger"                        17 lines  18-MAR-1987 09:57
          -< Get IBM to write ANSI or try MTEXCH >-
----------------------------------------------------------------
```

My limited experience indicates there is no such thing as an "IBM tape". There seem to be many different formats that come out of IBM operations. In our particular case we just get our EDP people to have the tape written in a suitable format that is fairly easy for VMS to read using standard facilities. Depending on the particular system and OS, the IBM side seems to have a lot of flexibility in how they write their tapes, including ANSI labeled format.

When this does not work I fall back on MTEXCH. It was on a Symposium SIG tape a few years back - attributed to Battelle I think. It seemed to be the best for our needs at that time.

There have been MANY programs in this space over the years on the tapes. Because of the wide variety on the IBM side the programs tend to differ a lot in what they do. You have to look at them carefully to find the best fit with your needs.

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```
================================================================
Note 609.3       Utility to read/write IBM tapes         3 of 3
"Frank J. Nagy"                        12 lines  22-MAR-1987 11:55
          -< IBM tape utilities on VAX SIG tapes >-
----------------------------------------------------------------
```

Don't remember which tapes things are on, but here are some program/file names or other directions:

1. ETAPE (reads tapes blocked/unblocked, especially with fixed length records, can handle ASCII and EBCDIC tapes).

2. MGT

3. <funny name> Look in Glenn Everhart's contributions (under RCAxxx usually) for an oldie-but-goodie which has been ported from RSX to VMS.

Frank J. Nagy
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```
================================================================
Note 610.0                DECnet DOS                   3 replies
"MICHAEL GRATTAN"                      13 lines  18-MAR-1987 13:13
----------------------------------------------------------------
```

I am trying to connect a PC/AT to my MicroVAX II via DECnet DOS. The PC/AT is hardwired to the DZQ11. The line and circuit states seem ok, but every time I try to connect from either the MicroVAX or the PC/AT I get "Node unreachable". Can anyone give me any ideas? The documentation for the MicroVAX is minimal at best. Thanks.

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617-993-9981 EXT 106

```
================================================================
Note 610.1                    DECnet DOS                  1 of 3
"Jack Patteeuw"                        2 lines  19¤MAR¤1987 07:32
                        ¤< Area Problem ? >¤
¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤
```

One quick suggestion, make certain that both nodes are in the same DECNET area ! If not, they won't synch up.

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```
================================================================
Note 610.2                    DECnet DOS                  2 of 3
"Frank J. Nagy"                       25 lines  22¤MAR¤1987 11:52
                  ¤< Hints on Async DECnet¤DOS >¤
¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤
```

First, you gotta look in the DECnet documentation which comes in the complete VMS documentation set (yes, I know that the complete VMS set price may represent 10% of the cost of the MicroVAX, but the MicroVMS documentation set is pretty much useless if it ALL that you have).

We had set up a similar configuration (PC¤AT to 785 via a terminal port on an Able VMZ/32) quite a while back (>1 year?). Now we have 1 (and soon to be 5 more) PC¤ATs connected via Ethernet using DECnet¤DOS and Micom/Interlan Enet boards.

As I remember, to get things to work properly, you must install the VT driver (virtual terminal) on VMS and set the DECnet line as DISCONNECTable. We actually had async DECnet working between the VAX and PC first using a dedicated line and then changing over to dynamic switching. To do the dynamic switching, the line is setup as a normal interactive terminal line. On the PC we would use Kermit to log into the VAX and then do something like SET TERMINAL /DYNAMIC/SWITCH [WARNING: don't take this as gospel, my manual set is not beside me and my memory i vague here]. A control¤]C would get us back to the Kermit¤MS prompt on the PC. We would exit Kermit and use NCP (on the PC) to start DECnet (SET LINE COM¤1 STATE ON). Worked like a charm.

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```
================================================================
Note 610.3                    DECnet DOS                  3 of 3
"MICHAEL GRATTAN"                      8 lines  25¤MAR¤1987 08:02
                        ¤< Problem Solved! >¤
¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤
```

I want to say thanks for all the help, it is greatly appreciated. I should have given more detail. The MicroVAX is an end¤node as opposed to a routing¤node and we are running Decnet with terminal servers. As the MicroVAX is an end node it can only recognize one circuit 'on' at a time. Dec instructed us to turn the circuit to the terminal servers off as it was only used during initialization. This worked like a charm and the whole thing has been working quite well. Thanks.

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```
================================================================
Note 611.0                LAVC Performance              14 replies
"Jan C Ostendarp"                      32 lines  18¤MAR¤1987 15:04
¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤¤
```

LAVC ¤ Performance Issues

It is hard to get an answer from Colorado about what acceptable performance is in an LAVC environment. Does anyone out there have experience running LAVC with a VAX¤11/780 (ample¤memory) as a boot node and 1 MicroVAX II in the cluster? Let's talk. My concern is that my network may be degrading performance of my MicroVAX cluster member.

We purchased a VAX II to run in LAVC environment with an existing VAX-11/780 which was used for application development (3 programmers-C language editing, compiling, linking) and end-users. Memory is ample on both machines-16MB (70% used / 30% used.) The 11/780 has 2 RA-81 disks-system and user. CPU used is distributed well over the two machines when the developers are using the VAX II. The VAX II has a local RD53 for paging and swapping.

The performance problem seems to be doing things from the MicroVAX which access (and read) a lot of files on the served user disk, for example LINKING (which programmers tend to do a lot.) My benchmark on "standalone" system says that while links are using the same amount of CPU time on the MicroVAX II is 4 times that of the same link on a "standalone" 780. (cluster common UAF.) We are already doing things like linking to the C shareable RTL in order to eliminate the copying of C-RTL objects into the image. The two machines a connected via DELNI... one other vax (an 750) and 5 decserver's share the ethernet. If I had to guess, the net is not the problem. Any suggestions?

Jan O.

Jan C Ostendarp
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```
================================================================
Note 611.1              LAVC Performance                1 of 14
"Jan C Ostendarp"                    10 lines  18-MAR-1987 15:19
                    -< errata: 611.0 >-
----------------------------------------------------------------
```

The benchmark describes in the above note has typos.

A link was run on each machine (780, MicroVAX II), same link, same User, etc. The link was run on each machine with nothing else going on on either the machines in the cluster nor on other machines on the ethernet. The cpu time was the same on both machines, the elapsed time on the MicroVAX II was 4 times the elapsed time of the link on the 780.

Jan O.

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```
================================================================
Note 611.2              LAVC Performance                2 of 14
"George Walrod"                      20 lines  19-MAR-1987 09:13
            -< Sounds like a Tuning Problem >-
----------------------------------------------------------------
```

Need some questions answered.

What is the average time that you are spend is the different modes (Kernel, Exec, Supervisor, User) ?

Are you spending any time in different types of wait states (Pagefault Wait ....)?

What are your disk hit rates like?

Are you pagefault rates like and what type of pagefault are they (hard/soft, demand zero, ...).

What are your lock rates like?

How fragmented are the disk?

I have found on LAVC, that tuning is a must. An what you have described sound like it might be a tuning problem. These are not all the question but a good start.

George Walrod
4260-b chain bridge rd
fairfax, va 22030

Note 611.3 LAVC Performance 3 of 14
"Frank J. Nagy" 21 lines 22-MAR-1987 11:44
-< Dual MicroVAX LAVC Startup >-

We are just starting (read tomorrow) to switch our development efforts to a LAVC similar to Jan's: to MicroVAX-II CPU's, both with 16 MB of memory, boot member has KDA50 with 2 RA81's (one for system and one for users), 2nd machine has RD53 currently used only for local paging and swapping (about 40% of disk devoted to this right now). Each MicroVAX also has a TK50; we are planning to add a TU81-Plus sort of immediately and to add another pair of RA81s this summer (possibly with a second KDA50 to split the disks across the two systems).

As we gather more experience, I'll try to pass it on. So far, just using the systems to get the startup files, etc. in place and tested, we have not noticed any major performance problems. One thing we have done is to tune the systems to use all that memory; this means large WSMAX, large working set quotas and very large WSExtents. We have also increased many of the file system caching quotas (again, trying to burn memory for performance).

Neither system has terminal lines; all terminals come in via LAT or SET HOST so we are hoping to get fairly good utilization of both CPUs.

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INPUT/OUTPUT

Note 611.7 LAVC Performance 7 of 14
"Jan C Ostendarp" 18 lines 23-MAR-1987 10:32
-< SHAREABLE LIBRARIES the ANSWER! >-

My suggestion to reduce I/O and processing during links by creating shareable libraries out of the numerous (7) and large object libraries used in our application development has "SOLVED" the "performance" problem in our LAVC.

Approx. 10 hours of work by a programmer converting 7 large object libraries to shareable images with the help of an article in the most recent DECUS proceedings (and the VMS doc. set) has reduced CPU time during links by a factor of 4, and elapsed time by a factor of 7. The performance gain is recognized on both the 11-780 boot node and the micro-vax II member node.

Let's talk about turning libraries into shareable images. (see EXPERIENCE w/ SHAREABLE IMAGES) note. Thanks to all those who assisted on this LAVC performance question.

Jan O. pre-shareable library elapsed time on links

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Boston, MA 02116

Note 611.10 LAVC Performance 10 of 14
"Jan C Ostendarp" 12 lines 24-MAR-1987 03:05
-< RE:611.3-Tuning LAVC member nodes >-

---

re: 611.3

Frank, can you tell me more about the tuning you did to improve file caching? The micro-vax II we're using as development machine RARELY uses more the 40% of its 16MB memory with the three developers. (WSdef:512, WSquota:1024, WSextent:2048 is ample). The developers keep multiple subprocesses around for the editor, to run MMS, get mail, etc and still more than 9MB around for the free page list.

Jan O.

