

1961-1986



Leading
Toward
The
Future

DECUS U.S. CHAPTER SIGs NEWSLETTERS

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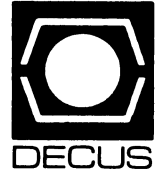
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BA

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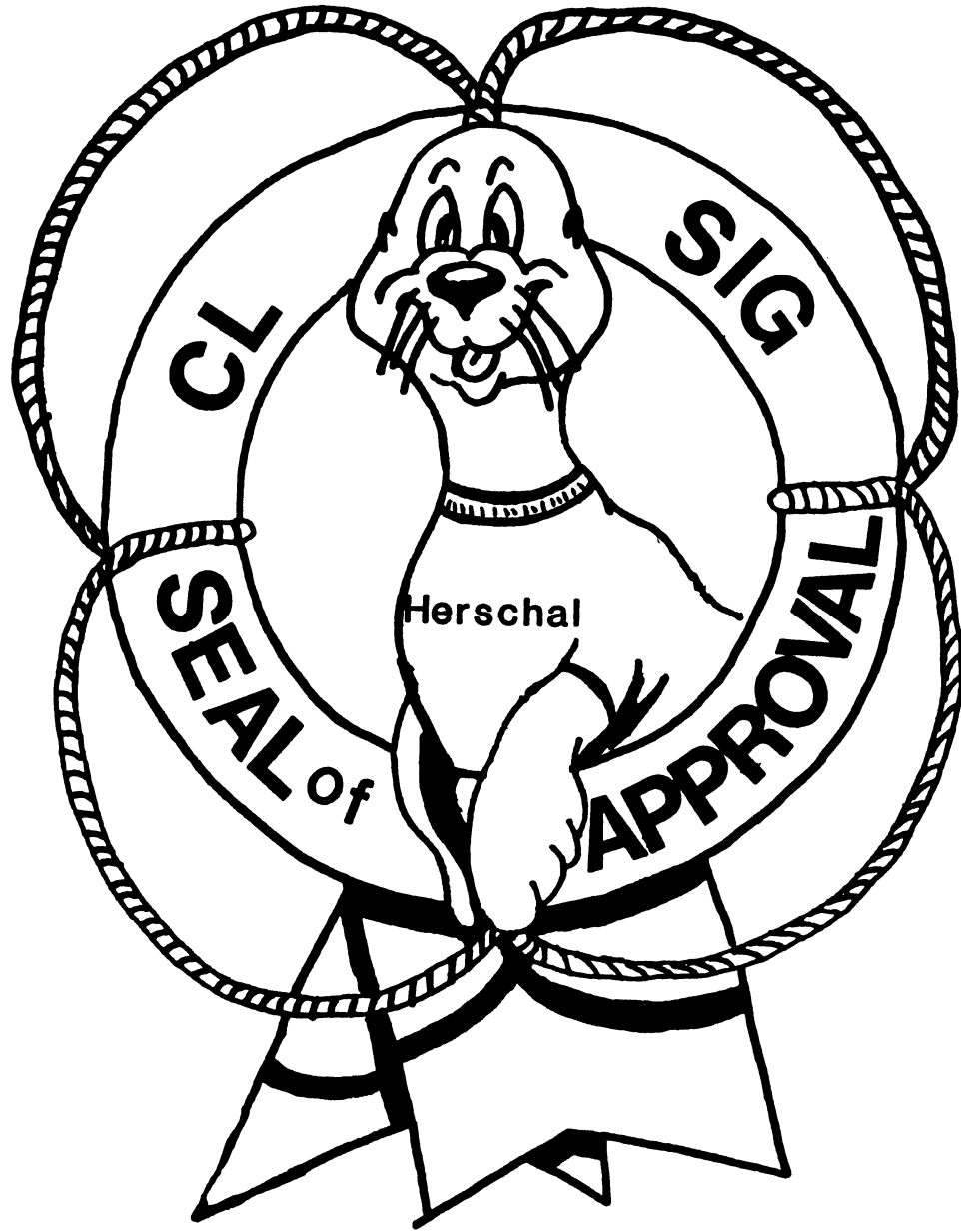
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Trying to find one that's open all night.

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There has been a time in every system manager's career when a user has had a file open all night and bombed out a batch run. That's the time it be nice to know who has what file open. This is one of those programs that has gone from programmer to programmer without anyone knowing where it was born. Each programmer has added a little personal touch so that the original author might not be able to identify it. This is a PDP version.

```

10      ! OPEN FILE INQUIRY
100     MAP (DETAIL)  D_JOB$ = 3% !JOB NUMBER &
,       ,           D_SP1$ = 1% !FILLER &
,       ,           D_PRJ$ = 4% !PROJECT NUMBER &
,       ,           D_COM$ = 1% !COMMA &
,       ,           D_PRG$ = 4% !PROGRAMMER &
,       ,           D_SP2$ = 1% !FILLER &
,       ,           D_WHR$ = 5% !WHERE (KB) &
,       ,           D_SP3$ = 1% !FILLER &
,       ,           D_WHT$ = 6% !JOB NAME &
,       ,           D_SP4$ = 1% !FILLER &
,       ,           D_CHN$ = 2% !CHANNEL &
,       ,           D_SP5$ = 1% !FILLER &
,       ,           D_FIL$ = 23% !FILE SPEC &
,       ,           D_SP6$ = 1% !FILLER &
,       ,           D_REC$ = 7% !RECORD &
,       ,           D_SP7$ = 1% !FILLER &
,       ,           D_SIZ$ = 7% !FILE SIZE &
,       ,           D_SP8$ = 1% !FILLER &
,       ,           D_BPM$ = 8% !FLAGS
MAP (DETAIL)  D_ALL$ = 79% !WHOLE LINE
MAP (PLINE)  LINE$(15%) = 79%
MAP (PLINE)  LINE_ALL$ = 1184%
MAP (POLD)   LINE_OLD$(15%) = 79%
MAP (POLD)   LINE_OLD_ALL$ = 1184%
DIM MON_TAB$(30%), WCB$(15%), FCB$(15%), WORD$(30%), TEDSIZE(63%,12%)

```

```

1000    ON ERROR GOTO 19000      !ERROR TRAPPING
TRAP$ = SYS(CHR$(6%) + CHR$(-7%))
PRINT IF CCPOS(0%)      !DO <CR> <LF>
PRINT "OPEN FILES"; CHR$(9%); FNE$(0%); " "; &
      DATE$(0%); " "; TIME$(0%)

1030    PRINT
INPUT "INTERVAL.....<5>"; INTERVAL%
INTERVAL% = ABS(INTERVAL%)
INTERVAL% = 5% IF INTERVAL% = 0%

1040    PRINT
INPUT "SIZE.....<0>"; TEDSIZE
TEDSIZE = ABS(INT(TEDSIZE))

LINE_ALL$ = ""
LINE_OLD_ALL$ = ""
BEGIN% = -1%
SEC = TIME(0%)

START% = -1%
OPEN "KB:" AS FILE #2%, MODE 8%

A$ = SYS(CHR$(3%) + CHR$(2%))

OPEN "KB:" FOR OUTPUT AS FILE #1%

A% = FNMON_TAB%
MAX_JOB% = MAX_JB%
A% = FNDEV_NAME%
PPN% = FNPPN%(FNJOB_NUM%)
2020    SCR% = FNCLEAR(1%, TERM%)

2030    IF TEDSIZE <> TEDSIZE_OLD OR START% THEN
TOP$ = "DISPLAY OF ALL OPEN FILES CONTAINING " + &
      NUM1$(TEDSIZE) + " OR MORE SEGMENTS"
DIF% = INT((79 - LEN(TOP$)) / 2)
TOP$ = SPACE$(DIF%) + TOP$ + SPACE$(DIF%)
SCR% = FNPRINT%(1%, TERM%, 1%, 0%, TOP$)
TEDSIZE_OLD = TEDSIZE
END IF

IF PRIV_MASK% <> PRIV_OLD% THEN
PRIV_OLD% = PRIV_MASK%
END IF

IF START% THEN
HDR$ = "JOB WHO WHERE WHAT C# FILE SPEC" + &
      " BLOCK OF BL/MIN"

```

END IF

SCR% = FNPRINT%(1%,TERM%,4%,0%,HDR\$)
START% = 0%

SCR% = FNPRINT%(1%,TERM%,3%,0%,"WORKING...")
CNT% = 0%

FOR I% = JOB% + 1% TO MAX JB%

GOTO 2100 UNLESS FNLOGGED IN%(I%)
GOTO 2100 IF PRIV_MASK% &
AND (FNMATCH%(FNPPN%(I%),PRIV_MASK%) = 0%)
IF (SWAP%(PPN%) AND 255%) <> 1% &
AND (SWAP%(FNPPN%(I%)) &
AND 255%) = 1% THEN
GOTO 2100

END IF

2060

D_ALL\$ = SPACE\$(80%)
IOB% = FNIOB%(I%)
FLAG% = -1%
FOR J% = 1% TO 12%
D_REC\$ = SPACE\$(7%)
D_SIZ\$ = SPACE\$(7%)
D_BPMS\$ = SPACE\$(8%)
BASE% = PEEK(IOB% + 2% * J%)
GOTO 2090 UNLESS BASE%
IDX% = PEEK(BASE%) AND 255%
IF IDX% THEN
GOTO 2090
ELSE
GOSUB 10100
TEDSIZE(I%,J%) = R TEDSIZE &
IF TEDSIZE(I%,J%) = 0 &
OR R TEDSIZE < TEDSIZE(I%,J%)

END IF

2070

GOTO 2090 IF F TEDSIZE < TEDSIZE
IF FLAG% THEN
D_JOB\$ = STRING\$(3%-LEN(NUM1\$(I%)),32%)+NUM1\$(I%)
D_COM\$ = ", "
D_PPN\$ = FNPPN\$(I%)
D_WHT\$ = FNJOB_NAMES\$(I%)
D_DB% = PEEK(IOB%)
TTINT% = PEEK(D_DB% + 30%)
DDS% = PEEK(D_DB% + 2%)
D_WHR\$ = "DET"
FLAG% = 0%
IF ((DDS% AND 255%) = I% * 2%) &
AND (PEEK(D_DB% + 6%) AND 8192% <> 0%) THEN
D_WHR\$ = FNCONSOLE KB\$(I%)
D_WHR\$ = EDIT\$(D_WHR\$,128%) + "*" &
IF TTINT% AND 16384%

END IF

2075

GOTO 2100 IF DETACH% AND D_WHR\$ = "DET"
RSET D_CHN\$ = NUM1\$(J%)
BPM = (R TEDSIZE - TEDSIZE(I%,J%)) * &
(60 / (TIME(0%) - SEC)) &
UNLESS BEGIN%
TEMP\$=NUM1\$(INT((BPM-INT(BPM)+.005)*100.))
TEMP\$=NUM1\$(INT(BPM)) + "." + &
TEMP\$+STRING\$(2%-LEN(TEMP\$),48%)
D_BPMS\$ = STRING\$(8%-LEN(TEMP\$),32%)+TEMP\$
CNT% = CNT% + 1%
LINE\$(CNT%) = D_ALL\$

2080

IF CNT% > 14% THEN
J% = 12%
I% = MAX_JB%

END IF

2090

NEXT J%

2100

NEXT I%

2110

BEGIN% = 0% IF TIME(0%) - SEC > 0

3000 !

DO PRINTOUT HERE

3010

FOR I% = 0% TO CNT%
IF LINE\$(I%) <> LINE_OLD\$(I%) THEN
SCR% = FNPRINT%(1%,TERM%,I% + 4%,0%,LINE\$(I%))
LINE_OLD\$(I%) = LINE\$(I%)
END IF
NEXT I%
I% = I% + 1%
GOTO 3040 IF I% > 15%

3030

IF LINE_OLD\$(I%) <> "" THEN
LINE_OLD\$(I%) = ""
SCR% = FNCURSOR(1%,TERM%,I% + 4%,1%) IF TERM%
PRINT #1% IF TERM%
I% = I% + 1%
GOTO 3030 UNLESS I% > 15%

3035

END IF
IF TERM% = 0% THEN
SCR% = FNCURSOR(1%,TERM%,CNT% + 5%,1%)
PRINT #1%, CHR\$(155%);"J"
END IF

```

3040 IF JOB% THEN
      MESS$ = "**** SKIPPING FIRST " + NUM1$(JOB%) + &
      " JOBS ****" IF LEFT(PAR$,1%) = "J"
      MESS$ = "**** ONLY LOOKING AT JOB " + NUM1$(JOB% + 1%) + &
      " ****" IF LEFT(PAR$,1%) = "O"
      Y% = INT((80 - LEN(MESS$)) / 2)
      SCR% = FNPRINT%(1%,TERM%,2%,Y%,MESS$)
      SLEEP 4
      SCR% = FNPRINT%(1%,TERM%,2%,Y%,SPACE$(LEN(MESS$)))
END IF

3050 SCR% = FNPRINT%(1%,TERM%,3%,0%,SPACE$(10%))
      SCR% = FNCURSOR(1%,TERM%,3%,0%)

4000 ! WAIT FOR INPUT _____ IF ANY

4010 SLEEP INTERVAL% - 1%

4020 WAIT 1%
      GET #2%
      GOSUB 10200

4030 PAR$ = EDIT$(INP$,-1%)
      MESS$ = ""
      MAX_JB% = MAX_JOB%
      JOB% = 0%
      GOTO 2020 IF PAR$ = "" AND START%
      SELECT PAR$
        CASE "EXIT"
          GOTO 4035
        CASE "E"
          GOTO 4035
        CASE ELSE
          GOTO 4040
      END SELECT

4035 SCR% = FNCLEAR(1%,TERM%)
      CLOSE 1,2
      RESUME 32767

4040 IF LEFT(PAR$,1%) = "I" THEN
      INTERVAL% = VAL(RIGHT(PAR$,2%))
      GOTO 4110
END IF

4050 IF LEFT(PAR$,1%) = "J" THEN
      JOB% = VAL(RIGHT(PAR$,2%))
      JOB% = MAX_JB% - 1% IF JOB% > MAX_JB% - 1%
      GOTO 4110

```

```

END IF

4055 IF LEFT(PAR$,1%) = "O" THEN
      JOB% = VAL(RIGHT(PAR$,2%)) - 1%
      JOB% = MAX_JB% - 1% IF JOB% > MAX_JB% - 1%
      MAX_JB% = JOB% + 1
      GOTO 4110
END IF

4060 IF LEFT(PAR$,1%) = "S" THEN
      TEDSIZE = ABS(INT(VAL(RIGHT(PAR$,2%))))
      GOTO 4110
END IF

4070 IF PAR$ = "A" THEN
      DETACH% = -1%
      GOTO 4110
END IF

4080 IF PAR$ = "D" THEN
      DETACH% = 0%
      GOTO 4110
END IF

4090 IF LEFT(PAR$,1%) = "A" THEN
      ACCT$ = RIGHT(PAR$,2%)
      LBR% = INSTR(1%,ACCT$,"(")
      COM% = INSTR(1%,ACCT$,",")
      RBR% = INSTR(1%,ACCT$,")")
      RBR% = LEN(ACCT$) + 1% IF RBR% = 0%
      PRJ% = VAL(SEG$(ACCT$,LBR% + 1%,COM% - 1%))
      PRG$ = SEG$(ACCT$,COM% + 1%,RBR% - 1%)
      PRIV_MASK% = SWAP%(PRJ%) + 255% IF PRG$ = "*"
      PRIV_MASK% = SWAP%(PRJ%) + VAL(PRG$) IF PRG$ <> "*"
      GOTO 4110 UNLESS PRJ% = 1% AND (SWAP%(PPN%) AND 255%) <> 1%
      ER_$ = "[NOT A CHANCE _____]"
      SCR% = FNPRINT%(1%,TERM%,23%,1%,ER_$)
      SLEEP 3
      SCR% = FNPRINT%(1%,TERM%,23%,1%,SPACE$(19%))
      PRIV_MASK% = PRIV_OLD%
      GOTO 2030
END IF

4095 IF INSTR(1%,"HELP",PAR$) = 1% OR PAR$ = "?" THEN
      GOSUB 4200
      SLEEP 20
      START% = -1%
      LINE_ALL$ = ""
      LINE_OLD_ALL$ = ""
      GOTO 4020

```

```

END IF
4100  ER $ = "[UNRECOGNIZED COMMAND - " + INP$ + "___]"
      SCR% = FNPRINT%(1%,TERM%,23%,1%,ER_$)
      SLEEP 3
      SCR% = FNPRINT%(1%,TERM%,23%,1%,SPACE$(LEN(ER_$)))
      GOTO 2030
4110  GOTO 2020 IF START%
      GOTO 2030
4200  SCR% = FNCLEAR(1%,TERM%)
      PRINT #1%,TAB(28%);"FILE STATUS VIDEO DISPLAY"
      PRINT #1%,TAB(28%);"-----"
      PRINT #1%, FOR I% = 1% TO 3%
      PRINT #1%, "LEGAL INPUT:"
      PRINT #1%
      PRINT #1%, "IN          - CHANGES INTERVAL TO N SECONDS"
      PRINT #1%, "JN          - IGNORES FIRST N JOBS"
      PRINT #1%, "SN          - IGNORES FILES LESS THAN N BLOCKS"
      PRINT #1%, "A           - IGNORES DETACHED JOBS"
      PRINT #1%, "D           - REENABLES DETACHED JOBS"
      PRINT #1%, "APPN         - DISPLAYS ONLY ACCOUNT #PPN"
      PRINT #1%, "A0,0        - TURNS OFF ACCOUNT LOOKUP"
      RETURN
10000 ! PROGRAMMER DEFINED SUBROUTINES
!WHAT WE HAVE HERE IS A WCB THAT POINTS TO A FCB DEP.
10100 A% = FNWCB_DECODE%(BASE%)
      A% = FNFCB_DECODE%(WCB_FCB% - 28%)
      R_TEDSIZE = ((256. * 256.) * WCB_MSB%) + &
                 (256. * WCB_NSB%) + &
                 WCB_LSB%
      TEMP$ = NUM1$(INT(R_TEDSIZE))
      TEMP$ = LEFT(TEMP$,LEN(TEMP$)-3%)+", "+RIGHT(TEMP$,LEN(TEMP$)-2%) &
              IF LEN(TEMP$)>3%
      D_REC$ = STRING$(7%-LEN(TEMP$),32%)+TEMP$
10120 F_TEDSIZE = ((256. * 256.) * FCB_MSB%) + &
               (256. * FCB_NSB%) + &
               FCB_LSB%
      TEMP$ = NUM1$(INT(F_TEDSIZE))
      TEMP$ = LEFT(TEMP$,LEN(TEMP$)-3%)+", "+RIGHT(TEMP$,LEN(TEMP$)-2%) &
              IF LEN(TEMP$)>3%
      D_SIZE$ = STRING$(7%-LEN(TEMP$),32%)+TEMP$
10140 DEVICE$ = MID(DEV_NME$, (FCB_UNT% * 3% + 1%),3%) + ":"
      D_FIL$ = DEVICE$ + FNPPN1$(FCB_PPN%) + FCB_FIL$
      RETURN
10200 ! FIELD THE INPUT

```

```

10210 IF RECOUNT = 1% THEN
      FIELD #2%, 1% AS TERMS
    ELSE
      FIELD #2%, RECOUNT - 2% AS INP$, 2% AS TERMS
    END IF
10220 IF ASCII(TERMS) = 3% THEN
      SCR% = FNCLEAR(1%,TERM%)
      CLOSE 1
      GOTO 32767
    END IF
10230 RETURN
15000 ! PROGRAMMER DEFINED FUNCTIONS
15010 DEF* FNE$(E%) = RIGHT(SYS(CHR$(6%) + CHR$(9%) + CHR$(E%)),3%)
      ! PRINT AN ERROR MESSAGE
15110 DEF* FNMON TAB%
      CHANGE SYS(CHR$(6%)+CHR$(-3%)) TO MON_TAB%
      MAX_KB% = MON_TAB%(3%)
      MAX_JB% = MON_TAB%(4%)
      DEV_CN% = FNSWP%( 5%)
      DEV_PT% = FNSWP%( 7%)
      MEM_LS% = FNSWP%( 9%)
      JOB_TB% = FNSWP%(11%)
      JOB_ST% = FNSWP%(13%)
      JOB_WT% = FNSWP%(15%)
      UNT_CL% = FNSWP%(17%)
      UNT_CN% = FNSWP%(19%)
      SAT_CT% = FNSWP%(21%)
      JSB_TB% = FNSWP%(23%)
      SAT_CM% = FNSWP%(25%)
15120 CHANGE SYS(CHR$(6%)+CHR$(-12%)) TO MON_TAB%
      FRE_ES% = FNSWP%( 3%)
      DEV_NM% = FNSWP%( 5%)
      CSR_TB% = FNSWP%( 7%)
      DEV_KB% = FNSWP%( 9%)
      TTY_HC% = FNSWP%(11%)
      JOB_CT% = FNSWP%(13%)
      RTS_LT% = FNSWP%(15%)
      ERL_CT% = FNSWP%(17%)
      SND_LS% = FNSWP%(19%)
      LOG_NM% = FNSWP%(21%)
      DEV_SY% = FNSWP%(23%)
      MEM_SZ% = FNSWP%(25%)
      CCL_LT% = FNSWP%(27%)
FNEND
! FUNCTION TO SETUP MONITOR TABLES IN ARRAY MON_TAB%

```

```

15160 DEF* FNSWP%(X%) = MON TAB%(X%) + SWAP%(MON_TAB%(X%+1%))
      ! FUNCTION TO DO THE SWAP% FOR ABOVE

15210 DEF* FNJOB_NUM% = (PEEK(518%) AND 255%) / 2%
      ! FUNCTION TO RETURN OUR JOB NUMBER

15230 DEF* FNJDB%(X%) = PEEK(JOB_TB% + 2% * X%)
      ! FUNCTION TO RETURN ADDRESS OF JDB FOR JOB X%

15360 DEF* FNJDB2%(X%) = PEEK(FNJDB%(X%) + 8%)
      ! FUNCTION TO RETURN ADDRESS OF JDB2 FOR JOB X%

15380 DEF* FNPPN%(X%) = PEEK(FNJDB2%(X%) + 24%)
      ! FUNCTION TO RETURN PPN FOR JOB X%

15395 DEF* FNJOB_NAME$(X%) = RAD$(PEEK(FNJDB2%(X%)+12%)) &
      + RAD$(PEEK(FNJDB2%(X%)+14%))
      ! FUNCTION TO GET A JOB NAME

15410 DEF* FNLOGGED_IN%(X%) = (PEEK(JOB_TB% + 2% * X%) <> 0%)
      ! FUNCTION TO SEE IF A JOB IS LOGGED IN THIS SLOT

15430 DEF* FNIOB%(X%) = PEEK(FNJDB%(X%))
      ! FUNCTION TO GET SOMEONE'S IOB

15450 DEF* FNCONSOLE_KB%(X%) = (SWAP%(PEEK(PEEK(FNIOB%(X%)) + 2%)) AND 255%)
      ! FUNCTION TO FIND SOMEONE'S CONSOLE KB

15510 DEF* FNPPN$(X%) !RETURN $
      P% = FNPPN%(X%)
      RSET D_PRJ$ = "[" + NUM1$(SWAP%(P%) AND 255%)
      LSET D_PRG$ = NUM1$(P% AND 255%) + "]"
FNEND
      ! FUNCTION TO FORMAT A PPN

15520 DEF* FNPPN1$(P%) = "[" + NUM1$(SWAP%(P%) AND 255%) &
      + "," + NUM1$(P% AND 255%) + "]"

```

```

15530 DEF* FNCONSOLE_KB$(X%)
      KB% = FNCONSOLE_KB%(X%)
      IF (TTINT% AND 255%) = 8% THEN
          FNCONSOLE_KB$ = "PK" + NUM1$(KB% - 1%)
      ELSE
          FNCONSOLE_KB$ = "KB" + NUM1$(KB%)
      END IF
FNEND
      ! FUNCTION TO FORMAT A CONSOLE KB:

15640 DEF* FNLOW_CASE$(W%)
      CHANGE W$ TO WORD%
      FOR CHA% = 2% TO WORD%(0%)
          WORD%(CHA%) = WORD%(CHA%) + 32%&
          IF WORD%(CHA%) > 64% AND WORD%(CHA%) < 91%
              NEXT CHA%
      CHANGE WORD% TO W$
      FNLOW_CASE$ = W$
FNEND
      ! FUNCTION TO CHANGE UPPER CASE NAME TO LOWER CASE

15710 DEF* FNMATCH%(X%,Y%)

15720 FNMATCH% = 0%
      GOTO 15740 IF TARGET_JOB% <> 0%
      GOTO 15730 IF Y% - SWAP%(PRJ%) = 255%
      FNMATCH% = -1% IF X% = Y%
FNEXIT

15730 FNMATCH% = -1% IF (X% AND Y%) = X% &
      AND (SWAP%(X%) AND 255%) = PRJ%
FNEXIT

15740 IF (SWAP%(PPN%) AND 255%) = (SWAP%(X%) AND 255%) &
      OR (SWAP%(PPN%) AND 255%) = 1% THEN
      FNMATCH% = -1%
      END IF

15750 FNEND
      ! FUNCTION TO CHECK ON MATCH BETWEEN PPN OF CURRENT JOB
      ! AND REQUESTED PPN

16020 DEF FNWCB_DECODE%(WCB_BASE%)
      WCB%(K% / 2%) = PEEK(WCB_BASE% + K%) FOR K% = 0% TO 30% STEP 2%

```

```

16030      WCB_IDX% = WCB%(0%) AND 255%
          WCB_STS% = SWAP%(WCB%(0%)) AND 255%
          WCB_JOB% = WCB%(1%) AND 255%
          WCB_FLG% = SWAP%(WCB%(1%)) AND 255%
          WCB_MSB% = SWAP%(WCB%(2%)) AND 255%
          WCB_NSB% = SWAP%(WCB%(3%)) AND 255%
          WCB_LSB% = WCB%(3%) AND 255%
          WCB_FCB% = WCB%(4%)
          WCB_WCB% = WCB%(6%)
          WCB_NXT% = WCB%(7%)
FNEND
! FUNCTIONS FOR LARGE FILE SYSTEMS DEPARTMENT
! A WINDOW CONTROL BLOCK

16060 DEF* FNFCB DECODE%(FCB_BASE%)
      FCB%(K% / 2%) = PEEK(FCB_BASE% + K%) FOR K% = 0% TO 30% STEP 2%

      FCB_NXT% = FCB%(0%)
      FCB_PPN% = FCB%(2%)
      FCB_FIL% = (RAD$(FCB%(3%)) + RAD$(FCB%(4%))) + "." + (RAD$(FCB%(5%)))
      FCB_STT% = FCB%(6%) AND 255%
      FCB_MSB% = SWAP%(FCB%(12%)) AND 255%
      FCB_UNT% = FCB%(12%) AND 255%
      FCB_NSB% = SWAP%(FCB%(13%)) AND 255%
      FCB_LSB% = FCB%(13%) AND 255%
      FCB_WCB% = FCB%(15%)
FNEND
! DECODE A FILE CONTROL BLOCK

16110 DEF FNDEV NAME%
      FOR M% = 0% TO (DEV_KB% - 2%) STEP 2%
          DEV_GEN$ = CVT%$(SWAP%(PEEK(M% + DEV_NM%)))
          DEV_NME$ = DEV_NME$ + DEV_GEN$ + CHR$(48% + K%) &
          FOR K% = 0% TO PEEK(DEV_CN% + M%)
              NEXT M%
      END FOR

16120      M% = DEV_NM% + M%
          DEV_DDB$ = "?"

16130      M% = M% + 2%
          K% = PEEK(M%)
          IF K% <> -1% THEN
              DEV_DDB$ = DEV_DDB$ + CVT%$(SWAP%(K%))
              GOTO 16130
          END IF

16140 FNEND
! FUNCTION TO BUILD DEVICE NAME TABLES

```

```

16210 DEF FNDEV$(HND_IDX%)
      IF HND_IDX% = 0% THEN
          DEV$ = MID(DEV_NME$, (FCB_UNT% * 3% + 1%), 3%) + ":"
      ELSE
          DEV$ = MID(DEV_DDB$, HND_IDX%, 2%) + NUM1$(FCB_UNT%) + ":"
      END IF

16220      DEV$ = "NL:" IF DEV$ = "NL0:"
          FNDEV$ = DEV$
FNEND
! FUNCTION TO FIND THE DEVICE FOR A WCB

17020 DEF* FNCLEAR (CHANNEL%, TERMINAL%)
      ! I/O CHANNEL
      ! TERMINAL TYPE:
      ! 0 FOR VTXX
      ! 1 FOR ADDS

17030      IF TERMINAL% THEN
          PRINT #CHANNEL%, CHR$(12%) ; !ADDS
      ELSE
          PRINT #CHANNEL%, CHR$(155%) ; "H" ; CHR$(155%) ; "J" ;
          !VTXX

17040 FNEND
! CLEAR THE SCREEN DEPARTMENT

17060 DEF* FNCURSOR(CHANNEL%, TERMINAL%, ROW%, COL%)
      ! I/O CHANNEL
      ! TERMINAL TYPE
      ! 0 FOR VTXX
      ! 1 FOR ADDS
      ! SCREEN ROW
      ! SCREEN COLUMN

      GOTO 17080 IF TERMINAL% !SEE IF THEY HAVE AN ADDS
      PRINT #CHANNEL%, CHR$(155%) ; &
          CHR$( 89%) ; &
          CHR$( 31% + ROW%) ; &
          CHR$( 32% + COL%) ; !CURSOR ADDRESSING FOR VTXX
      GOTO 17090 !END OF VTXX STUFF

17080      CUR_ARG1% = INT(COL% / 10%)
          CUR_ARG2% = COL% - (10% * CUR_ARG1%)
          PRINT #CHANNEL%, CHR$(139%) ; &
              CHR$( 63% + ROW%) ; &
              CHR$(155%) ; &
              CHR$( 5%) ; &
              CHR$(CUR_ARG1% + 128%) ; &
              CHR$(CUR_ARG2% + 128%) ; !CURSOR LEADIN FOR ADDS 980

17090 FNEND
! CURSOR POSITION ROUTINE

```



```

17110 DEF* FNPRINT%(CHANNEL%,TERMINAL%,ROW%,COL%,THIS%)
      !I/O CHANNEL
      !TERMINAL TYPE
      ! 0 FOR VTXK
      ! 1 FOR ADDS
      !SCREEN ROW
      !SCREEN COLUMN
      !PRINT THIS

      DUMMY% = FNCURSOR(CHANNEL%,TERMINAL%,ROW%,COL%)
      !CALL IN THE CURSOR ROUTINES
      PRINT #CHANNEL%, THIS% ;
      !WORK DONE HERE

      FNEND
      ! PRINT THIS STRING WHEREVER

19000 ! ERROR HANDLING CODE
      IF ERR = 28 THEN
          RESUME 4035          !* ^C TRAP
      END IF

19010 IF ERR = 11 THEN
      RESUME 1030 IF ERL = 1040
      START% = -1%
      RESUME 2020
      END IF

      IF ERR = 28 THEN
          SCR% = FNCLEAR(1%,TERM%)
          CLOSE 1,2
          RESUME 32767
      END IF

      IF ERR = 15 THEN
          RESUME 2020 IF START%
          RESUME 2030
      END IF

      IF ERR = 52 THEN
          RESUME 4100
      END IF

      ON ERROR GOTO 0

32767 END

```

Interactive emulation of RPG II DEBUG opcode

Submitted by: VAX RPG II development/writing group

VAX RPG II includes support for the interactive symbolic debugger included with VMS. The RPG II DEBUG opcode is not supported. However, VAX DEBUG can be used to obtain the information normally output as a result of a DEBUG opcode. Below are 2 files which can be used to get a listing of the indicators in a VAX RPG II program which are currently ON or OFF. The files included are

| | |
|-------------------|--|
| RPG\$DEB_INIT.COM | VAX DEBUG initialization file |
| RPG\$DEB.TPU | TPU filter used by the DEBUG init file |

RPG\$DEB_INIT.COM determines the list of valid user-defined symbols (including indicators) for the current RPG II program, and then uses the RPG\$DEB filter to insert the appropriate VAX DEBUG commands into this symbol list so that a listing of the indicators that are ON (or OFF) can be obtained at any time during the interactive debugging session.

For example, an RPG II program might have indicators 01,02,98,1P,0A,L1,LR.

```

DBG> IND ON
'01'
'98'
'L1'
DBG>

.
.
.

DBG> IND ON
'L1'
'LR'

```

The DEBUG commands above show how the information about indicators could be displayed. Note that this new DEBUG "IND" command is interactive and can be used at any time during the debugging session - the user does not need to decide ahead of time when indicator information will be dumped. The VAX DEBUG "EXAMINE" command is still available to examine the setting for a particular indicator.

```

-----
!+
! File: RPGTOOLS:RPG$DEB_INIT.COM
!
! This VAX DEBUG command procedure can be used with VAX RPG II programs
! to display a list of indicators which are on or off. To use
! this command procedure with an RPG program TEST, you must first
! link in TPUSHR which is used during debugging by this command procedure:
!
!   $ RPG/DEBUG TEST
!   $ LINK/DEBUG TEST,SYS$INPUT/OPT
!   SYS$LIBRARY:TPUSHR/SHARE
!   @Z
!
! Then this command procedure can be used to set up a portion of
! the debugging environment as follows:
!

```

```

!      $ DEFINE DBG$INIT RPGTOOLS:RPG$DEB_INIT
!      $ RUN TEST
!
! Then during debugging, the command IND can be used to display a list
! of indicators:
!
!      DBG> IND ON      ! Displays a list of indicators currently on
!      DBG> IND OFF    ! Displays a list of indicators currently off
!
! Note that this command procedure sets up the symbols ON,OFF,IND.
! If any of these symbols are used as variables in your program, you
! should modify this command procedure and RPG$DEB.TPU to use different
! symbol names. Also this command procedure uses VAX DEBUG output logging,
! so you may need to make modifications to the commands below if you also
! want to perform output logging.
!
! After you exit the debugger, you can delete the files RPG$DEB.COM,; which
! were created by this command procedure.
!
! The basic action this command procedure performs is to first create a file
! with a list of all the current symbol definitions known to VAX DEBUG (which
! includes the VAX RPG II indicators). Then a TPU filter is run to
! insert the appropriate commands so that the ON or OFF indicators list
! will be displayed.
!
! You should set up a logical RPGTOOLS to point to the location of this
! command procedure and the TPU section. Otherwise, you will need to modify
! the rpgtools reference below to point to the location of the TPU section
! file and set up the DBG$INIT appropriately.
!-
set log "rpg$deb.com"
set output noverify,log,noterminal
show sym * in t          ! This gets out to rpg$deb.com
set log nla0:
call share$tpushr+16 (XDESCR "tpu/nosection/nodisplay/sect=rpgtools:rpg$deb")
! This calls TPU$TPU
set output noverify,terminal,nolog
define/value on="on"      ! on used in rpg$deb.tpu also
define/value off="off"   ! off used in rpg$deb.tpu also
define/command ind="@rpg$deb"
-----
!+
! File: RPG$DEB.TPU
!
! This file takes the output from the SHOW SYM * command of VAX DEBUG
! and produces the appropriate VAX DEBUG commands so that a list of
! VAX RPG II indicators which are on or off can be displayed. This
! TPU file should be used with the RPG$DEB_INIT.COM VAX DEBUG command
! procedure.
!
! This file should be compiled as follows:
!
!      $ EDIT/TPU/COMMAND=RPG$DEB/NOSECTION/NODISPLAY
!
! On VMS V4.2 and VMS V4.3 systems the following should then be typed:
!
!      $ RENAME RPG$DEB. .GBL
!-

```

```

procedure tpu$init_procedure
    local
        search_range,
        rpg_ind;
on_error
    if error <> TPU$_STRNOTFOUND
    then
        return;
    endif;
endon_error;

set(SUCCESS,OFF);
rpg$deb_buf := create_buffer("RPG$DEB_BUF","RPG$DEB.COM");
position(beginning_of(rpg$deb_buf));
copy_text("declare P1:VALUE");
split_line;
loop
    exitif (mark(NONE) = end_of(rpg$deb_buf));
    search_range := search("=*IN",FORWARD); ! Find next indicator line
    if search_range <> 0
    then
        position(beginning_of(search_range));
        rpg_ind := substr(current_line,current_offset+2,5);
        move_horizontal(-current_offset);
        move_vertical(1);
    !+
    ! The next 4 TPU lines insert 2 VAX DEBUG commands which will
    ! check the option (IND ON or IND OFF) requested and the state
    ! of the indicators to decide if the indicator should be listed.
    !-
        copy_text("if " + rpg_ind + " = '1' and p1 = 'on' then (evaluate '"
            + substr(rpg_ind,4,2) + "')"); ! on also used in RPG$DEB_INIT
        split_line;
        copy_text("if " + rpg_ind + " = '0' and p1 = 'off' then (evaluate '"
            + substr(rpg_ind,4,2) + "')"); ! off also used in RPG$DEB_INIT
        split_line;
    else
        exitif 1;
    endif;
endloop;
exit;
endprocedure;
save('rpg$deb');
quit

```



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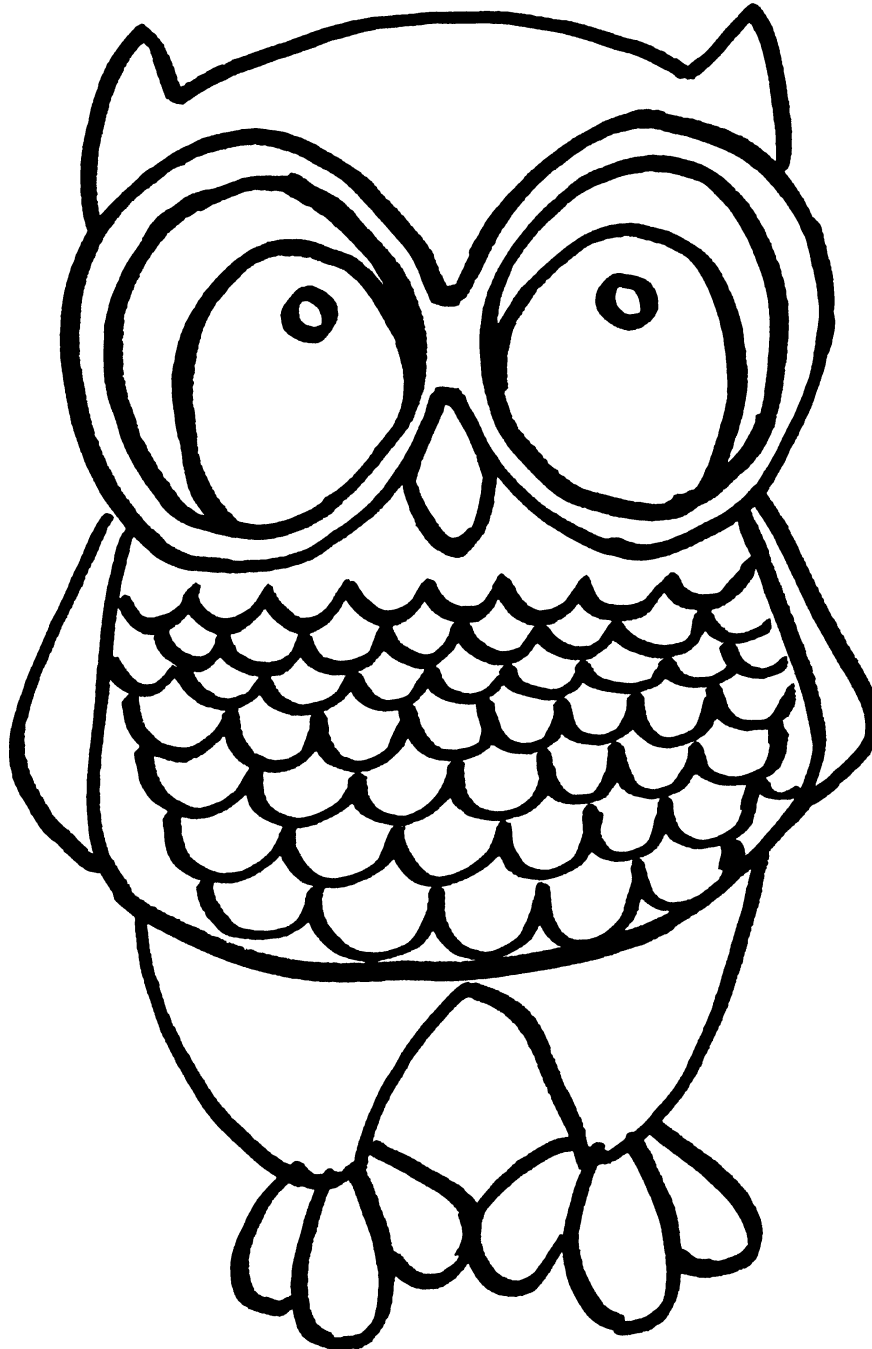
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Experiences with the VMS Screen Management Facility

by L. Gregory Macedonia
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When developing a highly interactive software system, headaches are an inevitable part of creating the user-interface. These headache can be lessened with the use of the Screen Management Facility (SMG\$) in the VAX/VMS Run-Time Library.

The goal of a good user-interface is to present information and request data in a manner that is quickly and easily understood by the user. It should be the responsibility of the interface, not the user, to "bend over backwards", if need be, to accommodate and cater to the idiosyncrasies of the other.

The presentation of displays on a video terminal often involves using a great deal of "escape" sequences to control the screen format. Keyboard input may also include special sequences as a result of pressing function keys. The use of these low-level primitives consumes a disproportionate amount of programming time during the life cycle of a project. Escape sequences are numerous, difficult to remember, device dependent, and as functionally primitive as binary machine code.

Clearly a much higher level of abstraction is needed to effectively develop an interface with what amounts to a slow, inexact device, the user. Our experience with SMG\$ indicates that Digital has taken an important step towards achieving this level of abstraction. SMG\$ provides terminal independent procedures for manipulating screen displays and obtaining input.

We first started using SMG\$ during the development of an Order Processing system for a large distributor of ski equipment. We needed to display input-forms, logical groupings of prompts and data, and to switch between these displays quickly and easily. Additionally, since the system is driven by function keys instead of menus, we needed a way to trap and identify the function-keystrokes. We also needed the flexibility to easily alter display formats and function key definitions as we received feedback from the client.

Displays with different formats correspond nicely with one of the fundamental elements of SMG\$, the virtual display. Virtual displays can be individually created, written to, and modified without appearing on the physical screen. When a virtual display is "pasted" to a pasteboard (corresponding to a physical screen) the text in the display becomes visible. A virtual display may be pasted on top of another display with the overlapped area being occluded. The magic of SMG\$ is seen when the top display is unpasted and the previously hidden area of the lower display is automatically redrawn. SMG\$ employs a minimal update algorithm that only redraws parts of the screen which have been changed. This minimal updating increases the computational overhead but allows for rapid alteration of displays. With this ability, low level routines with no knowledge of what is currently on the screen can paste status information or messages anywhere on the screen and then clear them, returning the screen to its original form.

Another big advantage of minimal updating is that a program can approach virtual displays from a conceptual standpoint without the need to handle the important issues of speed and efficiency. A good example is the clearing of input fields on a form by using the same routine used to draw the entire blank form. Conceptually the screen should appear as it did when the form was first drawn, but it's much faster to just erase the field areas. Using SMG\$, you can execute the same code used to draw the form originally and since the headings and prompts haven't changed, SMG\$ outputs only those characters needed to clear the input fields. This ability frees the programmer from having to address the issues of speed and efficiency when designing routines to handle displays.

When we encountered the situation where there was too much information to present on the screen all at once, we decided to try to a scroll a region in the virtual display. This presented some problems. Originally the user could select an item on the screen by moving the cursor over it and hitting a function key. Since SMG\$

allows you to read lines back off the screen, there is no need to keep track of where the cursor is. Just read the line with the cursor when the function key is struck. When you try this with a scrolling region you find out that lines that are scrolled past the top or bottom boundaries are lost from the virtual display and must be rewritten to scroll them back. This wouldn't be too much trouble, if it worked. There is apparently some errant code somewhere in SMG\$ under VMS V4.2 that periodically inserts a blank line in the scrolling region, destroying the integrity of the display. Even if this problem did not exist, scrolling is slow, especially if you highlight the cursor row by specifying attributes such as underlining, reverse video and boldening.

Our workaround for the problems with scrolling was to implement the concept of paging. When the cursor is at a region boundary and a key is hit to move past the boundary, the display moves by an entire region full of text. There are also plus-page and minus-page function keys. This seems to be more useful than scrolling at any speed since for our target applications, as the items are visually scanned prior to selecting the desired one.

Scrolling or paging, as implemented with the current SMG\$\$, still necessitates the use of an internal array and pointer. An important extension to SMG\$\$'s abstract model would be the concept of a "window" into a virtual display. This window could be pasted to the pasteboard like a virtual display but would represent only part of the virtual display associated with it. If the virtual display could be moved "under" its window, or the window moved "over" the display (without changing its position on the pasteboard) a scrolling or paging effect could be achieved without altering the content of the virtual display.

Although SMG\$'s abstraction covers keyboard input, it provides little more than a few shells to existing QIO's. The basic QIO's and the terminal driver are fairly sophisticated but the abstraction would do better to consider the basic elements of keyboard input to be the set of common data types (e.g. Integer, Date, Money, String). The closest approach to this idea is the READVERIFY procedure which allows you to specify, by position, the acceptable classes of characters in a string. This is difficult to use since unacceptable characters are treated as terminators and the calling routine must reinitiate the call to continue to accept input. That's fine for a QIO but SMG\$ could provide a more robust interface.

In the absence of any high level SMG\$ routines, we developed our own standard input routine. Built on the basic SMG\$ calls, our routine can highlight the field, timeout and return to caller, read default values from the screen, accept function keys as commands and terminators and verify data types and lengths. A nice feature of the SMG\$ input routines is that multi-character escape sequences, like those generated by function keys, can be returned as a single integer. Any valid ASCII character can be set as a terminator and is

returned as its decimal value. Escape sequences are returned as integers greater than 255. These terminators are easily processed by CASE logic and allow a function key to both terminate valid input, and initiate the next command in a single read.

I think Digital has taken a good first step with what they have engineered in SMG\$ V4.2. However, a more fully functional building block can, and should, grow from the existing facility. Furthermore, with widespread use, the existing shortcomings will soon be addressed. The concept behind SMG\$ is long overdue, and I'm glad that we've had the opportunity to utilize it in the development of a large system. It has saved many hours of tedious and error-prone screen coding. But having had a fleeting glimpse of the good life, I can't help wanting more.

The Wombat

EXAMINER

&

4GL

Dispatch

"Increases the Circulation of Anyone in America"

Volume 7

Number 11



DTR

DTR/4GL Special Interest Group - Officers

3-26-86

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2-26-86

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Letters and articles for publication are requested from readers of this newsletter. They may include helpful hints, inquiries to other users, articles, or any information of interest to users of Datatrieve and 4GL products (DEC and non-DEC alike). Machine readable input is highly desirable and machine-to-machine transfer of material is encouraged, but almost any legible material will be considered for publication. This newsletter, however, is not a forum for job and/or head hunting nor is commercialism appropriate.

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About the Cover

"Give me your tired, your poor, your huddled collections yearning to be free..."

Chairman's Corner

Joe H. Gallagher, 4GL Solutions, Overland Park, KS 66212

If your weren't at Dallas you missed a good Symposium and the 25th birthday party for DECUS. Compared to the past few national meetings it was a rather quiet one; it was Thursday before I saw a heated argument with arm waving and raised voices and Friday before I heard of someone "beating" on a Digital employee about a problem. Perhaps there were more attendees from reserve business environments rather than brash technical ones. There were lots of new things - a chance for some of us to play with RALLY and TEAMDATA and the announcement of VIDA, the link through DATATRIEVE or Rdb into Cullinet's relational data bases on "big blue" machines through an SNA gateway. There was, of course, the usual impressive network of Digital machines of the exhibit floor. This time, however, there were some impressive machines in the DATATRIEVE/4GL campground which we shared with the Data Management Systems SIG. We are indebted to Andy Schneider, Wendy Herman, and Bill Opalka from DEC for the two micro VAX II's which were a welcomed addition to the campground.

At the opening session (actually joint opening session with the DMS SIG) we took a little survey of the attendees -

90% were users of VAX-DATATRIEVE
(40% were running V3.3),
10% of DTR-11,
2% of PRO-DTR,
and none of DTR-20.

There were no users of ADE, only 2 of DECReporter, and about 5 users who were RALLY/TEAMDATA test sites. First timers made up 55% of the attendees of the opening session and 5% indicated that they were using a non-DEC 4GL product.

At the closing session, the attendees there were asked why they thought the attendance at the symposium was less than expected. While location and cost were mentioned as important factors, the technical level (not advanced enough) of the presentations was also mentioned as a possible reason for a slackening of interest in the symposia.

Well, when you speak, we listen. At the San Francisco symposia (which is early this year - October 6 thru 10), there will be a concerted effort to provide some advanced and very advanced technical presentations on DATATRIEVE.

As you will notice by the other material in this issue, Digital has committed to a new round of product improvements for DATATRIEVE. Make use of the product improvement request (PIR)

mechanism to influence the future capabilities of DATATRIEVE and related products.

There will be more next month on other aspects of the Dallas symposia. Have a safe summer, but it is not too soon to be thinking about getting your heart to San Francisco in October.

From the Editor's Pen

Donald E. Stern, Jr., Warner Lambert Company, Milford, CT

We've just returned from the Dallas Symposium... as usual an intense week of sessions. The DTR/4GL SIG sponsored some 40 sessions alone. From those of you who attended, we solicit comments. For those of you who were not able to attend, we'll be bringing some of the Symposium's content in this and future issues of the newsletter.

In the numerous committee meetings, which were held in Dallas during the symposium, one subject which kept coming up was quality. At a number of meetings, formal and informal, with the various members of the DECUS Communications Committees and the Datatrieve/4GL SIG Steering Committee, quality of the combined newsletter was a topic which produced, at times, rather animated discussions. A major effort is underway to explore means by which the overall quality of the newsletter can be improved. Reader suggestions are solicited. Parallel with this effort, we are investigating the feasibility of providing a means for electronic submissions to the newsletter. Would this be of benefit to anyone? Please let us know!

Quality of the sessions at the Symposia also resulted in some rather heated discussions at the various meetings. At the closing session of the Datatrieve/4GL SIG, a large percentage of those attending expressed interest in attending more technically orientated intermediate and advanced sessions at the expense of the more general novice sessions. The closing session was attended, however, by a small percentage of Symposium attendees. We'd like to hear from the rest of you!