Jan C Ostendarp
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```
================================================================
Note 611.12              LAVC Performance              12 of 14
"John Saunders"                    19 lines  25-MAR-1987 21:57
                    -< Two Cents Worth >-
----------------------------------------------------------------
```

re: 611.10:

Our site has a MicroVAX II with 10Mb memory, and we also had memory utilisation problems. One thing we tried was to increase the size of the modified page list: if this list is large enough, VMS won't feel obligated to write process-private modified pages to the page file on the (slow) system disk.

This has also allowed us to decrease the size of our page file on the system disk, since this type of page will not be written to disk as often. This also removed an occasional VMS hang we'd experience, when someone would try using EVE on a huge file (5000 blocks or so). Colorado Springs says that the hang occurs when VMS can't write the first page in the modified list to disk, so increasing the modified list size helps by reducing the amount in the page file.

The appropriate SYSGEN parameters are MPW_HILIMIT and MPW_LOLIMIT. I modified them in MODPARAMS.DAT by adding the same amount to each.

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FEL Computing
PO Box 72
Williamsville, VT, 05362
(802) 348-7171


```
================================================================
Note 611.14              LAVC Performance              14 of 14
"Frank J. Nagy"                    38 lines  28-MAR-1987 11:29
     -< RE: 611.10 ACP tuning, also satellite swap/page >-
----------------------------------------------------------------
```

Jan, we've had about a maximum of 6 users/node on our LAVC and have

yet to see more than about 30% of the user memory used. Of course, we have tuned things so VMS uses about 2 MB out of the 16 MB. The XQP cache tuning was based roughly on a guess of 8-10 average users with about 3 directories in active use "each", etc. The SYSGEN parameters as listed in our MODPARAMS.DAT are

```
ACP_SYSACC=40
ACP_QUOCACHE=50
ACP_DINDXCACHE=50
ACP_DIRCACHE=100
ACP_HDRCACHE=100
ACP_FIDCACHE=100
ACP_MAPCACHE=30
```

These were basically set by set-of-the-pants and may be adjusted after we gain more experience running.

I like the suggestion I just read here about the modified page list. Will have to try that one.

So far, so good. The LAVC seems solid and stable. It certainly installed smoothly except for our own indecisiveness with the satellite. The first try, the satellite didn't see its RD53 and so put all the page/swap file space on the common system disk. After the hardware problem was fixed, we re-installed the satellite (SATELLITE_CONFIG REMOVE then ADD) and had all the page/swap file put on the RD53. Second thoughts lead to another REMOVE-ADD cycle and we now have modest page/swap files on the common system disk (RA81) and larger ones (about 3-4 times) on the local RD53 which are installed in SYSTARTUP as secondary page/swap files. Why? If the RD53 fails or needs a re-init, I can still setup to run the satellite node by either using just the modest page/swap files on the common system disk or (if necessary) increasing the size of same and running without the RD53. Somehow that feels safer for now.

FJN

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Note 613.0 ACL Problems 7 replies
"Jack Patteeuw" 17 lines 19▪MAR▪1987 16:12

I have noticed two case where the DEFAULT_PROTECTION ACE of a directory's ACL does not work.

First, is the case of NOTES ! I have added the ACE

DEFAULT_PROTECTION,SYSTEM:,OWNER:,GROUP:,WORLD:RW

to NOTE$LIBRARY directory file's ACL. But, lo and behold, new conferences that I create have MY default file protection on them.

Second, if a remote user is accessing a directory via a proxy login the DEFAULT_PROTECTION again does not seem to work.

By the way, it seems a little "dangerous" to have to have NOTES conference files set to W:RW. This means that malicious users could write a program to go in and fiddle around with the data ! Or am I missing something somewhere ?

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Note 613.1 ACL Problems 1 of 7
"C J "Buck" Trayser" 24 lines 23▪MAR▪1987 00:18
▪< Notes has a mind of its own >▪

Hello Jack.

Seems you have come upon one of the favorite questions for 'New Noters'. Because the Notes image is NOT normally installed with privileges then the user needs one of two things: 1) W:RW to be able to write to a conference, or 2) a 'server' that will write for them.

First, the W:RW is a hold over from previous (internal only) versions of Notes in DEC. Future development of Notes will encourage the use of the server. Using the server will eliminate the need to have W:RW.

The file protection is a logical OR (.OR.) of your default protection plus (S:RWE,O:RWE,:RWE,G:RWE,W:RWE) for Note files and your default protection plus (S:RW,O:RW,G,W) for your Notebook.

The best way to get the 'proper file protection' on a conference is to create it in your own directory and then use the command file MOVE_CONFERENCE.COM in SYS$MANAGER: provided by Notes.

$

C J Trayser
360 Interstate North Parkway
Suite 600 ▪ MS: 6/B4
Atlanta, Georgia 30339

==========

Note 613.2 ACL Problems 2 of 7
"Jack Patteeuw" 12 lines 23▪MAR▪1987 Ø9:Ø4
▪< Yes, but ... >▪

If the NOTES program is not installed with privileges (I use the standard startup command files) how can NOTES (or any other non▪privileged program) create files in a directory with a UIC based file protection other that the one specified by the DEFAULT_PROTECTION ACE ? Is this a ACL bug or a "feature"?

One proposal that was put in the SIR was to allow a image to be installed with a identifier. The corresponding data file(s) would be protected with ACL only permitting access via that identifier ! That guarantees on access to the file via the proper image and no special "server" program is required !!

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==========

Note 613.3 ACL Problems 3 of 7
"C J "Buck" Trayser" 18 lines 23▪MAR▪1987 13:47
▪< Notes SPECIFIES its protection mask >▪

I guess I am missing something. Let me see if I got this straight. When Notes was installed it created the directory NOTES$LIBRARY with the 'appropriate' protection. Since then you have placed a DEFAULT_PROTECTION ACE on it which, among other things, is to prevent non▪privileged users from creating conferences. Does this work? Can non▪privileged users create files in this directory? Is the problem that you are using a privileged account and that Notes is setting a protection scheme of (Your Default Protection Mask ORed with its internal protection mask)? If so, this is the intended behavior, as Notes specifically sets the protection scheme, purposefully overriding the default (which is only a *default*, not a *mandatory* scheme).

If this isn't the case how about posting a DIR/SECURITY of the NOTES$LIBRARY.DIR file here.

$

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Atlanta, Georgia 3Ø339

==========

Note 613.4 ACL Problems 4 of 7
"Jamie Hanrahan" 14 lines 23▪MAR▪1987 17:4Ø
▪< I want install▪with▪idents too! >▪

Being being able to INSTALL an image (or, perhaps someday, a command procedure) with one or more identifiers is a great idea. It is closely related to, but more versatile than, the Unix(TM) "setuid" feature. (A Unix user who runs a program or CLI script that has the setuid bit set acquires the user identification, or uid, of the owner of the program or CLI script for as long as it runs.) I understand that Bell Labs has, or had, a patent on this aspect of Unix. DEC may be unwilling to add the "install with identifiers" feature either because they'd have to pay royalties or because of the Not Invented Here syndrome.

Personally, I think they should add it even if they do have to pay royalties. It'd sure make life simpler.

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619▪565▪1865

```
================================================================
Note 613.5                  ACL Problems                  5 of 7
"Larry Kilgallen"                    16 lines  23-MAR-1987 22:57
                 -< No, not the dreaded SETUID! >-
----------------------------------------------------------------
```

r.e. .4: VMS developers have acknowledged the need for capabilities in this area for some time. Their code phrase for it has been "protected subsystem" for several years now. The use patterns of VMS sites seem to be such that the best feature would be a mechanism for file protections which granted access to that file to a particular class of users ONLY VIA A SPECIFIED PROGRAM. No, Jamie, I don't think we want the user to assume the UIC of the owner of a program. Then all implementers of such programs would have to defend against those who would DEFINE/USER sys$output to some file they wanted to trash or at least mask with a new version!

Another key to successful design in this area seems to be that it must allow users to grant access without involving the system manager.

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Box 81, MIT Station
Cambridge, MA 02139-0901

```
================================================================
Note 613.6                  ACL Problems                  6 of 7
"Jamie Hanrahan"                      2 lines  24-MAR-1987 21:55
                      -< no, not setuid >-
----------------------------------------------------------------
```

No, no -- I don't want setuid! I just mentioned it for comparison.

Jamie Hanrahan
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9210 Sky Park Court
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619-565-1865


```
================================================================
Note 613.7                  ACL Problems                  7 of 7
"Jack Patteeuw"                      11 lines  30-MAR-1987 17:47
                      -< I see the light ! >-
----------------------------------------------------------------
```

re: .3

Thanks for explaining it Buck !

Being an old DEC-20 person (yes, another one of those) I thought that the DEFAULT_PROTECTION meant the MANDATORY file protection to be placed on new file (at least that's the way I recall it work on 20's).

I guess there is no way to FORCE a specific file protection on all files created in directory, is there ?

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```
================================================================
Note 614.0       EXPERIENCE w/ SHAREABLE IMAGES        10 replies
"Jan C Ostendarp"                    30 lines  23-MAR-1987 11:35
----------------------------------------------------------------
```

The application programmers here are excellent C programmers but novices with VMS LINKer, creating and using shareable libraries. Hopefully, experienced programmers in the vms environment can make suggestions about the use of shareable images, and shareable libraries.

Some questions:

1. We sometimes get the VMS SECTBLFUL "section table (process/global) is full" at runtime with an image linked to about eight shareable libraries, and sometimes we do not. Is this a matter of altering a SYSGEN parameter or something else, like putting all the shareable images into one library?

2. The manuals suggest that we allow extra room in our transfer vector module for routines to be added. Wouldn't the required recompile/relink take care of this anyway, or are they expecting us to use PATCH?

3. We tend to get Opcode▪reserved▪to▪Digital errors in programs linked with shareable libraries. The debugger dies on them and is no help. Does this happen to anyone else?

4. Global variables in C default to shareable/writeable, which is not what we generally want. Any alternatives to putting the (VAXC specific) readonly and/or noshare qualifiers in declarations?

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==========

Note 614.1 EXPERIENCE w/ SHAREABLE IMAGES 1 of 10
"M. Erik Husby" 25 lines 23▪MAR▪1987 12:42
▪< Shared Image comments >▪

I have had some experience with shared images.

Section Table full ▪▪ most likely SYSGEN parameters. One must have contiguous global page table entries to map a section. The system's global page table can become fragmented just as a disk can; therefore you may need to make the table large enough to hold the maximum number of simultaneous users.

Extra space in transfer vector ▪▪ have not had to do that.

Opcode reserved to Digital ▪▪ have had that occur when there was a mismatch between the shared image's transfer vector and the caller's expectations. Specifically, once relinked a shared image with an old copy of the transfer vector which did not include a new entry point. When an image tried calling the new entry point we got the opcode fault.

Globals ▪▪ one can use the LINKER's PSECT command to assign new attributes ▪▪ no need to change the source code.

Hope these comments help.

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(617)▪661▪1666

==========

Note 614.2 EXPERIENCE w/ SHAREABLE IMAGES 2 of 10
"C J "Buck" Trayser" 5 lines 23▪MAR▪1987 14:00
▪< Upping PROCSECTCNT sometimes helps >▪

You might also want to check PROCSECTCNT. The default of 32 is normally adequate, but bumping it to 40 may be a quick way to 'fix' your problem.

$

C J Trayser
360 Interstate North Parkway
Suite 600 ▪ MS: 6/B4
Atlanta, Georgia 30339

==========

Note 614.3 EXPERIENCE w/ SHAREABLE IMAGES 3 of 10
"John Saunders" 11 lines 24▪MAR▪1987 00:05
▪< Too many PSECTS >▪

Reply to .1:

The problem with using the PSECT option is that you need to apply it to each and every psect (C "extern" variable) that you don't want shared. This can amount to a very large, and constantly changing number of PSECT options.

The C compiler should really give you a "/DONT_MAKE_EXTERNS_SHAREABLE" switch. Does anyone have any idea of what the C developers were thinking of when they implemented this "feature"?

John Saunders
FEL Computing
PO Box 72
Williamsville, VT, 05362
(802) 348-7171

Note 614.4 EXPERIENCE w/ SHAREABLE IMAGES 4 of 10
"Jamie Hanrahan" 32 lines 24-MAR-1987 22:11
-< Fortran does it too >-

> Does anyone have any idea of what the C developers were
> thinking of when they implemented this "feature"?

A C extern variable is implemented just like a Fortran common block -- it becomes an OVR, GBL, SHR .psect, so that the linker can assign it to the same virtual address space as like-named .psects from other object modules. In retrospect it does seem like an unfortunate decision -- I'd rather that NOSHR be the default (in both Fortran and C). About the only time you want them shareable is when you're building a shareable writable section, which you usually want all by itself in an image file anyway.

But we're stuck with it. One way to avoid the proliferation of .psects in C is to treat them more like commons -- group your extern variables into a few extern structs. Then you'll have one .psect per struct instead of one per variable, and your linker option files won't change so often.

Back to the LAVC performance issue -- if the shareable images live on the big machine, keep in mind that you are improving your link performance at the expense of run-time performance, since page faults to the shareable images will have to be resolved by going to the big machine's disks (via Ethernet). Presumably this will be slower than talking to a local disk on your MicroVAX. (Then again, if the MicroVAX's disk is an RD5n, maybe not!)

If you decide to use the shareable version of the VAX-11 C Run-Time Library as well as your own shareable images, read note 578 ("Reserved identifiers in VAX C", if I recall correctly).

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619-565-1865

Note 614.5 EXPERIENCE w/ SHAREABLE IMAGES 5 of 10
"Larry Kilgallen" 2 lines 24-MAR-1987 22:24
-< Disk vs Ethernet speed in LAVC >-

Note that on the VAXstar, Ethernet access is DMA while disk access is not.

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

Note 614.6 EXPERIENCE w/ SHAREABLE IMAGES 6 of 10
"Edgar Zamora" 6 lines 25-MAR-1987 16:22
-< extra room in transfer vector module >-

You should leave room at the end of your transfer vector module so you can update your shareable image (i.e. add new routines, etc.) without needing to relink existing application programs already linked to your shareable image.

Edgar Zamora
Manufacturers Hanover Trust Co.
270 Park Ave.,
New York, NY 10017
(212) 286-5279

```
================================================================
Note 614.7        EXPERIENCE w/ SHAREABLE IMAGES          7 of 1Ø
"Jamie Hanrahan"                    16 lines  25▪MAR▪1987 21:31
            ▪< nope, no need to pad transfer vectors >▪
▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
```

If transfer vectors are used properly there should be no need to relink executables when routines (and corresponding transfer vectors) are added to a shareable image, even if no "padding" existed at the end of the transfer vectors in the previous version of the shareable. When you link the new shareable image, all of the JMPs in the transfer vectors end up pointing to the right places for the routines' new locations. But this is transparent to the executables, which care only about the relative locations of the transfer vectors. I don't know why the linker manual recommends the padding area.

At least one DEC publication (one of the handouts for an Educational Services course) recommended that transfer vectors be quadword▪aligned. To this end, I always put my transfer vectors in a .psect that has the QUAD attribute, and then precede each with a .ALIGN QUAD .

Jamie Hanrahan
Simpact Associates
9210 Sky Park Court
San Diego, CA 92123
619▪565▪1865

```
================================================================
Note 614.8        EXPERIENCE w/ SHAREABLE IMAGES          8 of 1Ø
"John Saunders"                     19 lines  25▪MAR▪1987 22:13
          ▪< Already "common" among Machines >▪
▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
```

Reply to .4:

Unfortunately, our application is already written, and the code we want to make shareable is already implemented on several other machines, with different C compilers.

Also, please note that although FORTRAN programs are often written from the beginning with COMMON blocks which contain many variables, C programs are often written with many individual "extern" variables. We face a major rewrite in order to make our library routines shareable. Not only would we have to rewrite the VMS code, but since these routines are supposed to be identical between machines, we would have to use the VMS code on the other machines as well.

It's unfortunate that DEC's implementation of these two portable languages prevents us from taking easy advantage of this powerful VMS feature. A compiler switch in each language would allow us to continue to use the same code on the VAX as on the other machines.

John Saunders
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PO Box 72
Williamsville, VT, Ø5362
(8Ø2) 348▪7171

```
================================================================
Note 614.9        EXPERIENCE w/ SHAREABLE IMAGES          9 of 1Ø
"Edgar Zamora"                       3 lines  26▪MAR▪1987 11:34
          ▪< more on transfer vector padding... >▪
▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
```

I also don't see the need for extra space at the end of the transfer vector module, as long as the module is updated properly. So why does DEC recommend the expansion space? Anybody know?

Edgar Zamora
Manufacturers Hanover Trust Co.
27Ø Park Ave.,
New York, NY 1ØØ17
(212) 286▪5279

Note 614.10 EXPERIENCE w/ SHAREABLE IMAGES 10 of 10
"Jan C Ostendarp" 27 lines 27-MAR-1987 17:13
-< Shareable images: psects and symbols >-

Some further notes on our experience with shareable images and VAX C:

In regards to the SECTABLFUL error (RE: 614.0), we reduced the image's number of psects by using (non-portable) VAX C storage classes GLOBALDEF, GLOBALREF which place external variables in the $CODE or $DATA psect depending on whether the readonly modifier is included. Since $CODE and $DATA are NOSHR we no longer have the shareable writable default for VAX C extern variables. We prefer this approach to bumping-up PROCSECTCNT or GBLSECTIONS (Sysgen Parameters).

We have learned the difference between UNIVERSAL and GLOBAL symbols in the linker. We think this is related to the opcode-reserved-to-Digital error mentioned 641.0. In a shareable image, we had declared as a global symbol an array of pointers to functions which had bogus addresses at run-time. By specifying in the linker option file "UNIVERSAL=<array_name>" we caused the error to go away, we think because the symbol then became accessible (had scope) throughout the entire executable image, and not just in the shareable image where it lived. However, we do not really understand why this was necessary, since the array in question was only ever referenced inside the shareable image.

became (we think). addresses

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

Note 615.0 MASS-11 w/XEROX 3700 printer No replies
"Jan C Ostendarp" 8 lines 24-MAR-1987 01:43

Anyone out there using MASS-11 wp on the VAX have a printer definition description for the XEROX 3700?

MEC (vendor) has the def. table for a XEROX 2700 but not the 3700. It's not a bad place to start but I'd like to avoid the job altogether. Many Thanks.

Jan O.

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

Note 616.0 Experience w/RDB,RALLY,TEAMDATA? No replies
"Jan C Ostendarp" 16 lines 24-MAR-1987 02:45

VMS layered products such as Rdb, Common Data Dictionary, TEAMDATA and RALLY are Digital's offerings for Database management, reporting, and ad-hoc query applications. Does anyone out there with experience using these products have impressions, war stories, or accolades? Specifically, TEAMDATA and RALLY. How do these stack-up to other vendor's products? (RTI's Ingres; QUEL, SQL, QBF, Report Writer, EQUEL, etc. or Oracle;...). I have heard some benchmark information comparing VAX/RDB and INGRES query processing performance but I'm more interested in general issues. (although performance IS an important issue with RDB's-generic. What are the strengths and weaknesses of these products?

Anyone used of VAX Xway?

Jan O.

Jan C Ostendarp
Massachusetts Financial Services
200 Berkeley Street
Boston, MA 02116

```
================================================================
Note 617.0                      INSTALL                  3 replies
"MICHAEL GRATTAN"                        15 lines  27-MAR-1987 13:50
----------------------------------------------------------------
```

Please forgive this novice VMS user, but my MicroVAX does not have full documentation and 'they' don't want to get me any yet. (I've tried pleading...)

I have some sharable libraries and applications which I would like to put into memory using INSTALL. Could you please tell me:

A) If I should INSTALL them shared or not and what's the difference is?

B) How do I figure out how much GBLPAGES etc. each file is going to use.

I would greatly appreciate any assistance.

MICHAEL GRATTAN
FAIRHAVEN CORP.
358 BELLEVILLE AVE.
NEW BEDFORD, MA. 02742
617-993-9981 EXT 106

```
================================================================
Note 617.1                      INSTALL                  1 of 3
"Larry Kilgallen"                        24 lines  27-MAR-1987 21:06
                    -< One person's advice >-
----------------------------------------------------------------
```

Given that you are going to INSTALL the images anyway, the decision as to whether to use /SHARED should be based on whether multiple users will be accessing them at the same time. (On MicroVAXen this answer is not obvious without knowing how you use the machine or plan to use the software). If each program will only have a single user at a time, it will not help to use /SHARED.

If your images should include any Writeable shareable program sections, you will have to use the /WRITEABLE qualifier when installing them /SHARED in order for them to function properly. This presumes, of course, that creation of writeable shareable program sections in the images was not just a coding error.

Even if you had the linker manual, poring over link maps to find the global page requirements for a particular image is a painful experience. I would suggest instead that you install your images one at a time and use the LIST/GLOBAL command in the INSTALL utility to find out how many global sections each uses.

By the way, you do at least have the full MicroVMS doc set, don't you (4 short binders)?

Larry Kilgallen
Box 81, MIT Station
Cambridge, MA 02139-0901

```
================================================================
Note 618.0          $set time and ETHERNET          2 replies
"CHUCK MCMICHAEL"                    13 lines  30-MAR-1987 10:04
----------------------------------------------------------------
```

We use a pair of VAX 11/750's connected via DELUAs on the ETHERNET.