The Dallas Symposium had not yet ended and the Symposium Committee was hard at work preparing for the Symposium to be held in San Francisco. The committee deserves our thanks and praise for the many hours of hard work and a job well done! Look to coming issues for more on the San Francisco Symposium.

With Digital's release of TEAMDATA, RALLY, DECReporter, and the A to Z Application Generator comes the need to get information out on these products. In fact, user written articles, on these or any other 4GL product, are actively solicited and will be considered for publication in this newsletter. C'mon folks, get involved!

Have a Datatrieve or 4GL problem? Write a letter to the Wombat Wizard. This month's column featuring user defined functions is outstanding. Help us help you!

A small quantity of microfiche exist which contain back issues of the Wombat Examiner (Vol. 1, No. 1 through Vol. 6, No. 3). The fiche are not for sale but, while the supply lasts, anyone who submits an article, which is published in the Wombat Examiner and 4GL Dispatch, will receive a set of microfiche. (Note: Members of the DTR/4GL SIG Steering Committee are not eligible.)

Review of Popular Computing Press on Fourth Generation Languages

Joe Gallagher, 4GL Solutions, Kansas City, MO

If you regularly read what is printed in the popular computer press, you will have noticed that they pick out a theme for the year. In recent years we have had data base management systems, PC's, local area networks, and artificial intelligence to be the latest, hot topic which supplied us with a whole bunch of new buzz words and ideas to simplify (or complicate) our professional computing lives. The latest topic is fourth generation languages which is the topic of this review.

What I would like to do is to review what has been said (at least, in print) in the popular computing press. I, like most of you, get a whole bunch of "for free" newspapers and magazines and I subscribe to a few more publications.

What I have noticed, so far, is that there has been a whole lot of heat and smoke generated on the subject, but not much light. The first point which strikes me is that there really is no definition of what a fourth generation language is.

Richard W. Schmoekel writes in Information WEEK, "It has been 10 years since computer-industry theorist James Martin defined a fourth-generation language as any program-development tool that can create a business application in one-tenth the time required by Cobol or any other third-generation language."1.

Martin A. Goetz, President of Applied Data Research, Inc. writes in ComputerWorld, "... Because the term 'fourth generation' is used to describe anything from a simple language for ad hoc queries by untrained end users to an entire tool kit that enables data processing professionals to build complex, high-volume, recovery-sensitive, transaction-processing applications, there is little wonder that confusion exists."2.

Edgar F. Codd, the President of The Relational Institute and the person who defined what a relational data base is, comments about fourth generation languages in one of his publicly aired

blasts at John Cullinane in which he wrote, "There is no fourth-generation language definition worth its salt, let alone any theoretical foundation. James Martin's purported definition fails to mention what capabilities a fourth-generation language should have - it is quite inadequate to say that it must express tasks 10 times more concisely than Cobol. A mere change in Cobol syntax could probably accomplish that goal, and incidentally, the language APL would qualify as a fourth-generation language." I always thought APL was a religious experience rather than a programming language.

Codd continues, "Thus, any vendor can claim to provide a product that support a fourth-generation language, and there is no basis for checking or challenging such a claim."3. In a subsequent interview in ComputerWorld, Codd was asked how he would define a fourth-generation language. He responded, "I don't define them. I am leaving that for other people, and I find that so far there aren't any good definitions. I don't think it is enough to say that the conciseness or the development of the statement of fourth-generation languages has to be 10 times faster or 10 times briefer.

"First you have to define what the language has to do for you; conciseness is a property of the language that you may then aim for. It [conciseness] is only a property; it does not define the language."4.

Since there is no real definition of what a fourth generation language is, there are some interesting marketing strategies which are being used to sell software products. As with the case of Cullinet's IDMS which suddenly became a "relational data base" by changing its name to IDMS/R without really changing the internal structure of its data base, companies such as the SAS Institute have begun marketing their software products as being fourth generation languages or tools without really changing the product which has had the same sort structure for years. It must be that they had a fourth generation language all along and didn't know till recently - till it became the "in" thing to sell. Mind you, in many ways the SAS software products are excellent and I have used them with success. They do have many of the important properties of 4GL's which I will discuss later; two of these properties are a concise and powerful syntax and the uncanny ability to run you out of machine resources.

One of the most down-to-earth definition of a 4GL was given by Denise Danks in her column DEC Abroad in the magazine Hardcopy in which she wrote. "What I would like is someone to say: This is a product that automates programming to 'such an extent' that you can produce customized programs to suit your work faster, cheaper and more easily than you could by traditional programming. What is more, you can change them easily to suit changing circumstances. And, oh by the way, the programs are designed so that you can run them to see how they work and what is wrong before you let them loose in your company. The other neat thing is, these programs don't exclude the end user."5. She has identified automated programming, powerful, inexpensive, ease of use, flexible and easy to

change, prototyping, easy to debug and verify, and end-user involvement as important properties of a fourth generation language.

Well, if we can't define what a 4GL is, perhaps we can look at the capabilities of some of the software packages that people generally agree are 4GLs.

In another article in Hardcopy in which Mark Brownstein (6) reviewed the software package FOCUS from Information Builders, he described the following properties: databases that span a range from simple relational tables to complex network structures with shared-relational data models which allows for an unlimited number of KEY and INDEX fields, transaction processing using English language commands, English language statements for program logic, screen design, validation and table lookups, a report writer with non-procedural English language commands, on-line error correction facilities, on-line HELP facilities, a user vocabulary facility, report graphics, a financial modeling language, basic and moderately complex statistical functions and analyses such as crosstabs, time series, and regression analysis, and a spreadsheet. There were a couple of items I thought he left out - windowing, birth control, and the kitchen sink. Windowing is one the properties which are part of the Rally/Teamdata products which Digital has recently announced and windowing was not mentioned but is part of the software Brownstein reviewed. In fact, most, but not all, of the properties are also properties of VAX-DATATRIEVE. It is the "... combination of relational data base management systems, integrated dictionaries and English-like programming languages ... [that will] drastically reducing development time."7.

There are, however, dissenting opinions as to where the real productivity lies. In a letter to the editor in ComputerWorld, Jon Pearkins writes, "... [it is] a widely held misconception in our industry: that fourth-generation languages are the key to productivity.

Prototyping is the real key to productivity because it is the only way to ensure that the system being developed will meet the user's needs. Having to retrofit a system after failing acceptance testing costs more than a fourth-generation language could ever save."8.

But the views of Kathy Hornback, Languages and Tools SIG Chair, as paraphrased from the Fourth Generation Language Panel held a year ago at the 1985 Spring DECUS meeting in New Orleans are in concert with industry-wide views. She identified "... an order of magnitude [productivity] increase over traditional programming languages ..., the ability to change the system very rapidly..., relatively non-technical..., [and] rapid prototyping ..."9. as being the most important properties of a 4GL.

While there is not complete agreement as to exactly what are the properties of fourth generation languages, it is generally conceded that they share at least the following "...four capabilities: they allow interactive development and testing; they provide

nonprocedural (what vs. how) coding; they interface with various data bases; they increase productivity by as much as five times that of Cobol (as measured in function points or equivalent lines of code)."10. Of course, there is a problem with always comparing 4GL's to Cobol or any other (living) language; Cobol is not static and is, therefore, a moving "yardstick" against which the comparison is made. And there is one property of 4GL's that everyone intuitively knows but nearly always fails to state is that any 4GL worth its salt will be guaranteed to use up all your memory and CPU power. In all seriousness, the impact of 4GLs on the hardware costs are not to be underestimated.

Of course, a number of articles have been printed which enumerate and compare the functionality of fourth generation language products, (11., 12., 13.) but it is not my purpose to make a detailed comparison of these products. Besides most of them run only on IBM mainframes and some cost more than one of our entire computer systems. It is up to you to make the assessment of your needs in the fourth generation language area.

Before we all rush out and place our orders for a 4GL, there are several things that should be kept in mind. "All complex software packages harbor bugs that can cause crashes ranging from annoying to devastating, depending on the application."14. And new fourth generation languages are no exception to this rule. It would be fool-hearty to stake one's professional career on a new, unproven fourth generation language even though with time, even a short time, the language would mature into exactly the tool that you would need to accomplish your task. The New Jersey Division of Motor Vehicles found that having the latest fourth generation languages did not save them from a colossal disaster. David Kull describes their difficulties in a cover story in Computer Decisions and cautions "...two general principles apply to a pioneering software project. No software arrives in the marketplace bug-free and in final working form. Many problems surface only after extended use. The vendor provides fixes and adds functions and features - enhancements - when its developers complete them. This 'maturing' process proceeds unpredictably. Prudent users, therefore, don't count on capabilities that are not in hand."15.

The second point of caution is that the productivity gains of a fourth generation languages are most likely to be the greatest with the simplest projects, that is, those done by end users. For some very complex tasks, the market research firm International Data Corporation found that in some cases the productivity was less with a 4GL than with Cobol.16. Perhaps the surveyed users were using the wrong 4GL, but it is also quite probable that using a 4GL does not obviate the need to think very hard about, and carefully plan, large complex applications. David Roman makes just such a point in his Computer Decision article on the marriage of structured techniques and fourth generation languages in which he writes, "Nothing prohibits a 4GL from developing sophisticated applications. However, a 4GL has the same fundamental problems as Cobol, according to Paul Ward, vice president ... for Yourdon ... 'It doesn't break a complex system into pieces you can work with.

Although a fourth-generation languages makes code easier to write, it doesn't give you a handle on how to partition the system ..."17.

The next point is one I alluded to earlier. The impact of 4GL software on the hardware will be significant. "Robert Tuttle, manager of technology assessment and planning for Kaiser Permanente Medical Care Program... says his organization is not too enthusiastic about fourth-generation language report writers. 'We found mainframe use went up when we put a fourth-generation product on the mainframe,' says Tuttle. 'You may say, "That's good," but the trouble is, we were tying up the mainframe with new chores. As a result, we fell behind with our normal processing load.'"18. Nothing comes for free. The price for increased productivity with a fourth generation language is larger, faster, more complex, and sometimes more expensive computer systems.

The final point I want to make is that the use of fourth generations languages is likely to have some rather far reaching effects in our organizations. Clearly the relationships between end-users and "the data processing" department will drastically change. Perhaps this change will be more where computing is done in the centralized, hierarchical "IBM-way" and less so in the distributed, end-user oriented DEC world. But never-the-less, there will be big changes and I, for one, welcome the increased productivity.

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Dear Wombat Wizard

WW Editor: Philip A. Naecker - Consulting Software Engineer

This month, WW explores the wonderful world of Datatrieve User Defined Functions.

Datatrieve was one of the first VAX programs to be fully layered and callable. Furthermore, DTR is user-extendable in a very flexible and simple fashion. Over the next few months, we'll talk more about the layering of VAX Datatrieve, but in this month's column let's take a look at just one aspect of layering: User Defined Functions, or UDF's.

User defined functions are simply subroutines that can be included as part of Datatrieve. Functions are added on a site-specific basis - that is, each installation of Datatrieve potentially has its own set of functions. This has a few ramifications that affect the use of functions:

- o Functions are installed as part of the DTR sharable image. This means that users can't do it - it is a system management function. Hopefully, you have a system manager who is cooperative and will let you add functions to DTR. But it is a painless and safe process, provided the system manager follows the instructions in the DTR documentation and the normal caveat regarding the security considerations of modifying system images. (See the Guide to VMS System Security for more information on security.)
- o Functions need to be installed on all systems that run a particular application that might use the functions. This can be quite a problem, for instance,

if you have an application that you want to run on any of many nodes in a large network. You have to make sure that all of the nodes have all of the functions installed. In a large network this can be a management problem.

- o Functions need to be "clean." DTR functions run in the context of a VMS Sharable Image, so they need to conform to the conventions for storage, use of resources, etc. that are expected of a sharable image. For example, functions must not assume anything about the environment of the process running DTR (such as the existence of logical names.)

The purpose of this article is NOT to discourse on installing DTR functions, but to respond to a few WW requests that are best answered by application of DTR functions. (See the DTR Guide to Programming for more information on adding functions to DTR.)

First we'll look at a few "cute" uses of DTR functions. Next, we'll look at a couple of simple functions to add to your site's DTR. And finally we'll create a sophisticated function that fully explores the power of DTR UDF's.

Dear WW:

I have an application that uses the personnel file for my corporation. The file is a simple multi-key ISAM file. I need to be able to do queries and reports against many fields, often names. I have some neat procedures I wrote to help with these queries and reports, but the people in the personnel department are frustrated by the case-sensitivity of DTR's lookups. It seems that they can't remember to use the Caps Lock key when they are doing lookups on names.

Consequently, when they type in names sometimes DTR doesn't find them because it requires an exact case match. As a result, they want ME to do all the retrievals, and I don't have time! Can you help?

Signed,
CAPTURED BY ALL CAPS

Dear Captured:

First, it is not DTR that is forcing the exact case match. That is a function of RMS key lookups. But that doesn't help you with your problem, does it? What will help you is the use of DTR functions. (If you don't know anything about DTR functions, now is a good time to pick up the documentation and read Chapter 4 of the DTR Reference Manual.)

DTR provides a nice function to uppercase all characters. The function FN\$UPCASE may be used anywhere a DTR value expression is allowed. For example:

```
DTR> PRINT FN$UPCASE("this String")
      Uppercased
      String
      THIS STRING
```

You can use the FN\$UPCASE function on a prompted value as well, like this:

```
DTR> WHILE 1=1 BEGIN
CON> PRINT EMPLOYEE NUMBER, COST_CENTER OF
CON> EMPLOYEES WITH LAST_NAME EQUAL
CON> FN$UPCASE(*."employee's last name")
CON> END
```

Using this type of value expression, the personnel clerk can type any combination of lower and uppercase characters, and it will all be translated to uppercase.

Now, you say, "But, gee Wombat Wizard - I don't want to type that big long value expression in each of the fifty locations in my procedures. Can't you make it even EASIER?" Ask and ye shall receive, oh Wizard Watcher:

```
DTR> DECLARE CAPS_NAME COMPUTED BY
CON> FN$UPCASE(*."employee's last name").
```

You can also make it easier for the operator by using the STARTING WITH expression:

```
DTR> PRINT EMPLOYEE NUMBER, COST_CENTER OF
CON> EMPLOYEES WITH LAST_NAME STARTING WITH CAPS_NAME
```

Wombat Wizard

Dear WW:

I have a report procedure that runs interactively. It asks the user for a start-date and end-date. My manager wants me to run it in batch mode to save money, but I can't figure out how to get the start- and end-dates into my procedure. Right now, I'm editing the procedure each month, but that's a real pain.

Is there a better way?

Signed,
Pained in Poughkeepsie

Dear Pained:

You bet your wombat warren there's a better way!

```
$ ! PARAMETER_PASSING_EXAMPLE.COM
$ ! This command file runs several DTR procedures to
$ ! produce reports. It takes two dates from either the
$ ! command line or the /PARAMETER argument of the SUBMIT
$ ! command, thus:
$ !
$ ! @PARAMETER PASSING_EXAMPLE "1-JAN-1986" "TODAY"
$ ! SUBMIT/PARAMETERS=("January 1, 1986",tomorrow)
$ !
$ ! Note that you must quote any date strings that contain
$ ! special characters or spaces. Also note that you can
$ ! use any DTR-interpretible argument. In general, you
$ ! can put in anything that DTR would recognize in
$ ! response to a value prompt (e.g., *."start date").
$ !
```

```
...
...
...
$ ! Now, we define the dates for the address report...
$ DEFINE REPORT_START_DATE "'p1'" !Get the quote right...
$ DEFINE REPORT_END_DATE "'p2'"
$ !
$ DTR
.
.
.
! Note the use of the logical name INCOME_SYSTEM_CDD in
! the following command. The logical translates to a full
! CDD path spec (CDD$TOP...). This way, I can move my
! application procedures at will. I can even assign
! different logicals while I'm testing the DTR procedures.
```

```
EXECUTE INCOME_SYSTEM_CDD:INCOME_REPORT_SETUP
EXECUTE INCOME_SYSTEM_CDD:INCOME_ANALYSIS_REPORT
$ !
$ ! Now, send some MAIL telling everyone we're done, etc
.
.
.
$ EXIT
```

The procedure INCOME_REPORT_SETUP has the following general form:

```
DEFINE PROCEDURE INCOME_REPORT_SETUP
!
READY INCOME_SYSTEM_CDD:ACCOUNT_LEDGER SHARED
!
DECLARE REPORT_START_DATE USAGE IS DATE.
REPORT_START_DATE = FN$TRANS LOG("REPORT_START_DATE");
DECLARE REPORT_END_DATE USAGE IS DATE.
REPORT_END_DATE = FN$TRANS_LOG("REPORT_END_DATE");
!
```



```
...  
END_PROCEDURE;
```

The procedure INCOME_ANALYSIS_REPORT has the following general form:

```
DEFINE PROCEDURE INCOME_ANALYSIS_REPORT  
!  
! comments...  
!  
! REPORT A IN ACCOUNT LEDGER WITH TRANSACTION DATE  
! BETWEEN REPORT_START_DATE AND REPORT_END_DATE SORTED  
! BY CLIENT_NAME ON INCOME_ANALYSIS.LIS  
! SET REPORT_NAME = ,... ..Other header stuff...  
! AT TOP OF PAGE PRINT REPORT HEADER, SKIP 2, "Reporting  
! Period "|||(FORMAT REPORT_START_DATE USING  
! NN/DD/YY),|||"Thru"|||(FORMAT REPORT_END_DATE USING  
! NN/DD/YY) ...report PRINT statements...  
END_REPORT  
END_PROCEDURE
```

Now that you see how to pass information from DCL to DTR, can you figure out how to do it in the other direction? For example, have you ever wondered how to tell your DCL command procedure that a DTR procedure failed? Perhaps you can reverse the process we've just shown and do it! (Hint - it requires a little adventure into the VMS RTL manuals and writing a very, VERY simple DTR UDF.) The answer will be in a future WW installment, but why wait? Go for it! You might learn something!

Sincerely,
The Wiz

Dear WW:

My supervisor was talking in the hall to a co-worker about taking a magnetic tape from another computer and putting it on our VAX. He said that all the data was in text format and we needed it converted to a format that our accounting programs could use. My co-worker (a FORTRAN programmer) said, "That sounds easy. All I have to do is write up a bunch of FORMAT statements, do a few READS and WRITES, and voila'!" But a few days later, he was still working on it.

Silly me, I told my supervisor that this sounded like a trivial Datatrieve task. He said, "Great. I'll give you eight working hours to do it, but you can take as long as you want to decide HOW to do it." It turns out that (1) the tape was written on an IBM system and the data is in EBCDIC instead of ASCII, (2) the data is in fields but it's not always right- or left-justified the same in each record, and (3) the tape is too big to be copied onto the spare space on our disks.

I have a COBOL record definition that came with the tape. And I can mount the tape and COPY it from the tape to the screen. But I want to develop a simple way to translate the data.

Please advise!

Signed,
Opened my big mouth

P.S. - Please also make sure that whatever you do is efficient. I get a lot of flack about DTR being slow.

Dear Opened:

Boy, you want everything, don't you? Okay - let's see if this helps. I'll address your problems one at a time, and I'll leave it to you to put them together.

1. The tape was written on an IBM system.

This is a job for DTR Functions! Fortunately, the VAX Run Time Library includes a function for translating from one character set to another - it's called STR\$TRANSLATE. (There used to also be a function explicitly for translating EBCDIC to ASCII, but STR\$TRANSLATE will suffice, and is more general.) You need to link the following function into Datatrieve.

```
; FN$STR_TRANSLATE - String translate  
;  
; Output is a string  
; Input is an output string descriptor,  
; an input string descriptor,  
; a translation table descriptor, and  
; a match-string descriptor.  
$DTR$FUN DEF FN$STR_TRANSLATE, STR$TRANSLATE, 4  
$DTR$FUN OUT_ARG TYPE = FUN$K_STATUS  
$DTR$FUN_HEADER_HDR = <"Translated"/"String">  
$DTR$FUN_IN_ARG TYPE = FUN$K_TEXT, OUT_PUT = TRUE  
$DTR$FUN_IN_ARG TYPE = FUN$K_DESC, DTYPE = DSC$K_DTYPE_T,  
ORDER = 1  
$DTR$FUN_IN_ARG TYPE = FUN$K_DESC, DTYPE = DSC$K_DTYPE_T,  
ORDER = 2  
$DTR$FUN_IN_ARG TYPE = FUN$K_DESC, DTYPE = DSC$K_DTYPE_T,  
ORDER = 3  
$DTR$FUN_END_DEF
```

This function will translate the characters in the first argument. The translation is done by matching characters in the third argument with their corresponding characters in the second argument. If there is no match, then the character is left untranslated. Thus, the following translation occurs:

DTR> print fn\$str_translate("123","abd","124")

Translated
String
ab3

That is, "123" is translated to the code set "abd" based on the match to the string "124". Now, the EBCDIC code set is a strict subset of the ASCII code set, so you can make up a translation table to convert from EBCDIC to ASCII. Put your input variable as the first argument, your ASCII translations as the second argument, and the EBCDIC source characters as the third argument. Since the STR\$TRANSLATE function only converts those values that it finds a match for, you don't need to include any characters that translate to themselves. You might do something like this:

```
DTR> DECLARE ASCII_CODE SET COMPUTED BY "--><".
DTR> DECLARE EBCDIC_CODE SET COMPUTED BY "[ ]'\".
DTR> DECLARE ASCII_INPUT_STRING COMPUTED BY
CON> FN$STR TRANSLATE(EBCDIC_INPUT_STRING,
CON> ASCII_CODE_SET, EBCDIC_CODE_SET).
```

2. The data in the fields is not always right- or left-justified.

Fortunately, DTR knows how to convert from any reasonable representation of a number to any other reasonable representation of a number. It doesn't matter WHAT the input string looks like - if DTR can interpret it as a number, and you ask DTR to put that number in some other representation, DTR will do it. Justification of text strings is immaterial to DTR. For example:

```
DEFINE RECORD EBCDIC_PAYROLL USING
01 DATA.
    03 E_EMPLOYEE_NUMBER PIC X(10).      !The employee
                                         number's in
                                         there somewhere!
    03 E_PAYROLL_CLASS PIC X(5).         !Ditto for
                                         payroll class
    03 E_BALANCE_OWED PIC X(15).         !left- or right-
                                         just.
                                         !Who knows? Who
                                         cares?
...
! This part of the record def came with the tape.
...
    03 CONVERTED_FIELDS.
        05 EMPLOYEE_NUMBER COMPUTED BY
            FN$STR TRANSLATE (E_EMPLOYEE_NUMBER,
                ASCII_CODE_SET, EBCDIC_CODE_SET).
...
! This part of the record def we wrote for ourselves.
...
;
DEFINE RECORD PAYROLL USING
01 DATA.
    03 EMPLOYEE_NUMBER PIC 9(10) USAGE INTEGER.
    03 PAYROLL_CLASS PIC 9(5) USAGE INFEGER.
    03 BALANCE_OWED PIC S9(13)V99 USAGE INTEGER.
...
! This is a "good" record definition in a compact
format.
```

; ...

Note that we've made the output picture clauses the same size as the input picture clauses. We might be able to save some space if we knew the range of the values for each field and made the output picture just big enough. But we'll save a bunch of space by using the USAGE INTEGER clause anyway. (I hope no one owes enough to use the entire space allocated for BALANCE_OWED!)

To convert from the input format (in EBCDIC) to the output format (in a nice binary representation), simply use the RESTRUCTURE command:

```
DTR> DEFINE FILE FOR PAYROLL_DATA ALLOCATION=10000; !Big
enough?
DTR> READY PAYROLL WRITE;
DTR> READY EBCDIC PAYROLL READ;
DTR> PAYROLL = EBCDIC_PAYROLL
    !Nothin' could be simpler!
```

Note that the restructure is trivial because we've been careful about our field names.

3. I can't fit the entire file on my disk.

First, you might complain to your system manager about the amount of free space. Perhaps he could ask users to purge unneeded files. (You DID purge all your OWN files, didn't you?) Free space (especially free contiguous space) is an important parameter of VMS performance - things really do run a lot faster if the disks are kept clean and have some free space (perhaps 10-20% for a normal time-sharing job mix.)

However, it really doesn't matter whether or not you have enough space for the EBCDIC file, because you don't need to have a file on disk for DTR to use it. Since DTR uses RMS to access files, anything that RMS can do, so can DTR! Here's an example of what you need to do:

```
$ ALLOCATE MTA0:
$ REQUEST/REPLY -
    "Please mount that silly IBM payroll tape for me!"
$ MOUNT MTA0: ABC123 PAYROLL TAPE
$ DEFINE PAYROLL_DATA PAYROLL_TAPE:PAY123
! The exact file name depends on how the tape was written.
! But you can read it even if it doesn't have a file name.
$ DTR
DTR> DEFINE DOMAIN EBCDIC_PAYROLL_DATA USING
    EBCDIC_PAYROLL ON PAYROLL_DATA;
```

And away you go! You can now read the tape, and use the RESTRUCTURE command to convert from EBCDIC to VAX integers on the fly! If you want to make things even more efficient, increase the number of RMS buffers for your sequential file and tape accesses. Use commands like:

```
$ SET RMS/DISK/BLOCK=10/BUFFER=10
$ SET RMS/MAGTAPE/BLOCK=10/BUFFER=10
```

You might try using several different numbers for BLOCK and BUFFER until you get the performance you want. See the Guide to File Applications for more information on tuning RMS buffers (or watch this space!) Also, be aware that RMS buffers generally come from your working set, so be sure to not increase the buffer counts and sizes so much that your process pages to death. If in doubt, change the numbers just a little at a time and be sure to keep an eye on your page faults.

Sincerely,
Wombat Wizard

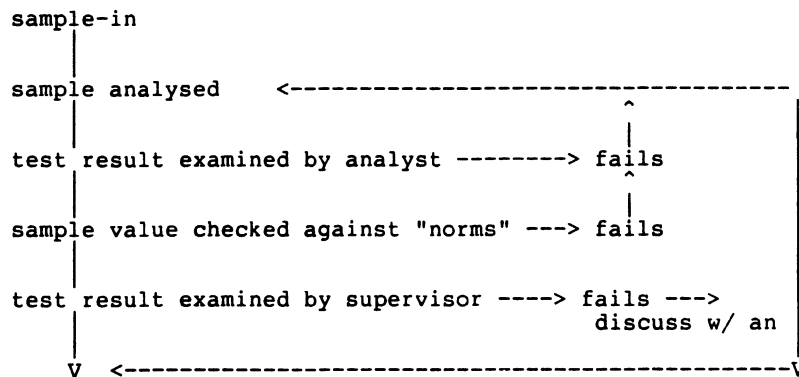
Dear WW:

I have an application that monitors laboratory test results. We have a fully normalized database that contains information on the sample, the test(s) done on the sample, and the result obtained.

The lab has just told me that they are going to implement an improved Quality Assurance (QA) program and they want to be able to track a sample through each of 29 steps involved in a approving the test result. Since my data is fully normalized, my sample record is now only 15 bytes long. I can't really see nearly doubling the size of the record (by assigning a byte for each step in the QA process) just for QA information, but my analysis shows that I want to store the QA information in the same record as the test values. What can you suggest?

Signed,
Hung Up On QA

P.S. - A flow chart of the QA process looks something like this:



Dear Hung Up:

It's clear that you've thought about the other options for normalization. For example, you could store the QA data in another record with a foreign key the same as the sample identification or test identification. You could then keep a "transaction log" that would indicate each step of the QA process that the sample passed through. This log would have information such as the analyst or supervisor's name or employee number, the date, and so forth, and the records would be stored in a chronological order so that you could reconstruct the sequence of events leading up to a sample's current status. But in this scheme it would be fairly difficult and time-consuming to find out the "current QA status" of a sample. Thus, a transaction log approach might just make your life unnecessarily complicated, since there is implied a single QA status for each test result. Let's instead look at ways to more efficiently encode your QA information.

There is an attribute of your QA diagram that we can exploit: You are generally concerned with the STATUS or STATE of a sample (has it passed a checkpoint in the QA process) rather than the sequence of events in getting to that checkpoint. For example, you want to make sure that the sample has been passed by both the analyst and the supervisor, but you don't care if the sample had to go around the re-analysis loop once, none, or a hundred times - just as long as it passed the appropriate tests. Similarly, if the test result fails the supervisor's review, it must pass a joint review by the analyst and the supervisor, but once that is passed we don't care what happens to the test result.

The key here is the words STATUS and STATE. We want to "preserve state" about a test result. We can do this with bit functions, and we can encode the data very efficiently. (In fact, with the best efficiency possible, ignoring possibilities for data compression.) We'll use the following UDF's in DTR:

```

; FN$CLEAR_BIT - Clear a bit in a longword
;
; Output is a value in R0, R1. -1 if operation
; successful
; Input is source longword (to be changed by a single
; bit) and a bit position.
$DTR$FUN_DEF FN$CLEAR_BIT, FOR$JIBCLR, 2
$DTR$FUN_OUT_ARG TYPE = FUN$K_VALUE, DTYPE =
DSC$K_DTYPE_L
$DTR$FUN_HEADER HDR = <"Bit"/"Cleared">
$DTR$FUN_IN_ARG TYPE = FUN$K_REF, DTYPE = DSC$K_DTYPE_L,
ORDER = 1
$DTR$FUN_IN_ARG TYPE = FUN$K_REF, DTYPE = DSC$K_DTYPE_L,
ORDER = 2
$DTR$FUN_END_DEF

; FN$SET_BIT - Set a bit in a longword
;
; Output is a value in R0, R1

```

```

; Input is a longword source (to be changed by a single
; bit) and a bit position
$DTR$FUN_DEF FN$SET_BIT, FOR$JIBSET, 2
$DTR$FUN_OUT_ARG TYPE = FUN$K_VALUE,      DTYPE =
                                           DSC$K_DTYPE_L
$DTR$FUN_IN_ARG TYPE = FUN$K_REF, DTYPE = DSC$K_DTYPE_L,
ORDER = 1
$DTR$FUN_IN_ARG TYPE = FUN$K_REF, DTYPE = DSC$K_DTYPE_L,
ORDER = 2
$DTR$FUN_END_DEF

; FN$TEST_BIT - Test a bit in a longword
;
; Output is a value in R0, R1
; Input is a longword source (to be changed by a single
; bit) and a bit position
$DTR$FUN_DEF FN$TEST_BIT, FOR$BJTEST, 2
$DTR$FUN_OUT_ARG TYPE = FUN$K_VALUE,      DTYPE =
                                           DSC$K_DTYPE_L
$DTR$FUN_EDIT_STRING ^\ -9\
$DTR$FUN_HEADER HDR = <"Test"/"Bit">
$DTR$FUN_IN_ARG TYPE = FUN$K_REF, DTYPE = DSC$K_DTYPE_L,
ORDER = 1
$DTR$FUN_IN_ARG TYPE = FUN$K_REF, DTYPE = DSC$K_DTYPE_L,
ORDER = 2
$DTR$FUN_END_DEF

```

These functions use the Fortran Run Time Library (FORRTL). It's also possible to use the VMSRTL calls for the same thing. In either case, you'll need to write a program to extend the size of the functions if you want to operate on bits in a datatype longer than a longword (32 bits.) (It's easy to do - and left as an exercise for the reader! You'll want to call your program from the DTR UDF's instead of calling the RTL functions directly. You may want to write functions that operate on octawords (128 bits) to allow yourself maximum flexibility.) But for our application, 32 bits is sufficient. Note that using these functions you can encode all 29 QA steps into a single 4-byte longword. That's quite an improvement over the 29 bytes it would take if you used normal DTR datatypes.

You can do both regular arithmetic and bit operations on the same variable using these functions. For example:

```

DTR> DECLARE QA_STATUS PIC 9(9) USAGE INTEGER. !Unsigned
                                           longword
DTR> FN$SET_BIT (QA_STATUS,3)                !Set the third bit
DTR> PRINT FN$TEST_BIT(QA_STATUS,3)          !and test it
Test
Bit
-1

DTR> PRINT QA_STATUS

```

```

QA
STATUS

8

DTR> QA_STATUS = QA_STATUS + 1
DTR> PRINT QA_STATUS

QA
STATUS

9

```

Here's an example of how you might use the bit functions in the QA application just described:

```

DECLARE TRUE PIC S9 USAGE INTEGER.
TRUE = -1
DECLARE FALSE PIC S9 USAGE INTEGER.
FALSE = 0

DECLARE PASSED_SUPERVISOR_TEST_BIT USAGE WORD.
PASSED_SUPERVISOR_TEST_BIT = 3
DECLARE PASSED_SUPERVISOR_TEST_COMPUTED BY
  FN$TEST_BIT(SAMPLE_STATUS,PASSED_SUPERVISOR_TEST_BIT).
DECLARE PASSED_NORMAL_RANGE_TEST_BIT USAGE WORD.
PASSED_NORMAL_RANGE_TEST_BIT=4
DECLARE PASSED_NORMAL_RANGE_TEST_COMPUTED BY
  FN$TEST_BIT(SAMPLE_STATUS,PASSED_NORMAL_RANGE_TEST_BIT).
...etc...
.
.
.
IF PASSED_NORMAL_RANGE_TEST NE TRUE THEN
  do something
...
IF (PASSED_SUPERVISOR_TEST EQ TRUE) AND
(PASSED_something_else EQ FALSE) THEN SAMPLE_STATUS =
  FN$SET_BIT(SAMPLE_STATUS,DONE_WITH_TESTS_BIT)
...
IF SAMPLE_STATUS LT FN$SET_BIT(0,ANOTHER_CHECKPOINT_BIT)
  THEN do some more
...

```

Play with these functions and you will find many more useful ways to use them!

Sincerely,
Wombat Wizard

Dear WW:

I heard that some people have installed a SPAWN function in Datatrieve. I tried installing one, but it seemed to take a long time to SPAWN. Is there a way to make that faster?

Signed,
Spawns Slowly

Dear Slowly:

The reason it takes a long time to SPAWN is that the SPAWN operation is very CPU intensive. It takes about 1-3 CPU seconds to create a new process on a VAX-11/780, depending on the load on the CPU, free memory available, number of process logical names, etc. On a heavily loaded CPU, this might correspond to a much longer elapsed time. On the other hand, if you've already SPAWNed a subprocess, it takes almost no resources at all to ATTACH to it. So what you want is a way to SPAWN a subprocess only the first time, then to ATTACH to it on subsequent uses.

I described one solution at a DECUS Wombat Magic a few years ago. Steve Cordiviola of the Kentucky Geological Survey took that idea and turned it into the spawn function given below. You might want to try to implement this same function on your system.

You use Steve's SPAWN function like this:

```
DTR> FN$SPAWN ("dir")
[a directory will print out here]
You can also do this:
DTR> FN$SPAWN ("")
SPAWN> !The SPAWN prompt tells you you're in a
! sub-process.
SPAWN> dcl-commands...
SPAWN> POP !this command puts us back in our parent
! process.
DTR>
```

Here are a couple of things you might want to consider to improve upon Steve's implementation:

- o The current function doesn't behave properly if you SPAWN from DTR, exit DTR, then start up DTR and SPAWN again. Can you think of a way to use either logical names or the SYS\$GETJPI RTL call to improve upon this situation?
- o You might want to include additional arguments to the FN\$SPAWN function that let you control whether or not logical names and other process context attributes are created for the subprocess. (See the documentation on the LIB\$SPAWN RTL call for more information.)
- o SPAWN might be better as a Datatrieve statement or command than as a function. You can extend Datatrieve "on the top" using User Defined Keywords (UDK's) just like you can extend it on the bottom using User Defined Functions (UDF's.)

The version of SPAWN that I have on my machine includes the ability to send commands from DTR directly to the subprocess for execution, to ATTACH from DTR to any process or sub-process, to keep subprocesses around for special purposes like doing DCL commands, and a number of other functions. In a future WW article, we'll explore the construction of UDK's and build a UDK implementation of a SPAWN statement.

How do you link the CREATE_SUB_PROCESS function in with DTR? You'll need a function definition in DTR\$LIBRARY:DTRFND.MAR. And you'll need to rebuild the DTR sharable image, DTRSHR. (The Wizard suggests that you continue to conform to the FN\$function-name form of the name for your SPAWN function (e.g., FN\$SPAWN) because the name SPAWN might be used by a UDK implementation of SPAWN!)

Here's Steve's implementation of FN\$SPAWN. Have fun!

Sincerely,
Wombat Wizard

```
Subroutine CREATE_SUB_PROCESS ( COMMAND_LINE )
INCLUDE '($JPIDEF)'          ! GET JPI VARIABLE NAMES
INTEGER STATUS,             ! STATUS CODE
1 LIB$SPAWN,                ! LIB FUNCTION
2 LIB$GETJPI,               ! LIB FUNCTION
3 SUB_PID,                  ! INTEGER SUB PROCESS PID
4 LIB$ATTACH,               ! ATTACH TERMINAL TO PID
5 BYTE_COUNT                ! # OF BYTES IN STRING

CHARACTER PROCESS_ID_NUMBER*8, ! MAIN PROCESS PID
1 POP_COMMAND*30,           ! COMMAND CHAR. STRING
2 SUB_PROCESS_ID_NUMBER*8,  ! SUB-PROCESS PID
3 SUB_ID_NAME*15,           ! SUB-PROCESS ASSN'D NAME
4 PROCESS_NAME*15,          ! MAIN PROCESS NAME
5 COMMAND_LINE*(*)          ! CMD. FROM CALLING PRGM

LOGICAL BEEN_HERE/.FALSE./
!
! If command line has a dcl command then spawn, execute
! the command, kill the subprocess, and return to the
! caller
!
IF (COMMAND_LINE.NE. ' ') THEN
STATUS= LIB$SPAWN(COMMAND_LINE,,,,,,,,,,,,)
IF (.NOT. STATUS) CALL LIB$SIGNAL (%VAL(STATUS))
RETURN
ELSE
ENDIF

! There is no command and the user just wants to create
! a sub process to work in..

5 CONTINUE
IF (.NOT. BEEN_HERE) THEN
! First get process identification number for calling
```

```

! process
STATUS =LIB$GETJPI ( JPI$ PID,,,,PROCESS ID NUMBER, )
IF ( .NOT. STATUS ) CALL LIB$SIGNAL ( %VAL ( STATUS))
! Get process name for calling process
STATUS = LIB$GETJPI ( JPI$ PRCNAM,,,,PROCESS NAME, )
IF ( .NOT. STATUS ) CALL LIB$SIGNAL ( %VAL ( STATUS))
! Using the calling process' name as a prefix, assign a
! name to the sub-process being created with a suffix of
!
! "_SP1"
!
! First check to see if process name is less than 15
!
! chars.
!
!
1
2
IF ( INDEX(PROCESS_NAME,' ') .LT. 11) THEN
SUB ID NAME =
( PROCESS_NAME (1: (INDEX(PROCESS_NAME,' ')
- 1)))/'_SP1'
ELSE
SUB ID NAME= PROCESS_NAME(1:11)/'_SP1'
ENDIF
! Create a command line using the calling process' pid
POP_COMMAND = 'ATTACH/ID= '//PROCESS ID NUMBER
! Now "SET" the DCL symbol 'POP' so user can go back and
! forth
STATUS = LIB$SET SYMBOL ( 'POP' , POP_COMMAND )
IF ( .NOT. STATUS ) CALL LIB$SIGNAL ( %VAL ( STATUS))
! Okay, let's spawn the subprocess, giving it the new
! name
!
! The calling process will be suspended while we work in
! the sub-process. the user will know he is in the
! sub-process because they will get the 'SPAWN>'
! prompt...
! At the end of his work in the 'SPAWNED' process, the
! user has two options:
! A) 'POP' back into his calling program and suspend
! the sub-process
! OR B) Logout of the sub-process
STATUS = LIB$SPAWN ( , , , ,SUB ID NAME, , , , , 'SPAWN>' , )
IF ( .NOT. STATUS ) CALL LIB$SIGNAL ( %VAL ( STATUS))
! We are back! Let's get the subprocess pid if there is
! one...
BEEN_HERE = .TRUE.
! See if the user 'POP'ed out of the subprocess or
! logout...
STATUS = LIB$GETJPI( JPI$ PID, ,
SUB ID NAME,
SUB PID,
SUB PROCESS ID NUMBER, )
IF ( .NOT. STATUS ) BEEN_HERE = .FALSE. | LOGGED OFF
! We know there is a subprocess out there with an ID =
!
! SUB_PID
! We will 'attach' to it, thus suspending the calling
! process again

```

```

ELSE
STATUS = LIB$ATTACH ( SUB PID )
IF ( .NOT. STATUS ) THEN
TOOPS, SOMETHING'S AMISS
BEEN_HERE = .FALSE.
GOTO 5
ELSE
ENDIF
ENDIF
RETURN
END

```

Modification of X_Y DTR Plot to Smooth Data

Bart Z. Lederman, Brooklyn, New York

I modified the X_Y plot to do a little smoothing of the data before graphing. There isn't much to say about it other than that it does an X_Y plot with smoothing.

```

REDEFINE PLOT X_SMOOTHY
!
! Works like X_Y except that the Y data is "smoothed" a
! little by averaging three data points.
!
! B. Z. Lederman 10-April-1986
!
DECLARE X_AXIS, Y_AXIS, X_LENGTH, Y_LENGTH, X_MAX, X_MIN,
Y_MIN, Y_MAX
DECLARE X_POS, Y_POS, I
DECLARE VECTOR XS, YS, YI !!! extra vector for input
ENTRY 0 (X_LABEL : STRING, Y_LABEL : STRING)
BEGIN
PLOT HOUSEKEEP 0
SET SEGMENT 1
X_AXIS = 100
Y_AXIS = 360
X_LENGTH = 600
Y_LENGTH = 350
PLOT LABEL 0 (X_AXIS, Y_AXIS, X_LENGTH, Y_LENGTH,
X_LABEL, Y_LABEL)
END
ENTRY 1 (X : REAL : "horizontal coordinate",
Y : REAL : "vertical coordinate")
BEGIN
XS (SIZE (XS) + 1) = X
YI (SIZE (YI) + 1) = Y !!! change to input vector
END
! Print scatter plot
ENTRY 2
BEGIN

```

```

      INCR I OVER YI ! go over the data and smooth it
      BEGIN
!
! The first and last points are not averaged as there are
! no "extra" points around them. (I suppose if you
! really wanted to you could average with one adjacent
! point.)
!
      IF I EQ 1 THEN YS(1) = YI(1) ELSE
      IF I EQ SIZE(YI) THEN YS(I) = YI(I) ELSE
!
! average of three points
!
      YS(I) = ((YI(I - 1) + YI(I) + YI(I+1)) / 3)
      END
      X_MIN = MIN (XS)
      X_MAX = MAX (XS)
      Y_MAX = MAX (YS)
      Y_MIN = MIN (YS)
      IF Y_MIN > 0
      THEN Y_MIN = 0
      PLOT LABEL 2 (X_MIN, X_MAX, XS)
      PLOT LABEL 3 (Y_MIN, Y_MAX)
      PLOT LABEL 8 (YS)
      INCR I OVER XS
      PRINT CENTER (XS(I), YS(I)-9, '+', 9)
      OUTPUT_SEGMENT 1
      PLOT HOUSEKEEP 2
      END
      END_PLOT

```

Wombat Magic: Part I - Dallas Symposium - May 1, 1986

Session Editor: Donald E. Stern, Jr. - Warner Lambert Company

At each symposium, Wombat Magic is a special time during which users of Datatrieve share information about unique and/or unexpected ways to use Datatrieve. This session was not unlike others in this respect. The "magic" presented in Dallas will be reproduced in this newsletter in two (or possibly three) parts.

The following is a partial compendium of Dallas "Wombat Magic". The speakers comments are quoted where appropriate and the magic is not necessarily presented in the original order.

Dynamic Record Definitions

Joe Gallagher - 4GL Solutions, Kansas City, Kansas
 Larry Jasmann - U.S. Coast Guard, Burke, VA
 Donald Stern - Warner Lambert Company, Milford, CT

"What this magic involves is trying to deal with records of different structure and what we wanted to be able to do is to change the record layout 'on the fly' depending upon what certain fields are." "The following record has the following properties.

"The data is stored in GROUP0 but you can't see it if you attempt to print it out because it is hidden (by virtue of the FILLER). There are a couple of REDEFINES clauses which specify that the data is stored either one way 4 and 6 or another 5 and 5. The real interesting part, however, is at the end. There are a couple of fields, FOOEY and FOOBAR, which are computed by 'CHOICE OF'. FOOEY and FOOBAR change their values and linkages on the fly."

```

DEFINE RECORD FOO_REC USING
01 FOO_REC.
  02 REC_TYPE      PIC X.
  02 GROUP0.
    03 FILLER      PIC X(10).
  02 GROUP1 REDEFINES GROUP0.
    03 REC1FLD_1   PIC X(4).
    03 REC1FLD_2   PIC X(6).
  02 GROUP2 REDEFINES GROUP0.
    03 REC2FLD_1   PIC X(5).
    03 REC2FLD_2   PIC X(5).
  02 FOOEY COMPUTED BY CHOICE OF
    REC_TYPE = 1 THEN REC1FLD_1
    ELSE      REC2FLD_1
    END_CHOICE.
  02 FOOBAR COMPUTED BY CHOICE OF
    REC_TYPE = 1 THEN REC1FLD_2
    ELSE      REC2FLD_2
    END_CHOICE.

```

;

These fields can be made indexed keys because RMS does allow overlapping keys. If you search on FOOEY or FOOBAR, however, the search is sequential. If you search on REC1FLD_1 or REC2FLD_1 an indexed search is performed.

```

DTR> SHOW FIELDS
FOO
FOO_REC      REC_TYPE <Character string>
GROUP0
GROUP1
  REC1FLD_1   <Character string, indexed key>
  REC1FLD_2   <Character string>
GROUP2
  REC2FLD_1   <Character string, indexed key>
  REC2FLD_2   <Character string>
FOOEY       <Computed value>
FOO_BAR     <Computed value>

```

"To illustrate this 'sleight of hand', we put some data together. There are two record types, REC_TYPE=1 and REC_TYPE=2. In one case the data are defined as 4 and 6 and in the other as 5 and 5." FOOEY and FOO_BAR change dynamically depending upon REC_TYPE.

If you explicitly print out all the fields, you can see all the values. If, however, you specify only the record then only the dynamically changing fields are printed.

```
DTR> PRINT REC_TYPE,GROUP1,GROUP2,FOOEY,FOO_BAR OF FOO
```

```
REC      REC1FLD  REC1FLD      REC2FLD  REC2FLD      FOO
TYPE      1      2          1      2      FOOEY  BAR

2      AAAA      ABBBBB      AAAA      BBBB      AAAA  BBBB
1      ABCD      EFGHIJ      ABCDE      FGHIJ      ABCD  EFGHIJ
```

```
DTR> PRINT FOO
```

```
REC      FOO
TYPE      FOOEY  BAR
2      AAAAA  BBBB
1      ABCD  EFGHIJ
```

```
Day of the Week
Pat Scopelleti, Corning Glass Works, Corning, NY
```

```
DECLARE FD USAGE IS DATE DEFAULT VALUE IS "1-JAN-85".
```

```
DECLARE DIFFS COMPUTED BY REC_DATE - FD.
```

```
DECLARE DOW COMPUTED BY DIFFS - FN$FLOOR(DIFFS/7)*7.
```

```
DEFINE TABLE DOW_TABLE
```

```
0 : "SUNDAY"
1 : "MONDAY"
2 : "TUESDAY"
3 : "WEDNESDAY"
4 : "THURSDAY"
5 : "FRIDAY"
6 : "SATURDAY"
END_TABLE
```

```
Hold Screen
Phil Naecker
```

```
DECLARE HOLD_SCREEN COMPUTED BY *."any character and return
to continue".
```

```
REPORT Big_domains
SET LINES_PAGE=20
```

```
.
.
.
AT BOTTOM OF PAGE PRINT HOLD_SCREEN
.
.
.
END_REPORT
```

```
PUT_FORM in RETRIEVE
Dick Azzi, Motorola, Pheonix, AZ.
```

"This isn't really magic but I found something out while playing with 'GET-PUTS' which not everyone knows about. It's not a big secret and not real magic but 'Did you know that you can do PUT_FORM's in the RETRIEVE USING section of the DISPLAY_FORM statement?"

```
Non-alphabetical Sort
Dana Schwartz, Department of Defense
```

Problem: Need a record stream sorted by SEQ_FIELD.

Example:

| Original Order | | Desired Sorted Order |
|----------------|------------------|----------------------|
| "SECOND" | | "FIRST" |
| "FIRST" | | "SECOND" |
| "FOURTH" | -- sorted to --> | "THIRD" |
| "FIFTH" | | "FOURTH" |
| "THIRD" | | "FIFTH" |

Standard DTR sort would be alphabetical...

```
FIFTH - FIRST - FOURTH - SECOND - THIRD
```

Not what we want...

Solution is to set up a table matching the text with a sequence number.

```
DEFINE TABLE SEQ_TABLE
```

```
"FIRST" : 1
"SECOND" : 2
"THIRD" : 3
"FOURTH" : 4
```



```

    "FIFTH"      :    5
    .
    .
    ELSE 999
END_TABLE

```

... then in the RSE:

```
... SORTED BY SEQ_FIELD VIA SEQ_TABLE ...
```

Limitation:

This technique cannot be used on a remote domain! (Table is local, but sort is performed remotely.)

Solution:

```
... NEQ_SEQ COMPUTED BY SEQ_FIELD VIA SEQ_TABLE.
```

then

```
... SORTED BY NEW_SEQ.
```

Date Stamp Magic
Dick Azzi, Motorola, Pheonix, AZ

"We've got a little application that's used at the Supreme Court in Arizona. What it does is send notices out to lawyers that something is going to happen. There's a record out there that has a date field called SDATE. The operator fills this with the date that the notice is to be mailed out. What I had to come up with was a way to check that (SDATE) every night and keep track of a switch somewhere so that the notice wasn't sent out again the next night. If, however, something happened and the operator changed the notice date then SDATE would change and we'd have to send out another letter. It's kinda hard on the operators to require them to remember to reset a flag to tell the computer to remail a notice if the notice date has changed." Here's what was done...

The record has a date field called SDATE.

We put in the following test

```

IF SDATE GT 0 AND FN$HUNDREDTH (SDATE) EQ 0 THEN
BEGIN
    print the letter
    SDATE = FORMAT (SDATE) USING 9(18) + 50000
END

```

Logically this test (1) checks to see if there is a date and (2) checks to see of the 1/100th part of the date field is greater

than zero. If both of these conditions are met then the letter is printed and 50,000 clunks are added to SDATE.