Recently one of our staff had to correct one VAX's time of year clock by issuing a $SET TIME for one hour in the past. The 2nd VAX then logged a DECNET event 4.18 (Line UNA-0 Adjacent node listener receive timeout) that lasted until the 1st VAX's toy clock progressed past the moment the $SET TIME had been issued. Our other line between the machines (DMF-0) was unaffected.

Apparently the DELUA depends on the toy clock to decide when to send the next "here I am" message. For obvious reasons, we haven't experimented with setting the clock ahead or turning off DECNET before issuing the $SET TIME, but with daylight savings time coming up soon, I thought I should mention this to all new ETHERNET users.

CHUCK MCMICHAEL
PITTSBURGH CORNING CORP
800 PRESQUE ISLE DR
PITTSBURGH PA 15239
412-327-6100

```
================================================================
Note 618.1              $set time and ETHERNET              1 of 2
"George Walrod"                          7 lines  30#MAR#1987 14:05
                        #< Another Victim >-
----------------------------------------------------------------
```

I've had the same problem with DECnet as a whole, an submitted an SPR. Their (DEC) response was that the TQE (Timer Queue Elements) that were queued by DECnet were being thrown off by the time being set forward or backward. If you thought that was bad, you should try it on a 5 node VAXcluster. I not sure if they told me that DECnet has its own type of timer queue (if that sense). Finally as usually FIXED IN FUTURE RELEASE. signed another victim.

George Walrod
4260#b chain bridge rd
fairfax, va 22030

```
================================================================
Note 618.2              $set time and ETHERNET              2 of 2
"Jamie Hanrahan"                         5 lines  30#MAR#1987 16:20
                  #< I thought that was fixed >#
----------------------------------------------------------------
```

That problem was supposed to have been fixed under V4.5. (See note 574.3 for a more complete discussion.) As far as I can tell, it *is* fixed: I tried setting the clock back on our MicroVAX a little while ago to see if the problem would occur, and all was well...

Jamie Hanrahan
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9210 Sky Park Court
San Diego, CA 92123
619#565#1865


```
================================================================
Note 619.0              unwanted formfeed                   1 reply
"CHUCK MCMICHAEL"                        12 lines  30#MAR#1987 10:11
----------------------------------------------------------------
```

Somewhere in VMS 4.x, the print spooler began forcing a formfeed before the 1st print job each morning when the VAX is powered up. This apparently is to flush the printer's buffer, but when the printer has numbered forms (i.e. checks), this is a royal pain.

Our previous workaround was to print a dummy file before the printer itself was turned on. Now that the terminal we use to print has been hooked to a DECserver 100, this "solution" works randomly 50% of the time.

Has anyone overcome a similar problem? Is the formfeed coming from the symbiont or the job controller? How can we kill it?

CHUCK MCMICHAEL
PITTSBURGH CORNING CORP
800 PRESQUE ISLE DR
PITTSBURGH PA 15239
412#327#6100

```
================================================================
Note 619.1              unwanted formfeed                   1 of 1
"Jack Patteeuw"                          14 lines  30#MAR#1987 17:39
       #< So you can draw pretty pictures on them ... >#
----------------------------------------------------------------
```

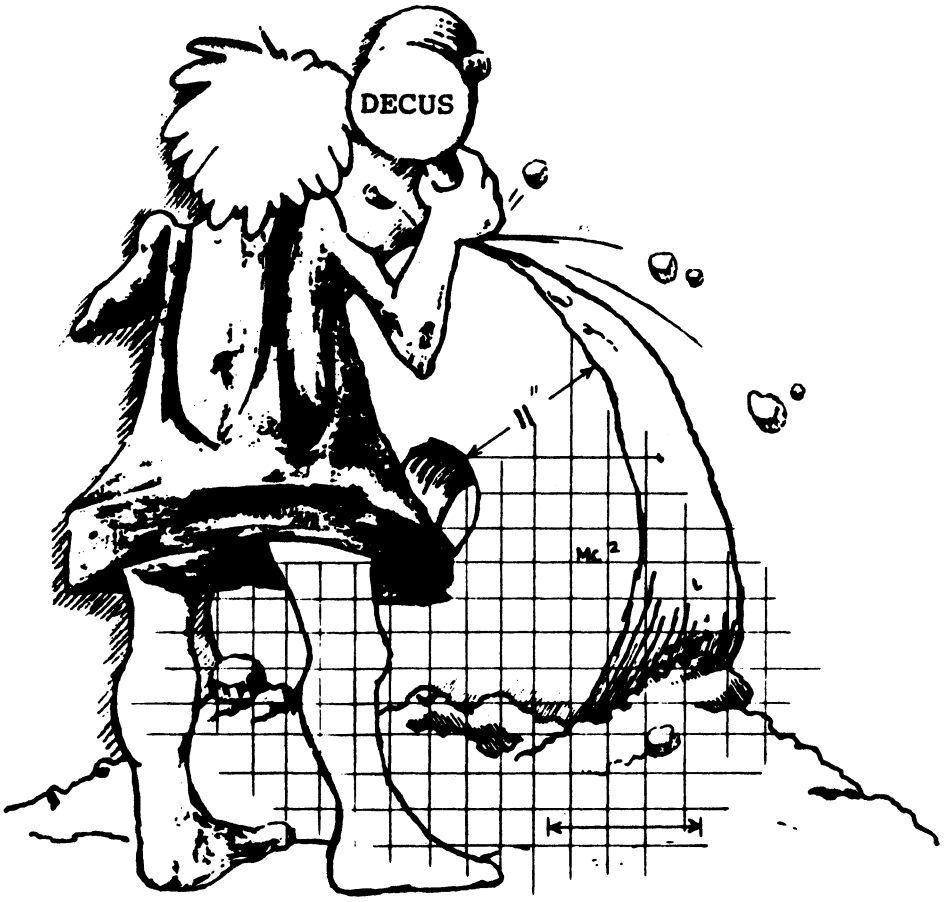
DEC is obviously in "kahutz" with several paper vendors because they really love to throw out those <FF>'s !

My experience is that whenever a Queue is started ($START/QUEUE or $INIT/START/QUEUE) the first thing the Print Symbiont does is send out a <FF> (this is on a terminal queue). This is not documented anywhere that I can find, but we have verified this at our site.

Additionally, if you use SETUP modules and they contain more than "standard" escape sequences, the Symbiont will throw a <FF> after the SETUP module is transmitted to the printer. This IS documented, but I can't think for the life of me why they would do such a thing. Now my users with non#DEC laser printers get

DECUS

LIBRARY



DECUS PROGRAM LIBRARY

DECUS PROGRAM LIBRARY CHANGES

DECUS NO: 11-179, **Title:** Fast Fourier Transform Routine Please note "Documentation available in hardcopy only".

NEW LIBRARY PROGRAMS AVAILABLE FOR THE PDP-11 COMPUTER FAMILY

DECUS NO: 11-SP-96 **Title:** Reese's PiecesVersion: October 1986

Submitted by: Frank R. Borger, Michael Reese Medical Center, Chicago, IL **Operating System:** IAS V3.2 **Source Language:** FORTRAN 77, FORTRAN IV, FORTRAN IV-PLUS, MACRO-11, REESE BASIC **Keywords:** Utilities - IAS

Abstract: Reese's Pieces is a collection of programs that are used at Michael Reese mostly as operational aids. Some are enhancements or additions to IAS functions, some are RSX-11M programs updated to operate under IAS, some are just fun.

1,10	Lots of programs, a catchall account.
1,12	The INForm package, updated for version 3.2.
1,16	DUPLEX and XMIT, updated for IAS (term emulators).
1,22	BRU and DSC tape directory pgms, unknown tape listers, tape copy programs, our on-line ROLLIN image mode disk save pgms.
1,25	COOKIE, DAMMIT, HEADACHE, MURPHY and MAY, smart remark pgms.
1,26	Programs to list the external page, software used to generate bootstrap roms for non standard device addresses.
1,30	Programs to help you patch disks, examine FCS file structures, show disk activity, recover lost files, show file attributes.
1,31	Screen based clock, and system display.
1,32	An RSX mail program, updated to run on IAS, (Uses Reese style login info, but could be adopted to regular IAS.)
1,40	Program to list current FCB's in use.
1,2	MRH HELP, help modified to use multiple help files, instead of one humongous file, so its faster. For a command of AID ZAP, help first tries to use ZAP.HLP, then defaults to MCR.HLP.
DR1:1,10	Much of the documentation for packages in
1,6	Reese's Pieces errors, aids to process error logging reports, and some simple on-line diagnostic aids.
[11,13]	Contains the sources to HEL, BYE, etc. that were developed to let an MCR based system use the protection features of a PDX system. Passwords, etc. are in the user profile file, with a modified version of the protection code. Also has same login for batch. (Modified task image of pdx is included.) Also includes a catchall task that does some one-line DCL style commands, (DIR,PRINT,etc.)
[1,100]	*.sys Basic programs used to update the user profile file. *.bas Programs to aid in logging, accounting, etc. pdsupf-.virA virgin file, with only SYSTEM and SCITERMINAL autostart.dat command file for autostarting selected users. Note that we still use an older format of the PDSUPF.DAT file.
351,70	Contains VTL, a VT100 terminal listing program, commands like KED, options for viewing 2 files, lots more.
351,72	VAX style directory command, short version with multiple entries per line, full version with all file attributes.
351,73	ECR, Editing MCR. MCR with command line editing, much more.

Media (Service Charge Code): 2400' Magnetic Tape (PC) **Format:** BRU

DECUS NO: 11-865 **Title:** LOGDIR **Version:** V1.1, January 1987

Submitted by: Andreas G. Schindler, Darmstadt, Fed. Rep. Germany D - 6100 **Operating System:** RT-11 V5.1 - 5.3, TSX+, SHARE **Source Language:** FORTRAN IV, MACRO-11 **Memory Required:** 8/11KW (overlaid/non-overlayed) **Software Required:** RT-11 Syslib **Hardware Required:** Extended Instruction Set (EIS) **Keywords:** Utilities - Disk - RT-11

Abstract: LOGDIR is a special directory program designed to give directory listings of nested logical disks without mounting them. It provides an ANSI mode for use with VT100 like terminals, producing a "tree of files" in full screen depiction (similar to the VAX/VMS "Dirtree" utility). All directory structured devices that can be accessed via a RT-11 handler are supported (i.e. disks, VM:'s and LD:'s). LOGDIR accepts wildcards and a fine choice of switches for easy file scanning. Hardcopy output on any device is supported as well. The program needs about 11KW of memory and has been successfully run under RT-11/SJ/FB/XM, TSX+ and SHARE+.

Notes: XM-version provided requiring only l.5KW of low memory.

Media (Service Charge Code): One RX01 Diskette (KA) **Format:** RT-11, 600' Magnetic Tape (MA) **Format:** RT-11

NEW LIBRARY PROGRAMS AVAILABLE FOR THE VAX/VMS FAMILY OF COMPUTERS

DECUS NO: V-SP-61 **Title:** Symposium Collection from the VAX SIG, Fall 1986, San FranciscoVersion: Fall 1986

Submitted by: J. L. Bingham, Mantech Services Company, Alexandria, VA **Operating System:** VAX/VMS V4.X **Source Language:** BLISS-32, C, MACRO-32, PASCAL, VAX BASIC, VAX FORTRAN **Keywords:** Symposia Tapes - VMS

Abstract: This submission contains the programs submitted to the VAX Systems tape copy effort at the Fall 1986 DECUS U.S. Symposium in San Francisco, California. The programs have been placed in two major backup sets named VAX86C and VAX86D. The following is a brief summary of the contents of the collection:

VAX86C

[.AKCOUNT]	VMS chargeback accounting package and resource accounter.
[.BCLUG]	VMS performance monitor system.
[.BULLETIN]	VAX Bulletin Board and Notes System.
[.CENTRAL FLORIDA]	Color representation on the VT-241 and LCP01. Set colors on a VT-241. TPU EDT enhancements.
[.CLEMENT]	A set default program, a directory wipeout procedure, a spying program, Bonner Lab RUNOFF, TPU EDT extensions.
[.DUFF]	STRETCH - performance analysis system for capacity planning. Structured Cluster Management talk command files.
[.EDTPLUS]	Enhanced emulation of EDT in TPU.
[.SYSTEMS]	ADA pretty printer. PASCAL pretty printer. TeX procedures for unsophisticated users to create memos, contact reports, slides, etc. using LaTeX.
[.FPAINT]	Data entry manager for use with FORTRAN.
[.FRANCE]	Font editor for LNO3 which allows you to use TeX type fonts on LNO3 (or to use fonts from TeX).
[.GAMES. CONQUEST]	Multiplayer realtime spacewar game based on Empire.
[.IIT]	Integrated accounting facility for academic systems. Network print symbiont for full function remote printing over DECnet.
[.KAZ]	EDT and EDT TPU emulator customizations & docs.
[.LATSHAW]	EDTEM - TPU based editor using EDT keypad. Utilities for doing binary DEC-IBM and IBM-DEC conversions.
[.MIVAXLUG]	Image to make a VMSINSTAL-able KERMIT. SEEALL mode for TPU. DRAWTREE update.
[.NSWC]	SD utility update. Reminder utility update.
[.PAGESWAPR]	Pageswapper articles since last tape.
[.RIGS]	Extensions to C library with equivalent of Un*x "system" function and some support routines.
[.SEALUG]	Conversational DECnet link. Netsubmit -submit jobs across net. SWAP (become another user) update.
[.SIXTPU]	SIXEL - program to plot ReGIS graphics to sixel files. Program to dump to LA100. Additions to EDT interface to TPU.
[.TPUWPS]	WPS-PLUS emulation in TPU.
[.UAB]	Foreign Tape processor. ASCII or EBCDIC. SMAUG - process to lower priority of CPU hogs, raise it again when they use less CPU.
[.UALR]	Full function bulletin board system for VAX.
[.VIEWRPT]	NEWS utility. REMOTE - issue commands across DECnet. SNOOPY - continuous user monitor to watch what a process is doing. VIEWSYSTEM -watch what's going on on the whole system.
[.WKU]	compile, link and execute a program in any language.

VAX86D

[.BIBLE]	Full text (uppercase only) of King James Version of the BIBLE (compressed).
[.BNELSON]	BITNET interface programs, KERMIT-11 Version 3.54, a fast tape-disk-

	tape copy program (VMSTPC), and the TED fullscreen editor for VMS (native mode), RSX, RSTS, and P/OS.
[.DTRSIG]	DTR defs for ALL-IN-1 logging or WPS-PLUS logging. User defined functions including SPAWN and string length. Wombat Examiner issues. Transcripts of some Symposium sessions.
[.FERMILAB]	EDTX extended EDT. Modified VAX C include files for system items not in Digital Equipment Corporation distributed files.
[.FERMLIB]	Device Independent Graphics Systems.
[.ICON]	This is Version 6.0 for VAX and 5.9 for MSDOS of the ICON programming language, which is a next generation text language with some SNOBOL antecedents.
[.LEVINE]	Includes several packages for reducing disk fragmentation.
[.RCAF86]	AnalytiCalc update (Version 21.2) with cell annotation. Update to VMS GNU EMACS.
[.MISC.	Various utilities and informational items
CSNETITM]	from CSnet mail.
[.SPELL]	Spelling checker for TPU/EVE, plus a standalone version.
[.VMSKERMIT]	Maintenance release of KERMIT-32. This version (3.3.111) fixes several bugs and now works correctly with FILE TYPE FIXED files with short final blocks.

Notes: Some submitters did not submit sources, most did. Many of the filenames violate VMS version 3.x naming conventions so you will get RMS errors if you try to load the programs on a version 3 system. Since most people are on version 4 by now, no attempt has been made to make the names compatible with version 3.

Restrictions: See individual AAAREADME.TXT files.

Complete sources not included.

Media (Service Charge Code): 2400' Magnetic Tapes (PB) **Format:** VMS/BACKUP, TK50 Tape Cartridge (TC) **Format:** VMS/BACKUP

DECUS NO: VAX-233 **Title:** Computer Modern Font Files and Build Procedures **Version:** October 1986

Author: John Sauter

Operating System: VAX/VMS V4+Source Language: DCL **Software Required:** METAFONT **Hardware Required:** Digital Equipment Corporation LN03 Laser Printer **Keywords:** Interface Routines, Utilities - VMS

Abstract: This is a collection of Computer Font files as well as the VMS command procedures which build them for use on a Digital Equipment Corporation LN03 laser printer using METAFONT device-dependent parameters. There are 75 standard fonts in the standard 7 magnifications, Computer Modern Symbols in 12-point and Computer Modern Sans Serif.

The collection includes the alternative parameter files and the resulting .TFM and pixel files for the Digital Equipment Corporation LN03.

Release Notes are distributed with each order.

Restrictions: Requires two and one-half days CPU time on VAX-11/785 to build files. However, all files have been included.

Documentation not available.

Media (Service Charge Code): 2400' Magnetic Tape (PC) **Format:** VMS/BACKUP

DECUS NO: VAX-235 **Title:** CAYENNE **Version:** 2G.6, January 1986

Submitted by: Digital Equipment Corporation **Operating System:** VAX/VMS Version 4.4 **Source Language:** FORTRAN 77, MACRO-32 **Memory Required:** Normal config. - more is faster. **Keywords:** Circuit Simulation

Abstract: CAYENNE is a parallel version of Berkeley SPICE 2G.6, DECUS Part No. VAX-216. It utilizes the PlibV2 parallel library routines. The purpose of CAYENNE is to run a parallel version of SPICE 2G.6 on any VAX/VMS multi-processor, which at this time includes the VAX 8300 and the VAX 8800. CAYENNE will also run on a single processor VAX.

A set of routines which embeds the parallelization methodology used for CAYENNE and greatly facilitates parallel program development is given in the file CAYEN-.FOR. This file along with the files PLIBFOR.FOR and PLIBMAC.MAR form the library of routines developed for the CAYENNE methodology.

Two SPICE input files are also in the directory: BJTADDER.SPI and MOSADDER.SPI. Outputs for these input files are: BJTADDERBST.SPO and MOSADDERBST.-SPO. These files will verify the CAYENNE application.

Benchmarking this application on a VAX 8300 MP has yielded performance results from 1.5 to over 1.8 times the single stream version of SPICE. Results will vary due to the size of the data sets. Larger SPICE 2G.6 data sets will tend to yield greater performance; hence greater throughout.

Several command procedures have been included for ease of use. CAYENNE may be run in single stream or as a parallel application by specifying the number of subprocesses desired. The specification of zero subprocesses, at start up, would yield a single stream execution of CAYENNE, while a specification of two subprocesses would be ideal to run CAYENNE in parallel across two processors.

Notes: Two input (demo) files are included as mentioned in the read_me.first file.

Restrictions: U.S. Government export regulations prohibit the distribution of this program outside of the United States without the appropriate export licenses.

Media (Service Charge Code): 600' Magnetic Tape (MA) **Format:** VMS/BACKUP

DECUS NO: VAX-238 **Title:** VMS Disassemblers Package **Version:** V1, February 1987

Author: Claus Calle, Andy Parlin and others

Operating System: MicroVMS, RSX-11M, VAX/VMS **Source Language:** MAC RO-32, PASCAL, VAX FORTRAN **Keywords:** Disassemblers

Abstract: Two VMS disassemblers capable of creating MACRO-32 sources from VMS native mode images are presented. All sources and brief documents are present, and one contains compiled executable code so that it can be used by sites without FORTRAN. The disassembler so presented is capable of disassembling user mode images, drivers and other system images reasonably intelligently, but there are areas in which it is incomplete, notably not having ALL possible RMS control block types recognized separately.

A few tapecopy VMS utilities and things are also included on the tape as a general convenience for users.

Media (Service Charge Code): 600' Magnetic Tape (MS) **Format:** VMS/BACKUP

NEW LIBRARY PROGRAMS AVAILABLE FOR THE PROFESSIONAL-300 SERIES OF COMPUTERS

DECUS NO: PRO-166 **Title:** FSTATS: Statistical Analysis Package **Version:** V1.0, January 1985

Author: Margaret Quince et al., Lincoln College

Submitted by: Stephen Hirsch, NZAEI, Lincoln College, Canterbury, New Zealand 8150 **Operating System:** RT-11 V5.1 **Source Language:** FORTRAN IV **Memory Required:** See Restrictions **Hardware Required:** EIS, FPU **Keywords:** Mathematical, Professional-300 Series -RT-11, Statistics

Abstract: FSTATS is a package of statistical routines which can analyze up to 1000 floating point variables in up to 100 groups. It includes the following options:

Data Editor, Wilcoxon's Matched Pairs Signed Rank Test, Fisher's Exact Prob. Test, T Test Paired, Histogram, Linear Regression, One Way Analysis of Variance, Graphs of Data, Data Summary, Chi Square Test on I x J Contigency Table, Pearson's Correlation Coefficient, T Test Unpaired, Mann Whitney U Test, Spearman's Rank Correlation Coeef., Kruskal-Wallis Analysis of Variance, and Transformations of Data.