When the operator puts in a new date, the hundredths field is cleared which automatically resets the flag!

More Date Stamp Magic (with Caution)
John Putnam, Harris Bank

"One of the things that we have, in the Harris Bank, are check sorters who work in shifts. The shifts start at 20 minutes after the hour. We had Datatrieve domains which had fields like date and shift number. You couldn't really do a good indexed look-up on date and shift. First you'd look up the date and then sequentially search for the proper shifts." The problem was solved in the following way taking advantage of "unused" clunks.

Record Definition Excerpt

```

.
.
.
05 DX USAGE DATE.
.
.
.

```

Excerpt from input procedure

```
!Transactions for a whole day entered starting at 00:20
!and going until going until 23:20.
```

```
DECLARE TIMX PIC 9999.
DECLARE TD USAGE DATE.
```

```
TIMX = 20 !Start at 20 min past midnight
TD = "TODAY"
```

```
WHILE TIMX LT 2400 BEGIN
    DX = FN$DATE(FORMAT TD USING MMM"-DD"-YYYYYB|
                FORMAT TIMX USING 99:"99|"00")
    .
    .
    .
    TIMX = TIMX + 100
END
```

"I did this and IT FAILED! I walked back and forth trying to figure out why and it kept failing with 'invalid time'. I built the code up to the point where I could put in an ASCII date string in FN\$DATE which would work! I called [DEC] Technical Support, gave them the code and they said that [the argument for] FN\$DATE

had to be a string and couldn't be a variable... They were wrong!"

The problem turned out to be that the result of the FORMAT statement produces a month of the form Mmm (uppercase first letter and lowercase second two) whereas the FN\$DATE function requires all uppercase. The following statement fixed the code.

```
DX = FN$DATE(FN$UPCASE(FORMAT TD USING MMM"-DD"-YYYYB|
  FORMAT TIMX USING 99:"99|".00"))
```

QUEUED Printing of Datatrieve Plots
Pat Scopelliti, Corning Glass Works, Corning, NY

Pat resurrected some old magic which shows how to print Datatrieve plots on a queued system printer. [Ed. Basil Harris, DEC, first shared this technique at the Wombat Magic Session at the 1984 Fall Symposium.]

```
DTR> PLOT ... ON X.X
DTR> ^Z
```

```
$ SLIDE/NOINT/SIX=X X.X !Need DECSlide and a
$ PRINT/QUE=LASER/NOFEED X.SLS !VT125 or VT240
```

[Ed. See also the May 1986 SIG Newsletters pp. DTR-23 to DTR-38 for an alternative to DECSlide for ReGIS to SIXEL Conversion.]

DTR/4GL Product List

The following is the is an update which attempts to provide readers with current information relating to products served by the DTR/4GL SIG.

| Product | Version Number | Announce/Ship Dates | Operating System |
|----------------|----------------|--------------------------|---|
| VAX Datatrieve | 3.3 3.2 | 11/85 3/86 5/85 10/85 | VMS 4.3 4.0 |
| Datatrieve 11 | 3.1 | 8/84 | RSTS 9.2 RSX 4.2 RSX+ 2.1/3.0 uRSX 1.1/3.0 VAX RSX 2.1 uRSTS 1.0 |
| Pro Datatrieve | 2.0 | 12/84 | P/OS 2.0/3.0 |
| Datatrieve 20 | 1.0 | 9/84 | |
| DECReporter | 1.0 | 11/85 1/86 | VMS 4.2 |
| VAX TEAMDATA | 1.0 | 2/86 6/86 | VMS 4.3 Rdb 2.0 |
| VAX RALLY | 1.0 | 2/86 6/86 | VMS 4.3 Rdb 2.0 |



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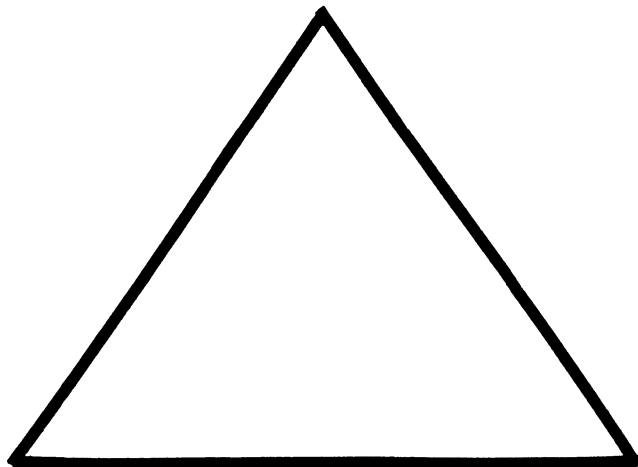
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Taft College
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Gary Finerty
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Marlboro, MA



Fellow Readers:

By the time this article gets to print I will have returned from Dallas DECUS in a state of disarray. So many thoughts will have passed through my brain it will seem like a snow storm on the 4th of July. So many thoughts, so little time. I would like those of you who attended, or for that matter those that didn't, to take a little time to write some thoughts down. Now is the time to give your devoted EDUSIG leaders some direction. We need fresh meat for the lion's den. Did you find our part of Decus well done? If not, what can we do to improve? Your dedicated officers will meet in June or July to map out next year's strategy. Let us gather up the morsels of thought for a well defined plan of action.

"If it is to be, it is up to me."

Your Editor,

Fred Bell
29 Emmons Park Dr.
Taft, CA 93268

PS.

My apologies to Mr. Platt for getting your letter in so late. It was too late for the March edition and we had too many pages for April.

Dear Sir (Editor):

Flagler College will give me a summer grant if I can come up with a program acceptable to the screening committee. Flagler College is an 18 year old four year liberal arts college. We have a PDP 11/34 computer with RSTS/E operating system. There is an additional ten IBM PC's in another instructional department. I am interested in computer aided instruction. I would like to know if someone is willing to put up with me and put me through the ropes of their setup or a workshop. I would like, at the same time, to have someone work with me in an independent study in advanced file handling with RSTS/E BASIC PLUS.

I am Director of Library Services here, and teach the media course for education majors. I have a M.S. in library Science and a M.A. in Religion, I program in BASIC PLUS and WATBOL.

Does any one want to help me?

Sincerely,

Glenn E. Platt
Director of Library Service
Flagler College
Post Office Box 1027
St. Augustine, Florida



DECUS

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GRAPHICS

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GAPSIG Activity Report

Bill Kramer

1985 was, as they say, in wine tasting "a very good year". The GAPSIG increased activity in all currently active areas while initiating activity in many new areas. The reason for this is the tremendous energy and excitement that new volunteers have brought to the SIG. This has spread to all the other volunteer leaders, and has resulted in a large increase in the services the SIG provides to the DECUS members.

The Symposia activities are one of the most important activities of the SIG. Our Symposia Coordinator, Bijoy Misra, has established a fine reputation for excellent sessions. The total number of sessions has increased by 65 of the number of DEC presented sessions actually decreasing. Users are becoming excited about the work of the SIG and are anxious to participate in the Symposia activities.

Several exciting new activities were started at the symposium this year. Nationally recognized keynote speakers were invited to attend the symposium and make presentations on the relevant topics in computer graphics. This year Dr. Richard Puk and Tom Wright presented topics concerning workstations and computer graphics.

The SIG also put together better and more informative session notes through the efforts of Mike McPherson, the Sessions Note Editor. He contacted each speaker and his efforts resulted in a quality package that was pre-sold for the Spring Symposia. The notes sold-out before he even bought a copy for himself!

The GAPSIG has been active in Computer Graphics standards for a long time. Jim Flatten, our representative to the ANSI Computer Graphics committee, has attended every ANSI meeting. This year, for the first time, DECUS participated in copying and mailing the PHIGS document to committee members. In addition to representing DECUS to ANSI, Jim has encouraged other standards work within the SIG. During the Fall Symposium, Jim arranged for three other ANSI committee members to present sessions which helped to educate our membership on a variety of topics.

Jim also started a working group to enhance a public domain GKS package. This project currently involves over twenty DECUS members, working to create a device independent graphics package which will run on all Digital computers - something not even available from DEC! The SIG will make the initial part of this work available through a GAPSIG Library tape to be submitted this summer. Mike McPherson is helping to coordinate this work.

Another GAPSIG activity is the monthly newsletter you are reading. Michael Anton, our newsletter editor, has worked to make the GAPSIG section a worthwhile part of the DECUS newsletter. In addition to this work, he serves as our Communications Representative and Chairs the Communications Budget & Finance Committee

and the Store Committee.

This year, the GAPSIG established and increased our activity in several working groups. In addition to the GKS working group already discussed, another significant advance was the establishment of a Human Interface working group. Dottie Elliot is the chair person and it is an exciting opportunity for the SIG. The activities of the group are still being clarified, but the group was very active at the Spring Symposia. Mike York, our Information Officer, supervises and coordinates the activities of the working groups.

The GAPSIG Pre-Symposium Seminars have been a reasonable success. Two of the four seminars that were scheduled were presented, but attendance was lower than expected. This year the GAPSIG offered a seminar in conjunction with DEC. This was a first for the SIG, and it is representative of the improved cooperation between GAPSIG and DEC.

At the Fall Symposium, Dick McCurdy worked to make the SIG suite a success. It has since become an important symposium activity. We held a speaker reception and had the suite open showing video tapes and other graphics products. In the spring, two workstations were provided by DEC for the campground. This allowed DECUS members to experiment with advanced graphics and ask questions of the DEC developers. Other activities also took place in the campground and suite, including meetings, planning sessions, help clinics. Several sessions turned into informal "round-table" discussions in the campground.

The most important, long term event for the GAPSIG happened last February. The SIG Steering Committee met with several DEC developers and product managers to exchange ideas and build cooperation between the SIG and Digital. We are already seeing an increase in DEC's participation in SIG activities. In addition to giving input into future DEC graphics products through this meeting, Mike York participated in several Product Development Committee meetings addressing DEC's future workstation products. These meetings will certainly lead to many long term benefits for DECUS members.

The GAPSIG continues to assist members by giving advice and referrals. This includes phone consultation, a question and answer column in our newsletter, and question forms at the symposia.

In all, this year has marked many advances for the GAPSIG. It could not have been done without the hard work of the SIG steering committee and the help from Digital and members of the SIG.

GAPSIG Activity Plans

Bill Kramer

The GAPSIG plans to continue to increase its service to the DECUS community. A detailed planning session held in late February led to a strategy to improve a number of DECUS products.

Foremost is to continue to improve our relationship with Digital. The GAPSIG has not effectively influenced DEC's decisions on computer graphics products and directions during the past few years. The meetings recently held with Digital personnel and the work of our counterpart, Rick Berzle, have improved this situation. A goal of the SIG is to continue this trend.

The GAPSIG will continue to produce more symposia sessions of better quality. We plan on continuing to invite well-know speakers to present keynote sessions and provide an opportunity for members to meet them at an informal receptions in the suite. In San Francisco, the keynote theme is "Graphics Hardcopy Systems". Informal symposia activity in the suite and campground will also be improved. We hope to solicit more Digital participation.

Pre-Symposium Seminars are also an important activity for the GAPSIG. In the past, the SIG has paid nationally known experts to present seminars. Due to the recent Board decision, this can no longer be done. It is not yet clear how this will effect the PSS activity, but we plan to continue our involvement.

The GAPSIG will continue to pre-sell Symposia session notes, and increase the number and the quality of the contributions. We also hope to increase newsletter contributions. We setting up a better network to solicit articles.

Another ongoing activity is the participation of a GAPSIG representative on the ANSI X3H3 committee. Continuity has been ensured by appointing an official alternate to the committee. We will continue to encourage DECUS member participation through symposia sessions and newsletter articles on standards, and distributing ANSI documents a SIG volunteers for review and comment.

Volunteer Coordinator is a new position created to manage and train new SIG volunteers. A new working group to develop and enhance public domain computer graphics software has been started. It is expected that working groups will make significant contributions to the SIG activities next year. Other working groups are planned including a Engineering Working Group, a PHIGS working group and a working group for translation and conversion tools of graphics metafiles.

Another new activity which is very exciting is the production of the first GAPSIG Library Tape. Mike McPherson has taken over the Library coordinator job. We plan to increase interest and submissions of graphics software for the tape.

The SIG faces a tremendous challenge from the introduction of the VAXstation. This moved

DEC firmly into the graphics market place for the first time. The GAPSIG plans to adapt to this product line by fully supporting the VAXstation and Digital's other graphics efforts. DECUS members use a myriad of graphics hardware and software on Digital systems. The challenge to the GAPSIG is how to adequately allocate the resources and volunteer person-power to all these aspects of graphics. We will discuss and plan with DEC and other SIGs to provide adequate support for all aspects of workstation use. This includes issues in support, system management, human interfaces, development tools, and end-user graphics applications. The GAPSIG and Digital have not made definite plans, but we will be exploring the options and possibilities.

Another challenge to the GAPSIG is turnover in leadership, through relocation or career changes. It is not yet clear if this will effect SIG activities, but additional volunteer support will minimize any problems.

The progress the SIG has made this year has been remarkable. With the continued support of the enthusiastic volunteers who serve in leadership positions, and a continued increase in new volunteer support, the next year will be even more remarkable.

Update on VDI/CGI

Abstracted from information provided to ARPAnet by Andrea Frankel, the CGI Document Editor (Hewlett-Packard - San Diego Division).

The CGI ISO/ANSI standard work is now in the "Working Draft" stage, with a new document recently being published. It will be registered as a Draft Proposed International Standard this fall. It then gets one or two rounds of technical balloting worldwide (plus a U.S. public review), and should be an official ISO and ANSI standard in late 1988 to mid-1989.

Work is progressing now on getting the standard to converge on major points. Several companies have implemented products "like" CGI, "based on" CGI, "in the spirit of" CGI. It is difficult to say when standards work is "solid enough" to build on; that's a decision each company, product group, or project makes on their own.

Currently, any company producing a "CGI-like" product needs to invent their own language binding. This work for CGI was postponed while other technical issues and functionality are nailed down. Once the work begins on the binding for C and other languages, it should be straightforward and go fairly quickly. There was a "strawman" C binding submitted a year or two ago, but it has no standing. The CGI is now far enough along to consider writing a draft C binding this summer.

GAPSIG Q & A

Is there any (undocumented, "magic") way to do simple 90 degree rotations in PROSight? Will this ever be added as a feature? (Oak Ridge National Lab)

We will forward your question to the PC SIG. VAXSight, a new software product for the VAXstation, can do arbitrary rotations to any angle.

What is the logical name for the default font used by the VT100/220 emulator in UIS? (Yale Medical School)

UIS does not provide a logical name, but you can define one for yourself. The real font file name appears in the UIS Graphics Programmers Guide. It can also be returned by calling UIS\$FONT[...]. The Version 3 documentation has an appendix of logical names used by the VT220 emulator (Peter George -DEC).

We have an LSI-11/23 with Peritek VRG-Q graphics board. We purchased the Graphics Subroutine Package Two (GSP-2), but none of the routines are "end-user" facilities. The half-time programmer in our institute needs most of his time for other applications. Therefore, we are searching for any graphics package that can be used by "naive users" to make histograms, pie-charts, scatterplots and 3D representations of multi-variable data sets like contingency tables. We wrote to Peritek, but the letter was returned.

Would send us the names and addresses of any companies that can help us in our search? (GEMEENTEELIJK PEDOTHERAPEUTISCH INSTITUUT, Amsterdam)

Evidently Peritek did move since you last contacted them. The address you used was incorrect. I talked to a marketing representative, and he said they have a catalog of several hundred user-written applications. Perhaps one of those will meet your need. I forwarded your letter to them and will send you the correct address.

Questions? Send them to:

Michael Anton
GAPSIG Q & A
P.O. Box 591293
Houston, Texas 77259-1293

New GAPSIG Leaders

The most refreshing experience at the Spring Symposium was the energy, interest, and enthusiasm we found in new volunteers who joined the SIG leadership! You'll be hearing more from all of them, but let me take a few minutes to introduce them to you.

Assuming responsibility of Associate Newsletter Editor is Charles Carter of Huntington Alloys. He will be a part of the network we are establishing to identify and solicit material for this newsletter. You will reap the benefits by what you read here!

Eric Rehm of Gonzaga University has volunteered to form a new working group for Engineering Graphics and will serve as Coordinator. Engineering graphics was the original foundation for the GAPSIG; it's great that we are getting back to our roots!

A DECUS long-timer making a comeback is Bob McCormick of Video Communications, who will serve as the Workstation Working Group Coordinator. With activity gearing up in several areas, he is sure to be very busy!

And finally we have Carol Schwob of Florida Atlantic University, the first to volunteer and the last to get mentioned! She started wearing the Session Note Editor's hat by coming to the 7:30 a.m. Communications meeting in Dallas. That's a test of dedication in our book!

Welcome aboard to all of you!

The GAPSIG Steering Committee

Graphics on the VAXstation

Michael Anton

The Pre-Symposium Seminar "Graphics on Workstations" was presented in April by Peter George, the Workstation Product Manager and Keith Curnford, a member of the GKS Development Team at DEC. The seminar focused on two major graphics interfaces on the VAXstation: UIS and GKS. UIS is the native VAXstation graphics interface which is only available on VAXstation products. GKS is the ISO/ANSI standard which is hardware independent. The following slides that were used to explain when and how each of these different interfaces should be used to develop graphics applications.

MicroVMS Workstation Software

April 27, 1986

Peter George

Outline

- o Overview
- o Graphics hardware
- o UIS graphics interface
- o UISDC graphics interface
- o Miscellaneous

MicroVMS Workstation Software

A Common Windowing and Graphics Environment for MicroVMS Workstations

- o Family of uVAX workstations
- o MicroVMS operating system
- o Common user interface
- o Common application development environment

Hardware Overview

MicroVMS Workstations

- | | |
|---------------------|-------------|
| o VAXstation I | Version 1.0 |
| o VAXstation II | Version 1.1 |
| o UIS | Version 2.0 |
| o VAXstation II/GPX | Version 3.0 |

VAXstation I

- o uVAX-I CPU
- o 1-3.75 MB main memory
(minimum of 2MB strongly recommended)
- o RD52 30MB winchester disk
- o Dual RX50 floppies
- o BA23 enclosure
- o QVSS video controller
- o VR100 19" monitor (960x864)
- o LK201 keyboard
- o 3-button mouse
- o DEQNA Ethernet controller
- o DZV-11 asynch controller (4 ports)
- o LA50, LA210, or LN03 printer

VAXstation II

- o uVAX-II CPU
- o 2-9 MB main memory
- o RD52 30MB or RD53 70MB winchester disk
- o Dual RX50 floppies or TK50 mag tape
- o DEQNA Ethernet controller
- o BA23 or BA123 enclosure
- o QVSS video controller
- o VR260 19" monitor (1024x864)
- o LK201 keyboard
- o 3-button mouse
- o DZV-11 asynch controller (4 ports)
- o LA50, LA210, or LN03 printer
- o Tablet, puck, and stylus

Software Documentation

- o MicroVMS Workstation "Read Me First" Card
- o MicroVMS Workstation Release Notes
- o MicroVMS Workstation Installation Guide
- o MicroVMS Workstation User's Guide
- o MicroVMS Workstation Graphics Programming Guide
- o MicroVMS Workstation Guide to Printing Graphics
- o MicroVMS Workstation Video Device Driver Manual

Workstation Software (User's Perspective)

- o MicroVMS operating system
 - DCL and utilities
 - DECnet
 - etc.
- o Windowing
- o All windows draw graphics simultaneously
- o Human interface for viewport operations
 - Create, delete
 - Push, pop, move, resize
 - Keyboard assignment
- o VT220 and TEK4014 terminal emulation
- o Ability to print portions of screen
- o Workstation setup
- o On-line help

VAXstation II/GPX

- o uVAX-II CPU
- o 2-9 MB main memory
- o RD52 30MB or RD53 70 MB winchester disk
- o Dual RX50 floppies or TK50 mag tape
- o DEQNA Ethernet controller
- o BA23 or BA123 enclosure
- o QDSS video controller
- o 4 or 8 planes of color
- o VR260 or VR290 19" monitor
- o LK201 keyboard
- o 3-button mouse
- o DZV-11 asynch controller (4 ports)
- o LA50, LA210, or LN03 printer
- o Tablet, puck, and stylus

Software Overview

Software Packaging

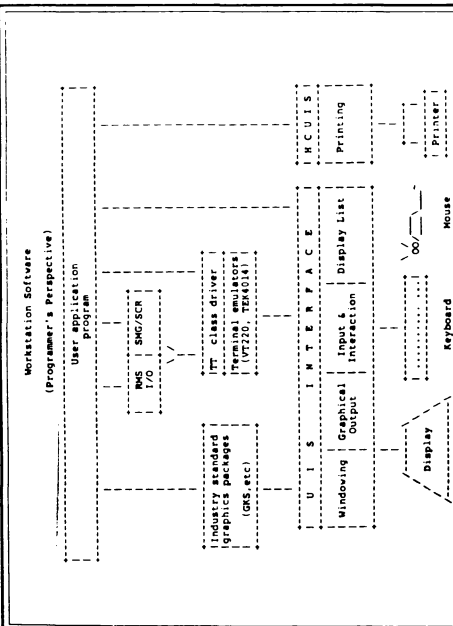
- o MicroVMS operating system
- o MicroVMS workstation software
- o MicroVMS workstation hardcopy support
- o MicroVMS workstation demos
- o VAX GKS graphics library

Graphics Device drivers

(The Lowest Layer)

Device Driver Input Support

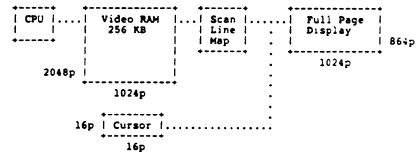
- o Rectangle based pointer input
 - Movement
 - Region transition
 - Pattern updating
 - Button transition
- o Virtual keyboard based input
 - Key strokes
 - Key translation
 - Keyboard attributes
- o Digitizer input
 - Movement
 - Button transitions



Device Driver Output Support

- o VAXstation I and II
 - Map bitmap as user writeable system non-paged memory
- o VAXstation II/GPX
 - QIO interface for windowing operations
 - Packet interface for drawing operations

VAXstation I and II Video Block Diagram



- o CPU sets bits in video memory to draw objects
- o Scan line map maps 864 of 2048 lines to the screen
- o Cursor is overlaid before picture is displayed

VAXstation II/GPX Graphics Controller

- o Two or three QBUS modules
- o DMA gate array
- o Graphics chip
- o Template RAM
- o Color lookup table
- o 4 or 8 planes of memory
- o Cursor logic
- o Pointer interrupt logic
- o Keyboard interrupt logic

UIS Graphics

(Layered on driver and VMS)

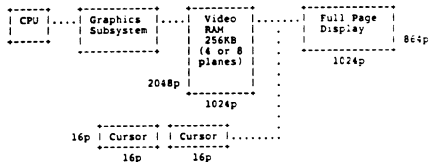
UIS Graphics Interface

- o Virtual displays, display windows, and viewports
- o Drawing graphics and writing text
- o Writing colors and modes
- o Display list management
- o Input mechanisms

VAXstation I and II Graphics Controller

- o Single QBUS module
- o CRT controller
- o Dual ported video RAM (256 KB)
- o Video scan line mapping
- o Cursor logic
- o Pointer interrupt logic
- o Keyboard interrupt logic

VAXstation II/GPX Video Block Diagram



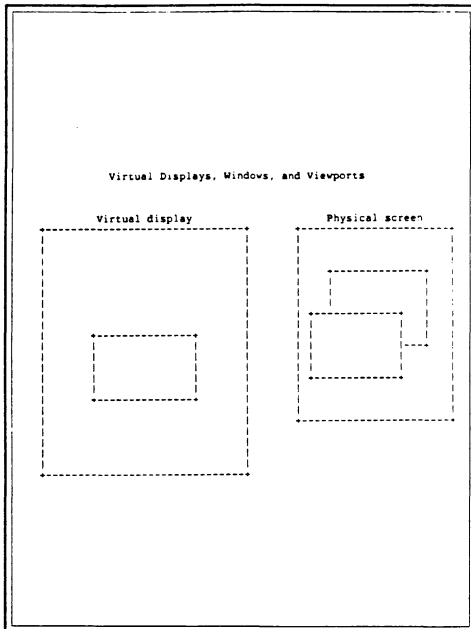
- o Top 864 scan lines are displayed on the screen
- o Bitmap is 4 or 8 planes deep
- o 2 plane cursor is overlaid before picture is displayed

Virtual Displays

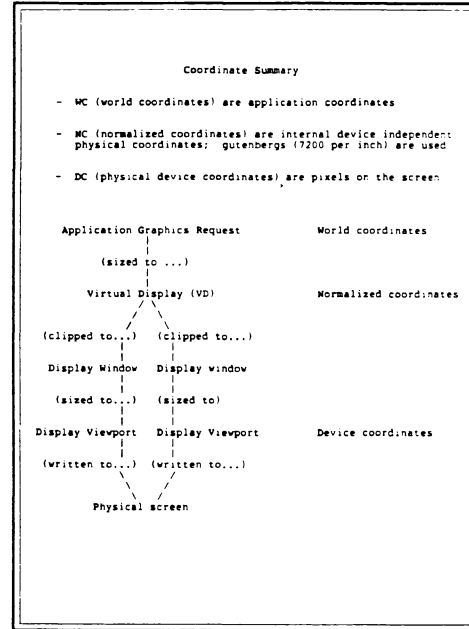
- o Written into by the application program
- o Application defines "world coordinate" space
- o Variable and infinite size
- o Device independent - not a bitmap
- o Need not be visible on physical display
- o Multiple virtual displays per application

Windows and Viewports

- o A "display window" is a portion of the virtual display
- o A "display viewport" is a portion of the physical display
- o Every display window has an associated viewport
- o Many windows may be created for the same virtual display
- o The display window is automatically scaled to the viewport
- o There may be many viewports on the physical display



- Virtual Display and Windowing Functions
- o Create, transform, and delete virtual displays
 - o Create, pop, push, resize, pan, move, and delete windows
 - o Respond to user interface events
 - o Get viewport position, size, visibility



- Display Window and Viewport Functions
- o UISSGET_DISPLAY_SIZE (devname, physical width and height, optional x and y resolution, optional width and height in pixels)
 - o UISSGET_VIEWPORT_POSITION (wd_id, x & y position)
 - o UISSGET_VIEWPORT_SIZE (wd_id, width & height)
 - o boolean = UISSGET_VISIBILITY (vd_id, wd_id, optional MC point or rectangle)
 - o attributes = UISSGET_WINDOW_ATTRIBUTES (wd_id)
 - o UISSGET_WINDOW_SIZE (vd_id, wd_id, MC rectangle)

- Virtual Display Functions
- o vd_id = UISSCREATE_DISPLAY (MC rectangle, physical width & height)
 - MC rectangle is not used for clipping
 - Width and height express desired physical size of virtual display
 - o UISSDELETE_DISPLAY (vd_id)
 - o tr_id = UISSCREATE_TRANSFORMATION (vd_id, new MC rectangle, optional old MC rectangle)
 - Can be used anywhere that VD_ID can be used
 - o UISSDELETE_TRANSFORMATION (vd_id)

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- Display Window and Viewport Functions
- o wd_id = UISSCREATE_WINDOW (vd_id, device name, optional title, optional MC rectangle, optional physical width & height, optional attribute list)
 - Device name: "SYSWORKSTATION"
 - Attribute list
 - WDP_LSC_ABS_POS_X,Y
 - WDP_LSC_PLACEMENT
 - o Top, bottom, left, right
 - o Center
 - o Invisible
 - WDP_LSC_ATTRIBUTES
 - o Aligned (recommended for VT220s)
 - o NoBanner, noborder
 - o Nokb_icon, nomenu_icon
 - WDP_LSC_END_OF_LIST
 - o UISSDELETE_WINDOW (wd_id)

- Display Window and Viewport Functions
- o UISSPOP_VIEWPORT (wd_id)
 - o UISSPUSH_VIEWPORT (wd_id)
 - o UISSMOVE_VIEWPORT (wd_id, placement)
 - o UISSMOVE_WINDOW (wd_id, wd_id, MC rectangle)

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- Display Window and Viewport Functions
- o UISSCLOSE_WINDOW (wd_id)
 - Default is to call SYSSEXIT
 - o UISSSET_CLOSE_AST (vd_id, optional AST routine and parameter)
 - Use UISSC_DEFAULT_CLOSE to restore default

Display Window and Viewport Functions

- o **UISSRESIZE_WINDOW** (vd_id, vd_id,
 optional new physical position,
 optional new physical size,
 optional new MC size)
 - Default is to scale MC and physical size
 - Effect is to make more info visible at same scale
- o **UISSSET_RESIZE_AST** (vd_id, vd_id,
 optional AST routine and parameter,
 optional new physical position,
 optional new physical size,
 optional new MC size)
 - Use **UISSC_DEFAULT_RESIZE** to restore default

Display Window and Viewport Functions

- o **UISSSHRINK_TO_ICON** (vd_id,
 optional icon_vd_id,
 optional icon_flags,
 optional icon_name,
 optional placement)
 - Default is to create icon consisting of title
 - Flags control KB and body handling
- o **UISSXPAND_ICON** (vd_id,
 optional icon_vd_id,
 optional placement)
- o **UISSSET_SHRINK_TO_ICON_AST** (vd_id,
 optional AST routine and parameter)
 - Use **UISSC_DEFAULT_SHRINK_TO_ICON** to restore default
- o **UISSSET_EXPAND_ICON_AST** (vd_id,
 optional AST routine and parameter)
 - Use **UISSC_DEFAULT_EXPAND_ICON** to restore default

Output Routines

- o **UISSPLOT** (vd_id, atb, x, y, ...)
 - vd_id - Virtual display
 - atb - Attribute block number
 - x, y, ... - One or more MC points
- o "Attribute blocks" are used to specify necessary attributes for the output operation

Attribute Blocks

- o Each attribute block contains values for all graphics attributes
- o 256 attribute blocks available at any time, referred to by number 0 - 255
- o Attribute block 0 is read-only and contains default settings
- o Attribute routines change a value in an attribute block, and allow copying of attributes from one block to another

Attribute Routines

- o **UISSSET_LINE_STYLE** (vd_id, iatb, oatb, style)
 - vd_id - Virtual display
 - iatb - Input attribute block # (0-255)
 - oatb - Output attribute block # (0-255)
 - style - Longword containing line pattern
- o style = **UISSSET_LINE_STYLE** (vd_id, atb)
 - vd_id - Virtual display
 - atb - Attribute block # (0-255)
 - s:yle - Longword containing line pattern

Clipping Region

- o **UISSSET_CLIP** (vd_id, iatb, oatb, MC rectangle)
 - sets clipping rectangle
 - (omit MC rectangle to disable)
- o Default - No clipping rectangle

Display Window and Viewport Functions

- o **UISSSET_ADDOPT_AST** (vd_id,
 optional AST routine and parameter)
 - User action routine
- o **UISSMOVE_VIEWPORT** (vd_id, placement)
- o **UISSSET_MOVE_INFO_AST** (vd_id,
 optional AST routine and parameter)
- o **UISSCREATE_TERMINAL** ("MT" or "TK",
 optional title,
 optional attribute list,
 returned device name,
 optional returned device name length)
 - Viewport not created on screen until first output
 - Viewport is deleted on last channel deassign

Drawing Graphics and Writing Text

Output routines modify the virtual display

Examples of output routines:

- UISSCIRCLE** - Draw circle
- UISSSELLIPSE** - Draw ellipse
- UISS\$IMAGE** - Draw natural image
- UISS\$LINE** - Draw disconnected lines
- UISS\$PLOT** - Draw connected lines
- UISS\$TEXT** - Draw text string

Graphics Routines

- o **UISSLINE** (vd_id, atb, x, y, ...)
- o **UISSLINE_ARRAY** (vd_id, atb, count, x_vector, y_vector)
 - Draw disconnected lines
 - **UISSSET_LINE_STYLE** - longword pattern
 - **UISSSET_LINE_WIDTH** - pixel or MC width
 - maximum is 24 pixels
 - 0.0 MC means 1 pixel
 - simple endpoints

```
*** ** *****
*** ** *****
*** ** *****
*** ** *****
*** ** *****
*** ** *****
*** ** *****
*** ** *****
*** ** *****
*** ** *****
```
 - Line drawing includes endpoints
- o **UISSPLOT** (vd_id, atb, x, y, ...)
- o **UISSPLOT_ARRAY** (vd_id, atb, count, x_vector, y_vector)
 - Draw connected lines
 - **UISSSET_LINE_STYLE** - longword pattern
 - **UISSSET_LINE_WIDTH** - pixel or MC width
 - Line drawing includes endpoints
 - beware complement mode writing
 - Fill points, lines, polygons

Fill Rectangle Example

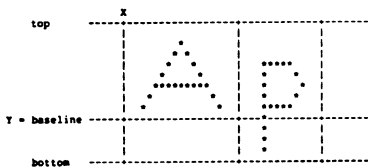
- ```
UISSSET_ONT (vd_id, 0, 1, "UISSFILL_PATTERNS")
UISSSET_FILL_PATTERN (vd_id, 1, 1, PATTSC_BRICK_HORIZ)
UISSPLOT (vd_id, 1, x1, y1, x1, y2, x2, y2, x2, y1)
```
- o Fill pattern can be character in any font
  - o Fill includes borders - beware complement mode
  - o Outline is not drawn - use second call
  - o **UISSSET\_FILL\_PATTERN** ( vd\_id, 1, 1 ) disables
  - o **PATTS** symbols and other **UIS** symbols defined in **EVSS\$LIBRARY:UISUSRDEF.\***
  - o Manual documents fonts and patterns

### Graphics Routines

- o **UISSCIRCLE** ( vd\_id, atb, center position, x radius, start and end degrees )
- o **UISELLIPSE** ( vd\_id, atb, center position, x and y radii, start and end degrees )
- Draw arcs, circles, and ellipses
- Routines are identical
- **UISSSET\_LINE\_STYLE** - longword pattern
- **UISSSET\_LINE\_WIDTH** - pixel or MC width
- Not supported - thick patterned arcs  
thick complemented arcs
- Fill arcs, circles, and ellipses
- **UISSSET\_ARC\_TYPE** - how to close arc
- UISSC\_ARC\_OPEN**
- UISSC\_ARC\_CHORD**
- UISSC\_ARC\_PIE**

### Text Routines

- o **UISSSET\_FONT** ( vd\_id, 0, 1, font name )
  - Font IDs conform to DEC standard
  - Programming guide describes naming standard
  - Fonts are found in SYSSFONT: directory
  - Do not use directory or type when referencing fonts
  - Error signalled if font not found
  - System wide fonts, loaded at system initialization
  - Process based fonts, image activated
- o **UIISSTEXT** ( vd\_id, atb, text string, optional x and y )
- o **UISSMEASURE\_TEXT** ( vd\_id, atb, text string, width & height )



- Text is written at the current position
- Current position is maintained on base line
- Different size fonts will all line up on same base

### Text Routines

- o **UIISSTEXT** ( vd\_id, atb, text string, optional x and y control list and length )

|                        |
|------------------------|
| UISSC_TEXT_ATB         |
| attribute block number |
| UISSC_TEXT_WRITE       |
| 5                      |
| UISSC_TEXT_END_OF_LIST |

|                             |
|-----------------------------|
| UISSC_TEXT_SAVE_POSITION    |
| UISSC_TEXT_TAB_ABSOLUTE     |
| UISSC_TEXT_TAB_RELATIVE     |
| UISSC_TEXT_IGNORE           |
| UISSC_TEXT_VPOS_ABSOLUTE    |
| UISSC_TEXT_VPOS_RELATIVE    |
| UISSC_TEXT_WRITE            |
| UISSC_TEXT_RESTORE_POSITION |
| UISSC_TEXT_END_OF_LIST      |

- Uses margins and justification from initial ATB
- Justifies with each new line

### Text Routines

- o **UISSMEASURE\_TEXT** ( vd\_id, atb, text string, width & height, control list and length, character position array )

|               |
|---------------|
| relative x MC |
| relative y MC |
| relative x MC |
| relative y MC |
| relative x MC |
| relative y MC |
| relative x MC |
| relative y MC |

- o **UISSGET\_FONT\_SIZE** ( font name, text string, width, height )
  - Measures the size of a text string
  - Can be used to calculate optimal display and window sizes before creation
  - Used by terminal emulators

- o **UISSGET\_FONT\_ATTRIBUTES** ( font name, ascender, descender, height, max width, item list )

|                 |                                    |
|-----------------|------------------------------------|
| FMT_FIRST_CHAR  | Return first character             |
| FMT_LAST_CHAR   | Return last character              |
| FMT_FIXED       | True if fixed width font           |
| FMT_WIDTH       | 0 if variable, char width if fixed |
| FMT_CELLORAST   | True if cell equals raster         |
| FMT_VA_FONT     | True if a VA font                  |
| FMT_FONT_ID     | Font id string                     |
| FMT_AVERAGE_GUT | "Average" char width in gutenbergs |
| FMT_GUTPERPIX_X | Integer gutenbergs per pixel x     |
| FMT_GUTPERPIX_Y | Integer gutenbergs per pixel y     |

### Text Routines

- o **UISSSET\_POSITION** ( vd\_id, atb, x, y )
- UISSGET\_POSITION** ( vd\_id, x, y )
- o **UISSSET\_ALIGNED\_POSITION** ( vd\_id, atb, x, y )
- UISSGET\_ALIGNED\_POSITION** ( vd\_id, atb, x, y )
- ATB is needed for the font name
- o **UISSNEW\_TEXT\_LINE** ( vd\_id, atb )
- o **UISSSET\_TEXT\_PATH** ( vd\_id, iatb, oatb, major, minor )
  - UISSM\_TEXT\_PATH\_RIGHT** (DEFAULT MAJOR)
  - UISSM\_TEXT\_PATH\_LEFT**
  - UISSM\_TEXT\_PATH\_DOWN** (DEFAULT MINOR)
  - UISSM\_TEXT\_PATH\_UP**
- o **UISSSET\_TEXT\_SLOPE** ( vd\_id, iatb, oatb, angle )

### Text Routines

- o **UISSSET\_TEXT\_MARGINS** ( vd\_id, iatb, oatb, x, y, margin\_length )
- o **UISSSET\_TEXT\_FORMATTING** ( vd\_id, iatb, oatb, formatting )
  - UISSM\_TEXT\_FORMAT\_MJUSTIFY** (DEFAULT)
  - UISSM\_TEXT\_FORMAT\_LEFT**
  - UISSM\_TEXT\_FORMAT\_RIGHT**
  - UISSM\_TEXT\_FORMAT\_JUSTIFY**
  - UISSM\_TEXT\_FORMAT\_CENTER**
- Justification occurs with each UIISSTEXT call
- o **UISSSET\_CHAR\_ROTATION** ( vd\_id, iatb, oatb, angle )
  - Angle of character relative to the text path
- o **UISSSET\_CHAR\_SIZE** ( vd\_id, iatb, oatb, char, width, height )
  - MC size of an example character
- o **UISSSET\_CHAR\_SLANT** ( vd\_id, iatb, oatb, angle )
  - Makes italics
- o **UISSSET\_CHAR\_SPACING** ( vd\_id, iatb, oatb, ds, dy )
  - Addition x and y spacing as a per char multiplier

### Writing Modes and Colors

#### Writing Modes

- o **UISSSET\_WRITING\_MODE** ( vd\_id, iatb, oatb, mode )

#### Device Dependent

|       |                                         |
|-------|-----------------------------------------|
| BIS   | Write '1' for each '1' in pattern       |
| BISM  | Write '1' for each '0' in pattern       |
| BIC   | Write '0' for each '1' in pattern       |
| BICM  | Write '0' for each '0' in pattern       |
| COMP  | XOR destination for each '1' in pattern |
| COPY  | Copy source to destination              |
| COPTN | Copy complemented source to destination |
| XOR   | XOR of destination and pattern          |

#### Device Independent

|                |                                                                                 |
|----------------|---------------------------------------------------------------------------------|
| ERAS           | Write background for each bit in pattern                                        |
| ERASN          | Write foreground for each bit in pattern                                        |
| (DEFAULT) OVER | Write foreground for each '1' in pattern                                        |
| OVERN          | Write foreground for each '0' in pattern                                        |
| REPL           | Write foreground for each '1' in pattern and background for each '0' in pattern |
| REPLN          | Write foreground for each '0' in pattern and background for each '1' in pattern |
| TRAN           | NOP - text position is updated                                                  |

#### Writing Indices and Colors

- o **UISSSET\_WRITING\_INDEX** ( vd\_id, iatb, oatb, index )
- o **UISSSET\_BACKGROUND\_INDEX** ( vd\_id, iatb, oatb, index )
- o **UISSSET\_COLOR** ( vd\_id, index, R, G, B )
- UISSGET\_COLORS** ( vd\_id, index, count, R\_vector, ... )
- o **UISSSET\_INTENSITY** ( vd\_id, index, I )
- UISSGET\_COLORS** ( vd\_id, index, count, I\_vector )
- o **UISSSET\_COLOR** ( vd\_id, index, retr, retG, retB, [vd\_id] )
- UISSGET\_COLORS** ( vd\_id, index, count, retr\_vector, ... [vd\_id] )
- o **UISSSET\_INTENSITY** ( vd\_id, index, retI, [vd\_id] )
- UISSGET\_COLORS** ( vd\_id, index, count, retI\_vector, [vd\_id] )
- Index must be within bounds of VCM
- R, G, B, I are floating numbers between 0.0 and 1.0
- Color converted to black and white using
- $I = (0.30 \times R) + (0.59 \times G) + (0.11 \times B)$
- and comparing to 0.5

#### Virtual Color Map Routines

- o `vcm_id = UISSCREATE_COLOR_MAP ( size, name, attributes )`  

|                               |                              |
|-------------------------------|------------------------------|
| <code>VCMALSM_SHARE</code>    | Create a shared named VCM    |
| <code>VCMALSM_RESIDENT</code> | Lock down HW resources       |
| <code>VCMALSM_NO_BIND</code>  | Do not allocate HW resources |
- o `vd_id = UISSCREATE_DISPLAY ( ..., optional vcm_id )`
- o `vcm_id = UISSGET_VCM_ID ( vd_id )`
- o `UISSDELETE_COLOR_MAP ( vcm_id )`

#### Hardware Color Map Routines

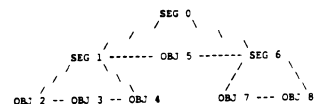
- o `cms_id = UISSCREATE_COLOR_MAP_SEG ( vcm_id, devnam, mode, data )`  

|                                |                                   |
|--------------------------------|-----------------------------------|
| <code>UISSC_GENERAL</code>     | Any available base                |
| <code>UISSC_COLOR_EXACT</code> | Exact base                        |
| <code>UISSC_COLOR_BASED</code> | Any available 2 <sup>n</sup> base |
  - o `UISSRESTORE_CMS_COLORS ( cms_id )`
  - o `UISSDELETE_COLOR_MAP_SEG ( cms_id )`
  - o `UISSGET_HW_COLOR_INFO`
- |                          |                                                              |                   |                    |
|--------------------------|--------------------------------------------------------------|-------------------|--------------------|
| <code>devnam</code>      | <code>SYSSWORKSTATION</code>                                 | <code>VCA0</code> | <code>VCB0</code>  |
| <code>type</code>        | monochrome, intensity, color                                 | mono              | intensity or color |
| <code>indices</code>     | # of color map indices                                       | 2                 | 16 or 256          |
| <code>colors</code>      | # of colors in palette                                       | 2                 | 2 <sup>n</sup> -24 |
| <code>maps</code>        | # of hardware color maps                                     | 0                 | 1                  |
| <code>Rbits</code>       | # of bits of R,G,B,I                                         | 0                 | 8                  |
| <code>Gbits</code>       |                                                              | 0                 | 8                  |
| <code>Bbits</code>       |                                                              | 0                 | 8                  |
| <code>Ibits</code>       |                                                              | 1                 | 8                  |
| <code>res_indices</code> | # of reserved color map indices                              | 0                 | 6                  |
| <code>regen</code>       | regeneration characteristics - retroactive or nonretroactive | yes               | no                 |

#### Display Lists and Segments

- o Display lists are structured hierarchically
- o Output primitives and attribute blocks are grouped into "segments"
- o Graphical BEGIN/END blocks
- o Segments may be nested
- o Each segment inherits the contents of the attribute blocks of higher level segments, but attribute changes only affect the local copy
- o Each segment inherits current text position of higher level segment, but changes only affect the local position

#### Display List Structure



#### Display List Routines

- o Creation
- o Searching
- o Editing
- o Extraction
- o Execution

#### Color Map Routines

- o `UISSGET_WS_COLOR ( vd_id, color_id, retR, retG, retB, [vd_id] )`
  - o `UISSGET_WS_INTENSITY ( vd_id, color_id, retI, [vd_id] )`
- |                           |                            |
|---------------------------|----------------------------|
| <code>WS_BLACK</code>     | Preferred BLACK            |
| <code>WS_WHITE</code>     | Preferred WHITE            |
| <code>WS_RED</code>       | Preferred RED              |
| <code>WS_GREEN</code>     | Preferred GREEN            |
| <code>WS_BLUE</code>      | Preferred BLUE             |
| <code>WS_CYAN</code>      | Preferred CYAN             |
| <code>WS_YELLOW</code>    | Preferred YELLOW           |
| <code>WS_MAGENTA</code>   | Preferred MAGENTA          |
| <code>WS_GREY25</code>    | 25% of Preferred WHITE     |
| <code>WS_GREY50</code>    | 50% of Preferred WHITE     |
| <code>WS_GREY75</code>    | 75% of Preferred WHITE     |
| <code>WS_MSG_FG</code>    | Display FG color           |
| <code>WS_MSG_BG</code>    | Display BG color           |
| <code>WS_TERM_FG</code>   | Terminal emulator FG color |
| <code>WS_TERM_BG</code>   | Terminal emulator BG color |
| <code>WS_CURSOR_FG</code> | Cursor FG color            |
| <code>WS_CURSOR_BG</code> | Cursor BG color            |
- o `UISSHLS_TO_RGB ( H, L, S, retR, retG, retB )`
  - o `UISSHSV_TO_RGB ( H, S, V, retR, retG, retB )`
  - o `UISSRGB_TO_HLS ( R, G, B, retH, retL, retS )`
  - o `UISSRGB_TO_HSV ( R, G, B, retH, retS, retV )`

#### Display List Management

##### Display Lists

- o UIS records what is drawn in the virtual display
- o This "display list" is kept automatically by UIS
- o Display lists allow applications to easily
  - Pan the display: `UISSMOVE_WINDOW`
  - Zoom the display: `UISSMOVE_WINDOW`
  - Copy the display: `UISSCREATE_WINDOW`
- o Display lists allow objects to be "edited" or "modified"
- o Display lists allow applications to transfer graphics between applications or to save and then replay graphics
- o Display lists allow high resolution printing of virtual displays

#### Object Creation

- o `UISSCIRCLE` - Draw circle
- o `UISSLELLIPSE` - Draw ellipse
- o `UISSIMAGE` - Draw natural image
- o `UISSLINE` - Draw disconnected lines
- o `UISSPLOT` - Draw connected lines
- o `UISSTEXT` - Draw text string

#### Segment Creation

```

UISSBEGIN_SEGMENT (vd_id)

.
. stuff
.

UISEND_SEGMENT (vd_id)

```

#### Private Data Creation

- o `UISSPRIVATE ( vd_id, facility id, buffer descriptor )`  
 Binds data to last output primitive or segment created
- o Example:
 

```

UISSBEGIN_SEGMENT (vd_id)
UISSPRIVATE (vd_id, 37, "Whatever ...")
UISSPRIVATE (vd_id, 37, "and some more data ...")
. output primitives,
. private data, and
. attribute settings
UISEND_SEGMENT (vd_id)

```

#### Display List Management

- o `UISSEMBLE_DISPLAY_LIST` ( `vd_id`, optional flags )
- o `UISSDISABLE_DISPLAY_LIST` ( `vd_id`, optional flags )

`UISSM_DL_UPDATE_WINDOW` - Control screen updates  
`UISSM_DL_ENHANCE_LIST` - Control creation  
`UISSM_DL_MODIFY_LIST` - Control editing

#### Display List Searching

- o `obj_id = UISSFIND_PRIMITIVE` ( `vd_id`, WC rectangle, optional context longword, optional returned extent rectangle )
- o `obj_id = UISSFIND_SEGMENT` ( `vd_id`, WC rectangle, optional context longword, optional returned extent rectangle )
  - Match detected by comparing WC rectangle and object extent rectangle
  - Called iteratively with context to find all matches

#### Display List Searching

- o `obj_id = UISSBEGIN_SEGMENT` ( `vd_id` )
- o `obj_id = UISSGET_CURRENT_OBJECT` ( `vd_id` )
- o `obj_id = UISSGET_NEXT_OBJECT` ( `obj_id`, optional flags )
- o `obj_id = UISSGET_PARENT_SEGMENT` ( `obj_id` )
- o `obj_id = UISSGET_PREVIOUS_OBJECT` ( `obj_id`, optional flags )
- o `obj_id = UISSGET_ROOT_SEGMENT` ( `vd_id` )

- Optional flags specify segment level

#### Display List Editing

- o `UISSET_INSERTION_POSITION` ( `obj_id`, optional flags )

`INSERT_AT_BEGIN`  
`INSERT_AFTER_OBJECT`  
`INSERT_BEFORE_OBJECT`

In general object priorities are not enforced with screen updates

#### Display List Execution

- o `UISSEXECUTE` ( `vd_id`, optional buffer length and address )
  - Erase and refresh if buffer is missing
- o `vd_id = UISSEXECUTE_DISPLAY` ( buffer length and address )
- o `status = HCUISREAD_BUFFER` ( `buflen`, `bufaddr`, `allocroutine`, `filespec`, `[defaultspec]` )
- o `status = HCUISREAD_DISPLAY` ( `vd_id`, `filespec`, `[defaultspec]` )

#### Generic Encoding

- o What is extracted from display list
- o What UIS encoding execution routine understands
- o Each record has type code, length, and value

```

| Opcode | Length | Arguments...
| (16 bits)| (16 bits)|

```

- o Basic record types
  - Descriptive or header information
  - Segment primitives
  - Attribute primitives
  - Output primitives
  - Application-specific private data
- o All coordinates are normalized floating point coordinates

#### Display List Editing ( Object Based )

- o `copy_id = UISSCOPY_OBJECT` ( `obj_id`, optional matrix and `atb`, optional insert object id )
- o `UISSDELETE_OBJECT` ( `obj_id` )
- o `UISSDELETE_PRIVATE` ( `obj_id` )
- o `UISSINSERT_OBJECT` ( `obj_id` )
- o `UISSTRANSFORM_OBJECT` ( `obj_id`, optional matrix and `atb`, optional insert object id )
  - Controlled by display list flags
  - Matrix specifies translation, scaling, rotation
  - `Atb` specifies new object attributes

#### Display List Editing ( Region Based )

- o `UISSERASE` ( `vd_id`, optional WC rectangle )
- o `UISSMOVE_AREA` ( `vd_id`, old WC rectangle, new corner )
  - Controlled by display list flags
  - Objects only partially within the rectangles are modified on the screen, but not in the display list
  - Rectangle includes pixels along the outline
  - Move area scrolls whenever possible

#### Display List Extraction

- o `UISSEXTRACT_OBJECT` ( `obj_id`, optional buffer length, optional buffer address, optional return length )
- o `UISSEXTRACT_PRIVATE` ( `obj_id`, optional buffer length, optional buffer address, optional return length )
- o `UISSEXTRACT_REGION` ( `vd_id`, WC rectangle, optional buffer length, optional buffer address, optional return length )
- o `UISSEXTRACT_HEADER` ( `vd_id`, optional buffer length, optional buffer address, optional return length )
- o `UISSEXTRACT_TRAILER` ( `vd_id`, optional buffer length, optional buffer address, optional return length )
- o `status = HCUISWRITE_BUFFER` ( `buflen`, `bufaddr`, `filespec`, `[defaultspec]` )
- o `status = HCUISWRITE_DISPLAY` ( `vd_id`, `filespec`, `[defaultspec]` )

#### Sample Generic Encoding Stream

```
BEGIN <>
PRIVATE < ... >
SET_LINE_STYLE <iatb, oatb, style>
PLOT <atb, #pts, x, y, ...>
PLOT <atb, #pts, x, y, ...>
END <>
```

#### Hardcopy Support

- o `status = HCUISBEGIN_TRANSLATOR` ( `tran_id`,  
device type - LA50, LA100, LA210, LN03,  
LASERWRITER, LCP01, LVP16,  
HP1475, HP1550  
putroutine, allocroutine, freeroutine,  
attributes - paper size (A, A4, LEGAL, ...) draft/nodraft mode )
- o `status = HCUISSTRANSLATE` ( `tran_id`, buffer length & address )
- o `status = HCUISSEND_TRANSLATOR` ( `tran_id` )

#### Hardcopy Support

```
$ RENDER input-filespec
/OUTPUT = output-filespec
/DEVICE_TYPE = UIS
LA50, LA100, LA210, LN03,
LASERWRITER, LCP01, LVP16,
HP1475, HP1550
/[NO]DRAFT
/PAPER_SIZE = A, A4, B, A3, C, A2, D,
A1, E, A0, LEGAL, LP
```

## Input Mechanisms

- o Keyboard
- o Pointers
- o Digitizers

## Virtual Keyboards

- o Analogous to a virtual display
- o Multiple virtual keyboards per application
- o Keyboard attributes and reads are associated with a virtual keyboard
- o Connection to the physical keyboard is managed by the user by manipulating the viewports

## Keyboard Attribute Routines

- o `UISSSET_KB_ATTRIBUTES ( kb_id,`  
    optional enable items,  
    optional disable items,  
    optional keyclick volume )
- o `UISSGET_KB_ATTRIBUTES ( kb_id,`  
    optional enable items,  
    optional disable items,  
    optional keyclick volume )

## Keyboard Attribute Routines

- o `UISSSET_KB_COMPOSE2 ( kb_id,`  
    optional table address and length )
- o `UISSSET_KB_COMPOSE3 ( kb_id,`  
    optional table address and length )
- o `UISSSET_KB_KEYTABLE ( kb_id,`  
    optional table address and length )

## Keyboard Management Routines

- o Virtual keyboard creation/deletion
  - `kb_id = UISSCREATE_KB ( device name )`
  - `UISSDELETE_KB ( kb_id )`
- o Connecting virtual keyboard and physical keyboard
  - `UISSENABLE_KB ( kb_id, optional wd_id )`
  - `UISSDISABLE_KB ( kb_id )`
  - `UISSTEST_KB ( kb_id )`
- o `UISSENABLE_VIEWPORT_KB ( kb_id, wd_id )`
- o `UISSDISABLE_VIEWPORT_KB ( wd_id )`
- o `UISSSET_GAIN_KB_AST ( kb_id,`  
    optional AST routine and parameter )
- o `UISSSET_LOSE_KB_AST ( kb_id,`  
    optional AST routine and parameter )

## Keyboard Input Routines

- o `UISSSET_KB_AST ( kb_id,`  
    optional AST routine and parameter,  
    optional key information )
- o `key = UISSREAD_CHAR ( kb_id, optional flags )`  
    - Flags control wait or nowait

## Sound Routines

- o `UISSSOUND_BELL ( device name, optional bell volume )`
- o `UISSSOUND_CLICK ( device name, optional click volume )`
  - Have no relation to virtual keyboards
  - Default bell and click volumes are established through the workstation setup menu
  - Routines translate `UISSBELL_VOLUME` and `UISSKEYCLICK_VOLUME` to get the default values

## Input Mechanisms

### Pointer Input

- Mouse is relative pointing device
- Tablet is absolute pointing device
- Can use one or the other, not both
- Type of pointing device is transparent to application
- Differences in number of buttons available
  - Stylus - 2 buttons
  - Mouse - 3 buttons
  - Puck - 4 buttons
- Cursor automatically tracks the pointing device



### Pointer Routines

UISSSET\_BUTTON\_AST ( vd\_id, wd\_id,  
optional AST routine & parameter,  
optional button code,  
optional WC rectangle )

UISSSET\_POINTER\_AST ( vd\_id, wd\_id,  
optional movement AST routine & parameter,  
optional WC rectangle,  
optional exit AST routine & parameter )

UISSSET\_POINTER\_PATTERN ( vd\_id, wd\_id,  
optional pattern1,  
optional pattern2,  
optional hot spot,  
optional WC rectangle,  
optional bind flag )

### Pointer Routines

UISSGET\_ABS\_POINTER\_POSITION ( device, absolute x & y )

boolean = UISSGET\_POINTER\_POSITION ( vd\_id, WC x & y )

UISSSET\_POINTER\_POSITION ( vd\_id, wd\_id, WC x & y )

boolean = UISSGET\_BUTTONS ( wd\_id, button mask )

### Device Coordinate UIS

- o Use viewport relative integer pixel coordinates instead of floating point world coordinates (lower left corner is 0,0)
- o No coordinate transformations are performed
- o Display list is not maintained and updated
- o Use simultaneously with world coordinate UIS
- o Separate text position, clip rectangle, margins
- o Duplicate UIS output and pointer input routines  
UISDC\$PLOT  
UISDC\$SET\_POINTER\_AST
- o Special DOP routines for VAXstation II/GPX

### Device Coordinate UIS

UISDC\$READ\_IMAGE ( vd\_id, DC rectangle,  
raster width & height,  
bits per pixel,  
buffer address & size )

Get BITBLT from  
UISDC\$READ\_IMAGE ( ... )  
UISSSET\_WRITING\_MODE ( ... UISSC\_MODE\_COPY )  
UISDC\$IMAGE ( ... )

### Input Mechanisms

#### o Digitizers

#### Digitizer Management Routines

- o Digitizer creation/deletion
  - tb\_id = UISSCREATE\_TB ( device name )
  - UISSDELETE\_TB ( tb\_id )
- o Switching into digitizing mode
  - UISSENABLE\_TB ( tb\_id )
  - UISSDISABLE\_TB ( tb\_id )

### Digitizing Routines

boolean = UISSGET\_TB\_INFO ( devnam,  
physical width and height,  
optional x and y resolution,  
optional width and height in pixels )

UISSSET\_TB\_AST ( tb\_id,  
optional data AST routine & parameter,  
optional data point,  
optional digitizing region rectangle,  
optional button AST routine & parameter,  
optional button code )

UISSGET\_TB\_POSITION ( tb\_id, x & y position in CMs )

### Device Coordinate UIS

- o UISDC\$ALLOCATE\_DOP ( vd\_id, size, atb )
- o UISDC\$EXECUTE\_DOP\_ASYNC ( vd\_id, dop, iasb )
- o UISDC\$EXECUTE\_DOP\_SYNC ( vd\_id, dop )
- o UISDC\$QUEUE\_DOP ( vd\_id, dop )
- o UISDC\$LOAD\_BITMAP ( vd\_id, bitmap length & address & width & bits per pixel )

### DOP Layout

```
+-----+
| STANDARD QUEUE HEADER |
+-----+
| RESERVED CELLS & FLAGS |
+-----+
| OPERATION TYPE CODE |
+-----+
| WRITING MODE |
+-----+
| COLOR INFORMATION |
+-----+
| SOURCE BITMAP INFO |
+-----+
| CLIPPING INFORMATION |
+-----+
| OPERATION SPECIFIC |
| INFORMATION |
+-----+
```

### Miscellaneous

- o KITINSTAL.COM
- o Installs new VMS files
- o Creates SYSSYSROOT:[SYSPFONT] directory and defines SYSPFONT to point to it
- o Adds @SYSMANAGER:STARTVMS.COM to SYSSYSROOT:SYSTARTUP.COM
- o Runs AUTOGEN to ensure that system is tuned as a workstation
- o Reboots to load new UIS and clean out font cache

### UISSDISPLAYMGR Process

- o Detached process running SYSSYSTEM:UISBG.EXE
- o Defines UIS logical names and setup functions
  - Read from SYSSYSTEM:UISSETUP.DAT
- o Initializes UIS
  - Loads UISL0A and UISNSGLOA
  - Allocates paged pool
  - Loads system wide fonts
- o Initializes the screen background
- o Owns empty screen and default keyboard
  - Manages "Workstation Options" menu
  - Manages "Getting Started" window
  - Manages HELP key
- o Owns F1 Hold Screen key
- o Owns F5 Cycle key

### Workstation Options Menu

- o TITLE "Workstation Options"
  - /INSTRUCTION\_FONT=font\_name
  - /CHOICE\_FONT=font\_name
- o INSTRUCTION "Move the mouse to the desired item"
- o SPACE
- o CHOICE "Help"
  - /ROUTINE=UISBGSCREATE\_TERMINAL
  - /IMAGE=SYSSYSTEM:UISHELP.EXE
  - /TITLE=HELP
  - /TERMINAL=WT
- o CHOICE "Your UIS application"
  - /ROUTINE=UISBGSCREATE\_PROCESS
  - /PROCESS\_NAME=MY\_APPLICATION
  - /IMAGE=DUA0:[VSDemo]APPLICATION.EXE
  - /INPUT=NLA0:[VSDemo]APPLICATION.DAT
  - /OUTPUT=NLA0:
  - /ERROR=NLA0:

### Workstation Options Menu

- o Possible routines
  - /ROUTINE=UISBGSAUTOLOGIN\_TERMINAL
  - /ROUTINE=UISBGSCREATE\_TERMINAL
  - /ROUTINE=UISBGSPRINT\_SCREEN
  - /ROUTINE=UISBGSETUP
  - /ROUTINE=UISBGSEXIT
- o Menu placement
  - /DEFAULT

```
UISBG.DAT

: Specify what the "Workstation Options" menu should look like
:
: TITLE "Workstation Options" -
: /INSTRUCTION_FONT=DTABER0003WK00GG0001UZZZZ02A000 -
: /CHOICE_FONT=DTABER0003WK00PG0001UZZZZ02A000
:
SPACE
INSTRUCTION "Move the mouse to the desired item"
INSTRUCTION "and then click the leftmost button."
SPACE
CHOICE "Help" -
/ROUTINE=UISBGSCREATE_TERMINAL -
/IMAGE=SYSSYSTEM:UISHELP.EXE -
/TITLE=HELP -
/TERMINAL=WT
:
: CHOICE "Your UIS application" -
: /ROUTINE=UISBGSCREATE_PROCESS -
: /PROCESS_NAME=MY_APPLICATION -
: /IMAGE=DUA0:[VSDemo]APPLICATION.EXE -
: /INPUT=NLA0: -
: /OUTPUT=NLA0: -
: /ERROR=NLA0:
:
: CHOICE "Create new VT220 window" -
: /ROUTINE=UISBGSAUTOLOGIN_TERMINAL -
: /IMAGE=SYSSYSTEM:LOGINOUT.EXE -
: /TERMINAL=WT
:
: CHOICE "Create new VT220 window (without autologin)" -
: /ROUTINE=UISBGSCREATE_TERMINAL -
: /IMAGE=SYSSYSTEM:LOGINOUT.EXE -
: /TERMINAL=WT
:
: CHOICE "Create new TEK4014 window" -
: /ROUTINE=UISBGSAUTOLOGIN_TERMINAL -
: /IMAGE=SYSSYSTEM:LOGINOUT.EXE -
: /TERMINAL=TK
:
CHOICE "Print (portion of) screen" -
/ROUTINE=UISBGSPRINT_SCREEN
CHOICE "Set up the workstation" -
/ROUTINE=UISBGSETUP
CHOICE "Exit this menu" -
/ROUTINE=UISBGSEXIT -
/DEFAULT
```

### VT220 and TEK4014 Terminal Emulation

- o Implemented as a pseudo device:
  - WTAX: is a VT220 emulation window
  - TKAX: is a TEK4014 emulation window
- o Terminal emulators are "port drivers" to standard VMS terminal class driver
  - WTDRIVR handles VT220 emulation
  - TKDRIVR handles TEK4014 emulation
- o Terminal emulators are UIS applications except they don't use UISSHR; they use UIS system services directly
  - o WTA0: and TKA0: are template devices
  - o Terminals are created on first output
  - o Terminals are deleted on last deassign
  - o Not all DCU commands work correctly with templates

### How UISSDISPLAYMGR Creates Terminals

- o Same process used for VT220, TEK4014, and HELP
- o Algorithm
  1. Set up window attributes block to specify
    - absolute position = center of WS Options menu
    - placement = center
    - attributes = byte aligned
  2. For VT220 and TEK4014 use default title, for HELP supply one
  3. Call UISSCREATE\_TERMINAL with device type
  4. Call SYSSCREPRC to create detached interactive process; specify SYSSYSTEM:LOGINOUT.EXE or SYSSYSTEM:UISHELP.EXE as image to run
- o Modified algorithm for application use
  4. Use LIBSSPAWN instead of SYSSCREPRC

### VT220 Terminal Emulator Escape Sequences

- o Set terminal banner
- o Shrink to icon
- o Expand from icon
- o Move terminal window
- o Move terminal icon
- o Disconnect keyboard
- o Disable keyboard
- o Enable keyboard
- o Push terminal window
- o Pop terminal window

### VT220 Terminal Emulator Mailbox Messages

- o Lose KB
- o Gain KB
- o Shrink to icon
- o Expand from icon
- o Resize window
- o Move window

### What Is GKS?

- ANSI/ISO Standard application interface
- ANSI/ISO Language Bindings
- Device Independent Interface

### INPUT

|   | a | b | c |
|---|---|---|---|
| 0 |   |   |   |
| 1 |   |   |   |
| 2 |   |   |   |

O  
U  
T  
P  
U  
T

a = no input available  
b = only request input mode  
c = add sample and event input modes  
0 = basic output primitives only  
1 = add dynamic bundles and segments  
2 = add WISS

### UISSHR Shareable Image

- o Included in VMS kit
- o Privileged shareable image insures UIS image rundown handler will be called
- o Contains transfer vectors into system space for most UIS routines
- o Contains actual routines for UISSCREATE\_TERMINAL and UISSPRESENT
- o Stub shareable image will be shipped with VMS 4.4
- o boolean = UISSPRESENT (major, minor) returns  
1 if real UIS  
SHRS\_PRODNOTINS if stub image

### VAX GKS V 2.0

- Level 2b
- Includes FORTRAN Binding
- Composed of Shareable Images
- Several Supported Devices
- User Writeable Device Handlers

### Workstation Categories

- Output
- Input
- Outin
- Metafile Output
- Metafile Input
- WISS

### Operating States

- GKCL - GKS Closed
- GKOP - GKS Open
- WSOP - 1 or more Workstations Open
- WSAC - 1 or more Workstations Active
- SGOP - Segment Open

### GKS Description Table

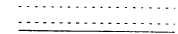
- Static Informaion
- GKS Level
- Limits for Workstations

### Output Attribute Types

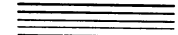
- Geometric Attributes
  - Modified by world coordinate system
- Non-Geometric Attributes

### Polyline Attributes

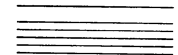
- o Line style



- o Line Width



- o Line Color



### GKS State List

- Dynamic Information
- List of Open Workstations
- List of Active Workstations
- List of Normalization Transformations

### GKS output primitives

 polyline  
Draws a series of connected lines

 polymarker  
Draws a series of markers used to indicate significant points

 text  
draws a text string

 fill area  
draws a hollow, filled, patterned, or cross-hatched polygon area

 cell array  
draws a rectangular area using pixel patterns

### Polymarker Attributes

- o Marker style

+ \* o x

- o Marker size

\* \* \* \* \*

- o Marker Color

\* \* \* \* \*

### Fill Area Attributes

- Interior style
- Style Index
- Pattern Reference point
- Pattern height and width
- Color index

### Fill Internal Styles

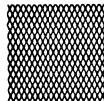
Hollow



Solid



Hatched



Patterned



### Text Attributes

- Non-Geometric Attributes
  - Font
  - Precision
  - Spacing
  - Expansion Factor
- Geometric Attributes
  - Height
  - Path
  - Vertical Alignment
  - Horizontal Alignment
  - Up Vector

### Text Spacing Effects

- Text spacing 0.0 (default)
- Text spacing 0.1
- Text spacing 0.25
- Text spacing 0.5
- Spacing 1.0
- Text spacing 2.0

### Expansion Factor Effects

- Text expansion 1.0 (default)
- Text expansion 0.5
- Text expansion 0.5
- Text expansion 0.75
- Text expansion 1.5
- Expansion 2.0

### Text Precisions

- String
- Character
- Stroke

Text clipping

Text in stroke precision

This string should get clipped

Text in character precision

This string should get clipped

### Text Height Effects

- Text height .01 (default)
- Text height .02
- Text height .03
- Text height .04
- Text height .05
- Text .1

### Alignments

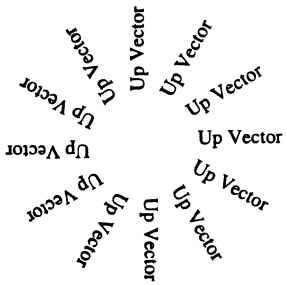
- Horizontal alignments
  - Left
  - Center
  - Right
- Vertical alignments



### Text Paths

U  
=  
h  
t  
a  
P  
tfeL=htaP Path=Right  
P  
a  
t  
h  
=  
D  
o  
w  
n

## Up Vectors



## Bundles

- Available for all Primitives except Cell Array and GDP
- Contain the Non-Geometric attributes for the related primitive
- Actual Representation on Workstation may draw from both bundles and state list
- Changes in bundles effect previously drawn primitives

## Deferral States

- ASAP - As Soon As Possible
- BNIG - Before Next Interaction Globally
- BNIL - Before Next Interaction Locally

## Implicit Regeneration

- Allowed
- Suppressed

## Coordinate Systems

- World Coordinates
- Normalized Device Coordinates
- Device Coordinates

## Aspect Source Flags

- one for each non-geometric attribute (13 in all)
- are either **BUNDLED** or **INDIVIDUAL**
- If **BUNDLED** then the attributes are drawn from a bundle
- If **INDIVIDUAL** then the attributes are drawn from the GKS state list

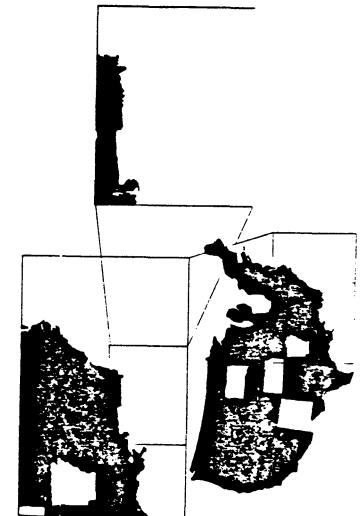
## Attribute Determination

|                       |                                 |
|-----------------------|---------------------------------|
| Polyline attributes   |                                 |
| Line Bundle index     | 2                               |
| Line type             | DASHED                          |
| Line width            | 3.5                             |
| Line color index      | 2                               |
| Aspect Source flags   |                                 |
| Line type             | BUNDLED                         |
| Line width            | INDIVIDUAL                      |
| Line color index      | BUNDLED                         |
| Line Bundle entry #2  |                                 |
| Line type             | SOLID                           |
| Line width            | 1.0                             |
| Line color index      | 3                               |
| Color Table (partial) |                                 |
| Color 2               | Red= 0.0, Blue= 1.0, Green= 0.0 |
| Color 3               | Red= 0.0, Blue= 0.0, Green= 1.0 |

This yields a green solid line with width 3.5

## Transformations

- Normalization Transformations
  - World Window
  - World Viewport
- Workstation Transformations
  - Workstation Window
  - Workstation Viewport



### Segment Attributes

- Name
- Visibility
- Detectability
- Priority
- Highlighting
- Transformation

### Input Functions

- Locator
- Stroke
- Valuator
- Choice
- String
- Pick

### Control Functions

- Open and Close GKS
- Open and Close Workstations
- Activate and Deactivate Workstations
- Set the Deferral state of Workstations
- Update A Workstation
- Escape Function

### Vaxstation Implementation

- Implemented as a workstation handler
- Handler uses UIS to perform Graphical activities
- Each GKS workstation has its own Vaxstation window

### Input Modes

- Request
- Sample
- Event

### Inquiry Functions Provide Information About

- The GKS description table
- The GKS state list
- The Workstation description tables
- The Workstation state list

### Output Capabilities

- Polylines and fill areas similar to UIS abilities
- Text has character and string precision supported through UIS
- Polymarkers implemented with UIS fonts
- Cell arrays are often simulated
- No GDPs supported

### Bundle Behavior

- Bundles are modifiable, but changes will cause a regeneration
- The number of bundles per primitive is limited but should be sufficient (20+ bundles per primitive)

### Screen Regeneration

- All Deferral states are supported
- All Regeneration modes are supported
- Updating techniques try to avoid redrawing

### Segment Support

- GKS segments uses UIS segments
- Pick Identifiers also use UIS segments
- Some Primitives are also kept as UIS segments
  - Polymarkers
  - Cell Arrays
  - Stroke text

### INPUT - String

- String is echoed in a separate window
- Trigger is the return key
- Control-U is the break function
- Delete key works, but line editing keys don't
- String is unaffected by resizing or moving the window

### INPUT - Locator

- Locator is echoed in the main output window
- Four supported prompt and echo types
  - Default arrow cursor
  - Cross Hairs
  - Rubber Band Line
  - Rubber Band Box
- Moving the window can interact with Locator input

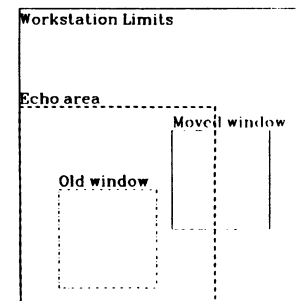
### INPUT - Valuator

- Valuator is echoed in a separate window
- Represented with a bar graph
- Representation also includes a textual echo
- Valuator is unaffected by resizing or moving the window
- Activated by pointing and clicking with the mouse

### INPUT - Choice

- Choice is echoed in a separate window
- Pop up style window
- Selected via clicking the mouse
- Choice is unaffected by resizing or moving the window

### Echo Area Interaction



### INPUT - Stroke

- Stroke is echoed in the main output window
- Uses the left mouse button twice
  - Once to start stroke
  - Once to end stroke
- Moving the window interacts with stroke input



### INPUT - Pick

- Pick is echoed in the main window
- Pick on lines and fill areas is exact
- Pick is performed by object extent on other primitives
- Moving the window interacts with pick input

### Device Independent Programming

- Use default workstation type and connection identifier
- On output...
  - Use inquiries to discover device limits
  - Use predefined bundles to get unique representations
- On input use inquiries to get default values for
  - for prompt and echo types
  - for echo areas

### GKS Advantages (continued)

- Pick, Locator and Stroke are easily usable
- Programmer training should be shorter due to familiarity with the standard
- WISS available for object storage

### GKS Disadvantages

- Input at level 2b is purely request mode
- Only one input device active at a time
- Some restrictions due to GKS input model
- No built in circles, ellipses or curves
- Some overhead associated with using GKS

### Device Independent Techniques

- Avoid using numerical values for GKS constants; Use the supplied names instead
- Avoid using hard coded device coordinates if possible
- Check the category and type of the device you are on
- Make sure inquiries completed successfully

### GKS Advantages

- Other devices available for use in addition to workstations
- Possible to add support for additional devices
- GKS is an ISO and ANSI standard
  - FORTRAN binding is source code portable
  - Metafiles are in standardized GKSM format





H M S

HMS

**HMS****Chairman VAX SIG Liaison**

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Hans Zoller



# THE DeVIAS LETTER

## T A B L E   O F   C O N T E N T S

The DeVIAS Letter - Issue 38  
July 1986

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26 May 1986

Dear IAS Enthusiast,

I was elected to the Board! Thank you! I was third of the three elected. While it was announced at the Dallas Symposium the complete official results will be in the next issue of DECUScope.

John Roman of McDonnell-Douglas Corporation in Hazelwood, Missouri is the new IAS SIG Chairman. I proposed him and the SIG Steering Committee agreed. I am grateful that he accepted, he's more than I could have hoped for as our SIG Chairman.

Skip Stanfield, of the United States Air Force, is leaving, too. His job activities are changing away from IAS. He has been an enormous help to the SIG in his position of Symposia Committee Representative. Thank you, Skip; we'll miss your contribution and welcome you back anytime!

The IAS SIG is in good hands. John and the SIG will need your support, however, for the SIG to continue. Please tell him that you are out there and can help.

So many of you have made my life with the DeVIAS LUG and the IAS SIG very rewarding and fun. There are some great 'campfire stories'. Do you remember the orange 'DEVIAS' ribbons at the Miami Symposium in 1981? Steve Keith bought those ribbons himself and we gave them out to signed-up members only. I can remember going down the escalator seeing a bunch of those orange ribbons all over the convention center. It was surprising. That was the Symposium at which Chuck Turley announced that Digital would discontinue support for IAS in June 1983. He, too, was surprised at large numbers of orange ribbons AND the lack of abuse he received at the announcement! Over the next two years many of you contributed to restoring Digital's interest in IAS.

Then, the next Symposium came along (San Diego?) and Jim Hopp, all on his own, came armed with BLACK ribbons with IAS printed on them. In memoriam! DEC got the point. And we still admire this example of the best of DECUS - one man's insight, execution and contribution. Remember, this was before there were more ribbons than DEC editors.

There was the meeting of the LUG in Philadelphia when Jim Kissane and six other guys in suits came from Maynard to listen. Our LUG meeting was attended by you from Texas, Toronto, Chicago as well as the 'local' troops. The Radiation Therapy Conference Room was never that full. It showed how a small group who worked together could achieve a desirable goal.

The best memory is the newsletter, "The DeVIAS Letter". The name of the LUG, the "Delaware Valley IAS LUG" was Steve Keith's idea,

which didn't thrill me, truth to tell. But, when he said that it would contract to "DeVIAS LUG", I was convinced. He contributed the name of the newsletter, too. He was the first editor. He would put the stuff together, print the sticky labels and send it off to the 'publisher of the month'. The 'publisher' would xerox the correct number of copies, attach the sticky label and pay the postage. We rotated that duty. The last issue to go out that way had a circulation of over 200. DECUS published it after that, after Ray French worked hard to convince the management that it was a good idea.

Thank you all for all you've done for IAS and me. Please do the same for John. I will not go away - I've asked to keep this column for the time being. I have been surprised by the people who read "The DeVIAS Letter"; and pleased that so many of you that do have mentioned it to me.

The big question so far is, "How does it feel?" or "What's it like?" I still don't know how to answer that. The most noticeable change from the SIG Council to the Board is the number of cigarette smokers in the meetings. There were none left in the SIG Council and the meetings were nice. The Board has a few serious smokers that make breathing difficult.

The members of the Board have been very friendly and helpful. Even though I don't take office until July 1st I have been invited to all the meetings including the joint meeting with the Management Council in the Dallas/Fort Worth Airport hotel a week ago. The change in perspective has been instructive.

One of the complaints that I have heard is that the board is not accessible. Until the general problem is solved to the satisfaction of all, I can be reached at the above address or at my home:

Bob Curley  
P.O. Box 322  
Flourtown, PA 19031

The telephone in my office is 215-662-3083, leave a message on the tape recorder when I'm not there. I can also be reached via ARPAnet:

CURLEY@WHARTON

I expect something in writing would be easier for me to deal with, but don't let that stop you.

A short DECUS topography lesson. The Board of Directors is defined by the bylaws to consist of 9 members. Six are elected at large, three each year, for a two year term. Seven is the Chairman of the Management Council and a eighth is the Vice Chairman. The ninth is the Digital Delegate who is appointed by Digital. The Officers are the President, Vice-President and Secretary-Treasurer who are elected by the Board from among the at-large members. There will be an election of officers at the first board meeting after July first.

"The management of the business of the Chapter shall be vested in the Board of Directors." A portion of Article 6.0 of the bylaws.

The other major group running DECUS (U.S. Chapter) is the Management Council. "The Chapter shall have a Management Council reporting and accountable to the Board of Directors, charged with the management of the Chapter's operational units and implementation of the strategic plan." (Article 7.0) The "MC" consists of ten voting members, The Chairman of the Symposia Committee, The Chairman of the Library Committee, the Chairman of the Communications Committee, the Chairman and Vice Chairman of the National LUG Council (nee NL0), the Chairman and Vice Chairman of the SIG Council, the Chairman and Vice Chairman of the Management Council itself and the DECUS Chief of Staff.

Members of the Board or Management Council "may not be involved in active leadership or management of projects in any other unit. Their roles in other units shall be limited to serving in an advisory capacity as a resource or observer." (Policies and Procedures Manual: 2.1.5)

Enough of that lesson. There will be a short quiz next month. Question will be accepted from the floor.

Now the burning issues. I would like to know:

1. Why there are only 8500 subscriptions to the newsletters when there are currently 40000+ members.
2. Some of you come to one symposium only. What could we do to make you come back?
3. Where should DECUS go from here? What activities and goals should be in the long range and short range plans?

Thank you in advance to all of you who take the time and effort to respond.

An month or two ago I said that Mr. Bill Andrus, Manager, Software Product Managers, Micro Systems Development, had told me at DECworld that he would send me a copy of the Digital Corporate Policy on retiring software products. I have received nothing from Mr. Andrus, nor anyone else, relating to such policy. If you know of such a policy or have a copy, please share it with me.

Again, thank you for your support,

Bob Curley

The News From Dallas  
John Roman

The Decus Symposium at Dallas was a time of great transition for the IAS Sig. To begin with:

#### BOB CURLEY ELECTED TO DECUS BOARD OF DIRECTORS

Bob Curley, the IAS Sig Chair, was elected to the Decus Board of Directors in the election just held this spring. He will take his position on the board starting July 1, the start of the Decus fiscal year, for a two year term. In the current organization of Decus, the Board is the group that determines policy for Decus, while another group, the Management Council, is expected to oversee implementation of this policy and watch the day to day operation of the Society. What this election means for Decus is that the Board will be gaining a contentious worker who will always push for what he believes is best for the society.

What this means for the IAS Sig is that it will be losing the person who has done more for the Sig than anyone else. Bob has been the Sig chair every since the Sig evolved from the DevIAS "Lug". He has kept the Sig going through the years. Quite frankly, he has made the Sig what it is today. Thanks, Bob, for all you have done. It is difficult to adequately thank you.

John Roman New IAS Sig Chairman

During the Dallas Symposium, I agreed to carry on as Sig Chair. This is not an easy thing to do for at least two reasons. First, it is difficult to imagine anyone other than Bob as Sig Chair. He did the job so easily and well and was so identified with the Sig. I am only now coming to understand all the things he did just to keep the Sig going.

The second reason is that this is a difficult period for the Sig. Other transitions are taking place. Skip Stanfield has resigned as Symposium Coordinator. Fortunately in this case we have an excellent person to carry on in that very important role. Mike Robitaille has already begun the duties of the Symposium Coordinator. As you will see in an article following, the scheduling of a symposium follows close on the heels of the previous, and already much of the nature of the San Fransisco Symposium has already been determined.

Additionally, Mike Reilly and Alison Nylander have left the IAS



Engineering group to work in other parts of Digital. Also fortunately, they have indicated their continuing interest in IAS and will be helping out the Sig in various ways, including teaching a presymposium course in San Fransisco. Mike will continue as technical counterpart of the the Sig.

Norm Booth, the IAS Product Manager, has resigned that position to take another within Digital. His duties will be assumed, at least for now, by his boss Tim Leisman. Tim, you will remember, had previously been the IAS Product Manager, so is very familiar with IAS and its users.

The Dallas Symposium can not be considered wildly successful for the Sig. On the one hand, the representation from Digital from the IAS Engineering team was gratifying. It included Mike Reilly, Mike Garcia, Bill Aupperlee, Wayne Blair, and Ed Millholme from Telephone Support. Alison Nylander also attended, but had already started working for the PC group in Littleton. However, all of the IAS technical sessions from the Engineering group were canceled, which was very disappointing. The user representation was down from previous symposia. There were sessions where the people from Digital outnumbered the users.

These matters have troubled me. I was concerned about the viability of the Sig. Under the IAS Sig Operating Procedures, the Sig Chair has the authority to "propose, and recommend for adoption, to the Steering Committee, a resolution to dissolve the Sig when interest in the Sig's activities becomes too small to justify the Sig's existance." I made such a proposal at a meeting of the Steering Committee held on the Thursday evening of the Dallas Symposium. My intent was not to force the dissolution of the Sig, but to determine if people still felt there was a need and a use for the Sig. A Special Interest Group is not a permanent entity, but dynamic, is created, grows and evolves. If the degree of interest in the Sig is not worth the trouble, then lets move onward to something else.

The response of the Steering Committee was unanimous. They all felt that there was a continuing need for the IAS Sig and that they were committed to keeping it a viable entity. I have reprinted the response of Bob Mack, one of the Digital Counterparts, to the proposal. Their response was gratifying, but I feel that we need to hear from the membership. So if you have read through this until this point, you must be a real member of the Sig and interested in what happens to it. Should the Sig continue? Do you want to help make it better? This is not a rhetorical question. I need to hear from you to know your feelings. If you don't respond, either by phone to me, or through our membership survey, we will assume you have gone over to the other side. Please let us know how you feel.

In any case, we are planning a full slate of activities for the

San Fransisco symposium. We are presenting two presymposium seminars, the same two we put on in Dallas: Getting Started with Vax Macro, by Kerry Wyckoff and myself, and an Introduction to C, by Mike Reilly and Alison Nylander. We are scheduling a full set of technical and non-technical sessions, leaving time to hold field trips to various sites of interest. Mark your calendar and we will see you there.

Spring Decus 1986  
1 May 1986

To the IAS Sig Steering Committee and the IAS Sig at large:

I appologize for my absence during this time. Regrettably I have allowed my schedule to get out of control and so must vote by absentee ballot.

I wish to restate Digital's committment to the IAS Sig in both the form of the Sig counterpart as well as participation in and support of sessions and other Sig activities. This statement of support is independant of my vote on the matter before the Committee. As counterpart I feel Digital should continue to support the Sig as long as it is in existence.

As to the motion before the Committee, I vote in favor of continuing the IAS Sig. This is, specifically, a vote against the motion to dissolve the Sig as presented by the Sig Chairman on 1 May 1986.

Clearly the IAS Sig needs to reevaluate its focus and the means by which it serves it members. I would argue that this is an issue facing all of Decus as well.

The IAS Sig serves a vital role in the mechanism of information dissemination. In light of pending changes discussed this week, the Sig needs to redouble its efforts towards serving its members as a source of information. I encourage all Sig members to take a more pro-active role in redefining the goals of the Sig and in participating in Sig activities, however minor that participation.

In closing I would like to move that this matter be re-addressed at the Fall 1986 Symposium to be held in San Fransisco. It is, in fact, an issue which requires on-going evaluation.

Respectfully,

Robert B. Mack  
IAS Sig Counterpart  
Digital Equipment Corporation

Frank Borger has agreed to take over as the DeVIAS Letter Editor. Frank is well-known to readers of the DeVIAS Letter for his regular articles on various technical aspects of IAS and through his support of Reese Basic.

I hope you will support Frank in the way you have supported me -- through your articles, letters, notes, and SPRs. The newsletter is the primary means that we can reach the IAS Community and DECUS at large. We need your input to continue as a viable entity. Please submit materials. Although machine readable media is preferred, all sorts of submissions are welcomed. Please send them to:

Frank Borger  
Physics Division  
Michael Reese Hospital and Medical Center  
Lake Shore Drive at 31st Street  
Chicago, Illinois 60616

The Cross Pens have arrived!

At last, the second batch of IAS Cross Pens have arrived. These are chrome Cross pens with an IAS emblem on the clip. The emblem is reminiscent of the IAS button from a few years ago -- round with a red border and the letters IAS on a white background.

These pens are to be used to honor members of the IAS Sig who have made contributions to the continuing well-being of the group. This includes holding Steering Committee positions as well as submitting articles to the DeVIAS Letter. The awarding of pens for articles is up to the discretion of the Newsletter Editor, Frank Borger. However, qualifying articles must be technical, and of value to the IAS Community. So, here is another reason to submit an article. Be one of the very few to get a limited edition IAS Cross pen.

I have obtained the IAS Sig membership list from George Wells and will be making an effort in the next couple of months to re-survey the Sig membership. If you are one of the 300+ members on that original list you should be receiving a letter from me. This will indicate what our records show you have in the way of hardware, IAS related software, and what your application is. It will also give you a chance to return the form with updated information and comments.

This survey is VERY important. It is one of the ways we hope to understand the IAS Community -- who they are, what they are doing with IAS, and what they want from the Sig. Hopefully, in the tear-out section at the back of the newsletter, there is a membership form. If you know you are not on our list or do not receive one of the mailings, please fill it out and return it to me. Your time is very much appreciated.

Fall Symposium at the the Moscone Center, San Francisco  
October 6 - 10, 1986

Mike Robitaille, Symposium Coordinator

To the best of my knowlege, all CFPs (Call For Participation forms) that were promised have been submitted. The following data was taken directly from the DCS Symposia Scheduling system and is the definitive list for San Francisco:

| Code | Title                                                                    |
|------|--------------------------------------------------------------------------|
| ---- | -----                                                                    |
| I001 | IAS Product Panel                                                        |
| I002 | IAS Technical Seminar                                                    |
| I003 | Reese Basic (The other Basic)                                            |
| I004 | IAS Sig Opening Session and Roadmap                                      |
| I005 | IAS Sig Closing Session                                                  |
| I006 | IAS User Forum                                                           |
| I007 | AN/GYQ-21(V) Users Forum                                                 |
| I008 | IAS+ Working Group                                                       |
| I009 | RSX-11D Working Group                                                    |
| I010 | A User Written CLI                                                       |
| I011 | Practical Applications of Memory Management Directives<br>(PLAS Support) |
| I012 | IAS Sig Library                                                          |
| I013 | Using the IAS Terminal Handler with your Application                     |
| I014 | IAS Technical Session                                                    |
| I015 | DSC and BRU - Backing up your IAS/RSX Disks                              |

By my count, we have 7 technical sessions for 8 hours (not including the User Forum), and 8 other sessions for 8.5 hours. We will squeeze in WHIMS inside the User Forum Session, so please copy and fill in the WHIMS form in this newsletter and send it in. The WHIMS forms will be forwarded to the IAS people at Digital before the symposium so that they can figure out responses.

While I've made up a tentative schedule for these sessions, it is subject to change, so I'll put the dates and times in another newsletter. Stay tuned.

By the way, you may have noticed that the Call For Participation for the next symposium usually closes about one week after the prior one. How about thinking ahead? The Spring '87 symposium will be in the Opryland Hotel in Nashville, Tennessee 27 April through 1 May 1987. Got a good idea for a session that you'd like to see presented? Send me your ideas and I'll see about putting it on at Nashville.

Mike Robitaille  
Gruman-CTEC, Inc.  
6862 Elm Street  
McLean, VA 22101  
(703) 556-7400

Trivia and Other Memories  
Tim Moffitt

Sooo...I missed a month while out at DECUS. Hope we can still be friends. As usual it's back to hardware trivia. Today I thought it'd be interesting if we took a trip down memory lane and looked at some of our earlier processors. The first question is easy. How many different kinds of PDP 11/70's were there. Along the same line, how many different kinds of PDP 11/45's were there, and as long as we're at it, how about PDP 11/34's? If you got that part, can you explain what the differences between family members were?

Let's do the 11/45's and 11/70's first as they are all variants of the same basic architecture.

First came the family head, the KB11-A, Among it's features was an optional memory management unit that allowed memory to expand to 256Kb. and an optional floating point processor, the FP11-B, that would execute in parallel with the main CPU.

The next large PDP 11 to come along was the 11/70. As we discussed in an earlier trivia article, the 11/70 was an outgrowth of the 11/45. Cache memory and a slightly modified memory management unit (to allow addressing of up to 4Mb.) came standard. The optional floating point processor was again the FP11-B. The initial 11/70 was the KB11-B.

A new floating point processor was in the works. It executed exactly the same floating instruction set as the FP11-B but was faster. This processor, the FP11-C was first installed in the 11/70. Since the internal interface was slightly different, the 11/70 was modified and became the KB11-C although the front panel remained the same. KB11-B CPU's could be changed into KB11-C's but it wasn't field service's idea of a good time...many wires changes on the CPU backplane.

Not to be outdone, the 11/45 engineers decided to upgrade to the FP11-C also. Since the /45 and /70 were so similiar, this was not difficult but again a modification if this nature called for a new identifier; hence, the KB11-D.

So by this hacker's way of counting there were two 11/70's, and two 11/45's if you don't count the 11/50 or 11/55 variants that had different memories and front panel art work. That's not too shabby if you remember that they all sprang from the same internal architecture.

The 11/34 was an entirely different story. The 11/34 started life as the KD11-E. It was comprised of two boards that occupied the first two slots of what appeared to be (but wasn't) a standard DD11-DK backplane. Soon after announcement it was noticed that certain bus functions worked a little differently than they should and a third board (M8264) was added to correct these anomalies. At around this time the entire CPU was redesigned and sold as the 11/34A with an internal name of KD11-EA. 11/34A's also had larger +5 volt regulators, the capability for battery backup, and the ability to interface to the FP11-A floating point processor. You could upgrade your older CPU board set to the newer set but it wasn't easy to get the battery backup option to work.

-----  
OK, a lot of you won't consider this trivia but hopefully you'll find it useful and perhaps even a little interesting.

And the question is...What does "margining the bus" mean and why is it done?

The first part of the question is pretty straight forward. "Margining the bus" means that you vary the voltage levels of the signals on the Unibus. This isn't done by adjusting the power supply regulators up or down but rather by using special terminators or a margining box that field service owns.

Why its done is far more interesting (but can get a tad boring if you're not into busses). Let's delve in.

Any unibus device presents a slight current drain to the bus. This is known as DC loading and each device presents at least one DC load to the bus. In a perfect world with no devices on it, a unibus's signal lines (with the exceptions of the grant lines, ACL0, and DCL0) would sit at 3.41 volts. As devices are added, this level starts to drop. This is due to DC loading of the devices. If the level drops too low, the bus receivers won't be able to figure out whether the signal is asserted or deasserted. If you're interested this gray area rears its ugly head from 1.3 to 1.7 volts.

It's pretty easy to determine how many DC loads you can have on a bus, the books all say 20. If you want more than that you need a bus repeater.

The other type of loading, AC loading, is far more difficult to deal with. In addition to current leakage, all unibus devices also present some amount of impedance to bus signals and this is known as AC loading. This impedance will cause a reflection to be sent down a line shortly after a signal is asserted or deasserted. This won't cause a problem if the reflection isn't great enough to cause the signal to go into a receiver's gray area but if it does, all bets are off as to what happens in that bus transaction.

Again the books say that you can have 20 AC loads per segment. A good maintenance person can break a bus into many segments and spread these reflections over time instead of allowing them to build up to into one big reflection that causes problems .

So we're back to margining at last.

When higher voltages are applied to the bus what is actually being tested is the ability of the unibus drivers to drive the signal lines toward ground and the ability of the unibus receivers to figure out that a signal is asserted as long as it's still below 1.3 volts. There usually isn't a problem found with high margining.

The fun begins with low margining. It's suddenly easier for reflections caused by AC loading to start affecting system operation. If this happens, its time for the field service person to start a critical evaluation of device placement on the bus.

There are complex rules to follow in this evaluation process. Fortunately Digital f.s. folks have access to a program called PAULI (Programmed Analysis of Unibus Loading and Interaction) that helps a great deal. Let them do the work; a hit or miss shot will only result in more downtime and nobody wants that.

IAS TO VMS CONVERSION NOTES  
FROM  
ONTARIO HYDRO PROJECT

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1. Cross Reference of System Routines
2. Conversion of MACRO Routines
3. FORTRAN Compiler Differences
4. File Transfer Methods
5. Interprocess Communications

for further information, contact:

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CARSS - IAS TO VMS SYSTEM CONVERSION  
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This section gives a general outline of the methods employed to convert the CARSS system from the PDP 11/70 under IAS to the VAX 11/785 operating under VMS. A basic understanding of the VMS operating system is assumed.

1. Cross Reference System Routines  
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In order to expedite the conversion, a philosophy of minimizing source code changes was followed. To help minimize the code changes, a number of routines were written to emulate the system calls used under IAS. It should be noted that these cross reference routines may not support the full functionality of the IAS routine, rather only that functionality required by the CARSS system. A list of these routines with a brief description of each is given below.

CREMBX - Creates a temporary mailbox used for implementing the interprocess communications scheme.

CRENXT - Creates a temporary mailbox using the low order 4 hexadecimal digits of the PID as part of the mailbox name. This is called by the PLOT program to ensure unique mailbox names in a multi-user environment.

DEASSIGN - This macro AST routine is used to deassign channel numbers that NAMER or SCHDLR has assigned to plot mailboxes so that their channel number program space could be reused in an orderly manner. This module is written in macro to allow a FORTRAN program to pass a parameter by value.

DISCKP - Disables process swapping

ENACKP - Enables process swapping

GETADR - Obtains the address of a variable. The address had to be increased to 4 bytes from 2 to handle VAX addresses.

GETCHAN - A macro routine to return the channel number of a disk file to the FORTRAN caller. In IAS, the system uses logical unit numbers to provide the software links between a file and a program. This LUN can be used by both FORTRAN and MACRO programs, for both high level read/write statements and QIO calls.

Under VMS, FORTRAN uses LUN's and QIO calls use a channel number. When both QIO calls and FORTRAN read/write statements are doing I/O to a file, this macro routine will return the channel number to be used by the QIO call.

NOTE: A file opened for "record access" (ie: FORTRAN read/write statements) must be re-opened for QIO access using GETCHAN as a user open routine to avoid access type conflict errors.

GETMYPID - This routine returns the callers PID. The PID is then used in forming a unique temporary mailbox name. It is only used by IRAS and PLOT for the SEND/RECEIVE interprocess communication emulation.

GETTSK - This routine returns the UIC in the 16th element of the first parameter. The high order byte contains the group number and the low order byte contains the member number. If either member or group numbers overflow a byte, the VMS condition handler "HANDLER" ignores the integer overflow and returns a zero.

HANDLER - This is a VMS condition handler used by GETTSK to ignore integer overflow arithmetic traps.

OUTPUT - This routine attaches and detaches a plotter to a process. The original VERSATEC "OUTPUT" module was modified for the CARSS system. Only the attach and detach entry points were used for the CARSS system.

QIO - This module handles the QIO calls for the following functions:

- i) disk files on channel 3
- ii) digitizers on channel 5
- iii) plotters on channel 10.

Only the QIO function codes and parameters required by the CARSS system were implemented. The parameter array had to be redefined as I\*4 in the QIO call. Under IAS priority for queuing is passed as a parameter. In VMS the QIO requests are queued by base priority.

On IAS, virtual block numbers are stored in a 2 word block, the first word containing the most significant bits and the second word containing the least significant bits. Under VMS, the first word contains the least significant bits and the second word contains the most significant bits. Therefore, for QIO calls, the two words of the IAS virtual block number have been swapped.

The I/O directive status is an optional parameter to the IAS QIO call but is a function value in VMS QIO calls. Many of the IAS programs omitted the parameter. Since QIO is a cross reference routine, the only way to exactly duplicate directive error handling would have been to translate I/O directive error numbers and pass it back as a parameter. This however, causes an access violation if the original QIO omitted the directive status parameter. Therefore, if an error is encountered, it is checked in the cross reference routine and the program is aborted.

VFRBUFF - This Versatec macro module is included to allow programs to link with the OUTPUT module.

VRECSK - This routine receives messages through VMS temporary mailboxes to emulate VRECSK on IAS.  
(See the Intertask Communication Section for more details)

VSNDRR - This routine sends messages through VMS temporary mailboxes to emulate VSNDRR on IAS.  
(See the Intertask Communication Section for more details)

WAIT - This routine emulates the IAS WAIT directive. It suspends program execution for a user specified amount of time through the use of the VMS system timer queue elements.

WAITFR - Wait for an event flag to be set.

WAKEAST - This is an AST routine that operates in conjunction with the mailbox interprocess communication scheme. It will wake up the calling process when a read QIO completes on the mailbox being used.

WTQIO - This routine is identical to QIO with the exception that it waits for the completion of the QIO.

## 2. Conversion of MACRO Routines.

-----  
The CARSS application source consisted of 5 modules coded in MACRO. It was determined that all five modules could be coded in FORTRAN under VMS. The five modules are: GETVER, IRAS7S, IRAS7W, IRAS7A, and IRAS7R.

## 3. FORTRAN Compiler Differences

-----  
A number of source code changes were required to compensate for the differences between F77 under IAS and VAX FORTRAN. A summary of the differences encountered is given below.