Because of it's size, FSTATS must be linked as a virtual job-it's high limit is 28543 words + the OTS work area. It can be linked using full high memory overlays which will use about 80000 words of memory or using disk overlays, this can be reduced to about 32000 words plus the operating system.

This version of FSTATS was originally developed on a system running IAS and was converted to run under RT-11 on a Professional 325. There are almost certainly minor bugs in the program as it has not been used extensively yet.

The Inline FORTRAN Compiler was used in program development - no responsibility can be taken for successful linking if the threaded code compiler is used.

Restrictions: Program was developed using the FORTRAN Inline Compiler an a 11/23 CPU with EIS and FPU. Because of memory allocation problems, there may be difficulties using a system with different hardware. For memory required, 80000 words or using disk overlays, this can be reduced to about 32000 words plus the operating system.

Media (Service Charge Code): One RX50 Diskette (JA)

REVISIONS TO LIBRARY PROGRAMS

DECUS NO: 11-SP-72 **Title:** Reese BASIC **Version:** September 1986

Submitted by: Frank R. Borger, Michael Reese Medical Center, Chicago, IL **Operating System:** IAS V3.2, RSX-11M, VAX/VMS V4.2 **Source Language:** MACRO-11 **Hardware Required:** FPP or emulator **Keywords:** BASIC, Language Interpreters, Programming Languages

Abstract: Reese BASIC is a highly upgraded version of what used to be a DECUS library program for DOS.

- Full FILES-11 I/O is supported, (fixed length random access, shared mode, etc.).
- String functions and user defined functions are much more flexible than in either the original version or in Digital Equipment Corporation's BASIC-11.
- Multi-user implementation is supported with separate pure and impure areas (IAS and RSX-11D only).
- Since it is an interpreter, it includes the special debugging commands: STEP, CON and SET TRACE.
- Although an interpreter, significant manipulation of

the source program is done to speed up operation.
. OVERLAY and a data preserving CHAIN are also supported.
. A clean "break" feature is implemented via the TT
. handler.
. A number of BASIC-PLUS-2 like features have been added including: virtual arrays, integer and byte variables, continued lines and IF-THEN-ELSE.
. The capability of SPAWNING another task is supported.

Media (Service Charge Code): 600' Magnetic Tape (MC) **Format:** BRU

DECUS NO: 11-433 **Title:** LISP for RSX-11 and Micro/RSX **Version:** October 1986

Submitted by: Maximilian Hadersbeck, Ludwigs-Maximilian-Universitat, 8 Munchen 40, West-Germany **Operating System:** Micro/RSX V3.0, RSX-11M V3.2 **Source Language:** MACRO-11 **Memory Required:** 10-28K **Software Required:** MACRO and the Advanced Programmer Kit for Micro/RSX. Keywords: LISP

Abstract: This version of LISP is written entirely in the PDP-11 MACRO by Chris Meyers, Eugene, OR. It has a minimum of system calls to make it easy to adapt it to other operating systems.

This revised version works as it is under Micro/RSX V1.0, RSX-11M PLUS V2.1 and RSX-11M V4.1. The delivered command files and installation files make it very easy to install the LISP system under the previous named operating systems.

With the package, some examples of LISP programs, like an algorithm for proving theorems out of the logic - calculus (Wang - Algorithm) and the Ackermann function are delivered.

The support programs LINT and SAVLSP written by Chris Meyer are also in this package. These were both written in FLECS which is a FORTRAN preprocessor. The resulting FORTRAN code is also there. LINT is very handy to both produce a readable LISP program and to eliminate those bugs due to miscounting parans. SAVLSP is very system dependent and is running only on an IAS system.

Notes: See 11-347 for the RSTS version of LISP-11.

Changes and Improvements: New examples and a complete new installation. Command-files suited for Micro/RSX and RSX.

Media (Service Charge Code): One RX50 Diskette (JA) **Format:** FILES-11, 600' Magnetic Tape (MA) **Format:** FILES-11

DECUS NO: 11-665 **Title:** PB: Device Handler for Data I/O System 19 Prom Programmer **Version:** March 1987

Submitted by: Michael M. Iloff, Moses Electronics, 7000 Stuttgart 1, West Germany **Operating System:** RT-11 V5.4 **Source Language:** MACRO-11 **Memory Required:** 582 words **Hardware Required:** Data I/O System 19 Universal Programmer 990-1900 **Keywords:** Device Handlers, PROM

Abstract: This handler was derived from Digital Equipment Corporation's PC11 high speed paper tape reader in order to allow for device-independent execution of file and command transfer via PIP.SAV to and from the DATA I/O SYSTEM 19 UNIVERSAL PROGRAMMER 990-1900 via a DLV11-J line at address 176520 and vector 320. It needs a running line time clock under a system generated monitor with device timeout feature for reading from the programmer device.

Notes: The system is generated with a device-timeout feature.

Changes and Improvements: XM bug fixed, address set code added plus see PB.MAC header plus adapted to V5.4.

Restrictions: Running line time clock. RT-11 version 5.4 is required due to new device handler macros.

Documentation not available.

Media (Service Charge Code): One RX01 Diskette (KA) **Format:** RT-11, 600' Magnetic Tape (MA) **Format:** RT-11

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*	VAX-LIB-5	VAX LIBRARY TAPE #5
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	V-SP-48	BEST OF PC-8088 COLLECTIONS 1-8
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You can submit material to either the editor, Bill Walker, or the assistant editor, Carmen Wiseman. We can accept submissions in a wide variety of formats:

- Items can be sent to the assistant editor on VMS format RX50s or IBM PC format 5 1/4" floppies.
- The editor can handle just about any reasonable media, but prefers RT-11 format diskettes.
- Hard copy, like cash, is always acceptable. If it is camera-ready it will save us a lot of typing, but we don't insist on it. You can also use the "Hardware Submission Form," which you will find in the "Questionnaire" section of the combined newsletters.
- Those of you that have access to DCS can send things to WALKER or WISEMAN. DCS is usually checked on a daily basis.
- You can reach the editor on CompuServe as "Bill Walker 71066,24" or via EasyLink mailbox 62752448. You can reach the assistant editor via EasyLink mailbox 62960090 (be sure to say ATTN: or TO: Carmen Wiseman somewhere in the message).

In any event, <u>if you have anything to submit, send it!</u> If it is a mess, but we can read it, we will get it in the newsletter somehow. Finally, if you have any question about submitting material, call one of us. The telephone numbers are listed below.

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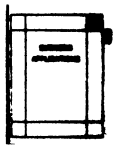

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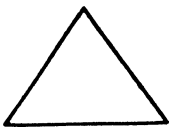

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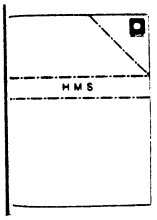

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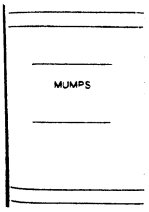

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2. Annotate your attachments. Simple comments or hand-written notes ("Everything worked until I added this statement.") go a long way toward identifying the problem.

3. Keep an exact copy of what you send. And number the pages on both copies. But send everything that is related to your question, even remotely.

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A PIR should be directed at a specific product or group of products. Be sure to give the full name of the product(s) and version numbers if applicable. Describe the functionality you would like to see in as complete terms as possible. Don't assume that the PIR editors or software developers know how it is done in some other software product - state specifically how you want the software to function. Provide justification of your request and give an example of its use. If you can, suggest a possible implementation of your request.

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DTR/4GL SIG Volunteer
1987 Spring Symposia, Nashville

April 27, 1987 to May 1, 1987

I would like to volunteer to be a session chair or suite host for the DTR/4GL SIG at the 1987 Spring DECUS Symposium in Nashville, April 27 to May 1. I can meet in the DTR/4GL Suite at 5:30pm on Sunday, April 26 for final assignments and instructions. I have indicated my first (1) to fifth (5) choices for assignments.

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I would like a letter to my boss.
Boss' name: _____
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Monday, April 27
|_| 10:00-11:00am Positioning Digital's Fourth Generation Language Products
|_| 11:00-12:00pm Beginner's Guide to DATATRIEVE
|_| 1:00- 1:30pm Understanding VAX POWERHOUSE Screen Processing
|_| 1:30- 2:00pm POWERHOUSE Hints and Kinks
|_| 2:00- 3:00pm VAX DATATRIEVE Status Update and Internals
|_| 3:00- 4:00pm Using VAX DATATRIEVE Graphics
|_| 4:00- 5:00pm VAX TEAMDATA - End-user Information Management
|_| 5:00- 6:00pm VAX RALLY - Fourth Generation Application Development System
|_| 6:00- 7:00pm POWERHOUSE Working Group Meeting
|_| 7:00- 8:00pm Designing Applications with FMS and DATATRIEVE
|_| 8:00- 9:00pm Solving Equations in DATATRIEVE
|_| 9:00-10:00pm Dealing with Hierarchies in VAX DATATRIEVE

Tuesday, April 28
|_| 10:00-11:00am What's Wrong with Fourth Generation Languages
|_| 11:00-12:30pm RMS Based 4GL Development Tools
|_| 11:30-12:30pm The Best of Wombat Magic
|_| 12:30- 1:30pm ACCENT R Simultaneous Update and Advanced System Functions
|_| 1:30- 2:30pm Using ACCENT R Data Sets with SPSS-X and RMS Indexed Files
|_| 2:30- 3:30pm DATATRIEVE Application Design Considerations and Tutorial
|_| 3:30- 4:30pm Performance Management for DATATRIEVE Applications
|_| 4:30- 5:00pm CDD Optimization for Performance
|_| 5:00- 6:00pm Advanced RMS File Design & Tuning for DATATRIEVE Performance
|_| 5:00- 6:00pm VAX REPORTER - A Business Reporting Package

Wednesday, April 29
|_| 9:00-10:00am Everything You Wanted to Know About DATATIEVE-11
|_| 11:00-12:00pm VAX DATATRIEVE's Interface into Relational Databases
|_| 1:30- 2:30pm Using the DATATRIEVE Call Interface
|_| 2:30- 3:00pm DATATRIEVE Call Interface and SPSS-X