- a) IAS treats a byte numeric as an unsigned value (0-255) while VMS treats it as a signed value (0-127).
- b) The default integer assignment is I\*4 under VMS and I\*2 under IAS. An "Implicit None" statement (as well as compiler switch on VMS 4.1) will list all variables in a module which are not explicitly defined. This is helpful in determining which variables must be defined under VMS to ensure compatibility between subroutines (ie: defined explicitly as I\*2 in one module but not in another).
- c) VMS does not support virtual array declarations.
- d) References to UIC's in the format [100,105] is not supported. Under VMS, UIC's do not represent directories. The use of Logical Names instead of explicit directory names is recommended.

e) Format of octal constants differs (VMS = '556'0)

f) Variables defined as Character type are treated differently when passed as parameters in a call statement between FORTRAN subroutines. Therefore, a variable X defined as CHAR\*4 in one routine and as I\*4 in another routine will not be passed correctly through a subroutine call statement.

NOTE: This also applies to special FORTRAN routines (ie: ENCODE, RAD50, etc.) The use of the qualifiers %REF and %DESCR can be used to eliminate the problem.

g) When using the RAD50 function with a variable defined as less than 6 bytes, the value returned under VMS differs from that on IAS. Therefore, all calls to the function RAD50 should be replaced with a call to the subroutine IRAD50.

h) VAX FORTRAN uses generic functions in many areas (ie: square root, trig). These generic functions determine whether to return a single precision or double precision value based on the parameter passed to the function. Therefore, if X is defined as R\*4 and a call to the double precision function DSQRT(X) is made, VMS will automatically execute the single precision function. This will result in a different value than obtained under IAS. To obtain the same value you must make an assignment to a R\*8 variable.

Example:           Real\*4    X  
                  Real\*8    Y  
                  Real\*8    Z  
  
                  Y = X  
                  Z = DSQRT(Y)

i) A Parameter defined as I\*2 will be output as I\*4 when written to a file.

Example:           INTEGER\*2    A  
                  PARAMETER    A = 10  
  
                  WRITE(LUN,REC=NUM)A,.....

The value of A will require 4 bytes in the output record.

j) Error return codes may differ. For example, when a FORTRAN open statement is executed using a LUN currently assigned to another file, IAS returns error 34. VMS will return

an error 30 and blanks the file name already associated with the LUN.

- k) The key words used in the FORTRAN open statements have changed. Although the old keywords are still supported, defaults have changed.
- l) Appendix D of the VAX-11 FORTRAN User's Guide (AA-D035C-TE) outlines a number of differences in language, runtime support, and utility subroutines between PDP FORTRAN and the VAX.
- 4. File Transfer from PDP to VAX.

-----  
Two utilities have been used in transferring files from the PDP to the VAX. Each is described below:

a) PDP - PIP to VAX - COPY

The PIP utility on the PDP may be used to copy files to tape. Ensure the label is initialized to 1600 bpi. The tape is mounted on the VAX and the COPY utility is used.

NOTE: PIP cannot handle direct access files with record sizes less than 14.

b) PDP - BRU to VAX - BRU (RSX compatibility mode)

A directory can be copied to tape using BRU on the PDP. Ensure that the tape has been initialized to 1600 bpi. A number of steps must be taken on the VAX in order to transfer the data from the tape.

- i) A disk must be initialized as ODS1 format.
- ii) A directory name corresponding to the UIC on the PDP must be established. For example, if the PDP directory [200,3] was loaded to tape using BRU, then a directory [200003] must be established on the VAX.
- iii) Use the BRU utility on the VAX to load the data from tape. (NOTE: BRU is supplied with the RSX compatibility software package.)

When transferring a direct access file from the PDP to the VAX, the file will be established under a different format. The VAX establishes the file as fixed length sequential. This should not pose a problem to the programs using this file since direct access techniques are allowed on a fixed length

sequential file. VAX FORTRAN file open statements distinguish between file access and file type. Since the default type is sequential, the open statements currently coded should work properly.

5. Interprocess Communication  
-----

Send/Receive directives were used under IAS to pass messages between processes (tasks). Under VMS, mailboxes are used to duplicate this process. Under IAS, queue priority is a parameter to the directive, whereas in VMS, mailbox messages are queued first in, first out. Also in VMS, the message must be sent to a mailbox name and not a process (ie:task) name. The VRECSF and VSNDRR directives were emulated in the following manner.

VRECSF: Issue a QIO call to the appropriate mailbox specifying an AST routine to be executed when I/O completes (read/write operations to VMS mailboxes are complimentary). The AST routine wakes the call process. Immediately after the QIO call is issued, a hibernate call is executed.

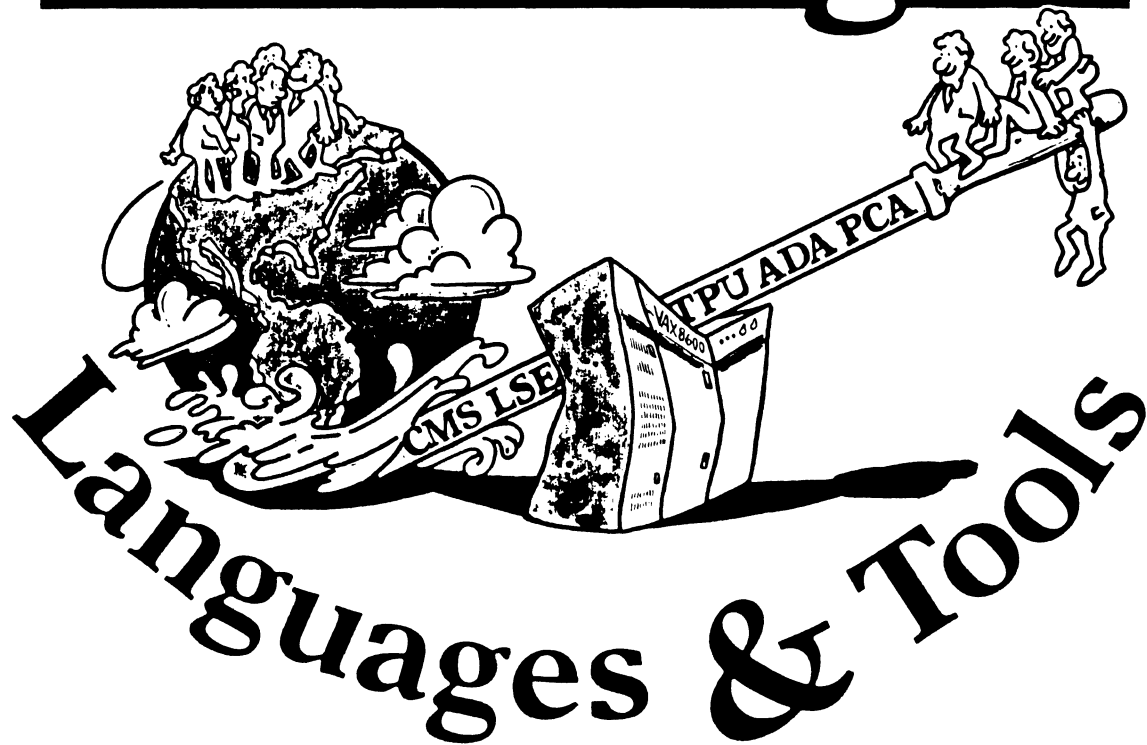
VSNDRR: Programs such as QMOD and PLOT are multiuser. Therefore, mailboxes created by these programs for communication purposes must be unique to the process. The 4 hexadecimal digits of the PID are used to ensure an unique name. The second word of the device I/O status buffer is filled with the PID of the sender for mailbox read operations to identify the caller to the receiving routine. Processes which communicate with PLOT or QMOD must use a separate channel number for each mailbox. To deassign these channel numbers in an orderly fashion, an AST is queued with the write QIO operation which deassigns the channel upon completion of the communication.





# Leverage

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L&T-ii

L&T-i

## Editor's Notes

Well, it looks like I won't be making it to Dallas, making the second Symposium in a row I've missed. Hopefully things will improve in the future, one way or another.

For the rest of you who couldn't make it, this issue has a couple of important forms distributed at the Symposium. These are the Wishlist form, which should be returned to Al Kizzuto as soon as possible. Remember, this is your chance to tell DEC what you want to see, if you don't vote, you've got no right to gripe. Also, I've included a description of the new L & T Masters program. At the back of the newsletters is a form for participating in this, also. Please give it some thought.

Sorry there isn't anymore in this issue, but deadlines are all out of whack due to the coming Symposium. It's been less than three weeks since I last sent in the newsletter, and I'm really not sure I'll make the deadline. Also, I've been underwhelmed by contributions. Please keep those card and letter coming! Don't forget my long lead time. To give me time to put the issue together, and get it to the DECUS office by their deadline, I must have the information by about the middle of the month six weeks before you would like to see it published.

Hope you all are having a great spring, it'll be nice to see the warm weather again up here!

## Languages and Tools Master Program

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 will be people who are experts in one or more languages and tools, a concept similar to the "Datatrieve Masters" list published in that SIG's newsletter. The qualifications of an L&T Master would be expertise in a specific area, 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 will be an overall coordinator who will sit on the L&T Steering Committee.

Ways in which a Master may be asked to help:

- \* Write articles for the newsletter on his product
- \* Potential speaker for LUGS in his city
- \* Host Birds-of-a-Feather or Clinic sessions at symposia
- \* Potential field test site for his product
- \* Interface with DEC product manager for his product
- \* Act as a reference for the product when product manager needs referral
- \* Work with local salesman when referral needed

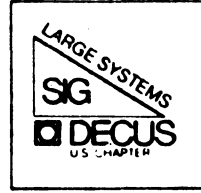
Benefits to the Master:

- \* Recognition of his/her expertise
- \* Close working relationship with DEC product manager; ability to provide feedback on product and perhaps field test it

Masters will be nominated by the steering committee; interested people may offer their services through any Steering Committee member. The LANGUAGES & TOOLS SIG chair will make the selection. The position is for a one year renewable term. 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).

The Steering Committee is enthusiastic about the Masters concept and is anxious to identify willing and qualified people to fill the role. If you are qualified, fill out the application on the reverse of this sheet.

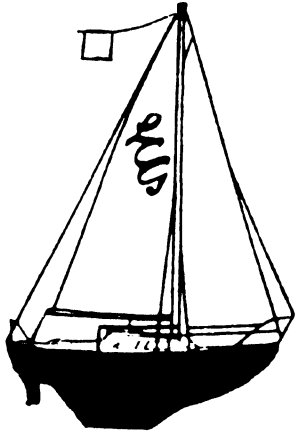




**DIGITAL EQUIPMENT COMPUTER USERS SOCIETY**

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**AT LARGE**

LS

The Newsletter of the Large Systems SIG

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## From the Editor

Instead of my usual monthly article focusing on a primary topic, I thought I'd covered a variety of timely topics in somewhat condensed form. An area that has come up for discussion in both DECUS and non-DECUS forums has been the use of Digital's large highend VAX systems as frontend systems for supercomputers. Some of us are getting involved with such configurations as the result of an initiative sponsored by the National Science Foundation. It would seem appropriate for the Large Systems SIG to sponsor activities at national symposia oriented toward users and managers of such configurations. While we have not specifically submitted such sessions as part of the formal program for the Fall Symposium this year, if sufficient interest exists, a Birds-of-a-Feather session could be arranged and publicized. Similarly with the initial deliveries of VAX8800 systems beginning to take place, a discussion involving early experiences in utilizing and managing such systems might be enlightening as these systems are being introduced in settings quite similar to those where DEC-20's have been popular.

As you may have already heard, several DECUS SIGs are making a special effort to coordinate some of our symposium sessions at the Fall Symposium based on a common topic or theme. This topic is "The Network is the System: the Next Generation of Computing Resources". Since the title can be interpreted in many ways and include many things, we have identified several sessions in our schedule as "theme" sessions. In particular, we are beginning to sponsor sessions dealing with the support of a multi-vendor/multi-operating system environment. Many, if not most, Large Systems sites peacefully coexist with other vendor systems. Also, most of our sites have or are planning to support significant networks. Digital's plans in this area are making it easier to believe that "the network is the system" is a feasible way to describe our distributed resources. Our SIG will be co-sponsoring a number of theme-oriented sessions in conjunction with other SIGs. The Symposium programs will reflect this effort.

At the recent symposium in Dallas, specific sessions were held to solicit input on precisely what we would like to see in our final releases of TOPS-10 and TOPS-20. Much good input was provided to Digital from those present. We would like to receive your input on the question of TOPS-10 at this time from those of you who were not present in Dallas. Suggestions should be communicated to me via whatever means your have-paper, phone, or electronic mail. This is probably the final request for such information that will be made.

Lastly, let me extend our very best wishes to our illustrious Dr. Tops who recently decided to wed. We all wish the good doctor and new spouse our very best. As in the past, the doctor will continue to remain anonymous in order to avoid requests for housecalls.

## Doctor Tops

Dear Doctor Tops,

I am looking for some home grown software that will turn the VAX accounting output into something that my TOPS system can use for general accounting. It would also be VERY useful to have a quicky command file that summarizes the interim results without taking all day. Can you help me? Thanks.

Desperate Hacker

Dear Desperate Hacker,

Yes, I just so happen to have a hack that you can use. I enclose the listing of the FORTRAN programs that will process your ACCOUNTNG.DAT into a reasonable format. Beware that when the VMS developers update to a new 4.x release, they WILL change the locations of the data within the output listings. All you would need to do is change the PARAMETER blocks so that the agree. As for your second request, I have included a command file to produce a summary of CPU, Connect, Pages printed and minimal costs (\$2/minute). Also note that the "Start|" account is really a NULL, which is used on system startup.

Dr. Tops

PS: I included a 3.7 version of the program too!

```

$!
$! command file for accounting summary based on account string
$!
$ account/sum=(account,user)/rep=(elaps,proc,pages)/out=
 account.raw
$ run billing
$ delete account.raw;
$ purge

```

```

$!
$! Command file to build the program to produce readable
$! output of the accountng.dat file
$!
$ for rawacct
$ link rawacct
$ pu
$ copy rawacct.exe mgr:
$ pu mgr:
$ exit

```

```

$!
$! Command file to produce weekly summaries of
$! accounting data
$!
$ submit xbilling/after="+7-00:00:00"
$ account/sum=(account,user)/rep=(elaps,proc,pages)/out=
 account.raw
$ run billing
$ delete account.raw;
$ purge
$ logo

```

```

! Systat command procedure
!
$ set noverify
$ nextpid := "" !Null pid for init
$ priv = f$privilege("WORLD")
$ if priv .nes. "TRUE" then $ goto hell
$ show day
$ write sys$output "User Name Account Process Name
 Image Name"
$ write sys$output "===== ===== ====="
 ====="

top:
$ currpj = f$pid(nextpid)
$ if currpj .eqs. "" then $ exit
$ id = "terminal"
ok:
$ id = "account"
$ account = f$getjpi(currpid,id)
$ if account .eqs. "" then $ account = "OVERHEAD"
$ if priv .nes. "TRUE" then $ account = ""
$ id = "prcnam"
$ procname = f$getjpi(currpid,id)
$ id = "imagname"
$ imagename = f$getjpi(currpid,id)
$ if imagename .eqs. "" then $ imagename = "DCL level"
$ id = "username"
$ username = f$getjpi(currpid,id)
$ if username .eqs. "" then $ username = "*** System ***"
$ sizet = f$length(terminal)
$ needt = 7 - sizet
$ fillt = f$extract(0,needt," ")
$ size = f$length(procname)
$ need = 16 - size
$ fill = f$extract(0,need," ")
$ write sys$output " username," ",-
account, " ", procname, fill, imagename
$ goto top
hell:
$ show system

```



```

c billing.inc include file for billing program
c
c Parameters which govern the size of things
c
parameter numusers=128 !Number of active
 users/uics
parameter ttyout=6 !out to tty
parameter ttyin=5 !in from tty
parameter diskin=1 !in from account.raw
parameter diskout=2 !out to account.%%
c
c common statements
c
common /chrdata/username,account,terminal,
 user,acct,term
common /intdata/uic,lptpages,toprec,uicgrp,uicusr,
1 etday,ethrs,etmin,etsec,ethun,ptday,pthrs,ptmin,
 ptsec,pthun,
2 pages
common /realdata/elapsed,processor
c
c character data
c
character*12 username(numusers),user
character*8 account(numusers),acct
character*4 terminal(numusers),term
c
c integer data
c
integer*4 uic(numusers),uicgrp,uicusr
integer*4 lptpages(numusers)
integer*4 toprec !next available record id
integer*4 etday,ethrs,etmin,etsec,ethun,ptday,pthrs,
 ptmin,ptsec,
1 pthun,pages
c
c real data
c
real*8 elapsed(numusers)
real*8 processor(numusers)
c
c format of the input file:
c
account(1:8) (8)
username(10:21) (12)
terminal(34:37) (4)
uicgrp(44:46) (3)
uicusr(48:50) (3)
etday(54:56) (2)
ethrs(58:59) (2)
etmin(61:62) (2)

```

```

c etsec(64:65) (2)
c ethun(67:68) (2)
c lptpages(74:77) (4)
c ptday(80:81) (2)
c pthrs(83:84) (2)
c ptmin(86:87) (2)
c ptsec(89:90) (2)
c pthun(92:93) (2)
c
c end of billing.inc file
c
c program rawacct !reads account.raw and writes
 account.d20
character*132 inline
character*12 username
character*8 account
character*4 terminal
character*7 uic
character*12 starttime
character*2 day
character*4 year
character*2 month
character*3 amonth
real*8 elapsed
real*8 processor
integer*4 pages
character*5 type,dummy
c
c open input file
c
open(unit=1,name='account.raw',status='old',
1 readonly)
open(unit=2,name='account.d20',status='unknown',
1 carriagecontrol='list')
c
c top of loop
c
1 continue
read(1,100,end=300)i,type
100 format(q,1a5)
if(i.le.4) goto 1 !skip blank lines
if(type.eq.'LOGIN') goto 1 !skip login failures
if(type.eq.'INTER') goto 2 !interactive
 termination
if(type.eq.'PRINT') goto 3 !print jobs
if(type.eq.'DETAC') goto 2 !same deal as
 interactive
if(type.eq.'BATCH') goto 2 !same as interactive
c
c unknown: ignore
c
goto 1

```

```

c
c here for interactive/detached
c
2 continue
read(1,100,end=300) i,dummy
read(1,100,end=300) i,dummy !skip two records
c
c read user id info
c
read(1,101,end=301)username,uic
101 format(t20,la12,t57,la7)
102 format(t20,la8)
c
c read account to charge to
c
read(1,102,end=301)account
if(account(1:1).eq.'<') account='OVERHEAD' !test
for funny things
c
c read start time
c
read(1,103,end=301)day,amonth,year,starttime
103 format(t57,la2,lx,la3,lx,la4,lx,la12)
call cnv(amonth,month)
c
c read elapsed time
c
read(1,104,end=301)id,ih,im,is,it
104 format(t66,i2,t69,i2,t72,i2,t75,i2,t78,i2)
elapsed=it*.01+is+im*60.+ih*3600.+id*24.*3600.
c
c read terminal and processor time
c
read(1,105,end=301)terminal,id,ih,im,is,it
105 format(t20,la4,t66,i2,t69,i2,t72,i2,t75,i2,t78,i2)
processor=it*.01+is+im*60.+ih*3600.+id*24.*3600.
if(type.eq.'BATCH') terminal = 'BATCH'
pages=0
c
c bypass junk records
c
read(1,100,end=300) i,type !remote node addr
read(1,100,end=300) i,type !remote node name
read(1,100,end=300) i,type !remote node id
read(1,100,end=300) i,type !queue entry
read(1,100,end=300) i,type !queue name
read(1,100,end=300) i,type !job name
read(1,100,end=300) i,type !final status
read(1,100,end=300) i,type !blank
read(1,100,end=300) i,type !page faults
read(1,100,end=300) i,type !p f read
read(1,100,end=300) i,type !peak ws

```

```

read(1,100,end=300) i,type !peak page
goto 10
c
c here for print jobs
c
3 continue
read(1,100,end=300) i,type
read(1,100,end=300) i,type !skip two records
c
c read user id info
c
read(1,101,end=301)username,uic
c
c read account to charge to
c
read(1,102,end=301)account
if(account(1:1).eq.'<') account='OVERHEAD'
c
c read start time
c
read(1,103,end=301)day,amonth,year,starttime
call cnv(amonth,month)
c
c read elapsed time
c
read(1,104,end=301)id,ih,im,is,it
elapsed=it*.01+is+im*60.+ih*3600.+id*24.*3600.
c
c read terminal and processor time
c
read(1,105,end=301)terminal,id,ih,im,is,it
processor=it*.01+is+im*60.+ih*3600.+id*24.*3600.
read(1,100,end=301) i,type !remote node
read(1,100,end=301) i,type !remote name
read(1,100,end=301) i,type !remote ID
read(1,100,end=301) i,type !queue entry
read(1,100,end=301) i,type !queue name
read(1,100,end=301) i,type !job name
read(1,100,end=301) i,type !final status text
read(1,100,end=301) i,type !blank
read(1,100,end=301) i,type !gets
read(1,100,end=301) i,type !qios
106 format(t25,i5)
c
c here to write the record out
c
10 continue
elapsed=elapsed/3600. !hours
processor=processor/60. !minutes
if(day(1:1).eq.' ')day(1:1)='0'
write(2,10)account,username,terminal,uic,

```

```

1 year,month,day,starttime,elapsed,
2 processor,pages
110 format(la8,lx,la12,lx,la4,lx,la7,lx,
1 la4,la2,la2,la12,lx,fl0.4,lx,fl0.4,lx,i5)
goto 1

c
c here on eof in mid-record
c
301 continue
type *,'Error: EOF in mid record'
continue
300 close(unit=1)
close(unit=2)
end
subroutine cnv(in,out)
character*3 in
character*2 out
out='01'
if(in.eq.'JAN') out='01'
if(in.eq.'FEB') out='02'
if(in.eq.'MAR') out='03'
if(in.eq.'APR') out='04'
if(in.eq.'MAY') out='05'
if(in.eq.'JUN') out='06'
if(in.eq.'JUL') out='07'
if(in.eq.'AUG') out='08'
if(in.eq.'SEP') out='09'
if(in.eq.'OCT') out='10'
if(in.eq.'NOV') out='11'
if(in.eq.'DEC') out='12'
return
end

program billing

c
c this program reads the billing file ACCOUNT.RAW
c and produces a summary of CPU, CONNECT, LPTPAGES by
c ACCOUNT or UIC or TERMINAL
c
include 'billing.inc' !get common data

c
c local variables
c
parameter CONNCHARGE=2.0/60. !Connect charges $2/Hr
parameter CPUCHARGE=2.0 !CPU charge $2/min
character*1 response
character*8 sorttype
integer*4 findacc,findtty,finduic,findusr,sumpages
logical*4 readrec
real*8 sumconn,sumproc,cost,sumcost

```

```

c
c initialize...
c
toprec=1 !first record is #1
account(1)='unlikely'
uic(1)=-1
terminal(1)='xxxx'
username(1)='unlikely'

c
c find the input file first thing
c
open(unit=diskin,name='account.raw',status='old',readonly,
1 shared,err=99)
read(diskin,l01,err=99,end=99)response
read(diskin,l01,err=99,end=99)response
read(diskin,l01,err=99,end=99)response
read(diskin,l01,err=99,end=99)response
goto 1

c
c here if error or EOF
c
99 continue
type *,'Cannot find ACCOUNT.DAT or error reading file'
call exit

1 continue
c write(ttyout,l00)
100 format(' Accounting summarize program',/,
1 ' Sum by ACCOUNT/NAME/TERMINAL/UIC (A,N,T,U)? ',)$
c read(ttyin,l01)response
101 format(lal)
response='a'

c
c analyse the answer the user choked with
c
if((response.eq.'?').or.(response.eq.'h').or.(response
1 .eq.'H')) then
write(ttyout,l02)
102 format(/,' Enter a single character A,N,T,U which
specifies',
1 /,' the field of the accounting record you wish to
summarize',
2 /,' on. A summarizes charges against an
ACCOUNT.',/,
3 ' N summarizes on User Name',/,
4 ' T summarizes on TERMINAL usage',/,
5 ' U summarizes on UIC code.')
goto 1
endif

c
c check for random garbage

```

```

c iw=2 !assume index 2 for goto
c
c (null,error,"A","T","U","N")
c
c if((response.eq.'A').or.(response.eq.'a'))iw=3
c !account sum
c if((response.eq.'T').or.(response.eq.'t'))iw=4
c !Terminal sum
c if((response.eq.'U').or.(response.eq.'u'))iw=5
c !UIC sum
c if((response.eq.'N').or.(response.eq.'n'))iw=6
c !User name
c
c goto(1,2,3,4,5,6),iw
c 2
c continue
c write(ttyout,103)response
103 format(/,' Illegal response: "',lal,'" Type HELP
c for help')
c goto 1
c
c here to summarize by account
c
c 3
c continue
c if(readrec(0))goto 200 !read entry or hit <EOF>
c icurrent=findacc(0) !find the match or miss
c if(icurrent.gt.numusers) then
c type *,'Too many accounts encountered: change
NUMUSERS'
c goto 200
c endif
c call addrec(icurrent) !insert the record
c goto 3 !loop for more
c
c here to summarize by TERMINAL
c
c 4
c continue
c if(readrec(0))goto 200 !read entry or hit <EOF>
c icurrent=findtty(0) !find the match or miss
c if(icurrent.gt.numusers) then
c type *,'Too many terminals encountered: change
NUMUSERS'
c goto 200
c endif
c call addrec(icurrent) !insert the record
c goto 4 !loop for more
c
c here for UIC summary
c
c 5
c continue
c if(readrec(0))goto 200 !read entry or hit <EOF>

```

```

icurrent=finduic(0) !find the match or miss
if(icurrent.gt.numusers) then
 type *,'Too many UICs encountered: change NUMUSERS'
 goto 200
endif
call addrec(icurrent) !insert the record
goto 5 !loop for more
c
c here for user name summary
c
c 6
c continue
c if(readrec(0))goto 200 !read entry or hit <EOF>
c icurrent=findusr(0) !find the match or miss
c if(icurrent.gt.numusers) then
c type *,'Too many usernames encountered: change
NUMUSERS'
c goto 200
c endif
c call addrec(icurrent) !insert the record
c goto 6
c
c here when EOF or error
c
c 200
c close(unit=diskin)
c if(iw.eq.3)
c open(unit=diskout,name='account.acc',status='unknown')
c if(iw.eq.4)
c open(unit=diskout,name='account.tty',status='unknown')
c if(iw.eq.5)
c open(unit=diskout,name='account.uic',status='unknown')
c if(iw.eq.6)
c open(unit=diskout,name='account.usr',status='unknown')
c
c loop for output
c
c sorttype='Internal'
c if(iw.eq.3)sorttype='Account'
c if(iw.eq.4)sorttype='Terminal'
c if(iw.eq.5)sorttype='[UIC] '
c if(iw.eq.6)sorttype='Username'
c write(diskout,109)sorttype
109 format(lx,'Summarized on: ',la8,/,
c 1 lx,'Account ',lx,'* Username *',lx,'Term',lx,' Conn',
c 2 ' Mins',lx,' CPU Mins ',lx,'* UIC *',lx,'Pages',5x,
c 'Cost')
c sumconn=0.0
c sumproc=0.0
c sumcost=0.0
c sumpages=0
c do 201 icurrent=1,toprec-1
c elapsed(icurrent)=elapsed(icurrent)/60.
c processor(icurrent)=processor(icurrent)/60.

```

```

cost=elapsed(icurrent)*CONNCHARGE+processor(icurrent)*
1 CPUCHARGE
 if(account(icurrent)(1:1).eq.<'>) goto 211
 sumconn=sumconn+elapsed(icurrent)
 sumpages=sumpages+lptpages(icurrent)
 sumproc=sumproc+processor(icurrent)
 sumcost=sumcost+cost
211 continue

write(diskout,110)account(icurrent),username(icurrent),
1
terminal(icurrent),elapsed(icurrent),processor(icurrent),
2 uic(icurrent),lptpages(icurrent),cost
110
format(1x,1a8,1x,1a12,1x,1a4,1x,f10.2,1x,f10.2,3x,1o6,1x,i5,
1 3x,'$',f10.2)
201 continue
 write(diskout,111)sumconn,sumproc,sumpages,sumcost
111 format(///1x,'Total connect minutes: ',t45,f12.2,/,
1 1x,'Total processor minutes: ',t45,f12.2,/,
2 1x,'Total pages printed: ',t45,i12,/,
3 1x,'Total charges: ',t44,'$',f12.2)
 close(unit=diskout)
 call exit
end
logical function readrec(dummy)

c
c this function reads records from the file ACCOUNT.RAW
c
c
c get include data
c
c include 'billing.inc'
c
c local data
c
c integer dummy
c
c start up code
c
c
1 continue
 readrec=.false. !no <EOF> yet
 read(diskin,100,end=200)acct,user,
1 etday,ethrs,etmin,etsec,ethun,
1 ptday,pthrs,ptmin,ptsec,pthun,pages
100 format(1a8,t10,1a12,
1 t25,i13,t29,i12,t32,i12,t35,i12,t38,i12,
1 t42,i13,t46,i12,t49,i12,t52,i12,t55,i12,t60,i16)
 uicgrp=11
 uicusr=11
 if(acct(1:1).eq.' ') goto 1 !ignore blanks
 return

```

```

c
c here on error or eof
c
200 continue
 readrec=.true.
 return
end
integer function findacc(dummy)

c
c this function finds a matching account name and
 returns the offset
c if not found, clear some new space
c
c include common areas
c
c include 'billing.inc'
c
c local data areas
c
c
c start up
c
c do 1 iacc=1,toprec
 if(acct.eq.account(iacc)) then
 findacc=iacc
 return
 endif
1 continue
 findacc=toprec
 toprec=toprec+1
 account(findacc)=' '
 terminal(findacc)=' '
 username(findacc)=' '
 uic(findacc)=-1
 lptpages(findacc)=0
 elapsed(findacc)=0.0
 processor(findacc)=0.0
 return
end
integer function findusr(dummy)

c
c this function finds a matching user name and returns
 the offset
c if not found, clear some new space
c
c include common areas
c
c include 'billing.inc'
c
c local data areas

```

```

c
integer findacc
c
c start up
c
do 1 iacc=1,toprec
if(user.eq.username(iacc)) then
 findusr=iacc
 return
endif
1 continue
findusr=toprec
findacc=toprec
toprec=toprec+1
account(findacc)=' '
terminal(findacc)=' '
username(findacc)=' '
uic(findacc)=-1
lptpages(findacc)=0
elapsed(findacc)=0.0
processor(findacc)=0.0
return
end
integer function findtty(dummy)
c
c this function finds a matching terminal name and
c returns the offset
c if not found, clear some new space
c
c
c include common areas
c
c include 'billing.inc'
c
c local data areas
c
c integer findacc
c
c start up
c
c
do 1 iacc=1,toprec
if(term.eq.terminal(iacc)) then
 findtty=iacc
 return
endif
1 continue
findtty=toprec
findacc=toprec
toprec=toprec+1
account(findacc)=' '
terminal(findacc)=' '

```

```

username(findacc)=' '
uic(findacc)=-1
lptpages(findacc)=0
elapsed(findacc)=0.0
processor(findacc)=0.0
return
end
integer function finduic(dummy)
c
c this function finds a matching uic and returns the
c offset
c if not found, clear some new space
c
c
c include common areas
c
c include 'billing.inc'
c
c local data areas
c
c integer findacc
c
c start up
c
c
itemp=uicgrp*512+uicusr
do 1 iacc=1,toprec
if(itemp.eq.uic(iacc)) then
 finduic=iacc
 return
endif
1 continue
finduic=toprec
findacc=toprec
toprec=toprec+1
account(findacc)=' '
terminal(findacc)=' '
username(findacc)=' '
uic(findacc)=-1
lptpages(findacc)=0
elapsed(findacc)=0.0
processor(findacc)=0.0
return
end
subroutine addrec(index)
c
c this routine adds data to an existing record pointed
c to
c by index
c
c
c get common areas

```

```

c
include 'billing.inc'
c
c
c
c
c
start it up
c
account(index)=acct
username(index)=user
terminal(index)=term
uic(index)=uicgrp*512+uicusr
lptpages(index)=lptpages(index)+pages

processor(index)=processor(index)+(.01*pthun)+float(ptsec)+
1
float(ptmin*60)+float(pthrs*60*60)+float(ptday*24*60*60)

elapsed(index)=elapsed(index)+(.01*ethun)+float(etsec)+
1
float(etmin*60)+float(ethrs*60*60)+float(etday*24*60*60)
return
end

```

## Sharing Knowledge

# Integration Tools Clearinghouse

To help Large Systems users optimize DECsystem-10/20 and VAX system resources in an integrated environment, Digital's Large Computer Group (LCG) collects and distributes software integration tools and documentation, free of charge.

The Integration Tools Clearinghouse (ITC), a frequently updated tape of tools and documentation relating to 32- and 36-bit integration, lets users benefit from the experiences of other Large Systems users. Digital believes the sharing of information benefits all users, and new materials are always welcome additions to the ITC.

### To Obtain Tools or Documentation

The ITC resides on a DECSYSTEM-2065 system, called MARKET, in Marlboro, Massachusetts. It has links to ARPAnet, plus Digital's own internal engineering network.

MARKET can be accessed via a 300/1200 baud modem by calling 1-617-467-7437, or over ARPAnet, host DEC-MARLBORO. To log into the ITC account, type: LOG LCG.CUSTOMER CUSTOMER.

There are several bulletin boards into which users can send mail. "Tools" and "Integration" are among the most frequently used. For more information, type 'HELP LISTS'.

There is a special mail-list for customers requesting tools. Just use the mail system (MS) to send a message to 'TOOLS-REQUEST' and answer all prompts. (Please do not request individual tools.) You will receive both a VAX/VMS backup tape and a TOPS-20 DUMPER and/or TOPS-10 BACKUP tape containing all Clearinghouse tools. The tapes will be mailed to your site at no charge.

### To Submit Tools

Large Systems users with any tools, documentation, or command files that may be useful to others are urged to send them to us. Submission kits in the ITC should be mailed to:

TOOLS Submission  
 c/o Large Computer Group  
 Digital Equipment Corporation  
 One Iron Way, MR02-2/8D2  
 Marlboro, MA. 01752

Submission kits should include the following:

1. Short (one page maximum) description of the package.
2. Installation notes.
3. Documentation.
4. Machine-readable media from the following list:
  - 9-track tape (800, 1600, 6250), in DUMPER (TOPS-20), BACKUP (TOPS-10), or ANSI (VMS) format.

Important: Tools or documentation must be accompanied by an Integration Tools Clearinghouse submittal form. See insert in this publication.

### Availability of Integration Tools Clearinghouse to Europe

ITC is available to European customers through Digital's European Technical Center in Valbonne, France, and through the Large Systems Skills Center (LSSC) in Leeds, UK. This service is available to all European DECsystem-10/20 customers at no cost. All Telephone Support Center customers may use their ordinary accounts. Large Systems customers who do not have an account of their own may also access the system.

For more information on ITC in Valbonne, please contact:

DIGITAL E.C.T.  
 B.P. 29 Sophia Antipolis  
 F-06561 Valbonne, France

For more information on ITC in the UK, please contact:

Chris Bond  
 Digital Equipment Co. Ltd.  
 Digital House  
 5, Lister Hill  
 Horsforth  
 Leeds LS18 5BJ

| TOOLS                            | Distributed on Tapes for: |         |     | Runs on: |         |     | DESCRIPTION                                                                                                                                                                                                                                                                  |
|----------------------------------|---------------------------|---------|-----|----------|---------|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                  | TOPS-10                   | TOPS-20 | VMS | TOPS-10  | TOPS-20 | VMS |                                                                                                                                                                                                                                                                              |
| SI DUMPER                        |                           |         | x   |          |         | x   | This is the new utility to read BACKUP and DUMPER tapes under VMS.                                                                                                                                                                                                           |
| ALTER                            |                           |         | x   |          |         | x   | This utility allows the user to read foreign (i.e., non-Digital) tapes under VMS.                                                                                                                                                                                            |
| 10 BACKUP, V2.1                  |                           |         | x   |          |         | x   | This is an implementation, in BASIC, of a VMS program that reads TOPS-10 format BACKUP tapes. Includes online help file (.HLB), as well as documentation.                                                                                                                    |
| TRANSFORT                        |                           | x       | x   |          | x       | x   | This is a FORTRAN translator. It helps convert FORTRAN-10/20 source code to VMS FORTRAN.                                                                                                                                                                                     |
| Tools, CBS                       |                           |         | x   |          |         | x   | This is a collection of tools, including a TOPS-20 command file converter which runs on VMS.                                                                                                                                                                                 |
| ISACON                           | x                         | x       |     | x        | x       |     | This is an ISAM file converter. It converts TOPS-10 or -20 ISAM files to RMS files on the VAX.                                                                                                                                                                               |
| CONBAT                           | x                         | x       |     | x        |         |     | This is a BATCH and MIC command file converter. This new version for TOPS-20 greatly increases the usefulness of the converter commands.                                                                                                                                     |
| PHONE-20                         |                           | x       | x   |          | x       |     | This mimics the VMS PHONE utility.                                                                                                                                                                                                                                           |
| Hexify: Convert VMS Binaries, V1 | x                         | x       | x   |          |         | x   | This converts VMS binary files into ASCII, or the reverse, for transfer through networks or media not supporting 32-bit words.                                                                                                                                               |
| COMPILE2, V2                     | x                         | x       | x   |          |         | x   | This is another implementation of the TOPS-10/-20 "compile class" commands (execute, load, etc.) for VMS, including the capability for conditional compilation of modules based on data comparisons of the object and source modules.                                        |
| VMS "Hexifiers" for Binary Files | x                         | x       | x   |          |         | x   | VMSHEX & VMSDEH are programs that, respectively, "hexify" and "dehexify" binary files on VMS. This makes it possible to move VMS binaries through systems that do not necessarily support VMS binary files. These tools turn the binaries into ASCII files for transmission. |
| "POP" Command for VMS            | x                         | x       | x   |          |         | x   | This is a VMS command file which implements the TOPS-20 command "POP" under VMS.                                                                                                                                                                                             |
| DUMPER-C                         | x                         | x       | x   |          |         | x   | This is a program, written in C, which allows you to read DUMPER tapes under VMS. Both source and documentation are provided.                                                                                                                                                |

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|                                     |   |   |   |   |   |   |                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|---|---|---|---|---|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RECOG                               | x | x | x |   |   | x | This is a set of routines which implement under VMS the TOPS-20 style of command lines, commonly referred to as the COMMAND JSYS.                                                                                                                                                                                         |
| Host                                |   | x |   |   | x |   | This new version of the Host program, which is used to establish virtual terminal connections with VMS, handles video terminal escape sequences in a more robust fashion.                                                                                                                                                 |
| Tell-Network Command Execution, V1  | x | x | x | x |   | x | This is a facility for remote execution of user commands from a TOPS-10 to VMS system.                                                                                                                                                                                                                                    |
| SPSS Conversion Aids                |   |   | x | x | x | x | This is a set of routines and programs to aid in converting SPSS applications.                                                                                                                                                                                                                                            |
| COMFILES for TOPS-10 Version 1      |   |   | x |   |   | x | This is a collection of VMS command files (COM) which implement a number of popular TOPS-10 commands under VMS.                                                                                                                                                                                                           |
| LOCATE Command (TOPS-10) for VMS    |   |   | x |   |   | x | This program which can be tailored to a specific installation, implements the TOPS-10 LOCATE command for remotng printing operations.                                                                                                                                                                                     |
| REV for VMS                         |   |   | x |   |   | x | This VMS command file implements the TOPS-20 REV program. REV is used to manage disk directories and their contents, and allows a user to "clean up" a directory's contents interactively.                                                                                                                                |
| COMPILE Class Commands for VMS      |   |   | x |   |   | x | This program implements the functionality of the TOPS-10 and TOPS-20 COMPILE-CLASS commands under VMS, which makes it possible to use LOAD, EXECUTE, COMPILE and other commands under VMS. You can also recompile source modules conditionally, depending on the relative dates of source and .OBJ files for that module. |
| DSCONV1:1022 to 1032 Conversion Aid |   |   | x | x | x |   | This program aids the conversion of System 1022 database structures to System 1032. It consists of a FORTRAN program, which analyzes the System 1022 database, and outputs information used by System 1032 to recreate that same database under VMS.                                                                      |
| DECnet-10 Tools and Patches, V1     | x | x | x | x |   |   | This is a set of programs and patches to DECnet-10, to improve its ability to transfer files between TOPS-10 and VMS.                                                                                                                                                                                                     |
| TVAX Version 2                      |   | x | x |   |   | x | This program is a VMS implementation of the popular TOPS-20 editor "TV."                                                                                                                                                                                                                                                  |
| TEACHVMS Version 2                  |   |   | x |   |   | x | This online, interactive facility is useful for teaching TOPS-20 users the VMS commands. It allows users to input TOPS-20 command sequences, and displays the appropriate VMS commands for corresponding functions. TEACHVMS also will create command files.                                                              |
| DUMPER Version 2                    | x | x | x |   |   | x | This program, which runs on VMS, reads both TOPS-10 BACKUP and TOPS-20 DUMPER TAPES. The files created on the VMS system require some post-processing before being used under VMS.                                                                                                                                        |

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|                                |   |   |   |   |  |   |                                                                                                                                                                                                                                       |
|--------------------------------|---|---|---|---|--|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SED Version 2                  |   | x | x |   |  | x | This program is an implementation of the popular TOPS-10/20 screen editor "SED" for VMS systems.                                                                                                                                      |
| CONVRT Version 1               | x | x | x |   |  | x | This program reads TOPS-10 BACKUP tapes, written in INTERCHANGE format, onto a VMS system. It can also give a directory of such tapes on a VMS system.                                                                                |
| TAPE11 Version 1               |   | x |   |   |  | x | This program reads and writes both ASCII and EBCDIC ANSI tapes on TOPS-20. Such tapes are then readable on VMS systems.                                                                                                               |
| SFTOVX                         | x | x | x | x |  | x | This set of APLSF routines aids in converting workspaces to VAX-11 APLSF workspaces. Documentation includes information on the various differences between APLSF and VAX-11 APL.                                                      |
| COMFILES for TOPS-20 Version 1 | x | x | x |   |  | x | This is a collection of VMS command files (COM) which implement a number of the more popular TOPS-20 commands under VMS. User input to this environment is quite similar to that of TOPS-20, but the output is standard VMS commands. |
| VMAIL/VMAILR Version 1         |   | x |   |   |  | x | These programs are background mailer tasks for TOPS-20. They allow the sending and receiving of mail with VMS systems running the current MAIL program.                                                                               |
| TENTAP Version 1               | x | x |   | x |  | x | This program for TOPS-10 reads and writes VMS ANSI tapes, and is used to transfer files between TOPS-10 and VMS. It has not been tested under TOPS-20.                                                                                |
| TOPS-20 Version 1              |   | x |   | x |  | x | This is an alternate command interpreter (EXEC) for TOPS-20 that implements the TOPS-10 command set. It provides an environment on TOPS-20 similar to TOPS-10, and is intended for those TOPS-10 sites wishing to move to TOPS-20.    |

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| Applicable to:             |         |         |     | DESCRIPTION                                                                                                                                                                                                 |
|----------------------------|---------|---------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DOCUMENTATION              | TOPS-10 | TOPS-20 | VMS |                                                                                                                                                                                                             |
| Atlas Steels               |         | x       | x   | Specialty steel producer, Atlas Steels, Welland, Ontario, is migrating applications from DECSYSTEM-2060 to VAXes.                                                                                           |
| TEACHVSM Command           | x       | x       | x   | This document describes the 'rules database' used by the TEACHVMS tool. It compares the actions Comparison, V1 and options of TOPS-20 commands and their VMS counterparts.                                  |
| TECO Differences           | x       | x       | x   | Describes the differences between the TOPS TECO editor and the VMS implementation.                                                                                                                          |
| FORTRAN Differences, V1    | x       | x       | x   | Outlines some of the important differences between TOPS FORTRAN and VMS FORTRAN, and gives hints on handling some of them.                                                                                  |
| BASIC-10 Differences, V1   | x       | x       | x   | Outlines some of the important differences between TOPS-10 and TOPS-20 BASIC, and VMS BASIC.                                                                                                                |
| EMACS for VMS              |         | x       | x   | This is the documentation file for a third-party version of EMACS. Digital distributes this file to make the tool's availability public.                                                                    |
| Accounting Package for VMS |         |         | x   | This is a publicity release for a third party accounting package from Computer Information Systems. It enables VMS systems to track the types of information that TOPS system administrators usually track. |
| 202VMS                     | x       | x       | x   | Outlining the correspondences between TOPS-20 and VMS commands, this was developed as part of the TEACHVMS project, and is rather extensive.                                                                |
| TOPS-20/VMS                |         | x       | x   | This is an extensive comparison of the TOPS-20 and VMS user commands, including notes on side effects.                                                                                                      |
| COBOL DOC Version 1        | x       | x       | x   | Documents the differences between TOPS COBOL and VAX-11 COBOL.                                                                                                                                              |
| Commands Version 1         | x       | x       | x   | This is a description of the TOPS commands and the corresponding commands on VMS. It is not an exhaustive comparison, but does cover some of the commonly used commands.                                    |

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KL TO VAX TRADEIN PROGRAM UPDATE

The KL10 Trade-in Program has been expanded to include trade-ins for 8650 and 8800 as well as the 8600.

Large Systems Marketing has an on-going Trade-in Program which allows customers to trade-in a specific KL10 configuration for a VAX 8600/8650/8800 and receive a trade-in allowance.

The original KL10 Trade-in Program was announced 7/1/85. Modifications have been made to the program since announcement as follows:

- o 8650 and 8800 have been added to the program.
- o The Trade-in value is processed as an allowance when the order is logged rather than a credit when the equipment is returned.
- o Minimum 8600/8650/8800 hardware (line item #1) must exceed \$450,000.

The specific KL10 configuration eligible for the \$90,000 trade-in allowance is:

KL10-D, -E, -R  
 512 Words of Memory  
 16 Terminal Lines  
 1 RP06  
 1 Console Terminal

If a customer wishes to trade items IN ADDITION to the above configuration, Sales must obtain approval and a written trade-in value from Connie Davis, Large Systems Marketing Manager.

Software licenses and media for VAX FORTRAN AND VAX COBOL are provided for the new 8XXX system.

| CASE STUDIES                         | Applicable to: |         |     | DESCRIPTION                                                                                                                                                                                                                                        |
|--------------------------------------|----------------|---------|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | TOPS-10        | TOPS-20 | VMS |                                                                                                                                                                                                                                                    |
| Case Study #1                        | x              | x       | x   | This is a case study of a TOPS-10 COBOL to VMS conversion, including notes on the methodology of performing such tasks.                                                                                                                            |
| Case Study #2                        | x              | x       | x   | These case study notes, from Digital's Information Systems MIS Department, outline what they encountered in their moves from TOPS-10 to VMS.                                                                                                       |
| Case Study #3                        | x              | x       |     | This case study reports on one of Digital's customers, ICI, who converted a major application from TOPS-20/COBOL/TRAFFIC-20 to VMS COBOL/DBMX/TDMS and had very good results.                                                                      |
| Case Study:<br>FORTRAN Conversion    |                | x       | x   | This case study describes a large FORTRAN shop that moved an entire suite of programs from TOPS-20 to VMS. It covers areas such as syntax differences, handling character data, accuracy, "bit fiddling," I/O formatting, and language extensions. |
| Case Study:<br>COBOL/DBMS Conversion | x              |         | x   | This details the conversion methodology from TOPS-10 COBOL/DBMS to VAX-11 COBOL/DBMS. Specific language conversions, as well as how to modify the operating environment from TOPS-10 to VMS, are described.                                        |
| University of Utah                   | x              | x       | x   | At the University of Utah, VAXes and DECSTYSTEMS are being integrated with UNIX.                                                                                                                                                                   |

The following information is necessary to process a tradein order:

1. Customer PO that states intention to trade-in KL10 (or references Sales quotation).
2. 8600/8650/8800 hardware (line item #1) must exceed \$450,000.00
3. Copy of Sales quotation which includes Trade-in information.

Field Service de-installation is required for all trade-ins. Upon receipt of your shipment, please contact your Field Service Branch to arrange for service.

## LARGE SYSTEMS SOFTWARE DOCUMENTATION

Susan Porada  
Digital Equipment Corporation

Documentation for the various software versions is released and distributed as part of the product's distribution. Customers can obtain additional copies of the manuals through DECdirect. Orders can be placed electronically, verbally with a toll-free telephone call, or by direct mail. DECdirect publishes twice a year the Documentation Products Directory that describes the ordering procedures, order numbers, and prices for many of the software technical documents.

### HOW TO ORDER BY PHONE

| IF YOU LIVE IN                         | CALL             | BETWEEN THE HOURS OF                |
|----------------------------------------|------------------|-------------------------------------|
| New Hampshire<br>Alaska                | 603-884-6660     | 8:30 AM and 6:00 PM<br>Eastern Time |
| Continental USA<br>Puerto Rico, Hawaii | 1-800-258-1710   | 8:30 AM and 6:00 PM<br>Eastern Time |
| Canada<br>(Ottawa-Hull)                | 613-234-7726     | 8:30 AM and 5:00 PM<br>Eastern Time |
| Canada<br>(British Columbia)           | 1-800-267-6146   | 8:30 AM and 5:00 PM<br>Eastern Time |
| Canada<br>(All other)                  | 112-800-267-6146 | 8:30 AM and 5:00 PM<br>Eastern Time |

HOW TO ORDER BY DIRECT MAIL

| IF YOU LIVE IN                              | WRITE TO                                                                                                                               |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| USA or<br>Puerto Rico                       | DIGITAL EQUIPMENT CORPORATION<br>P.O.Box CS2008<br>Nashua, NH 03061                                                                    |
| Canada                                      | DIGITAL EQUIPMENT CORPORATION<br>940 Belfast Road<br>Ottawa, Ontario K1G 4C2<br>Attn: P&SG Business Manager or<br>approved distributor |
| Other than USA,<br>Puerto Rico or<br>Canada | DIGITAL EQUIPMENT CORPORATION<br>Peripherals and Supplies Centers<br>P&SG Business Manager<br>c/o Digital's local subsidiary           |

NOTE: Prepaid orders from Puerto Rico must be placed with the local DIGITAL subsidiary (Phone 809-754-7575).

Please allow thirty (30) days for delivery.

When ordering, you must include the order number and title of the manual.

Customers desiring promotional literature and documentation update and subscription services should contact their Digital Field Sales Office.

The following pages list the current software manuals for TOPS-10, TOPS-20, and the integration project.

## TOPS-10 SOFTWARE PUBLICATIONS

May 1986

### MANUALS AVAILABLE

|                                                               |                                   |
|---------------------------------------------------------------|-----------------------------------|
| AID Manual (V1) .....                                         | AA-C785A-TB<br>(DEC-10-NAIDA-A-D) |
| ALGOL Programmer's Guide (10/20) (V1A) .....                  | AA-0196C-TK                       |
| ANF-10 Networks Software Installation Guide (V7.02) .....     | AA-W557A-TB                       |
| APLSF Language Manual (V2) .....                              | AA-H200A-TK                       |
| APL Reference Card (APL-SF and APL-11) .....                  | AV-K879A-TK                       |
| Autopatch Procedures Reference Manual (V1) .....              | AA-H729A-TK                       |
| BASIC Conversational Language Manual (V17D) .....             | AA-C859A-TB<br>(DEC-10-LBLMA-A-D) |
| BASIC Language Reference Card (V17D) .....                    | AV-C783A-TB<br>(DEC-10-XBRCA-A-D) |
| Batch Reference Manual (V4) .....                             | AA-H374A-TK                       |
| Batch Reference Manual Update (V4.1) .....                    | AD-H374A-T1                       |
| BLISS-10 Programmer's Reference Manual (V4) .....             | AA-C786A-TB<br>(DEC-10-LBRMA-A-D) |
| BLISS Language Guide (V3) .....                               | AA-H275C-TK                       |
| BLISS Language Guide Update (V4) .....                        | AD-H275C-T1                       |
| BLISS-36 User's Guide (V4) .....                              | AA-H712D-TK                       |
| BLISS-36 Installation Notes (V4.1) .....                      | AA-J937E-TK                       |
| BLISS Pocket Guide (V4) .....                                 | AV-AT45A-TK                       |
| BLISS XPORT Programmer's Guide (V3) .....                     | AA-J201A-TK                       |
| COBOL-68 Language Manual (V12B) .....                         | AA-5057B-TK                       |
| COBOL-74 Language Manual (V12B) .....                         | AA-5059B-TK                       |
| COBOL-74 Language Manual Update (V12C) .....                  | AD-5059B-T1                       |
| COBOL-74 Reference Card (V12B) .....                          | AV-L854A-TK                       |
| COBOL Conversion Utility Guide (V12B) .....                   | AA-M586A-TK                       |
| Commands Quick Reference Guide (V7.02) .....                  | AV-K729B-TB                       |
| CPL-10/20 User's Manual (V1B) .....                           | AA-0936B-TB<br>(DEC-10-LCPLA-B-D) |
| Crash Analysis Guide (V7.03) .....                            | AA-H206C-TB                       |
| Data Interchange Library User Reference Manual .....          | AA-M581B-TK                       |
| DBMS Administrator's Procedures Manual (V5) .....             | AA-0899C-TB                       |
| DBMS Programmer's Procedures Manual (V5) .....                | AA-0901C-TB                       |
| TOPS-10 DDT-10 Manual (V44) .....                             | AA-BH82B-TB                       |
| TOPS-10/20 DDT Reference Card (V42) .....                     | AV-M272A-TK                       |
| TOPS-10/20 DDT11 Reference Manual .....                       | AA-M494A-TK                       |
| TOPS-10/20 DECmail/MS Manual (V10) .....                      | AA-M840A-TK                       |
| Introduction to DECnet .....                                  | AA-J055D-TK                       |
| DECnet-10/PSI System Managers and Operators Guide (V4) .....  | AA-L413B-TB                       |
| DECnet-10/PSI Installation Guide (V4) .....                   | AA-P379B-TB                       |
| DECsystem-10 Technical Summary .....                          | EE-21041-26                       |
| DIGITAL Standard RUNOFF User's Guide .....                    | AA-J268A-TK                       |
| Documentation Directory .....                                 | AA-0858C-TB                       |
| DX Product User's Guide (V1) .....                            | AA-D870A-TK                       |
| DX/TOPS-10 Installation Guide .....                           | AA-D882A-TB                       |
| FORTRAN IV (F40) Programmer's Reference Manual (V27) .....    | AA-0943B-TB<br>(DEC-10-LFLMA-B-D) |
| TOPS-10/20 FORTRAN Language Manual (V10) .....                | AA-N383B-TK                       |
| TOPS-10/20 FORTRAN Pocket Guide (V10) .....                   | AA-P529B-TK                       |
| TOPS-10 FORTRAN Installation Guide (V10) .....                | AA-P345B-TB                       |
| FORTRAN-10/20/VAX-11 FORTRAN Compatibility Manual (V10) ..... | AA-Y868B-TK                       |
| Getting Started with Batch (TOPS-10) (V2) .....               | AA-D303A-TB                       |
| Getting Started with DECsystem-10 (V6.02) .....               | AA-C790A-TB<br>(DEC-10-XGSDA-A-D) |
| Guide to Measuring Uptime .....                               | AV-P012A-TK                       |
| IBM Emulation Termination .....                               | AA-D612B-TB                       |
| Integration Documentation Kit .....                           | QH308-GZ                          |
| Interactive Query Language User's Guide (V3) .....            | AA-H282A-TK                       |
| Introduction to Interactive Query Language (V3) .....         | AA-0947B-TK                       |
| Introduction to TECO (V23) .....                              | AA-C858A-TB<br>(DEC-10-UTECA-A-D) |

# TOPS-20 SOFTWARE PUBLICATIONS

May 1986

|                                                                                      |                      |
|--------------------------------------------------------------------------------------|----------------------|
| KL System Reference Card .....                                                       | EK-OKL10-RC-001      |
| Language Compatibility Documentation Kit .....                                       | QH309-GZ             |
| LINK Reference Manual (V5.1) .....                                                   | AA-0988D-TB          |
| LINK Reference Manual Update (V5.1) .....                                            | AD-0988D-T1          |
| LINK Reference Manual Update (V6) .....                                              | AD-0988D-T2          |
| MACRO Assembler Reference Manual (V53) .....                                         | AA-C780C-TB          |
| MACY11 Assembler User's Guide .....                                                  | DEC-10-LMACA-A-D     |
| MAKLIB User's Guide (V2B) .....                                                      | AA-M472A-TB          |
| TOPS-10/20 Math Library Reference Manual (V7) .....                                  | AA-M400A-TK          |
| Monitor Calls Quick Reference Guide (V7.02) .....                                    | AV-0978E-TB          |
| Monitor Calls Manual - Volume 1 (V7.03) .....                                        | AA-0974F-TB          |
| Monitor Calls Manual - Volume 2 (V7.03) .....                                        | AA-K039C-TB          |
| Network Compatibility Documentation Kit .....                                        | QH145-GZ             |
| Operating System Commands Manual (V7.03) .....                                       | AA-0916E-TB          |
| Operating System Compatibility Documentation Kit .....                               | QH717-GZ             |
| Operator's Guide (V7.03) .....                                                       | AA-H283B-TB          |
| Operator's Command Language Reference Manual (GALAXY V5.1) .....                     | AA-H599B-TB          |
| TOPS-10/20/VMS Operator's Reference Card .....                                       | AV-DB38A-TK          |
| PSI-10 User's Guide .....                                                            | AA-CK81A-TB          |
| DEC-10/DEC-20 Processor Reference Manual .....                                       | AA-H391A-TK          |
| DEC-10/20 Processor Reference Manual Update .....                                    | AD-H391A-T1          |
| TOPS-10 Remote Station Guide .....                                                   | AA-D783B-TB          |
| RSX-20F System Reference Manual (V15-06) .....                                       | AA-BS94A-TK          |
| RSX-20F System Reference Manual Update (V15-50) .....                                | AD-BS94A-T1          |
| TOPS-10 Software Installation Guide (V7.03) .....                                    | AA-P512B-TB          |
| SORT/MERGE User's Guide (V4C) .....                                                  | AA-M063A-TB          |
| SOS Reference Manual .....                                                           | AA-D598A-TB          |
| SOS Reference Card .....                                                             | AV-D578A-TB          |
| TOPS-10/20 SPEAR Manual (V2) .....                                                   | AA-J833B-TK          |
| TOPS-10/20 SPEAR Reference Card (V2) .....                                           | AV-M752B-TK          |
| System Reference Card (KA/KI) .....                                                  | AV-C784B-TB          |
|                                                                                      | (DEC-10-XSRCA-B-D)   |
| Tape Processing Manual (V4.1) .....                                                  | AA-L412A-TB          |
| TECO Reference Manual (V23) .....                                                    | AA-0999E-TB          |
|                                                                                      | (DEC-10-ETEE-D)      |
| TECO Reference Manual Update (V23B) .....                                            | AD-0999A-T1          |
|                                                                                      | (DEC-10-UTPRA-A-DN1) |
| USAGE File Specification (V4) .....                                                  | AA-4181B-TK          |
| USAGE File Specification Update (V4.1) .....                                         | AD-4181B-T1          |
| Utilities Manual (includes DDT, SOUP, LINED, PIP, FILEX, CREF) .....                 | AA-0998A-TB          |
|                                                                                      | (DEC-10-UTILA-A-D)   |
| Utilities Manual Update .....                                                        | AD-0998A-T1          |
|                                                                                      | (DEC-10-UTILA-A-DN1) |
| TOPS-10 Software Notebooks .....                                                     | QHK20-KZ             |
| TOPS-10 Software Notebook Update #96<br>(includes TOPS-10 V7.03 documentation) ..... | QHN04-WZ             |
| <b>COMING ATTRACTIONS</b>                                                            |                      |
| TOPS-10 Software Notebook Update #97 which includes .....                            | QHN05-WZ             |
| Monitor Calls Quick Reference Guide .....                                            | AV-0978F-TB          |
| Commands Quick Reference Guide .....                                                 | AV-K729C-TB          |
| User Utilities Manual .....                                                          | AA-0998B-TB          |
| Monitor Table Descriptions .....                                                     |                      |
| Stopcodes .....                                                                      |                      |
| DECmail/MS Manual (VII) .....                                                        | AA-M840B-TK          |
| FORTTRAN VII Documentation .....                                                     |                      |

## MANUALS AVAILABLE

|                                                                         |             |
|-------------------------------------------------------------------------|-------------|
| ALGOL Programmer's Guide (10/20) (V1A) .....                            | AA-0196C-TK |
| APLSF Language Manual (V2) .....                                        | AA-H200A-TK |
| APL Reference Card (APL-SF and APL-11) .....                            | AV-K879A-TK |
| Autopatch Procedures Reference Manual (V1) .....                        | AA-H729A-TK |
| BASIC-PLUS-2 Language Manual (V2) .....                                 | AA-H654A-TM |
| Batch Reference Manual (V4) .....                                       | AA-H374A-TK |
| BLISS Language Guide (V3) .....                                         | AA-H275C-TK |
| BLISS Language Guide Update (V4) .....                                  | AD-H275C-T1 |
| BLISS-36 User's Guide (V4) .....                                        | AA-H712D-TK |
| BLISS-36 Installation Notes (V4.1) .....                                | AA-J937E-TK |
| BLISS Pocket Guide (V4) .....                                           | AV-AT45A-TK |
| BLISS XPORT Programmer's Guide (V3) .....                               | AA-J201A-TK |
| COBOL-68 Language Manual (V12B) .....                                   | AA-5057B-TK |
| TOPS-20 COBOL Language Manual (V13) .....                               | AA-N420A-TM |
| TOPS-20 COBOL Language Reference Card (V13) .....                       | AV-N421A-TM |
| TOPS-20 COBOL Installation Guide (V13) .....                            | AA-N429A-TM |
| COBOL Conversion Utility Manual (V12B) .....                            | AA-M586A-TK |
| TOPS-20 Commands Reference Manual (V6.1) .....                          | AA-FP65A-TM |
| TOPS-20 Commands Reference Card (V6.1) .....                            | AV-FP79A-TM |
| CPL-10/20 User's Manual (V1B) .....                                     | AA-0936B-TB |
| Data Interchange Library User Reference Manual (V2) .....               | AA-M581B-TK |
| Introduction to Datatrieve-20 (V1) .....                                | AA-AG90A-TM |
| Datatrieve-20 User's Guide (V1) .....                                   | AA-AG91A-TM |
| Datatrieve-20 Guide to Using Graphics (V1) .....                        | AA-AG96A-TM |
| Datatrieve-20 Guide to Writing Reports (V1) .....                       | AA-AG95A-TM |
| Datatrieve-20 Reference Manual (V1) .....                               | AA-AG92A-TM |
| Datatrieve-20 Documentation Kit (V1) .....                              | QT371-GZ    |
| DBMS-20 Documentation Directory (V6.1) .....                            | AA-J876B-TM |
| DBMS-20 User's Guide (V6) .....                                         | AA-H229A-TM |
| DBMS-20 User's Guide Update (V6.1) .....                                | AD-H229A-T1 |
| DBMS-20 Data Manipulation Language Reference Manual (V6) .....          | AA-H232A-TM |
| DBMS-20 Data Manipulation Language Reference Manual Update (V6.1) ..... | AD-H232A-T1 |
| DBMS-20 Data Description Language Reference Manual (V6) .....           | AA-H231A-TM |
| DBMS-20 Data Description Language Reference Manual Update (V6.1) .....  | AD-H231A-T1 |
| DBMS-20 Utilities Manual (V6) .....                                     | AA-H228A-TM |
| DBMS-20 Utilities Manual Update (V6.1) .....                            | AD-H228A-T1 |
| DBMS-20 Error Message Manual (V6) .....                                 | AA-J878A-TM |
| DBMS-20 DBCS Error Message Manual Update (V6.1) .....                   | AD-J878A-T1 |
| DBMS-20 Installation Guide (V6.1) .....                                 | AA-J875B-TM |
| DBMS-20 DML Programmer's Reference Card (V6.1) .....                    | AV-H230B-TM |
| DBMS-20 DDL Reference Card (V6.1) .....                                 | AV-J879B-TM |
| DBMS-20 Utilities Reference Card (V6.1) .....                           | AV-Z784A-TM |
| DBMS-20 Poster (V6.1) .....                                             | AV-Z783A-TM |
| DBMS-20 Documentation Kit (V6.1) .....                                  | QT008-GZ    |
| DDT-20 Manual (V43) .....                                               | AA-M273A-TM |
| DDT-20 Reference Card (V43) .....                                       | AA-BH83A-TM |
| TOPS-10/20 DDT11 Reference Manual .....                                 | AA-M494A-TK |
| DEC/CMS-20 Reference Manual (V1) .....                                  | AA-W654A-TM |
| DEC/CMS-20 Pocket Guide (V1) .....                                      | AV-W651A-TM |
| DEC/CMS-20 Installation Guide (V1) .....                                | AA-W652A-TM |
| User's Introduction to DEC/CMS-20 (V1) .....                            | AA-W659A-TM |
| TOPS-10/20 DECmail/MS Manual (V10) .....                                | AA-M840A-TK |
| Introduction to DECnet (Phase III/Phase IV) .....                       | AA-J055D-TK |
| DECnet-20 User's Guide (V4) .....                                       | AA-J679B-TM |
| DECnet-20/PSI-20 System Manager's Guide (V4) .....                      | AA-J678B-TM |
| DECnet-20 Network Generation and Installation Procedures (V4) .....     | AA-K905B-TM |
| DECnet/SNA TOPS-20 Application Interface Programmer's Guide (V1) .....  | AA-CH45A-TM |
| DECnet/SNA TOPS-20 Gateway Management Guide (V1) .....                  | AA-CH20A-TM |
| DECnet/SNA Remote Job Entry Guide (V1) .....                            | AA-CH16A-TM |
| DECSYSTEM-20 Technical Summary .....                                    | EA-20415-18 |
| Introduction to DIGITAL Standard RUNOFF (DSR) (V2) .....                | AA-N388A-TK |
| Introduction to DIGITAL Standard RUNOFF (DSR) Update (V2) .....         | AD-N388A-T1 |
| TOPS-20 DIGITAL Standard RUNOFF (DSR) User's Guide (V2) .....           | AA-N388A-TM |

|                                                                                                |                 |
|------------------------------------------------------------------------------------------------|-----------------|
| TOPS-20 DIGITAL Standard RUNOFF (DSR) Pocket Guide (V2)                                        | AV-N390A-1M     |
| DX Product User's Guide (V1)                                                                   | AA-D870A-TK     |
| DX/TOPS-20 Installation Guide (V1)                                                             | AA-D877A-TM     |
| EDIT Reference Manual (V3)                                                                     | AA-5415A-TM     |
| EDIT User's Guide (V1B)                                                                        | AA-4182A-TM     |
| EDIT Reference Card (V3)                                                                       | AV-D310A-TM     |
| EDT Quick Reference Guide                                                                      | AA-DF20A-TK     |
| EDT-20 Primer (V1)                                                                             | AA-CH25A-TM     |
| EDT-20 Reference Manual (V1)                                                                   | AA-CH24A-TM     |
| EXEC Message Manual (V4)                                                                       | AA-J857A-TM     |
| FTS-20 Reference Manual (V1)                                                                   | AA-M252A-TM     |
| TOPS-10/20 FORTRAN Language Manual (V10)                                                       | AA-N383B-TK     |
| TOPS-10/20 FORTRAN Pocket Guide (V10)                                                          | AA-P529B-TK     |
| TOPS-20 FORTRAN Installation Guide (V10)                                                       | AA-P344B-TM     |
| FORTRAN-10/20/VAX-11 FORTRAN Compatibility Manual (V10)                                        | AA-Y868B-TK     |
| Getting Started with Batch (TOPS-20) (V3)                                                      | AA-C781B-TM     |
| Getting Started with TOPS-20 (V4)                                                              | AA-4187D-TM     |
| IBM Emulation-Termination                                                                      | AA-5095C-TM     |
| Integration Documentation Kit                                                                  | QT650-GZ        |
| Introduction to IQL (V3)                                                                       | AA-0947B-TK     |
| TOPS-10/TOPS-20 IQL User's Guide (V3)                                                          | AA-H282A-TK     |
| KL System Reference Card                                                                       | EK-OKL10-RC-001 |
| Language Compatibility Documentation Kit                                                       | QT651-GZ        |
| LINK Reference Manual (V6)                                                                     | AA-4183D-TM     |
| MACRO Assembler Reference Manual (V53)                                                         | AA-4159C-TM     |
| TOPS-10/20 Math Library Reference Manual (V7)                                                  | AA-M400A-TK     |
| Monitor Calls Reference Manual (V6.1)                                                          | AA-FV52A-TM     |
| Monitor Calls Quick Reference Guide (V6.1)                                                     | AV-P173B-TM     |
| Monitor Calls User's Guide (V6.1)                                                              | AA-D859C-TM     |
| Network Compatibility Documentation Kit                                                        | QT145-GZ        |
| Operating System Compatibility Documentation Kit                                               | QT717-GZ        |
| TOPS-20 Operator's Guide (V6.1)                                                                | AA-FP80A-TM     |
| TOPS-20 Operator's Command Language Reference Manual (V6.1)                                    | AA-H600B-TM     |
| TOPS-10/20 VMS Operator's Reference Card                                                       | AV-DB38A-TK     |
| TOPS-20 PASCAL Primer (V1)                                                                     | AA-L314A-TM     |
| TOPS-20 PASCAL Language Manual (V1)                                                            | AA-L315A-TM     |
| TOPS-20 PASCAL Installation Guide (V1)                                                         | AA-N306A-TM     |
| TOPS-20 PASCAL Reference Card (V1)                                                             | AV-L316A-TM     |
| TOPS-20 PASCAL Documentation Kit (V1)                                                          | QT221-GZ        |
| DEC-10/20 Processor Reference Manual                                                           | AA-H391A-TK     |
| DEC-10/20 Processor Reference Manual Update                                                    | AD-H391A-T1     |
| TOPS-20 PSI Installation Guide (PSI V1)                                                        | AA-N819A-TM     |
| TOPS-20 PSI User's Guide (PSI V1)                                                              | AA-J533A-TM     |
| TOPS-20 RMS User's Guide (V2)                                                                  | AA-N422A-TM     |
| RSX-20F System Reference Manual (V15-06)                                                       | AA-BS94A-TK     |
| SORT/MERGE User's Guide (V5)                                                                   | AA-M064B-TM     |
| TOPS-20 KL10 Model B Installation Guide (V6.1)                                                 | AA-M229B-TM     |
| TOPS-20 KS/KL Model A Installation Guide (V4.1)                                                | AA-P346A-TM     |
| TOPS-10/20 SPEAR Manual (V2)                                                                   | AA-J833B-TK     |
| TOPS-10/20 SPEAR Reference Card (V2)                                                           | AV-M752B-TK     |
| System Manager's Guide (V6.1)                                                                  | AA-FP67A-TM     |
| Tape Processing Manual (V4)                                                                    | AA-H180A-TM     |
| TRAFFIC-20 Programmer's Manual (V4)                                                            | AA-H296B-TM     |
| TV Editor Manual (V4)(includes one reference card)                                             | AA-H181A-TM     |
| TV Reference Card (V4)                                                                         | AV-J341A-TM     |
| USAGE File Specification (V4)                                                                  | AA-4181B-TK     |
| USAGE File Specification Update (V4.2)                                                         | AD-4181B-T1     |
| TOPS-20 User's Guide (V6.1)                                                                    | AA-FP69A-TM     |
| TOPS-20 UETP Procedures Reference Manual (V2)                                                  | AA-D606B-TK     |
| User Utilities Guide (V4)                                                                      | AA-D850A-TM     |
| User Utilities Guide Update (MAKLIB V2B)                                                       | AD-D850A-T1     |
| User Utilities Guide Update (DUMPER V4.1 PLEASE V4)                                            | AD-D850A-T2     |
| User Utilities Guide Update (DUMPER V4.2)                                                      | AD-D850A-T3     |
| TOPS-20 Software Notebooks<br>(includes 1-year update service)                                 | QT018-KZ        |
| TOPS-20 Software Notebook Update #25<br>(includes TOPS-20 V6.1 and DECnet-20 V4 documentation) | QTN04-WZ        |

## COMING ATTRACTIONS

|                                                     |             |
|-----------------------------------------------------|-------------|
| TOPS-20 Software Notebook Update #26 which includes | QTN05-WZ    |
| Monitor Table Descriptions (V6.1)                   |             |
| WATCH Documentation                                 |             |
| DECmail/MS Manual (VII)                             | AA-M840B-TK |
| FORTRAN VII Documentation                           |             |
| DIU/RMS Documentation                               |             |

## TOPS-10 INTEGRATION DOCUMENTATION KITS

May 1986

### TOPS-10 Integration Documentation Kit QH308-GZ

|                                               |             |
|-----------------------------------------------|-------------|
| Language Fundamentals                         | AA-M460E-TK |
| Data Interchange Library                      | AA-M581B-TK |
| TOPS-10/TOPS-20/VMS Operator's Reference Card | AV-DB38A-TK |
| PC to Mainframe Connection                    | AA-EE10A-TK |
| TECO Pocket Guide                             | AV-D530A-TK |

### TOPS-10 Network Compatibility Documentation Kit QH145-GZ

|                                |             |
|--------------------------------|-------------|
| Network File Transfer Guide    | AV-Z785A-TK |
| DECnet Networking User's Guide | AV-N956B-TK |
| Terminal Server Reference Card | AV-X021C-TK |
| Network Div/Spn/Insert Set     | AV-DA17C-TK |
| Binder                         | AV-N081A-TK |

### TOPS-10 Language Compatibility Documentation Kit QH309-GZ

|                                   |             |
|-----------------------------------|-------------|
| TOPS-10/20 FORTRAN to VAX FORTRAN | AA-Y868B-TK |
| TOPS-10 COBOL to VAX COBOL        | AA-C164A-TK |
| Language Div/Spn/Insert Set       | AV-FQ14B-TB |
| Binder                            | AV-N081A-TK |

### TOPS-10 Operating System Compatibility Documentation Kit QH717-GZ

|                                     |             |
|-------------------------------------|-------------|
| *TOPS-10/VMS Commands Comparison    | AA-EF67A-TK |
| Guide to DIGITAL Text Editors       | AA-EA10A-TK |
| TOPS-10/TOPS-20/VMS User Utilities  | AA-EF70A-TK |
| TOPS-10/20 DSR to VAX DSR           | AA-CH17A-TK |
| Operating System Div/Spn/Insert Set | AV-FY29B-TK |
| Binder                              | AV-N081A-TK |

\* New since December 1985.

# TOPS-20 INTEGRATION DOCUMENTATION KITS

May 1986

## TOPS-20 Integration Documentation Kit QT650-GZ

|                                                     |             |
|-----------------------------------------------------|-------------|
| EDT Quick Reference Guide .....                     | AA-DF20A-TK |
| FTS-20 Reference Manual .....                       | AA-M252A-TM |
| Language Fundamentals .....                         | AA-M460E-TK |
| Data Interchange Library .....                      | AA-M581B-TK |
| TOPS-10/TOPS-20/VMS Operator's Reference Card ..... | AV-DB38A-TK |
| PC to Mainframe Connection .....                    | AA-EE10A-TK |

## TOPS-20 Network Compatibility Documentation Kit QT145-GZ

|                                      |             |
|--------------------------------------|-------------|
| Network File Transfer Guide .....    | AV-Z785A-TK |
| DECnet Networking User's Guide ..... | AV-N956B-TK |
| Terminal Server Reference Card ..... | AV-X021C-TK |
| Network Div/Spn/Insert Set .....     | AV-DA17C-TK |
| Binder .....                         | AV-N081A-TK |

## TOPS-20 Language Compatibility Documentation Kit QT651-GZ

|                                          |             |
|------------------------------------------|-------------|
| TOPS-10/VMS Language Comparisons .....   | AV-EC54A-TK |
| DATATRIEVE-20 and VAX DATATRIEVE .....   | AA-FZ26A-TK |
| TOPS-10/20 FORTRAN and VAX FORTRAN ..... | AA-Y868B-TK |
| Language Div/Spn/Insert Set .....        | AV-EC53C-TM |
| Binder .....                             | AV-N081A-TK |

## TOPS-20 Operating System Compatibility Documentation Kit QT717-GZ

|                                           |             |
|-------------------------------------------|-------------|
| TOPS-20/VMS Commands Comparison .....     | AA-EF68A-TK |
| Guide to DIGITAL Text Editors .....       | AA-EA10A-TK |
| TOPS-10/TOPS-20/VMS User Utilities .....  | AA-EF70A-TK |
| TOPS-10/20 DSR to VAX DSR .....           | AA-CH17A-TK |
| Operating System Div/Spn/Insert Set ..... | AV-FY89A-TM |
| Binder .....                              | AV-N081A-TK |





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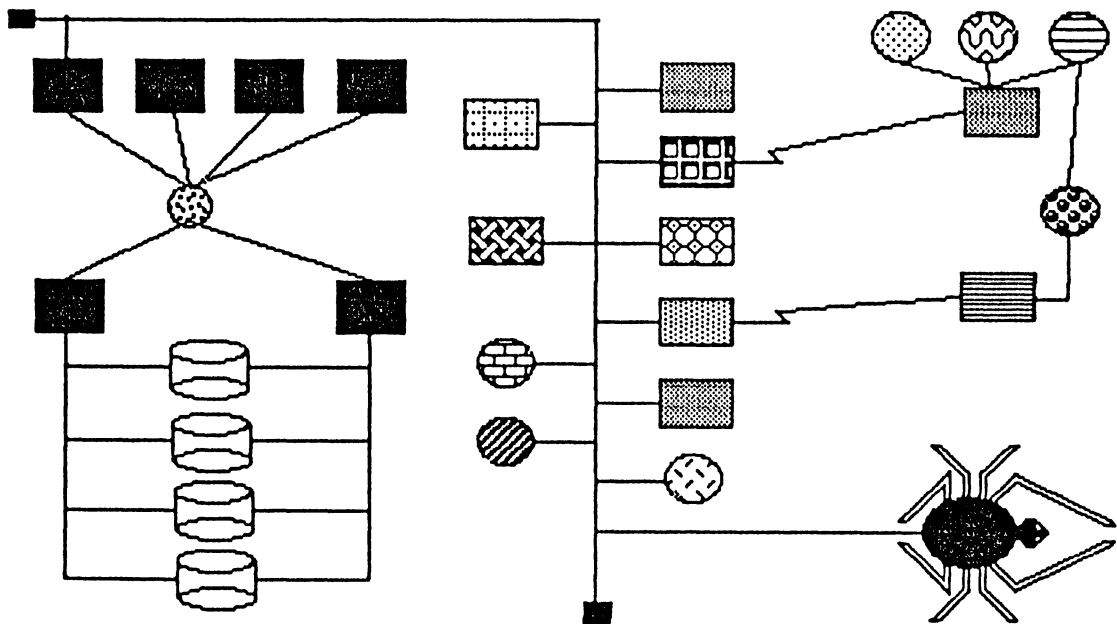
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The Networks Special Interest Group (SIG) is one of 25 SIG's within in Digital Equipment Computer User's Society (DECUS). The main purpose of the Networks SIG is to promulgate information concerning the use, development, and standardization of network products that function or involve Digital Equipment Corporation systems. Additional functions of the SIG include the coordination and scheduling of symposia sessions, providing methods for free-flow communications, publication of the Networks SIG newsletter NETWords, participation in domestic and international standards committees, input to Digital for new products and corrections to existing products, promotion of working groups for special network needs and topics, and many, many other functions.

The Networks SIG Steering Committee invites you to participate in the Networks SIG. There are many ways that you can help the Networks SIG. Some of those include chairing sessions at symposium, participation in the various Networks SIG working groups, participation in special research projects, and others. If you are interested in devoting your time and expertise, contact any of the steering committee members.

DECUS is run entirely by volunteer leadership. Help us make DECUS and the Networks SIG better - take an active part in **your** SIG!



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AUTOMATION**

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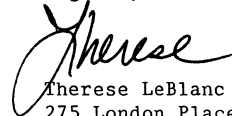
Welcome to our Post-Symposium (Dallas, 1986) issue. This month we have a recap of the Dallas highlights from our new OA SIG Chair, Kit Trimm; part one of a three part technical article by John Connolly of Digital Equipment Corp. on Modifiable Printer Tables for WPS+; the announcement of an exciting new ALL-IN-1 programming contest and of course, Ray Kaplan's 'Hints and Kinks' column.

The itemized SIR's from Dallas will be in the August issue, along with a ballot for you to vote for the ten you feel are most important.

Many thanks to the DECUS members who helped the OA SIG during the Dallas symposium...we appreciate your time and interest. Also, look for an announcement regarding new services which will be available in San Francisco this fall for everyone interested in OA.

I would like some input from you, our readers regarding Symposium. There was a lot of interest in having a "Symposia Justification Package" published in the September issue of the Newsletter. This would outline (in greater detail than in the past) OA sessions which will be presented, why attending DECUS is beneficial to you as an attendee and your company, information about what past attendees felt was most beneficial to them (in performing their day-to-day job), etc. The idea is to have a package of information that people can use to help justify (to upper management) why they should attend symposia. Here is where you can help...please send me a note telling me how you have justified DECUS to your superiors (time, money, education, etc.) or, if you have not yet attended a Symposium, what type of information you would need to be able to do so. Please be sure to include your phone number on any material you send so that I can call you if I have any questions.

Regards,



Therese LeBlanc  
275 London Place  
Wheeling, IL 60090

P.S. In case you're not sure, yes, that is a picture of a pig on page 2 for the ALL-IN-1 contest...more in August.

## CHAIRMAN'S MESSAGE

This this is my first message as Chairman of the OA SIG. I would like to start by expressing our appreciation for our first Chairman, Tom Orłowski. For those of you who are new to the OA SIG Tom was the person who had the vision and the fortitude five years ago to found the OA SIG. Tom realized the potential of Office Automation to revolutionize the way organizations function. Our European counterpart, Andreas Verbay from Switzerland, also shared with us that it was Tom who provided the inspiration for the founding of the OA SIG in Europe!

In these five years the OA SIG has grown to be one of the largest and most active SIGs. Some of our activities:

- o Over 50 hours of excellent sessions, both technical and managerial, at national Symposia, including a one day Executive Symposia.
- o Communications with our members including an informative monthly newsletter, session notes, white papers, and the OA SIG tape.
- o Information sharing through a masters list, an active campground staffed by Digital developers and our own gurus, and our first local users group (LUG) in Washington DC!
- o Feed back to Digital though our SIR and Wish List programs.

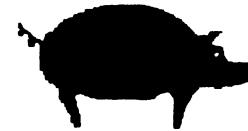
New projects we are working on include a "First Timers" program to help first time Symposia attendees get involved in the DECUS way of life, and our exciting new "ALL-IN-1 Programming Contest"! See the announcement in this newsletter!!

All these wonderful programs happened because individuals volunteered. If you would like to be part of  
MAKING IT HAPPEN -- give me a call!!

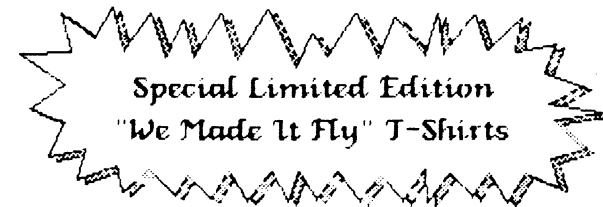
Katherine "Kit" Trimm  
OA SIG Chair  
(602) 886-5563

The first  
"We Made It Fly"

# ALL-IN-ONE PROGRAMMING CONTEST



All entries will be gratefully accepted. Programs will be judged on originality, creativity, usefulness, and documentation. All finalists will receive



### Rules:

- 1) All entries must be submitted for distribution on the OASIG tape
- 2) Entries must be sent to Randall Buck, 17911 Von Karman, Irvine CA 92714
- 3) Entries must be received by September 1st 1986.
- 4) Winners will be announced at the OA Magic Session in San Francisco and published in the newsletter. (Need not be present to win)
- 5) Judges decisions are final.
- 6) Even Digital people can enter.



**MODIFIABLE PRINTER TABLES  
PRINTING WITH WPS-PLUS**

John Connolly  
Digital Equipment Corporation  
Nashua, New Hampshire

**INTRODUCTION**

Since most, if not all, word processing eventually culminates in a printed document, WPS-PLUS must provide printing functions that result in good quality documents. These documents must faithfully reflect what the user intended, yet they must also be printed on print devices which can not reproduce the document exactly as specified. The print formatter determines that text is to be underlined, the driver determines how the underlining will actually be performed.

Formatting a document starts with the user defining margin settings with rulers and typing text. As the document takes shape, attributes such as character case and highlighting (bold, underline ect.) form the document until it best communicates the creator's ideas.

Print support within WPS-PLUS includes a print formatter and a driver. This is the area of WPS-PLUS that takes the revisable document, as entered within the editor, and creates the final, non-revisable document. The final, non-revisable document contains all the printer specific controls needed to reproduce, as faithfully as possible, the ideas originally represented in the revisable document.

Printer support has typically been limited to basic functions whenever the destination printer can not be precisely defined at product development time. This limited support results from the need to hardcode separate print drivers for each supported printer. Hardcoding multiple drivers requires a large maintenance effort and consumes memory resources that many small systems simply do not have available.

If only one driver can be made available it is desirable to have as much flexibility built into that driver as possible. The approach taken by WPS-PLUS is to provide flexibility through the use of run time printer definitions. Printers are defined by means of tables read into memory at format time and no code specific to any one printer is maintained in memory unless the current formatting operation is being performed on that printer.

The approach of user definable printer tables provides all environments with the ability to format for a large variety of printers without the penalty of having all possible printers defined for users choosing to use only a limited selection of printers. Having the printer defined within an external table also allows printers to be defined by end users without the need to rebuild the print driver, eliminating the requirement for new version releases when new printers become available on the market

and relieving some of the problems associated with coordinating software and hardware releases.

With the advent of more powerful printers, particularly low cost laser printers, a continuously growing base of users now expect a higher quality of text in their internal documents. Through DECpage, WPS-PLUS provides its users with the ability to create these very high quality documents.

In environments where DECpage is not available WPS-PLUS has the responsibility to generate high quality text. WPS-PLUS also must provide support for a variety of printers, including a large selection of printers manufactured by companies other than DEC that do not maintain ANSI standards.

The types of printers found in the different environments WPS-PLUS operates in varies from high volume high cost laser printers (LN01) to inexpensive dot matrix desktop printers (LA50). In addition to the wide range of DEC printers, many printers from vendors outside the control of DIGITAL (IBM, NEC, OKIDATA, HP, ect.) exist that cannot easily be overlooked.

User definable print services available through WPS-PLUS are designed to facilitate the definition of new printers as well as provide tools for customization of existing print tables. The operation of defining a printer is consistent throughout several versions of WPS-PLUS operating on different machines and a printer definition from one environment can be transported to another. Products that currently provide support for user defined printers include:

WPS-PLUS/VMS V2.0  
WPS-PLUS/A1 V2.1  
WPS-PLUS/PC V1.0  
WPS-PLUS/POS V1.0

It is anticipated that as new versions of WPS-PLUS are released the approach of defining the printer through the use of tables will be maintained and expanded.

**USER DEFINED PRINTER OVERVIEW**

While it is the goal of WPS-PLUS to provide the highest quality printing possible it is not the goal of WPS-PLUS print services to duplicate the functionality of DECpage. DECpage provides the user with maximum print quality and defined styles along with maximum utilization of printer functionality within its list of supported printers.

WPS-PLUS print services do not provide styles and due to the necessity of providing generic printer support, some functions, such as downline loaded fonts and true proportional text, are not fully supported at this time. WPS-PLUS does provide tools for developing printed images using the editor, print menu settings and control blocks, giving a great deal more control to the user than was possible in previous products. It is up to the user to develop the "style" the document will take on.

There are three main areas of WPS-PLUS that offer the user control over the image that is to be printed.

- 1) The on-screen formatting performed within the editor is the method familiar to most users. Within the editor, through the use of renditions and rulers, a document can be generated by even a novice user that presents a very professional appearance.
- 2) Global print settings selected from the print menu prior to printing a document. These settings include margins, pitches, line spacing and rendition reassignment.
- 3) External, modifiable print table function definitions, activated through the use of control blocks. Control block activated functions include definitions provided by DIGITAL and a facility for the user to define customized functions.

While all three formatting areas are defined from within the printer tables, and can therefore be modified for specific applications, it is the external table function definitions that will be covered in detail here. The external tables will be covered first, defining the functions supplied with the released products and then the use of user defined functions will be covered.

User defined functions will first be introduced to the user as if someone has already defined the function being discussed. Many users need not know how a function was defined, whether it was user defined by a system manager, Software Services or DIGITAL supplied. Once the use of control blocks have been covered the method of using rendition reassignment will be discussed.

Actual modification of the printer files will be discussed last. At that time the concept of a printer attribute file and a printer character file will be introduced along with the Print Table Utility (PTU)

Throughout the discussion of the print facility reference will be made to the "user" modifying the tables. In most cases the "user" referenced is not necessarily the end user of the product but rather knowledgeable maintainers or system managers that have researched the problem being addressed and with their knowledge of the specific printer, have modified the appropriate table. The table maintainer will vary from one environment to the next depending on the particular product being used and the size of the user group.

The POS and PC products provide the tools needed to modify the tables along with the necessary documentation. Provisions for modification of tables on VMS can be made through special arrangement with Digital Software Services. Since a basic set of tables are always provided, many users of WPS-PLUS will not need to know how to modify print tables but only will need to know how to activate the functionality provided within the tables.

## TALKING WITH THE PRINTER

WPS-PLUS offers two primary ways to embed printer specific formatting information into a document while editing; screen renditions and control blocks.

### CONTROL BLOCKS

A WPS-PLUS document may contain non-printing control blocks. The contents of control blocks are not printed but evaluated for their contents which are then used to activate DIGITAL defined or user defined functions.

An example of a DIGITAL defined function is LANDSCAPE, by selecting this function the printer will print all text with the horizontal axis aligned with the long edge of the paper. If this function, like all others, is not defined for this printer it will be ignored and formatting of the document will continue without interruption. This method of ignoring undefined functions allows printer specific functions to be contained within a document without requiring modification of the document before printing on other printers.

```
----- START CONTROL -----
TOP
PAGE \P
----- END CONTROL -----
----- START CONTROL -----
PRINTER FORMAT LANDSCAPE
----- END CONTROL -----
Everything from here to a control block which ends landscape
printing by requesting that the WPS-PLUS formatter return to
portrait printing is printed in landscape format.

Each page has the page number on it at the top of the page. The
beginning page number is specified in the print settings when the
document was selected for printing.

Note that each command to the WPS-PLUS formatter must have its
own control block.
----- START CONTROL -----
PRINTER FORMAT PORTRAIT
----- END CONTROL -----
```

Figure 1

The WPS-PLUS formatter recognizes several printer commands embedded within a document. These commands have a format similar to DECpage and always begin with the word PRINTER followed by a category and a value.

Commands embedded within control blocks are important because they allow changes in the printing activity within a document. Previously, attribute assignments could be made only at the beginning of a document and were in effect for the entire

document. With control blocks, commands can be mixed throughout a document.

An example of mixing operations not previously available would be switching back and forth between landscape and portrait orientation inside the same document. Portrait orientation could be used for text while landscape could be used for TDE pictures. Control blocks could also be used for overriding the default sheet feeder operation by explicitly selecting a sheet feeder.

```

PRINTER FORMAT { PORTRAIT, LANDSCAPE }
 Provides selection between orientation formats.
 Default value is PORTRAIT.

PRINTER MODE { DRAFT, LETTER }
 Provides selection between print densities and character
 quality. Default value is DRAFT.

PRINTER SELECT { FRONT, REAR, LETTERHEAD, ENVELOPE }
 Provides method for selecting options supported by the
 automatic sheet feeder.

PRINTER TABLE { keyword }
 Provides access to user specified keywords for which
 entries have been made in the printer attribute table.

PRINTER FONT { keyword }
 Used when a user defined keyword will cause a change from
 one font to another.

```

Table 1

Table 1 contains the printer commands available within WPS-PLUS. The word following the word PRINTER is a reserved word describing the category, the words contained within the brackets {} are the permitted values.

The PRINTER TABLE {keyword} operation is the control block operation that activates user defined functions.

PRINTER FONT { keyword } operates in a similar manner to PRINTER TABLE in that it activates a user defined command. Internal to WPS-PLUS, however, special operations take place that are unique to font selection.

#### USING CONTROL BLOCKS

WPS-PLUS can use the C.G. Times Font Cartridge on the LN03 to produce near typeset quality documents using control blocks. The C.G. Times Cartridge has three font sizes available and they may be selected at any point within the document. Default fonts may also be selected and cartridge and default fonts may be mixed in the same document.

Figure 2 demonstrates the use of the standard LN03 print definitions provided with WPS-PLUS. If the text is read, you

will notice that the printed text does not match the description. Font styles are described but are not printed. To make the printed text match the descriptions, the required fonts must be selected from the C.G. Times Font Cartridge.

---

#### C.G. Times proportional fonts

12 Point Roman, **Bolded and Underlined**  
 10 Point Roman, **Bolded and Underlined**  
 8 Point Roman, **Bolded and Underlined**

#### Built-in monospaced fonts

10 Point/10 Pitch Courier 10  
 10 Point/12 Pitch Elite 12  
 6.7 Point/13.6 Pitch Courier 10

---

Figure 2

```

----- START CONTROL -----
PRINTER FONT 12_POINT_ROMAN
----- END CONTROL -----
 C.G. Times proportional fonts
 12 Point Roman, Bolded and Underlined
----- START CONTROL -----
PRINTER FONT 10_POINT_ROMAN
----- END CONTROL -----
 10 Point Roman, Bolded and Underlined
----- START CONTROL -----
PRINTER FONT 8_POINT_ROMAN
----- END CONTROL -----
 8 Point Roman, Bolded and Underlined
----- START CONTROL -----
PRINTER FONT 10_POINT_COURIER
----- END CONTROL -----
 Built-in monospaced fonts
 10 Point/10 Pitch Courier 10
----- START CONTROL -----
PRINTER FONT 10_POINT_ELITE
----- END CONTROL -----
 10 Point/12 Pitch Elite 12
----- START CONTROL -----
PRINTER FONT 6.7_POINT_COURIER
----- END CONTROL -----
 6.7 Point/13.6 Pitch Courier 10
----- START CONTROL -----
PRINTER FONT RESET
----- END CONTROL -----

```

Figure 3

To select the requested font, control blocks are entered into the document, as shown in Figure 3, using the keyword associated with the desired font. Figure 4 is the sample resulting from the use of the control block selection of fonts.

C.G. Times proportional fonts

12 Point Roman, **Bolded and Underlined**  
 10 Point Roman, **Bolded and Underlined**  
 8 Point Roman, **Bolded and Underlined**

Built-in monospaced fonts

10 Point/10 Pitch Courier 10  
 10 Point/12 Pitch Elite 12  
 6.7 Point/13.6 Pitch Courier 10

Figure 4

RENDITION REPLACEMENT

Since rendition definitions are defined in the printer's attribute file they may be modified to perform functions. For example simply inserting the command sequence necessary to select italics into the underline rendition will cause italics to be generated whenever underlined text appears in the document. If the extra dark rendition was defined to contain italic text, italics could be selected to replace bolded text from the print menu before a document is formatted and all bolded text would become italic.

Rendition replacement/modification can be used to perform a wide variety of tasks. One application that is currently being used for equation generation involves modifying the sub/superscript rendition, the reverse rendition or a combination of the two. A request for sub/superscripted characters to be imaged in a smaller font was satisfied by modifying the sub/superscript rendition to automatically select the 6.7 point courier font whenever sub/superscripted characters were detected in the document. When normal text is encountered the font active prior to the sub/superscripted characters would be reactivated.

If smaller characters are desired, but not every time, sub/superscripting is selected, another rendition not normally used such as reverse, may be used to select the reduced size font. To achieve the same results with this method the character would be superscripted but the miniature font would be selected by placing the reverse video rendition on the character from within TDE.

In one case a user felt that the superscripted characters were being placed too far above the base line and wanted these characters to only be offset by one-quarter of a line instead of one-half a line. This effect was achieved by replacing the normal escape sequence for sub/superscript with positioning commands that moved the active line half the distance normally moved in a sub/superscript operation.

By using a combination of the quarter line spacing and small font size, equations are made more visually appealing and easier to read. Figure 5 shows a document using the default values for sub/superscript and figure 6 shows the results using a custom definition.

Laplace's Equation:

$$\nabla^2 \phi = \frac{\delta^2 \phi}{\delta x^2} + \frac{\delta^2 \phi}{\delta x^2} \frac{1}{r} \frac{\delta}{\delta r} + \left[ \frac{\delta \phi}{\delta r} \right] + \frac{1}{r^2} \frac{\delta^2 \phi}{\delta \phi^2} = 0$$

$$\nabla^2 \phi = \frac{\delta^2 \phi}{\delta x^2} + \frac{\delta^2 \phi}{\delta x^2} \int_0^{\infty} \left[ r \frac{\delta \phi}{\delta r} \right] \frac{1}{r} \frac{\delta}{\delta r} \int_0^{\infty} \frac{1}{r^2} \frac{\delta^2 \phi}{\delta \phi^2} = 0$$

$$\nabla^2 \phi = \frac{\delta^2 \phi}{\delta x^2} + \frac{\delta^2 \phi}{\delta x^2} \frac{1}{r} \frac{\delta}{\delta r} \left[ r \frac{\delta \phi}{\delta r} \right] + \frac{1}{r^2} \frac{\delta^2 \phi}{\delta \phi^2} = 0$$

Figure 5

Laplace's Equation:

$$\nabla^2 \phi = \frac{\delta^2 \phi}{\delta x^2} + \frac{\delta^2 \phi}{\delta x^2} \frac{1}{r} \frac{\delta}{\delta r} + \left[ \frac{\delta \phi}{\delta r} \right] + \frac{1}{r^2} \frac{\delta^2 \phi}{\delta \phi^2} = 0$$

$$\nabla^2 \phi = \frac{\delta^2 \phi}{\delta x^2} + \frac{\delta^2 \phi}{\delta x^2} \int_0^{\infty} \left[ r \frac{\delta \phi}{\delta r} \right] \frac{1}{r} \frac{\delta}{\delta r} \int_0^{\infty} \frac{1}{r^2} \frac{\delta^2 \phi}{\delta \phi^2} = 0$$

$$\nabla^2 \phi = \frac{\delta^2 \phi}{\delta x^2} + \frac{\delta^2 \phi}{\delta x^2} \frac{1}{r} \frac{\delta}{\delta r} \left[ r \frac{\delta \phi}{\delta r} \right] + \frac{1}{r^2} \frac{\delta^2 \phi}{\delta \phi^2} = 0$$

Figure 6

## PRINTER TABLES

Every printer WPS-PLUS supports requires the presence of two tables, one containing attributes of the printer and another containing the character definitions and mappings. These tables are readable and modifiable through the Print Table Utility (PTU).

### PRINTER ATTRIBUTE TABLES

The printer attribute table contains information defining characteristics of the printer. Some entries describe the characteristics of the printer itself (e.g. the character which causes the print head to backspace) and others contain values for specific parameters to be used in the formatting of a document (e.g. the default horizontal and vertical pitch settings). A large category of entries contain control sequences which cause specific actions in the printer (e.g. <ESC>K will cause the printer to move the print position to facilitate the printing of a superscripted character).

The following figure is a sample of screen output while in the attribute modification portion of the PTU. Entries that exceed the width of the screen are truncated. When that entry is selected by positioning the cursor over its entry the entire contents of the string is displayed in the active entry window. The active entry window in this sample contains the initialization sequence.

#### DEFINE PRINTER ATTRIBUTES

```
<CSI>10m<SI><CSI>?20 J<CR>
```

|                                               |                            |
|-----------------------------------------------|----------------------------|
| Default vertical pitch (lines/inch)           | 6                          |
| Default horizontal pitch (chars/inch)         | 10                         |
| Char. positional width (print head movements) | 1                          |
| Maximum sheet height (motor steps)            | 1000                       |
| Extra page ejects                             | 1                          |
| Pass output tables? (Y/N)                     | N                          |
| Pass page limits? (Y/N)                       | N                          |
| Backspace character (ASCII value)             | 8                          |
| Red line character (ASCII value)              |                            |
| Double underline character (ASCII value)      | 19                         |
| Initialization sequence                       | <CSI>10m<SI><CSI>?20 J<CR> |
| Termination sequence                          | <ESC>c<CSI>10m<CR><SI><CS  |
| Set red line                                  | <ESC>[9m                   |
| Reset red line                                | <ESC>[29m                  |
| Set double underline                          | <ESC>K                     |

Figure 6

The following descriptions are of the table entries in Figure 6. Note that all numeric entries are decimal values and that standard mnemonics for ANSI control characters are legal entries. LN03 control sequences shown in the figure can be found in the

LN03 Programmer Reference Manual.