Thursday, April 30
|_| 9:00-10:00am How to Evaluate Fourth Generation Languages
|_| 10:00-11:00am A Software Developer's Comparison of 4GLs
|_| 11:00-11:30am Selecting an Application Development 4GL
|_| 11:30-12:30pm Using a 4GL to Enhance Manufacturing Software
|_| 12:30- 1:00pm Using SMARTSTAR to Complement DATATRIEVE
|_| 1:00- 2:00pm Advanced DATATRIEVE Record Definitions
|_| 2:00- 3:00pm Advanced Report Writing Techniques in VAX DATATRIEVE

|_| 3:00- 4:00pm Writing Menu-driven Systems in VAX DATATRIEVE
|_| 4:00- 5:00pm VAX DATATRIEVE Security Using Environment Accounts & ACLs
|_| 4:00- 6:00pm VAX RALLY: Advanced Usage
|_| 5:00- 6:00pm Adding Functions to VAX DATATRIEVE
|_| 6:00- 7:00pm System Management Techniques Using DATATRIEVE

Friday, May 1

|_| 9:00-10:00am MANTIS - A Fourth Generation Language for the VAX
|_| 10:00-10:30am Prototyping in Fourth Generation Languages
|_| 10:30-11:00am A Comparison of CDD and VAX POWERHOUSE PHD Dictionaries
|_| 11:00-11:30am DATATRIEVE vs POWERHOUSE QUIZ Report Writers
|_| 11:30-12:30pm Application Development Using INTELLECT/Rdb

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	|_| 9:00-10:00am	|_| 9:00-10:00am	|_| 9:00-10:00am	|_| 9:00-10:00am
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IAS SIG MEMBERSHIP SURVEY

Name: _____

Address: _____

_____

_____

_____

Telephone: _____

Current Hardware: (Include number and type of processors, mass storage devices, communication devices, etc.)

IAS Release: (Indicate release of IAS under which these systems are running)

Software: (Indicate software running on these systems, i.e., DECNET, Decus C, etc.)

Application: (Indicate the type of application running on the system.)

Contacts: Would you be willing to be placed on a list of contacts? If so, what areas?

Features: Do you have any features which you would like IAS to include?

Any further comments?

IAS SIG MEMBERSHIP SURVEY

fold

Frank R. Borger
Michael Reese Medical Center
Dept of Radiation Therapy
Lake Shore Drive at 31st Street
Chicago Il 60616

Languages & Tools SIG

MASTERS APPLICATION

Name: _____ **Title** _____

Company: _____

Address: _____

_____

_____ **Phone:** ( ) _____

Network Address: _____

The Languages & Tools SIG has established the designation "LANGUAGES AND TOOLS MASTER", to be applied to selected, qualified people willing to share their expertise in various subjects with others. Masters are people who are knowledgeable enough in one or more languages and tools to be comfortable answering questions about them. The qualifications of an L&T Master are: expertise in a specific area, a willingness to have his/her name published as a Master, and a willingness to volunteer services in different ways. Each product may have several Masters, and there is an overall Masters Coordinator who sits on the L&T Steering Committee.

Masters are asked to serve other users (and, under some circumstances, DEC), as a resource on products within their competence. In addition to being listed in the L&T Masters Directory (published in the newsletter) as available for occasional telephone consultation, Masters may act as 'Doctors' at Symposium Clinics, present Symposium sessions on the products of interest to them, field test products, interact with DEC product managers when appropriate, or act as a reference for a product for Digital salespeople. Especially on mature products, the SIG is anxious for knowledgeable users to offer product tutorial sessions at Symposia, and Masters can be of great help here. At Symposia, Masters will wear an identifying button bearing the legend "Ask Me About....." and the name of the language or tool in which he/she specializes.

If you'd like to serve as an L&T Master, please check the products on which you are able to answer questions:

☐ Fortran	☐ Ada[1]	☐ Scan	☐ C	☐ APL	☐ Bliss	☐ VAX Notes
☐ Pascal	☐ LSE	☐ DTM	☐ PCA	☐ MMS	☐ CMS	☐ Runoff & DSR
☐ Debug	☐ TPU	☐ EVE	☐ EDT	☐ TECO	☐ PL/1	

Briefly describe your experience with those you checked. _____

_____

_____

_____

_____

_____

_____

How long have you held your present position? _____

Are you able to attend at least one symposium each year? _____

Users are encouraged to seek assistance with products by calling appropriate Masters listed in the Directory. As a Master, your name and telephone number will be published in the Masters Directory, and users will call on you for limited help from time to time. Please check, below, any additional activities you might do:

☐ Field-test new versions of your product at your work site.

☐ Provide feedback on the product when needed by its DEC product manager.

☐ Act as a reference for the product at the request of Digital Sales or Marketing people.

Mail to: Dena Shelton, L&T SIG Masters Coordinator, Cullinet Software, Inc., 2860 Zanker Road, Suite 206, San Jose, CA 95134.

[1] Ada is a trademark of the DoD

Languages & Tools SIG

WISHLIST QUESTIONNAIRE

Name: _____ **Title** _____

Company: _____

Address: _____

_____

_____ **Phone:** ( ) _____

Network Address: _____

The Languages & Tools SIG is principally concerned with the DEC software products listed below. If your request directly involves one of these products, please check which one (if you have more than one request, please use a separate form for each):

☐ Fortran	☐ Ada[1]	☐ Scan	☐ C	☐ APL	☐ Bliss	☐ VAX Notes
☐ Pascal	☐ LSE	☐ DTM	☐ PCA	☐ MMS	☐ CMS	☐ Runoff & DSR
☐ Debug	☐ TPU	☐ EVE	☐ EDT	☐ TECO	☐ PL/1	

If your request or suggestion doesn't relate to one of the products listed above, check which one of the following Language & Tools SIG topics it concerns:

☐ Newsletter	☐ Symposium Sessions	☐ Pre-Symposium Seminars
☐ Masters Program	☐ Working Group Activities	☐ Session Notes
☐ Information Folder	☐ SIG Tape	☐ DECUS Store Item
☐ Other L&T SIG topic: _____		

Should one of the L&T Working Groups see your request? Check which:

☐ Configuration Management	☐ TECO	☐ PDP-11 Languages & Tools
☐ Public Domain Software	☐ Macro	☐ Multi-Language Data Type Compatibility
☐ Project Management	☐ Fortran	☐ Programmer Productivity Measurement
☐ Desk Top Publishing	☐ Pascal	☐ Synchronizing New Releases
☐ Tools Integration	☐ C	☐ Language and Tool Documentation
☐ Multi-Language Graphics		

Wish List Request—brief description: _____

_____

_____

Complete description—please explain your request thoroughly; don't assume we know details of other products or services; give examples. _____

_____

_____

_____

_____

_____

_____

_____

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_____

_____

_____

_____

Mail to: Sam Whidden, L&T SIG Chair, American Mathematical Society, P.O. Box 6248, Providence, RI 02940.

[1] Ada is a trademark of the DoD

DATAGRAM

DATAGRAMs are short messages, comments, requests, or answers that are published in NETwords. Please fill in the sections below and send the DATAGRAM to:

Vickie Hess
NETWords Editor
2510 Limestone Ln.
Garland, Tx. 75040

Title: _____

Message: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Your Name: _____
Address: _____
_____

Telephone: _____

If this is a reply to a previous DATAGRAM, what #? __

Signature: _____ **Date:** ____

Place
Stamp
Here

Vickie Hess
NETWords Editor
2510 Limestone Ln.
Garland, Tx. 75040

Fold Here

OFFICE AUTOMATION SIG

SYSTEM IMPROVEMENT REQUEST SUBMISSION FORM

Name _____ **Address** _____

Firm _____ _____

Telephone _____ _____

INSTRUCTIONS: System Improvement Requests (SIR) can be either hardware of software; please check the category addressed by this SIR. Under ABSTRACT, give a brief definition of the capability you would like. In the DESCRIPTION section, give a detailed description and examples of what you want. Be specific; don't assume that we know how other products function. Justify the usefulness of the capability and give an example of its use.

HARDWARE IMPROVEMENT

DECmate _____

PRO-Series _____

Rainbow _____

Other _____

SOFTWARE IMPROVEMENT

ALL-IN-1 _____

CP/M (DECmate) _____

CP/M (Rainbow) _____

Other _____

WPS _____

P/OS _____

MS-DOS _____

ABSTRACT _____

_____

_____

DESCRIPTION _____

_____

_____

_____

_____

_____

_____

_____

_____

E. Catherine Ditamore
ARA Services
Corp MIS
The ARA Tower
1101 Market Street
Philadelphia, Pa. 19107

DECmate Wish List Ballot

Use this ballot to show which items on the DECmate Wish List are most important to you. Put the number of the most important item on the list in space 1, the next most in space 2, etc.

1._____	10._____	19._____	28._____	37._____
2._____	11._____	20._____	29._____	38._____
3._____	12._____	21._____	30._____	39._____
4._____	13._____	22._____	31._____	40._____
5._____	14._____	23._____	32._____	41._____
6._____	15._____	24._____	33._____	42._____
7._____	16._____	25._____	34._____	43._____
8._____	17._____	26._____	35._____	44._____
9._____	18._____	27._____	36._____	45._____

Please add the following to the wish list:

_____

_____

_____

_____

Comments:

Name:_____

Company:_____

Address:_____

_____

_____

Work Phone:_____

Home Phone:_____

Return Ballot to:

Cheryl Johnson
DECUS DECmate Working Group
Grinnell College
P.O. Box 805
Grinnell, IA 50112-0810

Professional Wish List Ballot

Use this ballot to show which items on the Professional Wish List are most important to you. Put the number of the most important item on the list in space 1, the next most in space 2, etc.

1._____	10._____	19._____	28._____	37._____
2._____	11._____	20._____	29._____	38._____
3._____	12._____	21._____	30._____	39._____
4._____	13._____	22._____	31._____	40._____
5._____	14._____	23._____	32._____	41._____
6._____	15._____	24._____	33._____	42._____
7._____	16._____	25._____	34._____	43._____
8._____	17._____	26._____	35._____	44._____
9._____	18._____	27._____	36._____	45._____

Please add the following to the wish list:

_____

_____

_____

_____

Comments:

Name:_____

Company:_____

Address:_____

_____

_____

Work Phone:_____

Home Phone:_____

Return Ballot to:

Thomas Hintz
DECUS Professional Working Group
University of Florida
IFAS Computer Network
1022 McCarty Hall
Gainesville, FL 32611

Rainbow Wish List Ballot

Use this ballot to show which items on the Rainbow Wish List are most important to you. Put the number of the most important item on the list in space 1, the next most in space 2, etc.