#### Default vertical pitch (lines/inch):

The default vertical pitch in lines per inch. This is the vertical pitch used with the normal character font. This field is not currently used by WPS-PLUS.

#### Default horizontal pitch (chars/inch):

The default horizontal pitch used with the primary font. This field is not currently used by WPS-PLUS.

#### Character positional width (print head movements):

For a monospace printer this entry is always 1. In fact, this is 1 for all Digital printers except the LQP02 where it is 10.

#### Maximum sheet height (motor steps):

This entry is not currently used by WPS-PLUS. This field is reserved for future use.

#### Extra page ejects:

This is the number of page ejects requested between documents. Currently entries of 0 and 1 both default to 1.

#### Pass output tables? (Y/N):

This is currently set to Y only for the LQP02.

#### Pass page limits? (Y/N):

This entry is N for laser printers and for the LP11. For other printers Y indicates that WPS-PLUS will define the page limits by sending an escape sequence to the printer. The escape sequence is defined in the code and is not specified in the tables.

#### Backspace character (ASCII value):

The decimal value of the ASCII character denoting backspace. For printers which cannot backspace (e.g. the LN01 and LP11) the entry should be null (no entry), which appears as a blank on the screen. This causes WPS-PLUS to perform the backspace function by moving the print head to the left end of the line and forward spacing to the desired position.

#### Redline character (ASCII value):

This is the decimal offset into the character table for the character to be used when performing fallback redlining. If the printer is designed with the capability to do redlining, this entry should be blank. The software then uses the set and reset redline sequences described below to do redlining. If the printer is not designed to do redlining, the decimal value of the preferred redline character (e.g. 45, the hyphen) should be entered. This causes WPS-PLUS to redline by using its underline algorithm with the requested redline character replacing the underscore.

#### Double underline character (ASCII value):

This is the decimal offset into the character table for the character to be used when performing fallback doubleunderlining. If this entry is null, it indicates that the printer can perform the function with the set and reset double underline sequences below. An entry causes WPS-PLUS to print the character string

underlined and then go back and performs overstrike underlining using the replacement character, conditioned by the sequence in the set double underline entry. For example, this LN03 entry causes the overstriking to be performed after an <ESC>K. The character chosen, VT100 scan line (offset 19), was determined by repeated substitution to achieve the most attractive results.

**Initialization sequence:**

This is the sequence sent to the printer before each document is printed. In the case of the LN03, the pieces of the sequence are: (Note that <CSI> is the eight bit equivalent of the two character sequence <ESC>[).  
 <CSI>10m - At power up, the primary font is loaded into SGR number 10. This sequence selects the primary font set from SGR 10.

<SI> - This loads the font set in G0 into GL (graphics left table).

<CSI>?20 J - This sequence selects the Tall extended North-American letter format (PORTRAIT format).

<CR> - This carriage return sets the initial print position to the left margin.

**Termination sequence:**

The sequence sent to the printer as each document finishes printing.

<ESC>c - This sequence resets the printer to its power up settings.

<CSI>10m<CR><SI><CSI>?20 J - This is equivalent to the initialization sequence.

**Set redline:**

<ESC>[9m, causes the LN03 printer to redline all characters until it receives a reset redline sequence.

**Reset red line:**

<ESC>[29m, causes the LN03 printer to discontinue redlining.

**Set double underline:**

The LN03 does not perform double underlining as a function, therefore, it must be emulated by the WPS-PLUS software. The sequence, <ESC>K, (partial line down) is the condition applied to the double underline character entered above when overstriking the underlined string.

**DEFINE PRINTER ATTRIBUTES**

<ESC>K<DCS>1;19}RCOURIR101VK00GG<ST><CSI>19m

|                                              |                             |
|----------------------------------------------|-----------------------------|
| Reset double underline                       | <ESC>L                      |
| Set subscript                                | <ESC>K<DCS>1;19}RCOURIR101V |
| Reset subscript                              | <CSI>10m<ESC>L              |
| Set superscript                              | <ESC>L<DCS>1;19}RCOURIR101V |
| Reset superscript                            | <CSI>10m<ESC>K              |
| Set bolding                                  | <ESC>[1m                    |
| Reset bolding                                | <ESC>[22m                   |
| Set underline                                | <ESC>[4m                    |
| Reset underline                              | <ESC>[24m                   |
| Set reverse                                  | <DCS>1;19}RCOURIR101VK00GG< |
| Reset reverse                                | <CSI>10m                    |
| Set shadow                                   | <ESC>[1m                    |
| Reset shadow                                 | <ESC>[22m                   |
| Set extra dark                               | <ESC>[1m                    |
| Reset extra dark                             | <ESC>[22m                   |
| Set technical                                | <DCS>1;19}RELITE0L02SK00GG< |
| Reset technical                              | <CSI>10m                    |
| Set vertical pitch of 1                      | <ESC>[4z                    |
| Position height for vertical pitch of 1      | 12                          |
| Set vertical pitch of 2                      | <ESC>[4z                    |
| Position height for vertical pitch of 2      | 12                          |
| Some entries omitted                         |                             |
| Position height for vertical pitch of 11     | 2                           |
| Set vertical pitch of 12                     | <ESC>[3z                    |
| Position height for vertical pitch of 12     | 2                           |
| Set horizontal pitch of 1                    | <CSI>10m<ESC>[5w            |
| No. chars on line for horizontal pitch of 1  | 40                          |
| Set horizontal pitch of 2                    | <CSI>10m<ESC>[5w            |
| No. chars on line for horizontal pitch of 2  | 40                          |
| Some entries omitted                         |                             |
| Set horizontal pitch of 15                   | <CSI>15m<ESC>[9w            |
| No. chars on line for horizontal pitch of 15 | 145                         |
| Set horizontal pitch of 16                   | <CSI>15m<ESC>[4w            |
| No. chars on line for horizontal pitch of 16 | 151                         |
| Proportional spacing capability? (Y/N)       | N                           |

Figure 7. Additional entries in the LN03 printer attribute table as seen within PTU. This figure contains the contents of several screens.

Figure 7 shows the entries in the attribute table following those of Figure 6. In this section some entries that represent a series of similar entries have not been reproduced. The entries have the following interpretation.

**Reset Double Underline:**  
Ends double underlining.

**Set Subscript:**

The first part of the sequence, <ESC>K, is the partial line down sequence which positions the paper for the subscript. If subscripting were being done with the 10 point current font, this would be all that is needed. This print definition of the LN03 has chosen to use the 6.7 courier font for all subscripting. This font must be selected and invoked. This operation is achieved as follows:

<DCS>1;19} - This sequence assigns the desired font set ID to SGR (selected graphic rendition) number 19.

RCOURIR101VK00GG - This is the font ID.

<ST> - This is the string terminator.

<CSI>19m - This sequence invokes the font set in SGR 19 for printing.

Reset Subscript: This sequence again has two parts:

<CSI>10m - Invokes the primary font set which is always to assigned SGR number 10.

<ESC>L - This is the partial line up, returning the paper from its subscripted position.

**Set superscript:**

This is the same as the set subscript sequence except that <ESC>L is used to generate a partial line up, to position for superscripting, rather than the partial line down sequence. Again, for the LN03 we assign and select the 6.7 point font.

**Reset superscript:**

Same as reset subscript but partial line down replaces partial line up. Again the primary font is reselected.

**Set bolding:**

This sequence causes the printer to print all subsequent characters dark. Note that the sequence could be entered as either <ESC>[1m, or as <CSI>1m. If there is no entry WPS-PLUS produces dark characters by the fallback algorithm of overstriking.

**Reset bolding:**

This sequence causes the printer to turn off dark printing.

**Set underline:**

Causes the printer to underline all subsequent text. A null entry causes WPS-PLUS to underline using a fallback algorithm that overstrikes underscore characters.

**Reset underline:**

Stops the underlining of text.

**Set reverse:**

This rendition can be used at the users discretion because the

LN03 does not print a reverse mode. The choice here is that reverse mode causes the Courier 6.7 point, 13.6 pitch font to be assigned and selected.

**Reset reverse:**

Causes the reverse rendition attributes to be discontinued. This sequence includes the reinvoking of the primary font.

**Set shadow:**

On the LN03, shadow and bold printing are indistinguishable. Therefore, if you wish to trade bold for some other action you could do so by selecting shadow printing on the print settings menu. The table would then contain a sequence replacing shadow with the sequence to cause the desired action, e.g. bolding could be traded for italics.

**Reset shadow:**

This turns off the action invoked by the set shadow sequence.

**Set extra dark:**

This attribute is not distinguishable from bold on the LN03. Therefore, it is set to bold. Note again that this is a potential user defined rendition for printing, trading bold for a specified action by choosing extra dark on the print settings menu.

**Reset extra dark:**

Turns off the action initiated by the set extra bold sequence.

**Set technical:**

For esthetic reasons we have caused the technical character set choice to use the 10 point, 12 pitch Elite font set. This set is assigned and invoked in SGR number 19.

**Reset technical:**

Reselects the primary font in SGR number 10.

**Set vertical pitch of 1:**

Starting here are the entries defining the vertical pitch for all vertical pitch values from 1 to 12 lines per inch. Each vertical pitch setting consists of two entries, the first entry is the sequence selecting the vertical pitch, the second entry denotes the height of the character cell in the smallest units the printer is capable of moving in the vertical direction. Height information is used by the software to determine position on the page for pagination. These pitch settings are chosen from the print settings menu.

Note that most printers, including the LN03, may not be able to print at 12 distinct pitches. For example, the LN03 has pitch settings of 2, 3, 4, 6, 8 and 12. The entries in the table may represent approximations. For those pitches which are not available on the printer the closest value available is used. Intermediate pitches can be obtained on the LN03 by using the (SPI) control sequence <CSI>Pv;Ph G.

**Position height for vertical pitch of 1:**

This is the height of the character in units of minimum printer

movement.

Following the entries describing the vertical pitch are the entries for horizontal pitch. Again, because not all printers support all integer horizontal pitches between 1 and 16, some entries are approximations. Horizontal pitch values for WPS-PLUS are selected from the print settings menu.

**Set horizontal pitch of y:**

Sequence to cause the printer to use a specific horizontal pitch. In addition to the sequence activating the horizontal pitch a font selection may be made allowing for a more appealing font size for the selected horizontal spacing. The LN03 can print with nine distinct horizontal pitches: 5, 6, 6.6, 8.25, 10, 12, 13.2, 15 and 16.5.

**No. chars on line for horizontal pitch of y:**

This is the maximum number of characters which will fit on a line at the selected horizontal pitch when in Landscape orientation.

**Proportional spacing capability? (Y/N):**

This should be answered yes only for the LQP02. This field will not be included in future releases and is misnamed here, the LQP02 does not support proportional printing in current releases of WPS-PLUS. This field only indicates that the printer definition is for an LQP02.

Figure 7 shows the last of the entries described above along with the entries defining portrait and landscape formats. Following these are the keyword entries used in the example shown in Figure 3. The entry shown in the active entry window is the sequence for selecting the 10\_POINT\_ROMAN font. The printer format entries are:

**PORTRAIT:**

This sequence selects the Tall extended North-American letter format (PORTRAIT). This is the same sequence selected as part of the initialization and termination sequences.

**LANDSCAPE:**

This sequence selects the Wide extended North-American letter format (LANDSCAPE).

**DEFINE PRINTER ATTRIBUTES**

<DCS>1;10}RTIMES0002SK00GG<ST><CSI>?27h

|                                              |                                  |
|----------------------------------------------|----------------------------------|
| No. chars on line for horizontal pitch of 15 | 145                              |
| Set horizontal pitch of 16                   | <CSI>15m<ESC>[4w                 |
| No. chars on line for horizontal pitch of 16 | 161                              |
| Proportional spacing capability? (Y/N)       | Y                                |
| PORTRAIT                                     | <CSI>?20 J                       |
| LANDSCAPE                                    | <CSI>?21 J                       |
| 8 POINT ROMAN                                | <DCS>1;10}RTIMES00028K00GG<ST><C |
| 10 POINT ROMAN                               | <DCS>1;10}RTIMES0002SK00GG<ST><C |
| 10 POINT ITALIC                              | <DCS>1;10}RTIMES0002SK01GG<ST><C |
| 12 POINT ROMAN                               | <DCS>1;10}RTIMES0003CK00GG<ST><C |
| 10 POINT COURIER                             | <DCS>1;10}RCOURIRJ02SK00GG<ST><C |
| 6.7 POINT COURIER                            | <DCS>1;10}RCOURIR101VK00GG<ST><C |
| 10 POINT ELITE                               | <DCS>1;10}RELITE0L02SK00GG<ST><C |
| FORM PITCH                                   | <CSI>?72; G                      |
| SET ITALIC                                   | <CSI>?3m                         |
| RESET ITALIC                                 | <CSI>?23m                        |

Figure 8. The last page of the printer attribute table for the LN03 containing user defined entries.

The following description will describe the 10\_POINT\_ROMAN entry in detail and will only list other, similar, entries.

10\_POINT\_ROMAN: This sequence has several parts, much of it similar to what we have see before. The parts are:

<DCS>1;10}RTIMES0002SK00GG<ST> - This is the sequence which assigns the 10 point Times Roman font to SGR number 10. Note that by assigning this to SGR number 10, it now becomes the primary font, it is not necessary to select it. When a font is loaded into SGR 10 the original default font is no longer known to the printer. To retain the original font as the default, assign the font to an SGR other than 10 and select it. To reset the original font, select SGR 10.

<CSI>?27h - This sequence enables proportional spacing on the LN03.

The entries for the keywords 8 POINT ROMAN, 10 POINT ITALIC, 12 POINT ROMAN, 10 POINT COURIER, 6.7 POINT COURIER and 10 POINT ELITE are identical except for the differences in font ID's.

The next keyword entry is FORM PITCH which defines a 10 point vertical pitch setting using the sequence <CSI>?72; G. This keyword demonstrates an example of how to override a print menu setting that would normally be applied to an entire document.

The last two keywords shown can be used to select and cancel the italics associated with the font set currently selected. This can be used as an alternative to using a rendition for italics or using entries of the form shown for 10\_POINT\_ITALIC.



ALL-IN-1 Hints and Kinks

by  
Ray Kaplan  
PIVOTAL, Inc.

Hi there, again.

Yet another crack at it, here. How about you? Happily ALL-IN-ling? Hope so. Great little toy, Don't you think? I do.

Have you a favorite ALL-IN-1 "thingie", problem solution, complaint, or question that you would like to contribute? Hope so. Please feel free to address them (what ever) to me:

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Since Last time

As with you, a lot of water has run under the bridge since last column. Notably, the Dallas Symposium! The OA SIG had it's first "dual Symposium session stream" in that there were separate technical and managerial office automation related session going on at the same time. Hats off to OA SIG Symposium person Mitch Brown (of Gen Rad in Waltham, Mass.) for his superb work in making it all hang together so well. Fact is, what you see from the OA SIG is a result of a concerted effort from a lot of energetic volunteers. The first page of the Newsletter has a list of some of the fine folks that "make it all happen". This newsletter, for instance, is a significant volunteer effort by Therese LeBlanc (Wheeling, Mi.). What's the point here? Simple. If you want to help make the OA SIG "a better place to live", please join us in our volunteer efforts. Contribute a newsletter article, come give a Symposium session, volunteer to help with one of the many ongoing OA SIG projects!

Left Over

I gave several presentations at the Dallas Symposium, and one of the examples that I had hoped to include in two of the technical ALL-IN-1 sessions that I did somehow did not make into my brief case. Thought that I would take this opportunity to present it, especially since several people have asked for it.

The problem that we had to solve centered around making a smooth transition into version 2 of ALL-IN-1 for a DECmail based user community. The specific problem was that the DECmail users were used to sharing a printer. In that, DECmail helped by affixing an asterisk (\*) to the end of the addressee and/or copy to line to indicate which user printed out a copy of the message on the shared printer. Without this splat (\*), no one could tell which message belonged to whom.

While ALL-IN-1 version 2 allows shared printers, the only way to differentiate between message printers is to have the print queue spit out header and trailer pages for each job that prints. A waste of paper and time at least!

Ta dah! A simple ALL-IN-1 customization to the rescue. Here it is, complete with an array of comments that I hope you will find interesting.

First, a word about the ALL-IN-1 mail system. Like any good ALL-IN-1 application, it is "fully integrated" with ALL-IN-1 in the sense that it knows how to play with such things as the ALL-IN-1 file cabinet. When you create a mail message, you actually create two separate things: An address and copy to list (which, along with some other things, shows up as the header of the mail message), and the mail message itself which is just a text file created with your default ALL-IN-1 editor. Of course you can also have attached documents as well, but that is a topic for another Hints and Kinks column.

Now, if you are reading the Application Programmer's Reference Manual, you find some clues. Notice that I said "are reading" rather than "have read". The point is that you have to do this reading of the manuals as a regular and continuous thing. Chapter 11 of the APR tells us all about the Electronic Messaging system. Page 11-9 has a section on it entitled "Customizing the Message Header" where we find out that what we see when we print out a message to our screen is actually being controlled by some "templates" and the value of a logical name. Based on the number of addresses, we either print out the address list before or after the message itself. If you look in your ALL-IN-1 startup file (SYSSMANAGER:ALV2START.COM), you will see the logical name (OASMAIL\_NUM\_ADDRESSES) defined to be 5 by default. You can change this if you would like, but 5 seems to be a nice number of addressee lines to restrict the top part of a message display to.

For information on templates we can consult the MERGE function documentation in chapter 6 of the APR. This is going to come in handy, since when you look at the various templates that the mail system documentation mentions you will find that they look strange unless you have read the MERGE documentation. This is quintessential ALL-IN-ling. Read some things to discover that you need to read yet some more. Page 6-137 of the APR begins the list of "template directives". These "directives" are actually processing instructions to the MERGE function that is going to both manufacture the message header and "glue" the message header onto the actual text of the message when we look at it on the terminal or print it out on the printer.

Lets look at one of the templates. Below, is a listing of the MAILMEM01.BLP template that is used when the number of addresses is less than the logical name OASMAIL\_NUM\_ADDRESSES as explained above.

You can find it in OASBLP:, which is the logical name which refers to the repository for most of the other ALL-IN-1 "boiler plates" (templates).

In general, we surround anything that we want the MERGE function to interpret by "< >", in order to separate it from any plain text that we want the MERGE to just "pass through". The main template directive of interest (both in the documentation and in the template we are looking at) is the `&OA` directive. As the documentation suggests, this syntax allows us to tell the MERGE function (which is interpreting the template) to go off and do an ALL-IN-1 function for us. Now if you don't understand this, please take a moment to ponder it. "Imagine the possibilities", as a DEC salesman might say.

Think of it, during the MERGE of the template into our current context, we sort of go off and execute an ALL-IN-1 function (or functions)! We might even conditionally execute some ALL-IN-1 code on the basis of some criteria associated with our context. This is, in fact, the basis for solving our little DECmail user community problem - as we will see.

First, look MAILMEMO1.BLP.

```
<&OA get oa$formatting_header="1"><->
<&reverse>d<&clear> <&reverse>i<&clear> <&reverse>g<&clear>
<&reverse>i<&clear> <->
<&reverse>t<&clear> <&reverse>a<&clear> <&reverse>l<&clear>
 <&bold>I N T E R O F F I C E M E M O R A N D U M<&clear>

<&tab 40><&bold>Date:<&clear> <oa$curdoc_created> <#zone>
<&tab 40><&bold>From:<&clear> <oa$curdoc_author>
<&tab 40> <cab$.from_address[oa$curdoc]>
<&tab 40><&bold>Dept:<&clear> <cab$.from_dept[oa$curdoc]>
<&tab 40><&bold>Tel No:<&clear> <cab$.from_tel_no[oa$curdoc]>

<&oa for cab$attributes:TO do get oa$merge_line =
"<&bold>TO:<&clear> " .value>
<&oa for cab$attributes:CC do get oa$merge_line =
"<&bold>CC:<&clear> " .value>
<&bold>Subject:<&clear> <cab$.subject:156[oa$curdoc]>

<&OA get oa$formatting_header="0"><->
<&include oa$curdoc_filename>
```

As you can see, it will take some study to see what it does, especially if you are not familiar with templates. Let us pick it apart. Given the previous discussion, the first line, `<&OA get oa$formatting_header="1"><->`, is fairly straight forward. It obviously uses the GET function to put a 1 into the special ALL-IN-1 symbol `OASFORMATTING_HEADER`. I do not know what that does, and I have not been able to get it to misbehave by taking it out. Anyone out there know what this symbol does? The "`<->`" is just an "continuation line indicator", much as in DCL.

Given the fact that the next few lines put the "header" onto the finished message that we see, common sense will tell you that there are letters (DIGITAL) mixed in with formatting commands (`<&reverse>` `<&clear>`). For instance, `<&reverse>D<&clear>` puts out a reverse video "D" in the finished product for us to look at. In the

case that all you want to do is to customize your "boiler plate" to have your name at the top of your mail messages instead of DEC's, all you have to do is edit the boiler plate and then make the changes known to ALL-IN-1 (more on that later).

Rolling right along, there is a `<&bold>` directive that just turns on bolding and a `<&clear>` that turns it off after the INTEROFFICE MEMO string has been printed out.

The line: `<&tab 40><&bold>Date:<&clear> <oa$curdoc_created> <#zone>` is as easily decoded. The `<&tab 40>` just says "go over to column 40 and print out the bold string "Date:". Given that you've read the documentation, you can guess that `<oa$curdoc_created>` tells the MERGE to go out and get the value of the special symbol `oa$curdoc_created` and plug it in here. `<#zone>` says to go get the value of the local symbol "zone" and plug it in here. More on ALL-IN-1 symbols in a later effort. As you can guess, "oa\$curdoc\_created" contains the creation time of the current document and "zone" contains the time zone used by the creator. The line that contains `<oa$curdoc_author>` gets the symbol `oa$curdoc_author` which, of course, is the author of the current document.

As you can guess from knowing what your mail messages look like when you print them out, the next 3 lines contain information about where the message came from. Given that and a common sense reading of the lines of the template, our gathered ALL-IN-1 knowledge tells us that the expressions inside of the angle brackets are responsible for retrieving that information and giving it to the MERGE function to include in the current MERGE operation. The expressions inside of the angle brackets are Data Set References (DSR) that use a special specification (`cab$`) to find the information that it needs. For instance, the expression `<cab$.from_address[oa$curdoc]>` translates into a command to ALL-IN-1 to "go into the file cabinet, using the current document name as a key, and bring back it's "from" address." The expression `<cab$.from_dept[oa$curdoc]>` says "go get the "from" department, and the expression `<cab$.from_tel_no[oa$curdoc]>` says "go get the "from" telephone number. All of these things (`cab$.`) are "document attributes" which are pieces of information associated with documents that are in our ALL-IN-1 "file cabinets". I will cover those in a future column. As you can see, the life of a volunteer columnist is never done! (To bad they don't pay for this work!)

Now for the "meat of it." The lines `<&oa for cab$attributes:TO do get oa$merge_line = "<&bold>TO:<&clear> " .value>` and `<&oa for cab$attributes:CC do get oa$merge_line = "<&bold>CC:<&clear> " .value>`, are the parts of the template that go get the "addressees" and "copy to's", and build the "distribution list" portion of the mail message that you see when you print out the mail message. Since they are both do the same jobs, we can just pick one apart. "`&OA`" is the now familiar way that we tell the MERGE function that we want ALL-IN-1 to go off and do something for us. At first glance it is hard to see what all is in this line, so let me just blur it out, and then we can go back and look at it in detail.

What we have here is a "FOR loop" which uses an embedded "DO loop". This line goes into the file cabinet and gets all of the "addressees" (or "copy to's") and builds a distribution list for the purpose of printing it out on the mail message.

As you can imagine, the "FOR" is the start of a "for - while loop" construct. You can find this well documented in the APR starting on page 6-83. As you can see from the documentation, the everything between the FOR and the DO is a Record Selection Expression (RSE). "Cab\$attributes:TO" goes into the file cabinet and gets all of the "TO's" (or CC's) for the current message, one at a time.

"Get oa\$merge\_line =" is a ALL-IN-1 GET function call. It loads everything on the right hand side of the "=" into the ALL-IN-1 special symbol OA\$MERGE\_LINE which causes it to be output to the current MERGE destination - our print out of the mail message. As you can guess, the "<bold>TO:<clear>" puts the bold "TO:" (or "CC:") ahead of the distribution list name. Perhaps not so obvious is the ".value", which translates to the VALUE of the current document TO or CC attribute.

So, the "magic" of the merge template is really a DO function which uses a GET function to get the value of the "TO" (or "CC"), all controlled by a FOR function which is looping through the list of "TO's" (or "CCs") for the current file cabinet document. Neat, huh? I think so.

Next we put in a "Subject:" header followed by the contents of the SUBJECT document attribute associated with the current document compliments of the line "<bold>Subject:<clear><cab\$.subject:156[oa\$curdoc]>". The confusing part is the "subject:156". If you have read the APR section on ALL-IN-1 symbols (chapter 8), you recognize the "subject:156" as a "substring specification". Hmm. You can say something such as "XXX:10:0" to get the first 10 characters of the symbol XXX. That is, the first number (:10) is the length, and the second number (:0) is the starting position. According to the documentation, if you leave off the starting position specification (:0 in our simple example here), you get the entire symbol, regardless of length. One can only suppose that "156" was chosen as a value for the length specification in order to insure that the whole mail message subject got into the header of the message that we are printing out.

The second to last line of the template has that perplexing OA\$FORMATTING\_HEADER="0" business in it. I will try to find out what it does sometime soon. Meantime, if you know - drop me a line!

Last, but certainly not least(!), the merge template line <include oa\$curdoc\_filename> goes out and gets the actual mail message to include after the distribution list has been printed out (finally!).

Note that when you look at the merge template MAILMEMO2.BLP, you will see that line way up top in the template, since the rules say that when the number of addresses exceed the value of the logical name OA\$MAIL\_NUM\_ADDRESSES, we will put the distribution list at the bottom of the message print out, after the mail message itself.

Whew

We are done, right? No, no. We still have to solve our problem of the DECmail community that needs to tell which message belongs to whom.

First a word on a development strategy. Given that we have only a production ALL-IN-1 system to work with, we darn well better not mess it up! Since the developers knew we were coming, they provided us a nice way to mess around with what would otherwise be "production" ALL-IN-1 code in the seclusion of our own ALL-IN-1 context. The problem is that the contents of OA\$BLP is normally put into the memory resident Text Library (TXL) (along with the contents of OA\$SCP and OA\$DO) and linked into the ALL-IN-1 image (program) when we install it (or reinstall it). So, we can't just change one merge template without recompiling the TXL and reinstalling it, right? No, no! That would be negligence on the part of the developers! As you know by now, the developers have provided us with quite a nice development environment. They have given us a special ALL-IN-1 symbol, OA\$TXL\_SEARCH\_LAST, that controls where ALL-IN-1 (only the current ALL-IN-1 context, that is) looks for TXL elements. By default, the search order for TXL elements is:

```
The TXL
The current user's directory
OA$LIB:
OA$DATA:
```

Step 1 is to issue a "<GET OA\$TXL\_SEARCH\_LAST=1" command interactively at your terminal. This changes the TXL element search order to:

```
The current user's directory
OA$LIB:
OA$DATA:
The TXL
```

Note that the TXL search has been moved to last on the list. This way, we can create a text file named MAILMEMO1.BLP in our own ALL-IN-1 default directory, and have ALL-IN-1 come and use our template when we call it. The important thing is that this change of search order does not affect anyone else but us, so we can develop to our hearts content. Be serious now, development means making a lot of mistakes, right? Ye old trial and error.

Step 2 is to set about doing "step wise" development. Changing a little at a time to see what happens. I started by making my template look like:

```
<&OA get oa$formatting_header="1"><->

THIS IS A TEST

<&OA get oa$formatting_header="0"><->
<&include oa$curdoc_filename>
```

That allowed me to see that I can control what is going on, as it printed out only "THIS IS A TEST" and the current mail message when I asked for the the mail message to be printed.

From there I made it look like:

```
<&OA get oa$formatting_header="1"><->

 I N T E R O F F I C E M E M O R A N D U M

<&tab 40><&bold>Date:<&clear> <oa$curdoc_created> <#zone>
<&tab 40><&bold>From:<&clear> <oa$curdoc_author>
<&tab 40> <cab$.from_address[oa$curdoc]>
<&tab 40><&bold>Dept:<&clear> <cab$.from_dept[oa$curdoc]>
<&tab 40><&bold>Tel No:<&clear> <cab$.from_tel_no[oa$curdoc]>

<&OA do test.scp>

<&OA get oa$formatting_header="0"><->
<&include oa$curdoc_filename>
```

Note that the distribution list production code was replaced by an ALL-IN-1 function call which caused a script called TEST.SCP (in my directory) to be executed. I then developed my distribution list merge code in a script a small comfortable step at a time. When I was done with it, I put it inside the merge template and I was done. You do not have to do this, I just found that it helped keep my sanity since I had problems with the syntax of the continuation lines inside of the template.

First, lets look at the complete solution. Then we can pick it apart. Here is the finished template incorporating the customization needed to make mail messages printed out under ALL-IN-1 look like mail messages printed out under DECmail.

```
<&OA get oa$formatting_header="1"><->
<&reverse>d<&clear> <&reverse>i<&clear> <&reverse>g<&clear>
<&reverse>i<&clear> <->
<&reverse>t<&clear> <&reverse>a<&clear> <&reverse>l<&clear>
<&bold>I N T E R O F F I C E M E M O R A N D U M<&clear>

<&tab 40><&bold>Date:<&clear> <oa$curdoc_created> <#zone>
<&tab 40><&bold>From:<&clear> <oa$curdoc_author>
<&tab 40> <cab$.from_address[oa$curdoc]>
<&tab 40><&bold>Dept:<&clear> <cab$.from_dept[oa$curdoc]>
<&tab 40><&bold>Tel No:<&clear> <cab$.from_tel_no[oa$curdoc]>

<&! 12-MAR-1986/RAYK>
<&! Check to see if the current TO or CC attribute is the current user,>
<&! if so, append an "*" to the end, a la DECmail.>
<&!>
<&OA FOR CAB$ATTRIBUTES:TO DO GET #TEMP = .VALUE\\<->
<GET #TEMP1 = #TEMP:37:0\\<->
<.IF #TEMP1 EQS OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "TO: " #TEMP "*" \\<->
<.IF #TEMP1 NES OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "TO: " #TEMP\\<->
<FOR CAB$ATTRIBUTES:CC DO GET #TEMP = .VALUE\\<->
<GET #TEMP1 = #TEMP:37:0\\<->
<.IF #TEMP1 EQS OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "CC: " #TEMP "*" \\<->
<.IF #TEMP1 NES OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "CC: " #TEMP\\<->
<&!>

SUBJECT: <CAB$.SUBJECT:156[OA$CURDOC]>

<&OA get oa$formatting_header="0"><->
<&include oa$curdoc_filename>
```

The operative part is:

```
<&! 12-MAR-1986/RAYK>
<&! Check to see if the current TO or CC attribute is the current user,>
<&! if so, append an "*" to the end, a la DECmail.>
<&!>
<&OA FOR CAB$ATTRIBUTES:TO DO GET #TEMP = .VALUE\\<->
<GET #TEMP1 = #TEMP:37:0\\<->
<.IF #TEMP1 EQS OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "TO: " #TEMP "*" \\<->
<.IF #TEMP1 NES OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "TO: " #TEMP\\<->
<FOR CAB$ATTRIBUTES:CC DO GET #TEMP = .VALUE\\<->
<GET #TEMP1 = #TEMP:37:0\\<->
<.IF #TEMP1 EQS OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "CC: " #TEMP "*" \\<->
<.IF #TEMP1 NES OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "CC: " #TEMP\\<->
<&!>
```

Yowie. A bit funny looking. It's not to worry. It is easily understood.

The core of it are the lines:

```
<&OA FOR CAB$ATTRIBUTES:TO DO GET #TEMP = .VALUE\<->
<GET #TEMP1 = #TEMP:37:0\<->
<.IF #TEMP1 EQS OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "TO: " #TEMP "*" \<->
<.IF #TEMP1 NES OAS$FULL_NAME THEN GET OAS$MERGE_LINE = "TO: " #TEMP\<->
```

The &OA FOR CAB\$ATTRIBUTES:TO DO looks just like it did in the "real" template. It is the rest of it that does the work of conditionally printing out an "\*" if and only if this addressee (or CC) is the current ALL-IN-1 context.

First, we GET the value of the current TO (or CC) into a temporary symbol, TEMP (GET #TEMP = .VALUE). "#TEMP" is the way we tell ALL-IN-1 that we want a "scratch" symbol named TEMP. The reason I had to put all of this into a script to develop it was that I could not seem to get all of the "<->" (line continuation) and "\<->" (function stacking) syntax correctly stated inside of the template. Breaking the problem into two parts, I first go the logic to work in the script, then worried about the merge template's syntax requirements.

Then we GET the first 37 characters out of TEMP into TEMP1. We had to do this in order to compare it to the OAS\$FULL\_NAME symbol to see if this addressee (or CC) is the current ALL-IN-1 user. OAS\$FULL\_NAME is an ALL-IN-1 symbol that has the current user's full name in it. The two lines starting out with "IF"s are the ones that decide if they should put out a "\*" behind the addresses (or CC) name if they are the current user. In once case, we put out the "\*", and in the other we do not.

I make no claim as to this being the best or most elegant way to solve the problem, just to the fact that it seems to work. I will leave it to you to streamline it and make it elegant! Don't forget that you have to do this to ALL of the templates that are associated with document handling for it to be a "complete solution" to the problem.

From Here?

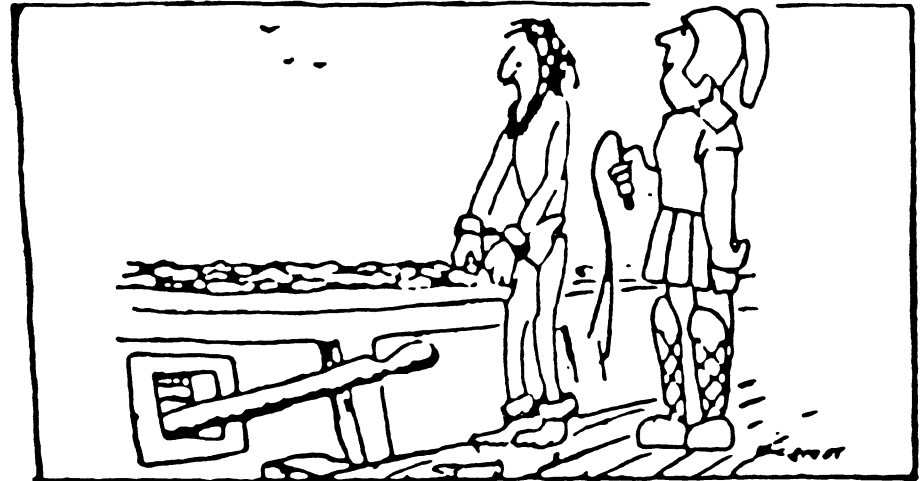
Hope that this stimulates your creativity in the use of templates. You can cause them to behave in wondrous ways! I like to think of this as a way to make some "intelligent documents" that "know" about their environment and change their behavior accordingly. An example might be modifying a template to sample a condition (local user or system wide) and decide how to act. How about a template that could "automatically choose" from several kinds of greetings as a heading for some sort of overdue notice being generated. An partial "IF" statement might look like:

```
IF #OVER_DUE_DAYS GES 120
THEN GET OAS$MERGE_LINE = "ATTITUDE: Law Suit Minded"
```

Have a ball, you all! And, by the way, don't forget to send me your comments, problems, or problem solutions so I can put them in this column! What "goes around", "comes around", you know.

Till then,

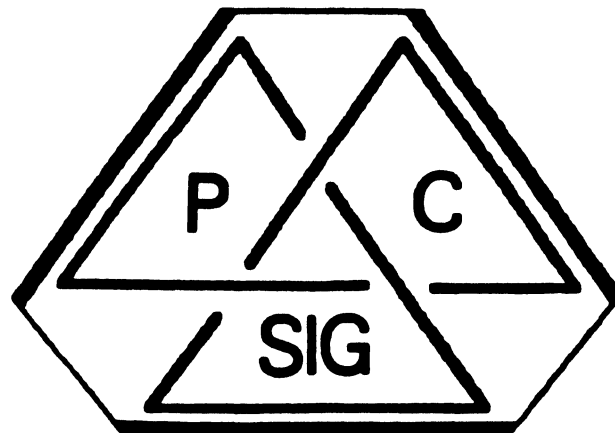
Happy ALL-IN-ling and VAXing!



**'It's Called a ... "Workstation."**



# Personal Computer Special Interest Group



## Newsletter

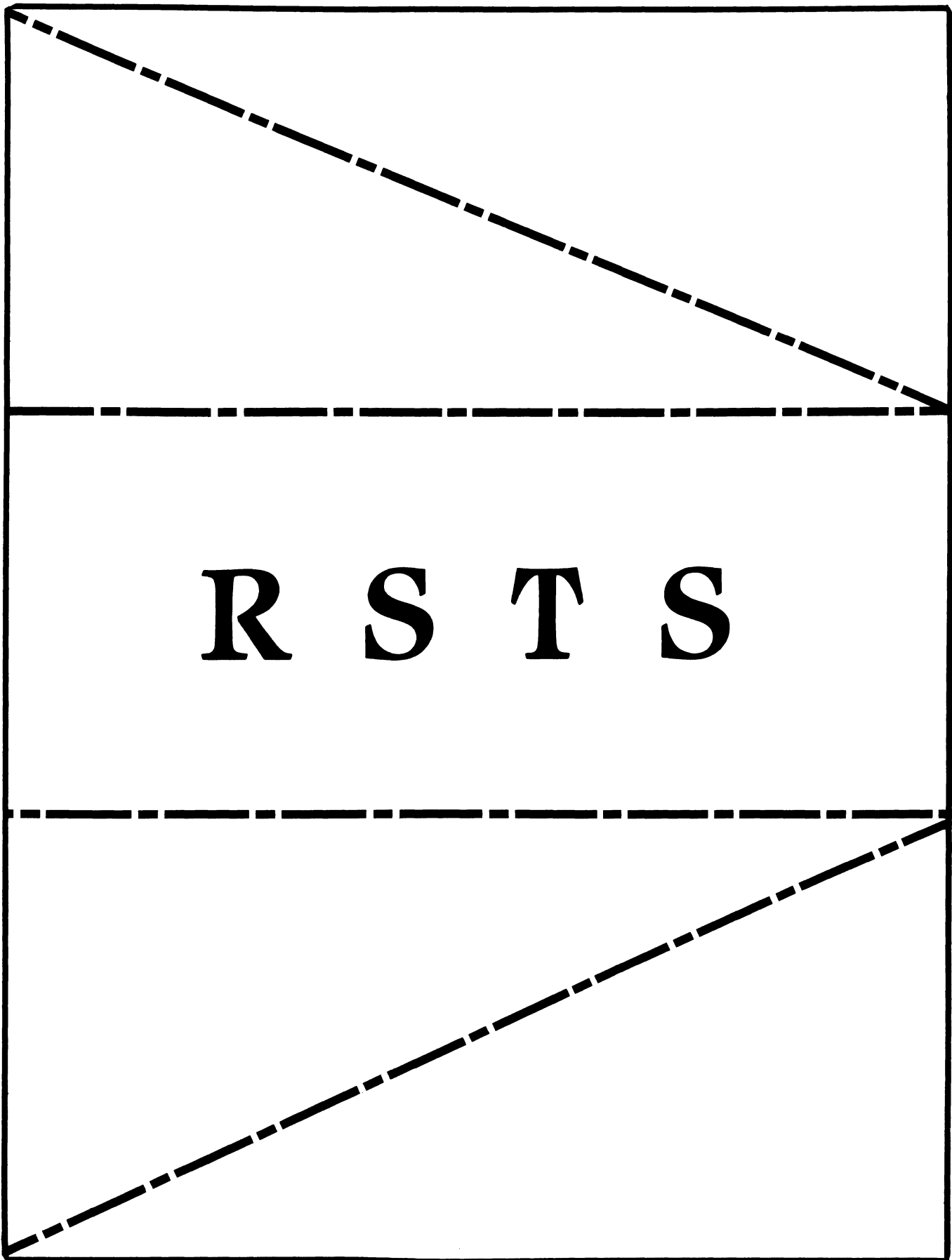
=====

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## The Kermit protocol and the PDP-11

Brian Nelson 4-OCT-1985 14:10

### Abstract

This article will describe the author's implementation of the Kermit file transfer protocol for the PDP-11 series under RSTS/E, RSX11M/M+, P/OS RT11 and TSX+. This protocol allows many (if not most) types of computer systems to effect, at minimum, error free file transfer with other systems and microcomputers over asynchronous lines.

The first obvious use of any program or protocol designed to accomplish file transfer is to be able to provide the ability to support file uploads and downloads from superminis such as the VAX and PDP-11 to remote personal computers, such as the PC and Rainbow. Since as of this date (03-Oct-1985) there are available over 160 versions of Kermit available for numerous micro, mini and mainframe configurations, Kermit addresses this need quite well.

Other uses of Kermit are quite numerous. I routinely use Kermit for transferring software developed for the PRO/350 on a RSTS/E 11/23+ host as well as using the PDP-11/44 and VAX 11/785 I run at the University of Toledo for dialing out to other systems, such as the LCG Tops 20 system and the LDP public domain library. Considering that there exists a Kermit for almost any DEC configuration one can even use Kermit as a poor man's Decnet. In my case, I have a DMF modem port from the 11/785 and a DZ11 port from the 11/44 connected to the Gandalf PACX front end switch, which allows me to connect either system to any of the other systems on the PACX, which includes an IBM 370 compatible system as well as connecting the VAX to the PDP-11.

With the knowledge that there are Kermit implementations for most personal computers in use it becomes apparent that the Kermit standard is well worth looking in to. A list of versions running on Digital hardware follows the article.

### The Kermit protocol

The Kermit protocol is designed to operate over normal asynchronous terminal lines. All data and commands are transferred with a packet oriented protocol, basically consisting of a start of packet character (normally SOH), followed by length, control, data and checksum fields. Communications is half duplex, in that for every packet sent, the sender must wait for either an acknowledgement packet (ACK) or a negative acknowledgement packet (NAK). Transmission is in ascii, with no requirements needed for the transmission of eight bit characters or control characters other than the choice of control-A for marking the start of a packet. All 'control' characters imbedded in the data are prefixed to convert them to printable characters, the same

applying to eight bit characters if required by the characteristics of the line. Since there are many different implementations of Kermit, the protocol provides a mechanism by which the capabilities of two connected Kermits can be negotiated to allow for differences in the level of protocol support. Examples of protocol features that not all Kermits understand include data compression and transfer of file attributes.

Rather than to go into more detail about the the Kermit protocol, the reader should consult the references listed at the end of this article.

### The PDP-11 Kermit-11 implementation

The author's version of Kermit-11 is written in Macro-11 and can run on RSTS/E, RSX11M, RSX11M Plus, P/OS and RT11. The RSTS and RSX file system interface is via RMS11 version 2, while the RT11 interface attempts to emulate the RMS11 subsystem. The choice of Macro-11 for the implementation language was made for several reasons, one being the availability of the assembler on all systems and another being speed and compactness of the code.

RMS11 was used for RSTS/E and RSX to provide a common i/o interface to the host file system. Additionally, Bob Denny of Alisa Systems further extended the RMS interface to support remote file access over DECNET with Kermit, allowing commands such as SEND NODENAME::[BRIAN.FUBAR]FILE.TYPE and other remote file accesses over DECNET. RMS11 version 2 also provides a very simple and powerfull means of doing wildcard searching, file renames and file deletion via the \$PARSE, \$SEARCH, \$RENAME and \$DELETE macros. Points against RMS basically amount to it's size, RMS is quite large even if overlaid. This is helped by using the segmented RMSRES available on RSTS/E and RSX11M Plus, though there is no remote file access for RMSRES in the current release of Kermit-11. The other objection to RMS will come from RSTS/E users, who are used to using files that normally lack file attributes. This is overcome by the ability of RMS v2 to create stream ascii files.

The RSTS/E Kermit, while it does 'run' under RSX emulation, does NOT use any RSX directives (apart from GTSK\$S) to interface to the executive, as (one) the RSX directive emulation under RSTS/E is only a small subset of 'real' RSX and (two) there is no need to go through an additional layer of overhead to make RSTS/E map RSX calls to native calls. The 'multiple private delimiters' feature is used to avoid losing read pass all (binary) mode on read timeouts, as well as setting the link to '8-bit' mode to keep the terminal driver from stripping the high bit from data received.

The RSX11M/M+ and P/OS versions of Kermit-11, like the RSTS/E and RT versions, receive eight bit data assuming no parity is used. Where parity is a must, Kermit-11 has to use a prefixing scheme for eight bit binary data. Like the RSTS/E version, binary files are created as FIXED no carriage control files such as used for task images. Note that parity generation is done by software in Kermit-11. The P/OS version runs under control of DCL. The next release of Kermit-11, which will be 2.37, will include support for the PRO TMS (Telephone Management System) option.

The RT11 and TSX+ version of Kermit-11 maintains source module compatibility with the RSTS/E and RSX versions. Each version of Kermit-11 has its own source file to deal with the operating system, for RSX it is K11M41.MAC, for RSTS/E they are K11E80.MAC and K1180S.MAC, and for RT11 they are called K11RT\*.MAC. Apart from these specific files, all other source files are shared. The RT11 Kermit-11 can use either the version 5.x XL and XC handler for high throughput, or it can use multiple terminal service to do all its terminal i/o. This second option allows the use of any interface supported, including the PDT150 modem port, DL/DLV11's and DZ/DZV11's. The drawback is overhead, the RT11 MT service can't sustain a rate much past 1200 baud at most. This is not a problem for Kermit, however, due to its half duplex nature and the fact that no packet received is ever longer than the ring buffer size. The only problem is in when Kermit-11 is running as a terminal emulator (the Kermit CONNECT command) where the data coming from the remote host can easily overrun the executive's buffer. A SET RT11 [NO]FLOW command was added to force Kermit-11 to send its own flow control to the host via XON and XOFF. TSX+ users can connect to CL: for dialing out, the exact means is documented in the Kermit-11 users guide. The disk i/o emulates the RSTS/E and RSX RMS11 version, and each executive directive has its error codes mapped into a unique global error code, with the symbolic names corresponding to the nearest RMS11 error name. Wildcarding is handled, of course, by non file-structured access to the directory on the desired volume, and supports full RT11 wildcard filenames.

#### Transmission of file attributes

One of the optional features of the Kermit protocol is the ATTRIBUTE packet. The attribute packets allow a Kermit program to send to a receiving Kermit information regarding the file organization, size, cluster/retrieval size, protection and so forth. There is even a system dependant attribute packet type that can be used to transfer things like the RMS11 IFAB (the RMS/FCS attributes). One of the things that two Kermits exchange before any file transfer is an information packet, this packet tells the receiving Kermit about itself. The last field in this packet, the CAPAS mask, tells Kermit if the other one can process attribute packets. If two Kermit-11's are communicating, they will find that each can do so, and the sender of a file will then send over attribute packets indicating the need (or lack of) for binary transmission, based on the file organization, filetype and protection code (for RSTS/E). If the sending Kermit-11 is running on RSTS/E, RSX11M/M+ or P/OS it will also send a copy of the RMS/FCS attributes so the received file will be identical (to FCS and/or RMS) to the copy on the sender's system. Since other implementations of Kermit may use this special system attribute packet, Kermit-11 always sends an attribute packet telling the receiver what hardware and operating system it is running on, and thus will only use such data if they are compatible. Of course, there will be times when a file may be binary and Kermit-11 can't tell so, many Kermit's have a SET FILE BINARY and SET FILE ASCII to allow the user to override defaults. Kermit-11 also has a SET

FILE AUTO/NOAUTO to disable it from trying to determine a file's binary status.

#### Future directions

With the advent of packet switched networks and satellite communications the Kermit protocol will likely be extended to increase efficiency over such links. The main problem is the half duplex nature of Kermit, the packet acknowledgements can take up to several seconds in transit thus drastically reducing the throughput. There are several possibilities under discussion and a standard should be appearing shortly.

## Summary

This article describes only the PDP-11 Kermit-11 implementation, for further reading see:

|                |           |              |              |
|----------------|-----------|--------------|--------------|
| DECmate-II,III | CPM80 2.2 | M80,LASM     | ACC          |
| DECsystem-10   | TOPS-10   | Bliss, Macro | Stevens I.T. |
| DECSYSTEM-20   | TOPS-20   | MACRO-20     | Columbia U   |

Kermit: A File-transfer Protocol for Universities  
Frank da Cruz and Bill Catchings  
BYTE Magazine, June/July 1984

The Kermit Protocol Manual, version 5  
Frank da Cruz April 1984  
Columbia University Center for Computing Activities

Information on obtaining Kermit:

KERMIT Distribution  
Columbia University Center for Computing Activities  
7th Floor, Watson Laboratory  
612 West 115th Street  
New York, N.Y. 10025

Kermit is also usually found on the Decus symposia SIG tapes.  
Kermit-11 is available from DECUS as number 11-731

Digital hardware that Kermit is currently available for:

| Machine          | Operating System | Program Language | Contributor  |
|------------------|------------------|------------------|--------------|
| DEC PDP-11       | MUMPS-11         | MUMPS-1982       | Cornell U    |
| DEC PDP-11       | RSTS/E           | Macro-11         | U of Toledo  |
| DEC PDP-11       | RSX-11/M         | Macro-11         | U of Toledo  |
| DEC PDP-11       | RSX-11/M+        | Macro-11         | U of Toledo  |
| DEC PDP-11       | RT-11            | Macro-11         | U of Toledo  |
| DEC PDP-11       | RT-11            | OMSI Pascal      | U of Toronto |
| DEC PDP-11       | TSX+             | Macro-11         | U of Toledo  |
| DEC PDP-11       | Unix 2xBSD       | C                | Columbia U   |
| DEC PDP-11, ...  | Unix V7          | C                | Columbia U   |
| DEC PDP-8        | OS8, RTS8        | PAL-8            | R. Hippe     |
| DEC Pro-3xx      | P/OS             | Bliss, Macro     | Stevens I.T. |
| DEC Pro-3xx      | P/OS             | Macro-11         | U of Toledo  |
| DEC Pro-3xx      | Pro/RT           | Macro-11         | U of Toledo  |
| DEC Pro-3xx      | Venix V1         | C                | Columbia U   |
| DEC Pro-3xx      | Venix V2         | C                | Columbia U   |
| DEC Rainbow      | CPM86            | ASM86            | Columbia U   |
| DEC Rainbow      | MS-DOS           | MASM             | Columbia U   |
| DEC Rainbow      | QNX 1.x          | C                | Merrell-Dow  |
| DEC VAX          | Ultrix-32        | C                | Columbia U   |
| DEC VAX          | VMS              | Bliss,Macro      | Stevens I.T. |
| DEC VAX          | VMS              | C (VAX-11 C)     | Columbia U   |
| DEC VAX          | VMS              | Pascal           | U of Toronto |
| DEC VAX, ...     | Unix 4xBSD       | C                | Columbia U   |
| DEC VT-180 Robin | CPM80            | Turbo Pascal     | Jeff Duncan  |
| DEC VT-180 Robin | CPM80 2.2        | M80,LASM         | ACC          |

FORTRAN-IV TIMING FUNCTIONS  
for RSTS/E  
Using the RT11 Run Time System

The subroutines in this article return timing information about the RSTS/E environment for the calling job. They include single and double precision routines for the CPU time in tenths of a second (ICTIME and JCTIME), and the memory utilization in Kilo-core ticks (IMTIME and JMTIME), as well as single precision routines for the terminal connect time in minutes (ITTIME) and device time in minutes (IDTIME).