1._____	10._____	19._____	28._____	37._____
2._____	11._____	20._____	29._____	38._____
3._____	12._____	21._____	30._____	39._____
4._____	13._____	22._____	31._____	40._____
5._____	14._____	23._____	32._____	41._____
6._____	15._____	24._____	33._____	42._____
7._____	16._____	25._____	34._____	43._____
8._____	17._____	26._____	35._____	44._____
9._____	18._____	27._____	36._____	45._____

Please add the following to the wish list:

_____

_____

_____

_____

Comments:

Name:_____

Company:_____

Address:_____

_____

_____

Work Phone:_____

Home Phone:_____

Return Ballot to:

Lynn Jarrett
DECUS PC Sig Rainbow Working Group Chairman
Union Tribune Publishing
P.O. Box 191
San Diego, CA 92108

PRO/SIGHT GRAPHICS CONTEST

SPRING 1987 DECUS

<<ENTRY FORM>>

Name _____

Address _____

_____

_____

City _____ State _____ Zip _____

Phone (_____)_____

Image/Script Title _____

Category Number _____ File Name _____

****

NOTE: If diskette(s) are to be returned to the author, please send entries with self-addressed AND stamped envelope. Provide sufficient postage and packing material. The PC SIG will not be responsible for damage to diskette or entries not returned because of insufficient postage. Returned diskette will contain some .GID files from the contest if requested, so ORIGINAL IMAGE MAY BE DELETED to provide space.

If multiple entries are submitted, xerox and fill out an entry form for each submission. Multiple entries may be sent on a single diskette.

PC POSTSCRIPT

PC Postscripts are short requests, comments and responses to be published in the *Postscript Section* of the PC SIG Newsletter. Please respond to the following:

__ Y/N This is a reply to a previous Postscript. __ __ Issue Mo. _____ No.

Title:_____

Message:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Name: _____

Address: _____

_____

Phone: (_____) _____-_____

Signature: _____ **Date**_____

DECUS PERSONAL COMPUTER SIG QUESTIONNAIRE

General:
I would like information on _____
I would like to see an article
in the newsletter on _____
I would like to see a symposium
session on _____

I am willing to write an article(s) on: _____
I am willing to be contacted by PC SIG members by telephone to give
assistance/advice on: _____
Phone number to call: Area Code (___) # _____ Times _____

I attend DECUS Symposiums : ____always ____Sometimes ____never
I expect to attend these symposiums ____Fall 85 ____Spring 86 ____Fall 86

I use/own: ___Rainbow(s) ___PRO(s) ___DECmate(s) ___Robin ___Other_____
I use the machine(s) checked above: ___at work ___at home ___both
If a work, total number of DEC PC's at your site: _____
I also use: ___VAX ___IBM or other mainframe ___IBM/other PC
Type of use: ___business ___educational ___government ___other_____
Primary Operating System: ___MS-DOS ___CP/M ___both equally
___P/OS ___UNIX ___other_____

I belong to a local DEC PC Group: ___yes ___no
There is a user group in my geographic area: ___yes ___no
I would like information on starting a user group: ___yes
I use a modem: ___often ___reluctantly ___never
___for work ___for pleasure ___both

Here is information on he DEC PC User Group I belong to or know of:

Name of Group _____
Name of Contact Person _____
Address _____
_____
Telephone (___)_____
Supports ___Rainbow ___PRO ___DECmate ___Robin ___LUG ___Gold Key

Here is a DEC oriented bulletin board not on your list, or new information on a
listed board:

Name of Board _____
Full name of Sysop _____
Address if known _____
City and State _____
Telephone Number _____
Other Info: _____
Supports ___Rainbow ___PRO ___DECmate ___Robin

The subjects of greatest ineres to me are:

___word processing	___project management
___spreadsheets	___specialized vertical software
___database	___(type)_____
___graphics	___Other:_____
___communications	___Rainbow
___programming	___PRO
___software reviews	___DECmate
___technical articles	___Robin

___DEC Gossip and News ___Other:_____

If I had it to do over again, I:
___would buy another DEC Rainbow/PRO/DECmate (circle one)
___might buy another Rainbow/PRO/DECmate if it was a bargain (circle one)
___would not buy another Rainbow/PRO/DECmate (circle one)

Will you continue to subscribe at the new price of $35/year? ___yes ___no
Feel free to enclose another page(s) with comments!
Do you feel that leaving the prices out of the newsletter
___is appropriate
___is very annoying
___makes the articles less useful

Do you feel that Decus should revise its (anti)commercialism policy?
___yes
___no

Name_____
Company_____
Address_____
City/ST/ZIP_____
Work Phone (___)_____
Home Phone (___)_____

Return to:
Barbara Maaskant
Computing Resources
The University of Texas Health
Science Center at San Antonio.
7703 Floyd Curl Drive
San Antonio, Texas 78284

fold here, flap under----------

stamp

Barbara Maaskant
Computing Resources
The University of Texas Health
Science Center at San Antonio
7703 Floyd Curl Drive
San Antonio, Texas 78284

Information Resource Sign Up Sheet
Personal Computing Special Interest Group - PC SIG

Are you willing to be an information resource for other PC SIG members? Placing your name on the *Contact List* means you are willing to answer questions within the span of a brief telephone conversation. A Contact is not expected to be a consultant. *Please Register below.* Your name and phone number (including restrictions) will be posted in the PC SIG Newsletter.

First Name:_____ **Last Name:**_____

Address:_____

_____

City:_____ **State:**_____ **ZIP:**_____

Phone:(_____) _____-_____

Areas of Expertise:_____

_____

_____

_____

_____

Suggestions for Additional Services the SIG can Provide:

_____

_____

_____

Barbara A. Maaskant
UTHSCSA Computing Resources
7703 Floyd Curl Drive
San Antonio, Texas 78216

PERSONAL COMPUTING SPECIAL INTEREST GROUP
VOLUNTEER FORM

Name_____
Company_____
Address_____
City_____ State_____ Zip Code_____
Telephone_____

What special talents do you have?_____

When do you attend symposia?

- ☐ Always
- ☐ East Coast Only
- ☐ West Coast Only
- ☐ Occasional Attendance
- ☐ Other (please specify)

_____
_____

Please check if you are interested in helping with any of the following activities:

Symposia Related Activities:

- ☐ Session Chairs _____
- ☐ Campground Volunteer_____
- ☐ Suite Volunteer_____
- ☐ DECUS Store _____
- ☐ Software Clinic_____
- ☐ Panels_____ (indicate topics)_____
- ☐ Technical Sessions_____ (indicate topics)_____
- ☐ Articles for Update.Daily
- ☐ Write letters of appreciation
- ☐ Equipment Setup

Ongoing SIG Activities:

- ☐ Working Groups_____ (indicate which groups)_____
- ☐ Newsletter_____
- ☐ Public Domain Software Project _____
- ☐ Write Software for Special SIG Needs_____

Other SIG Activities: (please specify) _____

Do you wish to see the PCSIG undertake any activities which it is not currently doing? Please specify.

_____

Would you be willing to coordinate the activity you have listed above? ☐ Yes ☐ No

Thank you

INPUT/OUTPUT Submission Form

A SIG Information Interchange

Please reprint in the next issue of the Pageswapper

If this is a reply to a previous I/O, which number? _____

Caption: _____

Message: _____

_____

_____

_____

_____

_____

Contact:

Name _____

Address _____

_____

_____

_____

Telephone _____

Signature _____ Date _____

Mail this form to: Larry Kilgallen, PAGESWAPPER Editor
Box 81, MIT Station, Cambridge, MA 02139-0901, USA

To register for on-line submission, dial (in the United States):
(617) 262-6830 and log in with the username PAGESWAPPER.

Tear out or photocopy reverse to submit an I/O item

Larry Kilgallen, PAGESWAPPER Editor
Box 81, MIT Station
Cambridge, MA Ø2139¤Ø9Ø1
USA

System Improvement Request Submission form

Page 1 of _____

Submittor: Firm:

Address: Phone:

How to write an SIR:
Describe the capability you would like to see available on VAX systems. Be as specific as possible. Please don't assume we know how it's done on the XYZ system. Justify why the capability would be useful and give an example of its use. If you wish, suggest a possible implementation of your request.

Abstract (Please limit to four lines):

Description and examples (use additional pages if required)

System Improvement Request Submission Form

Tear out or photocopy reverse to submit an SIR

Mark D. Oakley
Battelle Columbus Division
Room 11-6-008
505 King Avenue
Columbus, Ohio 43201-2369
USA

VAX/VMS V5.0 Tailoring Survey Form

1) Is it important that you be able to remove the machine-specific files not used for your system (approx. 500 block savings) from your system disk?

2) Is it important that you be able to remove the bus-specific files not required for your system (approx. 400 block savings) from your system disk?

3) Is it important that you are able to remove the cluster support (approx. 1000 block savings) from your system disk?

4) To what degree should tailoring protect the user from himself? (For example, if you're tailoring an RA60 system disk booted on a MicroVAX II, VMS could check that you don't delete the Qbus drivers. However, there's no way to tell if this RA60 is also used in your lab on a VAX 11/780 and therefore the MASSBUS drivers shouldn't be deleted.) Is it necessary for tailoring to do any checking?

5) Do you have any other suggestions for tailoring?

Mail completed form to: VMS Product Management, Digital Equipment Corporation, ZKO1-2/C07, 110 Spit Brook Road, Nashua, NH 03062-2698

VAX/VMS V5.Ø Tailoring Survey Form

Tear out or photocopy reverse to respond to the survey.

---------- fold here ----------

stamp

VMS Product Management
Digital Equipment Corporation
ZKO1-2/CØ7
11Ø Spit Brook Road
Nashua, NH 03062-2698

---------- fold here ----------

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DEC	MicroVMS	TOPS-10/20
DECnet	PDP-11	ULTRIX
DECserver	PDP-11/24 (et.al)	ULTRIX-32
DECUS	RD-53	VAX
Digital	Rdb	VAX C
HSC-50	RMS	VAX/VMS
IAS	RSTS	VAXstation
KA	RSTS/E	VT220
KI	RSX	VT240
KL	RSX-11M	VMS
KS	RT-11	

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Circulation: 6958

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STATUS CHANGE

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

( ) Change of Address
( ) Please Delete My Membership Record
(I Do Not Wish To Remain A Member)

DECUS Membership No: _____

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Company: _____

Address: _____

_____

State/Country: _____

Zip/Postal Code: _____

Mail to: DECUS - Attn: Subscription Service
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