The commands to compile and link these routines are contained in the following code. Your System Manager may wish to install the generated object module in the FORTRAN library FORLIB.OBJ or the System library SYSLIB.OBJ depending on your system configuration and there preference.

The instructions for compiling these routines are contained in the following code. A FORTRAN-IV program for demonstrating the routines is included at the end of the MACRO code.

\*\*\*\*\*

```
.TITLE TIMEIT
.PSECT TIMEIT
.LIST ME,MEB,LD
```

```
.SBTTL RSTS job timing information
;Must compile with COMMON.MAC
;as a prefix file
```

```
.SBTTL ROUTINE DESCRIPTIONS
```

TIMING FUNCTIONS FOR FORTRAN

The following subroutines return timing information about the RSTS/E environment for the calling job.

| Subroutine Name | Function                    | Units   | Argument Type |
|-----------------|-----------------------------|---------|---------------|
| JCTIME          | Job's CPU time              | 0.1 sec | I*4           |
| ICTIME          | "                           | "       | I*2           |
| ITTIME          | Job's Terminal connect time | min     | I*2           |
| JMTIME          | Job's Memory utilization    | KCT's   | I*4           |

```
; IMTIME " " I*2
; IDTIME Job's Device time min I*2
;
;NOTE: For Digital Equipment Corporation's FORTRAN IV V2
; operating under the RSX-11M V3, RSX-11D V6.2,
; RSTS/E V6B, IAS V2, or RT-11 V3 operating systems,
; the "PDP-11 FORTRAN Language Reference Manual"
; (DEC-11-LFLRA-C-D including DEC-11-LFLRA-C-DN1)
; says that for data type INTEGER*4..."Four bytes
; are allocated but only the first two are used to
; represent the integer value. The range of possible
; values is therefore the same as for INTEGER*2 variables."
;-----
;
; ASSEMBLY INSTRUCTIONS
;
;Ready
;-----
;swit rt11
;.R MACRO
;-
;*TIMEIT.OBJ=(1,2)COMMON.MAC,TIMEIT.MAC
;-
;*Z
;-
;.SWIT
;-
;-----
;
; TESTING INSTRUCTIONS
;
;To test these functions link the above generated TIMEIT.OBJ
;with the OBJ module generated from the FORTRAN test program
;TIMEIT.FOR
;-----
;
; INSTALLING IN A LIBRARY
;
;The System Manager may wish to install the above generated
;TIMEIT.OBJ module in the FORTRAN library FORLIB.OBJ or the
;System library SYSLIB.OBJ depending on his or her system's
;configuration and perference.
;
;.PAGE
;.SBTTL Job's CPU time in 0.1 sec
JCTIME::
 CLR (5)+ ;Double precision routine
 MOV (5)+, R1 ;Skip over number of arguments
 EMT 377 ;Get the address of the argument
;Prefix EMT under the RT-11 emulator
```

```

 .TIME ;Execute the .TIME macro from the
 ;COMMON file
MOV XRB, (1)+ ;Get the low word
MOV XRB+10, (1)+ ;Get the high word
RETURN ;Go back to Mother

;
;ICTIME:: ;Single precision routine
CLR (5)+ ;Skip over number of arguments
MOV (5)+, R1 ;Get the address of the argument
EMT 377 ;Prefix EMT under the RT-11 emulator
.TIME ;Execute the .TIME macro from the
 ;COMMON file
MOV XRB, (1)+ ;Get the low word
RETURN ;Go back to Mother

 .PAGE
 .SBTTL Connect time for channel 0 (Terminal) in minutes

;
;ITIME:: ;Single precision routine
CLR (5)+ ;Skip over number of arguments
MOV (5)+, R1 ;Get the address of the argument
EMT 377 ;Prefix EMT under the RT-11 emulator
.TIME ;Execute the .TIME macro from the
 ;COMMON file
MOV XRB+2, (1)+ ;Get the low word
RETURN ;Go back to Mother

 .PAGE
 .SBTTL Memory Utilization in KCT's
;a KCT is the use of 1k of memory for one-tenth of a second
;
;JMTIME:: ;Double precision routine
CLR (5)+ ;Skip over number of arguments
MOV (5)+, R1 ;Get the address of the argument
EMT 377 ;Prefix EMT under the RT-11 emulator
.TIME ;Execute the .TIME macro from the
 ;COMMON file
MOV XRB+4, (1)+ ;Get the low word
MOV XRB+14, (1)+ ;Get the high word
RETURN ;Go back to Mother

;
;IMTIME:: ;Single precision routine
CLR (5)+ ;Skip over number of arguments
MOV (5)+, R1 ;Get the address of the argument
EMT 377 ;Prefix EMT under the RT-11 emulator
.TIME ;Execute the .TIME macro from the
 ;COMMON file
MOV XRB+4, (1)+ ;Get the low word
RETURN ;Go back to Mother

 .PAGE

```

```

 .SBTTL Elapsed device time in minutes
;
;IDTIME:: ;Single precision routine
CLR (5)+ ;Skip over number of arguments
MOV (5)+, R1 ;Get the address of the argument
EMT 377 ;Prefix EMT under the RT-11 emulator
.TIME ;Execute the .TIME macro from the
 ;COMMON file
MOV XRB+6, (1)+ ;Get the low word
RETURN ;Go back to Mother

;
 .END

A FORTRAN PROGRAM FOR TESTING THE ABOVE MACRO ROUTINES

PROGRAM TIME2
TYPE *, 'AT THE START'
CALL TIMIT

C
C
DO 10, J=1, 1000
A=J/1000
B=SIN(J)/J

10
C
C
TYPE *, 'AT THE END'
CALL TIMIT
END
SUBROUTINE TIMIT
INTEGER *4 JTIM
INTEGER*2 ITIM(2)
EQUIVALENCE (JTIM, ITIM(1))
CALL JCTIME(JTIM)
TYPE *, 'CPU JTIME = ', JTIM
TYPE *, 'CPU ITIME = ', ITIM(1), ITIM(2)
CALL ICTIME(ITIM(1))
TYPE *, 'CPU ITIME = ', ITIM(1)

C
C
CALL ITTIME(ITIM(1))
TYPE *, 'TERMINAL TIME = ', ITIM(1)

C
C
CALL JMTIME(JTIM)
TYPE *, 'JKCTS = ', JTIM
TYPE *, 'IKCTS = ', ITIM(1), ITIM(2)

```

C  
C  
C



```
CALL IMTIME(ITIM(1))
TYPE *,'IKCTS = ',ITIM(1)
```

```
CALL IDTIME(ITIM(1))
TYPE *,'DEVICE TIME = ',ITIM(1)
```

```
RETURN
END
```

\*\*\*\*\*

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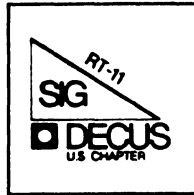
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*Notes from the RT-11 World*

*Copyright's*

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The RT-11 SIG *does* solicit signed articles for insertion in the Mini-Tasker, on or about bugs, features (bugs with a collar and tie), nifty things, etc., all about the RT-11 operating system and its environment. Wonderful presentations have been made at various DECUS Symposia about how YOU use RT-11. 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 of the Mini-Tasker.

If you have not submitted because you could not submit electronically, and you would like a bulletin board (you pay the long-distance), please let me know. We are considering this alternative. However, I *can* take RX-01, RX-50 and pieces of paper.

*Trivia*

With thanks to Diana Miller, RT-11 Product Manager, DEC put together an interesting DECUS program last year on PDP-11 trivia. Following are some interesting RT-11 facts of life.

1. What does RT stand for?
2. When was the RT-11 SIG formed?
3. Who were primarily involved in forming the RT-11 SIG? (one DEC, 6 customers)
4. Who was the first RT-SIG Chairman?
5. What newsletter did RT-11 take its format from?
6. What DECUS did RT-11 sessions first appear in?
7. What was the name of the first RT-11 LUG?

*Referred Paper Winners Announced*

Congratulations to *Rally Barnard* and *Charles Parrish*

The winners of the Referred Papers were announced Wednesday evening in Dallas at the session where Admiral Grace Hopper was the Key Note speaker. This years theme is "The Human-Machine Interface". Among the awards presented by Clair Goldsmith, President of U.S. DECUS, were:

**First Place (tie)**

*Making the Human-Machine Interface Responsive to Many Classes of Users* - by R. W. Barnard.

**Honorable Mention**

*Touch Panels for the LLNL Plutonium Metal Production Line* - by Charles P. Parrish

Both Rally and Charles are active members of the RT-11 community, and we in the RT-11 SIG are proud of them. All of the finalists received a plaque, a \$25.00 DECUS store certificate and one days registration. In addition, the First place winners each received checks for \$300.00, while the Second Runnerup received a check for \$100.00.

**Notes from the RT-11 World**

*RT-11 SIG Tape - On-line Distribution*

The May issue of the Mini-Tasker (TBO V1.9, RT-13 and 14) contained the addresses of four sites (General Scientific Corporation, Sidlinger Computer Corporation, RDB/Alpha Systems & Software, and Compuserve) that you could use to dial-up and down-load portions of the RT-11 SIG tape (long-distance toll charges at your expense). Please refer to that issue for details.

If you would like to volunteer your site, please contact Tom Shinall of the RT-11 SIG Steering Committee.

*Communications Problems*

In the May 1986 Mini-Tasker (TBO V1.9, RT-1), Diana Miller asked for feedback on communication problems. Gregory N. Brooks of Washington University and William A. Ahroon of Plattsburg State University of New York submitted interesting replies, and are included in this Mini-Tasker.

*The Mini-Tasker*

As we begin to look at the second year of the Mini-Tasker being included in "The Big One", we would be interested in your comments as to how well it has worked out for you, the reader. Please let me or John Rasted, RT-11 SIG Chairman, know how you feel. AND - please renew your subscription when the time comes.

*Trivia - Answers*

1. Real-time foreground/background system
2. November 7, 1974 meeting at 9 a.m.
3. George Thissell - DEC  
J. Frederick Bartlett, Mark Bartlett,  
and H. Wayne Hammond - Cal Tech  
Anton Chernof - Lawrence University; Tom Provost
4. Tom Provost
5. RSX Multitasker
6. Spring DECUS 1975
7. S.C.U.R.T. - Southern California Users of RT-11

And finally, I am always looking for something to print.

Please send your submissions to *The Mini-Tasker* (RX-01, RX-50, or pieces of paper) to me at:

Bill Leroy  
The Software House, Inc.  
2964 Peachtree Road, NW #320  
P. O. Box 52661  
Atlanta, GA 30355-0661

404/231-1484 or DCS (LEROY)

How to read RT-11 tapes on VMS

```

$! EXCHANGE.RT - An example of how to read an RT-11 Magtape onto a VMS disk
$! and convert its data to various other forms
$!
$! by Dan Graham
$! New York University
$! New York, NY 10006
$!
$!*****
$! First, mount the RT-11 magtape READONLY (no write ring) on
$! the tape drive, and make it known to VMS as RT11A (the
$! default label for all RT-11 tapes).
$
$ ASSIGN MTA0: MT:
$
$ MOUNT/OVER=(OWNER,IDENT) MT: RT11A
$
$ Then, run the VMS EXCHANGE program and create an RT-11 virtual disk
$! in our default directory. This example uses a 1000 block virtual
$! disk called RT.DSK. Once created, we must MOUNT the virtual disk
$! and define the logical name DK: to point to it.
$
$ EXCHANGE
 INITIALIZE/CREATE/ALLOCATION=1000 RT.DSK
 MOUNT/VIRTUAL DK: RT.DSK
!
! Next, we copy the magtape contents to the virtual disk.
! The /ALLOCATION=1 switch is required to prevent EXCHANGE
! from getting confused by an inconsistency with respect to
! RT-11 file tape structure. Without this switch, a spurious
! "DEVICE FULL" error is detected and causes all copy commands
! referencing the magtape to fail.
!
COPY/LOG MT:.* DK:/ALLOCATION=1/TRANSFER=BLOCK
!
! Finally we copy the files from the virtual disk to a VMS file
! structure. The /TRANSFER=RECORD is required when changing
! (converting) from record format to another (such as from RT-11
! to VMS Files-11) to prevent the insertion of extra <CR> <LF>'s
! every 512 characters.
!
COPY/LOG/TRANSFER=RECORD DK:.* [DGRAHAM.SHUTTLE]*.*
EXIT ! (from EXCHANGE)
$

```

How to read RT-11 tapes on VMS

```

$!*****
$!
$! To copy the RT-11 Virtual disk image to a MicroVax for futher
$! conversion to RX-50 diskettes, issue the following commands.
$
$ COPY RT.DSK NYBMV1"DGRAHAM passwd"::[DGRAHAM.ISC]*.*
$
$!*****
$!
$! Logout of the VAX with a Magtape drive on it and log into the
$! MicroVax. In this case we'll login on the NYBMV1 MicroVax II
$!
$!*****
$
$ SET DEFAULT [DGRAHAM.ISC]
$
$! Load two RX-50 diskettes, one each into DUA1: and DUA2:.
$! First we'll initialize the RX-50's with a BADBLOCK scan
$! enabled. Then we'll mount the RT.DSK virtual disk as device
$! RT:. Note that the device name RT: MUST BE UNIQUE JOBWIDE.
$! Don't use DK: because it is used as a VMS logical name
$! pointing to the current default directory name.
$
$ EXCHANGE
 INITIALIZE DUA1:/BAD
 INITIALIZE DUA2:/BAD
 MOUNT/VIRTUAL RT: RT.DSK
!
! Next we'll copy the contents of the RT-11 virtual disk onto
! the RX-50 diskettes
!
COPY RT:.* DUA1:.* /LOG/TRANSFER=BLOCK/ALLOC=1 ! Primary copy
COPY RT:.* DUA2:.* /LOG/TRANSFER=BLOCK/ALLOC=1 ! Backup copy
!
! Finally, let us dismount everything.
!
SHOW ! Show all devices we defined in EXCHANGE
DISMOUNT DUA1: ! Dismount them one at a time
DISMOUNT DUA2:
DISMOUNT RT:
EXIT
$
$ DISMOUNT DUA1:
$ DISMOUNT DUA2:
$ EXIT ! Exit from this command file

```

WASHINGTON UNIVERSITY BEHAVIOR RESEARCH LABORATORY  
AT MALCOLM BLISS MENTAL HEALTH CENTER  
1420 GRATTAN STREET  
ST. LOUIS, MISSOURI 63104

May 2, 1986

Diana L. Miller  
c/o Bill Leroy  
RF11 SIG Newsletter Editor  
The Software House, Inc.  
2964 Peachtree Road NW #320  
P.O. Box 52661  
Atlanta, GA 30355-0661

Dear Diana,

I was glad to see your call for comments on RT-11 communications. I will outline my views and finish up with some comments (read complaints) on the RTEM product.

To give you a bit of background, I work in a university research lab, and am responsible for a VAX 750, running VMS and 3 PDP-11's, and running RT-11. In addition, we have sold two RT systems to collaborators and provide some support for those systems.

We purchased our first PDP-11 in 1972, and have been using RT-11 since version 1. We have developed a lot of FORTRAN code for our RT systems since that time, and the bulk of our development even today is for or related to our RT systems.

One of the biggest limitations we have encountered to date is communications, specifically, moving large data files (15 to 20Mb per subject) from an RT system to RT system, and from an RT system to a VAX. We presently transfer RLO2s between RT systems and copy to mag tape to port files to the VAX. Both methods are a real pain, especially the mag tape copy.

Although VTCOM is very useful, I do not believe a VTCOM/TRANSFER/serial line link is a good solution to a problem like ours, and I don't think our situation is unique. Ethernet file transfers, particularly with the advent of thin-wire, seem to be the most practical solution.

This is particularly true in view of DEC's release of Ethernet

based DECnet for IBM's, the machine most threatening to the future of PDP-11, because of the low cost, reasonable performance, availability of good, inexpensive graphics hardware and software, and the availability of a wide variety of communications offerings, including Ethernet.

RT-11 Should have a full, real implementation of DECnet (not the joke of a product currently labeled DECnet/RT), however, I would be most happy if we could just yet file transfer support as an end node on an Ethernet LAN.

We cannot afford the machine time required to transfer these large data files via serial lines. I see Ethernet as the only viable solution.

I would like to see implementation in the following priority:

1. File transfers to a DECnet node on the Ethernet.
2. File transfers to and from a DECnet node on the Ethernet.
3. Implement a mechanism to initiate execution of a command or command file on an RT system from a remote system (i.e., starting a compile and link after down loading of source files from a VAX).
4. Full implementation of complete DECnet (similar to DECnet/DOS, DECnet/Rainbow).

VTCOM, RMON, or some portion of RT-11 also needs to be changed to allow the RT-11 console to send and receive full 8-bit data. This is important when a graphics terminal is used as a console, and a user wants to access graphics applications on another system. VTCOM does not allow 8-bit data. When we try using Kermit and set Kermit for 8 bits, RT seems to strip the eighth bit and attempts to interpret characters it should pass (even when we have GEN'ed for multi-terminal support). I have not seen any package that will do what we need to do. Again, I do not believe our case is unique.

If VTCOM and RT would work properly with 8-bit data, hardware costs could be reduced, since scarce graphics terminals could be shared among systems.

Again, the IBM PC is beating out RT-11 systems in this area. McDonnell Douglas and others in our area are using IBM PC's as graphic workstations to connect to other systems and use graphics applications in addition to using them for PC application. They are getting more for their DP dollar.

This small improvement would provide a wealth of benefits for RT users for what seems to be minor effort. Eight-bit support would also allow binary file transfers between RT systems. I am

sure many would make use of this feature, too.

I much prefer an RT system, but, unless there is some bolstering of the weak areas, RT-11 systems may be gobbled up by Big Blues PC's.

On to RTEM-11. This product needs a major overhaul or to be put out to pasture. It is the most useless piece of DEC software I have ever encountered. RTEM does not provide an RT-11 environment for the VAX, although it purports to. RTEM only allows the SJ, which, in the majority of cases, is not the choice of monitor for new RT applications. DEC itself has discouraged the use of the SJ monitor, and made the FB and XM monitors standard. RTEM does not support virtual arrays from FORTRAN, it does not provide a run time or debugging environment, it requires VAX11/RSX to run, and is much too expensive.

Much of the problem with RTEM has to do with the lack of PDP-11 MMU hardware on the VAX. Why can't RTEM have a virtual MMU to allow usage of extended memory and allow FORTRAN virtual arrays?

If a virtual MMU was added to RTEM XM & FB environments could be support, (not full XM FB features, but reasonable equivalents of XM & FB) FORTRAN would behave properly and provide compilation of code on the VAX (yeah!), and off-load busy RT systems (one of the strong reasons to move RT-11 development to the VAX in the first place).

If these features are not added, DEC may as well lay RTEM to rest. RTEM is just not worth the effort nor expense without these additional features.

I intend to drop RTEM from my software support when I sign a new contract in September, if these changes are not implemented. I have the most recent version on my desk. I won't load it. It is not worth the energy expended to load. None of our users are using the current version. They can't. It does not do the things they need to do. They have to use an RT system.

We paid a good deal of money, and four times that in wasted time attempting to put RTEM to use. We were depending upon RTEM to ease our development crunch. We were set back three to six months on some projects because we could not do useful RT development under RTEM.

This does not include the flack I took for making the suggestion that we spend the money for RTEM to help speed up our RT application development, or the time I lost on RTEM software versions that would not run under version 4.

Once again, IBM PC's are winning in the PDP-11/RT system marketplace. Packages are available to develop PC applications (cross assemblers, cross compilers, add-in hardware/software

systems), but the loyal RT user cannot develop PDP/RT-11 applications on a VAX.


Why can't DEC at least develop a VAX-based hardware/software system that allows a VAX user access to a PDP-11/RT system much like the IBM PC hardware/software package available from a number of suppliers? This would appear to be an easy task for DEC.

The whole thing seems beyond me. There is a definite need for a product that would support RT development on a VAX; the mere existence of RTEM attests to that fact, so why won't DEC provide a real solution, instead of this poor imitation they are currently providing?

Please take all my comments as constructive criticism. I am a DEC user, a DECUS member, I purchase DEC products, I recommend DEC products to others, and I even have an "I love digital" bumper sticker. I want to see DEC and DEC products improve, and I want to see DEC provide the tools and solutions that I and others need.

I hope I have stated my case as clearly as possible. If you should require further clarification, feel free to contact me at the address above, or at (314) 241-7600, extension 257.

I will welcome your response.

Sincerely yours,  
  
Gregory N. Brooks  
Systems Manager

GNB/vb

P.S. I have enclosed copies of letters I have sent to Bill Walker at Digital Review for further information.



BEHAVIOR RESEARCH LABORATORIES AT  
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April 14, 1986

William K. Walker  
Monsanto Research Corporation  
P.O. Box 32 A-152  
Miamisburg, OH 45432

Dear Bill:

I have been playing with RT systems virtual terminal programs lately, making PDP-11's talk to a VAX.


Most of them work quite well. However, when using them with a graphics terminal (Raster Tech Model One/10) and trying to run a VAX graphics program, they all bomb out, seemingly stripping the eighth bit. I recognize most of these programs normally default to 7 bit ASCII, but even programs that perport to be more capable still will not work. I have my monitor sysgened for multiterminal, so I assume RT is not responsible for this. I have used VTCOM, KERMIT, NET, TEMPRO TSTE, EXFILE, MODEM7, and every program I could get my hands on. No luck.

Have you even encountered such a problem? Surely, others must have encountered this problem when using graphics terminals. Are there any programs (public domain or commercial) that might address this problem?

I would like to see an article in your column discussing communications Network and virtual terminal communications. This seems to be a confusing mystery (to us laymen) with RT.

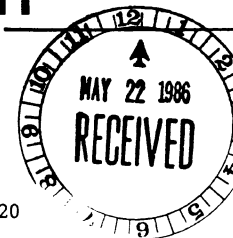
Thanks.

Sincerely yours,

  
Gregory M. Brooks,  
Systems Manager

RT-9

plattsburgh  
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May 15, 1986

Bill Leroy  
The Software House, Inc.  
2964 Peachtree Road, NW #320  
P.O. Box 52661  
Atlanta, GA 30355-0661

Dear Mr. Leroy:

In response to the most recent request in the Mini-Tasker, I would like to relate a problem we are having with the TRANSF.SAV program.

HOST CONFIGURATION: MicroPDP-11/73 with RQDX1/RD52/RX50, 2 MB (Clearpoint) memory, two DHV multiplexers, Spectralogic S-25 tape/disk controller, CDC 9715-340 FSD, CDC 9710 RSD, Cipher Cassetape. Operating system is TSX-Plus (version 6.0).


REMOTE CONFIGURATIONS: Several systems, including a MicroPDP-11/73 and LSI-11/23, are running RT-11 (version 5.2), using DLV serial interfaces and the XL.SYS handler. The DLV is strapped at either 9.6 or 11.2 kbaud.

PROBLEM: When transferring a file from the TSX-Plus Host to the RT-11 remote (i.e., TRANSF filnam.suf/T=filnam.suf/W), the remote hangs after transfer is completed. The transferred file is complete, but the remote will not respond to any command. TSX "WHO" command shows the line running KMON. The remote system must be booted (restarted) to continue. This problem occurs on approximately 50% of the HOST-to-REMOTE file transfers.

ADDITIONAL REQUEST: We are interested mainly in high-speed file transfer. VTCOM/TRANSF capabilities are sufficient, yet serial-line speed is a problem. I'd invest in Ethernet hardware and DECnet-RT software if we could transfer files fast. (RX50's are the fastest means now, but a royal pain.) Perhaps an XL-type handler that uses the DEQNA hardware on the RT side, with the appropriate driver and TRANSF program on the TSX-Plus side might fit our need.

I look forward to solving our communication problems and limitations.

Sincerely,

  
William A. Ahroon, Ph.D.  
Sr. Research Associate

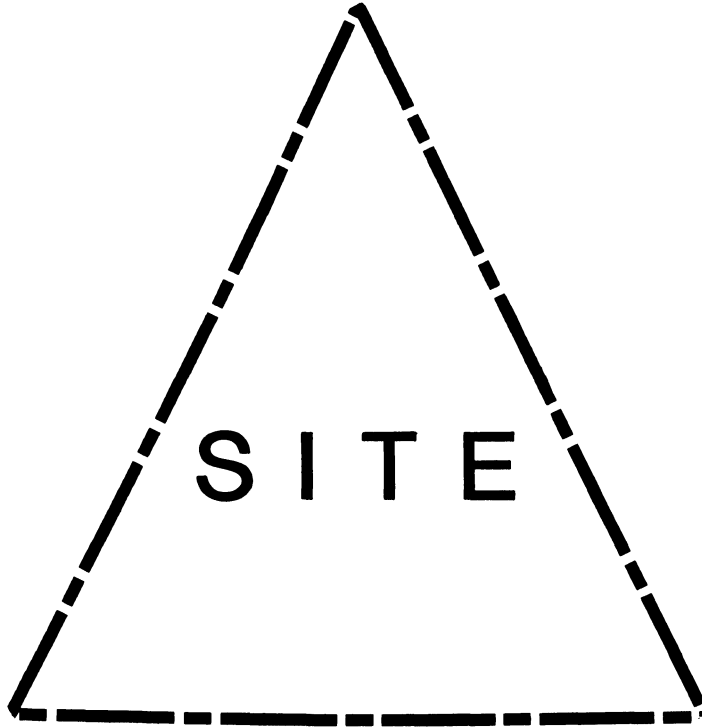
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RT-10





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---

Letter from the Editor

---

Welcome to the July issue of the Site Newsletter.

As of the Dallas Symposia Dave Hunt has retired as the Site SIG Chairman. Larry Hicks has taken over as chairman and there may be some new Steering Committee assignments in the coming months to ensure that all areas of responsibility are taken care of.

Many thanks to Dave Hunt for all his hard work in behalf of the SIG. The SIG made very strong progress under Dave's leadership. Dave will still be associated with the SIG as a member of the steering committee.

Articles are needed for up coming issues of the Site Newsletter. If you have an article, a Site Management hint, could transcribe a cassettes tape, or even just an idea for an article, I would like to hear from you. My address and phone number are listed below.

I can accept the following formats: 1600 or 6250 BPI magtape (VAX backup, ANSI, RT, DOS, etc.) RX01, RX02, RL02, and RK05 disks in RT format, and TU-58's.

Gregory N. Brooks  
Washington University  
Department of Psychology  
Behavior Research Labs.  
1420 Grattan St.  
St. Louis, MO. 63104  
(314) 241-7600 ext. 257

---

Cable Management

---

With the advent of huge VAXclusters, bigger VAX machines, LANs, and connecting PC's to larger systems, cable management has become more difficult for DEC system and site managers.

In the past, an old 11/34 may have had 16 lines hard wired to 16 terminals. Some of the lines may have had manual switches that allowed more than one device to connect to the line, but in general cable management was almost non existent. Every one on the system was a guru (at least they thought they were). They knew how to go thru the esoteric manuevers to connect, whatever,

to the system.

Today, with VAXes and clusters capable of supporting hundreds of users, managing a site's cable plant can be a BIG job. Even small DEC sites are finding that the users of today want simple, swift, reliable access to the system(s) without the headaches of yesteryear.

To accomplish this goal of simplifying access to systems, the design and installation of the cable plant and installation of any associated equipment must be carefully planned. System and site managers need to follow the basics of cable management from start to finish and PLAN, PLAN, PLAN.

Designing the Cable Plant

Cable plant is merely a fancy term for that conglomeration of cables that terminate inside your system and stretch out like a giant ambilicle cord into various areas of your building(s).

The cable plant must be designed to meet the specific needs at a particular site. To design a cable plant, you must first determine what the cabling requirements are. What type of devices are to be connected, (RS232, switching systems, remote muxes, Ethernet, broadband, etc.) how many will be connected, and how will the cables be terminated. (what type of connectors are needed at each end).

At installation, cables are assigned and labeled with a unique identifier. (numbers, letters, or combinations) This is an arbitrary designation, but a labeling system can also be worked out which may make the cable labeling meaningful. (such as labels corresponding to room numbers, etc.)

Label designations and a descirption of its associated cable must be recorded. This is refered to as the cable legend. The cable legend will serve as a master inventory list of cables and should always be kept up to date. A word processing file is very useful for this purpose.

A sample cable legend is shown below. It is short and simple, but illustrates the concept.

CABLE LEGEND

Room G5 (terminal room)

| Label | Cable type    |
|-------|---------------|
| A     | RS232C cable. |
| B     | RS232C cable. |
| C     | RS232C cable. |
| D     | RS232C cable. |

E 4 wire phone cable.(spare)  
 F 4 wire phone cable. (spare)

ROOM G6

Label Cable type  
 I RS232C cable.  
 J 4 wire phone cable. (spare)

Room G8

Label Cable type  
 K RS232C cable.  
 L RS232C cable.  
 M 4 wire phone cable. (spare)

Room G13

Label Cable type  
 G RS232C cable.  
 H RS232C cable. (for DECnet)

MUX CABLES

Cables connecting terminals and computer ports to the two muxes are labeled £0-7 according to the channel numbering of the muxes.

The mux connects various computer ports to the following offices.

|               |                      |
|---------------|----------------------|
| Mux channel 0 | G1 office.           |
| Mux channel 1 | G19 office.          |
| Mux channel 2 | G13 Conference room. |
| Mux channel 3 | G14 office.          |
| Mux channel 4 | G17 printer room     |
| Mux channel 5 | G4 office.           |

Terminal Assignment Tracking

Once the cable plant is in place, you must keep track of the devices connected to it. This can be done in a number of ways. One way is to write assignments on write on labels inside a patch panel cabinet. If changes are not so dynamic, a WP file listing the assignments can be updated as changes are made and referred to when ever changes are necessary.

An example of the latter is shown below.

TERMINAL PORT ASSIGNMENTS

| Port   | Virtual | Description                       | Cable I.D.  |
|--------|---------|-----------------------------------|-------------|
| TXA0:  |         | DECnet 9.6kbaud. DDCMP            |             |
| TXA1:  | VTA     | Modem, 1200 baud. syspass.        | Cable R     |
| TXA2:  | VTA     | Modem, 1200 baud. syspass.        | Cable S     |
| TXA3:  | VTA     | Office (G6) autobaud.             | Cable I     |
| TXA4:  | VTA     | Office (G8) autobaud.             | Cable K     |
| TXA5:  | VTA     | Office (G8) autobaud.             | Cable L     |
| TXA6:  | VTA     | Office (G4) autobaud.             | Cable Mux.5 |
| TXA7:  |         | Virt. term. line, autobaud        | no label    |
| TXA8:  |         | Term. room(G5) autobaud.          | Cable C     |
| TXA9:  | VTA     | Office (G8),autobaud.             | Cable Mux.6 |
| TXA10: | VTA     | Office (G1) autobaud.             | Cable Mux.0 |
| TXA11: | VTA     | Office (G19) autobaud.            | Cable Mux.1 |
| TXA12: | VTA     | Conf. room (G13) autobaud.        | Cable Mux.2 |
| TXA13: | VTA     | Office (G14) autobaud.            | Cable Mux.3 |
| TXA14: |         | Oki. printer (G17),<br>9600 baud. | Cable Mux.4 |
| TXA15: |         | Trilog printer, 19.2kbaud.        |             |

Cable Wiring

It is also an excellent idea to keep a record of cable/connector wiring. This is especially true with RS 232 cables since they can vary so widely. (modem, null modem, etc.)

Along with keeping records on the wiring of the cables and connectors, each cable, and/or connector must be identified with some designation so the wiring record can be matched to individual cables.

For instance, cables can be identified as modem or null modem types. Null modem printer cables, modem printer cables, null modem cables with special connections, etc. Decide what works best at your site and is easily understood by all personnel involved.

A sample of a cable wiring records is shown below.

CABLE WIRING

Mux cables (to terminals and computer ports)

| DB 25P pin # | DB 25S pin # |
|--------------|--------------|
| 1-----       | 1            |
| 2-----       | 2            |
| 3-----       | 3            |
| 4-----       | 4            |
| 5-----       | 5            |
| 6-----       | 6            |
| 7-----       | 7            |
| 20-----      | 20           |

Cables are modem type cables.

Direct terminal cables.

| DB 25P pin # | DB 25S pin # |
|--------------|--------------|
| 1-----       | 1            |
| 2-----       | 3            |
| 3-----       | 2            |
| 4-----       | 4            |
| 5-----       | 5            |
| 6-----       | 6            |
| 7-----       | 7            |
| 20-----      | 20           |

Cables are null modem type cables.

Modem cables. (computer ports to modems)

| DB 25P pin # | DB 25S pin # |
|--------------|--------------|
| 1-----       | 1            |
| 2-----       | 2            |
| 3-----       | 3            |
| 4-----       | 4            |
| 5-----       | 5            |
| 6-----       | 6            |
| 7-----       | 7            |
| 8-----       | 8            |
| 20-----      | 20           |
| 21-----      | 21           |
| 23-----      | 23           |

Cables are modem type cables.

Okidata printer cables.

| DB 25P pin # | DB 25S pin # |
|--------------|--------------|
| 1-----       | 1            |
| 2-----       | 3            |
| 3-----       | 2            |
| 4            | 4            |
| 5            | 5            |
| 7-----       | 7            |
| 6            | 6            |
| 20           | 20           |

Cables are null modem types with other special characteristics.

Trilog printer cable.

| DB 25P pin # | DB 25S pin # |
|--------------|--------------|
| 1-----       | 1            |
| 2-----       | 3            |
| 3-----       | 2            |
| 4            | 4            |
| 5            | 5            |
| 7-----       | 7            |
| 6            | 6            |
| 20           | 20           |

Cables are null modem types with other special characteristics.

### Conclusions

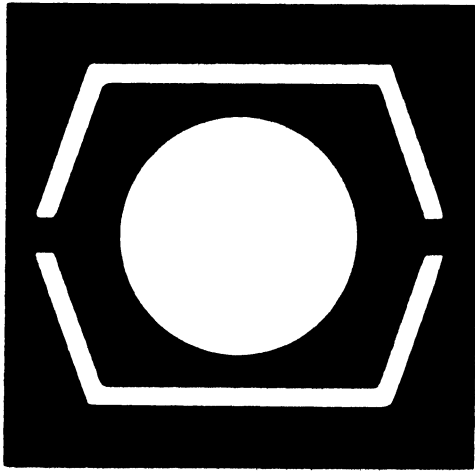
Cable management is one of the necessary evils of site and system management. Done effectively, it will add to the productivity of users and prevent the system personnel from constantly tracking down problems related to the cable plant, and will serve to increase the confidence users have in their system personnel.

Regardless of the size of the site, cable management boils down to these basic concepts. Determining cable needs, proper installation, proper labeling, and religious record keeping.





**UNISIG**



**DECUS**

**UNISIG Chair**

James W. Livingston, Jr.  
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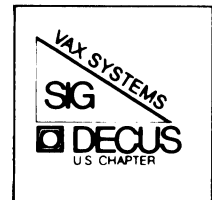
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# NEWSLETTER OF THE VAX SYSTEMS SIG



*Our Mascot*

# Pageswapper



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General material for publication in the Pageswapper should be sent (US mail only -- no "express" services please) to:

Larry Kilgallen, PAGESWAPPER Editor  
Box 81, MIT Station  
Cambridge, MA 02139-0901  
USA

Preference is given to material submitted as machine-readable text (best is Runoff source). Line length should not exceed 64 characters.

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.

For information about on-line submission to the Pageswapper, use a 1200 baud modem to dial (in the United States):

(617) 262-6830

and log in with the username PAGESWAPPER.

Change of address, reports of non-receipt, and other circulation correspondence should be sent to:

DECUS U.S. Chapter  
Attention: Publications Department  
249 Northboro Road (BPO2)  
Marlborough, MA 01752  
USA

Only if discrepancies of the mailing system are reported can they be analyzed and corrected.

## Editor's Workfile

by Larry Kilgallen, Pageswapper Editor

### Symposium VAXnotes -

This electronic conferencing software from DEC was announced as a product at the Dallas Symposium, and use of it on the demonstration machines was quite popular. I was given a magtape of the "VAXSIG" conference at the end of the week for possible publication. There is a slight problem in that those contributing did not give explicit authorization for publication, although making one's comments available on-line to several thousand symposium participants hardly counts as keeping them secret.

The middle ground I have chosen is to sanitize the file by removing references to individual names and publish the most interesting excerpts. I cannot yet easily read the tape I have received, however, since the DEC Electronic Store has not set a delivery date for the VAXnotes software. Hopefully it will be available in time for the August issue of the Pageswapper.

### Symposium Mail -

As if to make up for the aforementioned windfall, we again had trouble with the ability to send Mail to Pageswapper at the symposium. A system management tactic chosen by those running the exhibit was to remove the MAIL command from the DCL tables. It was not too tragic, however, since now we have the ability to accept Pageswapper submissions electronically all year round. See the June 1986 Pageswapper (that's last month) for details. (Actually it would seem several people have seen the June Pageswapper; after just a few responses to the article in UPDATE.DAILY from the Dallas Symposium there have lately been quite a few inquiries now that the June Pageswapper has started to arrive around the country).

### Architecture manual -

Free for the taking at the Dallas Symposium was the NEW architecture manual for the VAX. I'll stick with my 1981 copy, thank you, as the new one leaves out several important pieces of information, such as which registers get destroyed by various instructions and which registers contain results!!!

"Complete" VMS documentation set -

It turns out there is one document that won't be in the "complete" set in the future. It is AI-HB12A-TE, "VAX/VMS Developer's Guide to VMSINSTAL". Now I think it is appropriate that great numbers of people not be burdened with a manual for which they have little use, but its absence from any "set" means there is no way to subscribe to updates for the document.

After asking several DEC folks at the symposium, I got a letter dated May 9 from Betsy Anderson of DEC confirming that there are no plans to offer update service. She says the reason is there are no plans for changes to the book. It seems to me, however, that if the possible future license enforcement facility discussed at a birds-of-a-feather session at Anaheim last December ever came to pass it would be something whose documentation would logically be bundled with VMSINSTAL documentation and many people would want to get the news by subscription.

There are two other documents not included with the "full" documentation set, but they are both for "layered" portions of VMS:

AA-HP69A-TE Guide to Multiprocessing on VAX/VMS

AA-HI90A-TE VAX/VMS Volume Shadowing Manual

As such, I presume they can be put on subscription as the "documentation only" version of the appropriate layered VMS segments.

Of course the DEC Electronic Store does not recognize any of these order numbers as being valid as of today (May 19), but it was not until the week before the Dallas Symposium that it recognized the existence of VMS version V4.3.

My congratulations, by the way, to Betsy Anderson for actually sending a letter to respond to a verbal question. It is quite hard sometimes to get people (DEC or otherwise) to even respond to a letter with another letter, no matter how straightforward the question. Anderson sets a fine example for us all.

Trivia -

Perhaps the most arcane thing I learned at the Dallas Symposium has to do with the ACCOUNT field in accounting records. Apparently the Signal Technologies chargeback product sets certain of the high order bits in that field to encode the line speed used for an interactive session. That method of making up for shortcomings in the data DEC records may be fine once you know what is going on, but at least one symposium participant who had the software installed had no idea that this was the case (and therefore had trouble sorting data based on the raw accounting records).

Orange book ratings for secure systems -

And now for something NOT from the Dallas Symposium, a representative of the National (DOD) Computer Security Center predicted on Tuesday May 6, 1986 that DEC would have a system approved at the A1 level by 1989. Speaking to the Ninth US Department of Energy Computer Security Group Conference in Las Vegas, Dain Gary of the N(DOD)CSC cautiously avoided mentioning particular names of products for which vendors had consulted the center on what is called "developmental evaluation". This is different that the announced product evaluations underway (and now scheduled for completion this summer) for VMS and CDC's NOS.

Although Gary did not indicate which hardware architecture DEC might use to achieve an A1 rating, he earlier had mentioned the Center had no success in convincing DEC to go for DOD security ratings on their PDP11 processors. If it's going to be existing hardware on which this predicted A1 system runs, that means it must be a PDP-8 (DECmate), Rainbow, 36-bit machine, or VAX.

Gary showed a chart with several vendors (including DEC) estimated to be achieving an A1 rating by 1989, but IBM was not among them. The highest rating he showed for IBM at that time was B2.

## Letters to the Pageswapper

The South Australian Institute  
of Technology  
The Levels  
P.O. Box 1, Ingle Farm 5098  
Australia

21st May, 1986

(This is a copy of a letter to:)

Mr. Gary L. Grebus,  
Batelle Columbus Division,  
Room 11-6011,  
505 King Avenue,  
COLUMBUS Ohio 43201-2693  
U.S.A.

Dear Gary,

When you come to report on the disappointing response to the Spring 1986 System Improvement Request Ballot, spare a thought for us poor users in Australia. We were presented with a list of great ideas to vote on, and a description of the voting procedure saying THE DEADLINE IS APRIL 1. This was in the February Pageswapper, which we received today, May 20th, a mere seven weeks after the deadline. Robbed of our right to voted ten seconds after we discovered we had it!

To make things worse, the March Pageswapper arrived in the same package. It contained a comment from Larry Kilgallen along the lines of "if you don't vote, I'll get my friends to thwart your desires". Grrrr! I bet he gets tacks of poison-pen letters from overseas.!

Yes I know the problem is in the distribution of newsletters within Australia. I know it has nothing to do with you. But please don't regard us all as apathetic if you don't get a satisfactory response to your ballot.

The last six pageswappers have arrived here an average of 10 weeks after the first of the month of issue. A letter in the March Pageswapper suggests that European readers have similar difficulties. Maybe you could make the ballot deadline a little later next time. How about it?

Yours faithfully,  
ROLLO ROSS  
Network Manager

c.c: Decus Australia  
Mr. Larry Kilgallen

Response from Larry Kilgallen

Tell you what -- you give us our Cup back, and ...

No, seriously, it may pain you further to learn that those six Pageswapper issues were turned in for production one month BEFORE the first of the month of issue. So that makes it 14 weeks of transmission time, certainly unacceptable.

There were changes made a year or so ago to prevent someone from being a member of a DECUS chapter other than their "home" chapter. My assumption is that the goal was to prevent other chapters from being just ancillary to the US chapter. In the process, however, it would seem appropriate communications mechanisms were not set up to provide for the exchange of information (i.e., newsletters) between chapters (this goes both ways, note that on-line disk restructuring was number 1 on the European SIR ballot before it was in the US).

Technically we have the capability to allow dial-up retrieval of the Pageswapper, and I would be willing to set that up for some particular member of a faraway chapter if they were able to pay for the phone call. The obvious provision must be that they would pass it on to their normal chapter distribution mechanism. If the problem is REALLY in Australia, I don't think that would help, but I tend to believe the problem is getting the original to Australia in the first place. One difficulty with dialup is I think there may be a problem with modem compatibility (the modulation schemes I have available are Bell and Vadic).

We should ask ourselves, however, whether such underground efforts are appropriate, as compared to making the mechanisms already in place work properly. In the US there is a "communications committee" with members from each of about 20 SIGs set up to worry about things like distribution mechanisms. It is clearly possible for the US DECUS staff (paid DEC employees) to express ship a photocopy of newsletter originals to their counterparts in Australia the day they get it. It is not the finished book which is required anyway, just the technical content. I have seen very much rearranged copies and excerpts of the Pageswapper come back from Europe, so I think the priority should be on moving the information rapidly.

To:

Vickie Hancock  
NETwords Editor  
2510 Limestone Ln.  
Garland, TX 75040  
U.S.A

and

Larry Kilgallen  
PAGESWAPPER Editor  
Box 81, MIT Station  
Cambridge, MA 02139-0901  
U.S.A.

22-Apr-1986.

Dear Editors:

In NETwords of January 1986 there was an article from David W. Bynon entitled "Using DECnet for VAX System Management". A similar routine named "showsys.com" could be found in the PAGESWAPPER of December 1984 as part of an article entitled "What one VMS V4.0 Site is Up To" written by Stephen Simm.

David's article shos very clearly how DECnet can be used for task-to-task communication, or in this case image-to-procedure communication, emulating the VMS command:

```
$ TYPE node::"TASK=procedure"
```

However in this case I personally prefer using a command procedure like Stephen's "showsys.com". Also, to make it easier: when the remote procedure that is executed by the above command is located in the default DECnet directory, then one does not need to define the procedure as a known DECnet object via the NCP utility! This feature enables us to create such remote command procedures dynamically. We use this for submitting IBM jobs via one central DECnet/SNA Remote Job Entry workstation from other VAX'es, and for doint a "REPLY" (I called it "HERALD") to remote VAX'es.

I also found a very useful undocumented feature of the above construct. The remote procedure may have one single argument! Thus the complete command may be as follows:

```
$ TYPE node::"TASK=procedure argument"
```

So I adapted Stephen's procedure to a general remote show facility, where the show item may be specified as a parameter. As this feature allows only one argument, and hence qualifiers cannot be specified, I build some extra facilities around this parameter.

Rienk S. Doetjes, System Manager  
SKF - Engineering & Research Centre  
P.O. Box 2350  
3430 DT Nieuwegein, The Netherlands

Tel. -31-3402-75975

## On-Line Disk Compress

by Ronald Papajcik  
Horsburgh & Scott Co.  
Cleveland, Oh

The recent DECUS Symposium in Dallas showed that there is much interest in an on-line disk compress utility of some form.

Note that I hve seen (but not used) a product which attempts to use the DCL copy command to create contiguous disk space. The utility will take the files that border an area and copy them to a new location on the disk. All other activity on the disk must be stopped.

The utility's name is THE SHUFFLER and it is available from:

Cadde Solutions Group, Incorporated  
1015 E. Arrow Highway  
Glendora, CA 91740

## Insecurities of DZ-11 Modem Polling

Indiana University  
Bloomington Academic Computing  
Services  
Memorial East 330  
Bloomington, IN 47405

April 25, 1986

Larry Kilgallen, PAGESWAPPER Editor  
Box 81, MIT Station  
Cambridge MA 02139-0901

Larry,

In the April issue of the DECUS Newsletter, G.S. Bal and Andy Goldstein talked about the possibility of VMS missing a hang-up and then connecting a new user to a session owned by the previous user of that particular port (See pages VAX-15 and 16). Our article (A Concern About Security and DZ Ports) in the same issue addresses the same topic.

In brief, the following scenario will cause user B to be connected to the session belonging to user A.

-- User A successfully logs into a DZ port thru a port contention device

-- VMS polls the DZ port for hangup and finds the port busy

-- The port contention device hangs up user A (for whatever reason)

-- The port contention device connects user B to the same DZ port

-- VMS again polls the DZ port for hangup and finds it in use

Thus, because the device must be polled, VMS missed the hangup. If the DZ had the ability to interrupt VMS on a hangup, the security breach would have been avoided. We understand that some port contention manufactures circumvent the problem by not reassigning the port until the CPU toggles DTR. Thus the hangup is never missed.

Sincerely,

Jean Pollock  
Jim Haskett

## Applying the VMS V4.4 Documentation Set Update

by Larry Kilgallen  
Box 81, MIT Station  
Cambridge, MA 02139-0901

In every case I have seen so far, the RTL manual replacement pages, contrary to their update notice, do NOT include new copies of pages RTL-647 through RTL-658. Common wisdom is to keep the old pages of those numbers.

Notice that the new appendix A provided for the system services manual is DIFFERENT MATERIAL from the old one. The old one (obsolete system services) seems to me worth keeping, so I typically (i.e., at sites where I perform a documentation update) store the old appendix A in the extra binder I establish for the V4.0-V4.3 release notes. I realize that the instructions say those release notes do not need to be kept because all the information is in the V4.4 release notes, but associating with computers breeds paranoia.

The four page brochure on how to update the documentation did not explain that the spine inserts are in the same package with the dividers, but on balance I would say that the V4.4 documentation update represents a significant improvement regarding ease of installation (compared to the physically smaller V4.2 update).

The next step (are you listening, DEC) should be a divider for the TECO manual. Together with a spine insert entry that will ensure the manual is in the same location in every documentation set (I know, real TECO programmers don't use manuals).



## Volume Shadowing Internals Slides

Ralph Weber of VMS Development has provided an updated version of the slides he used for his presentation on Volume Shadowing Internals at the Dallas Symposium. (That is, the slides in the session handouts were a subset of those used in the actual presentation, due to handout publication deadlines.)

Our policy is not to publish in the Pageswapper material which would require one had attended a symposium session, so with Ralph's permission we are making the slides available on a dial-up basis for those who wish to get it.

Using some technique which will capture a copy (e.g., SET HOST/DTE/LOG), dial:

(617) 262-6830

and log in to username SHADOWING. This will be available from June 10 through August 31, 1986.

## Fall 1986 System Improvement Requests

\*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\*  
\*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\*  
\*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\* VOTE \*\*\*

Gary L. Grebus

**HERE IT IS!! GET YOUR VOTES IN NOW!! THE DEADLINE IS AUGUST 29.** You have an opinion about what is right or wrong with VAX's and VMS. Here is your chance to influence the directions of future DEC development. The VAX Systems SIG System Improvement Request (SIR) program is an important method for the VAX user community to provide input to Digital. Everyone's opinion is important, and every ballot adds to the influence of the SIR program.

On the following pages, you will find the current collection of System Improvement Requests. Please take the time to review these SIR's and assess their effect on your use of VAX's. Then indicate your preferences as described below. Based on its popularity, the simplified ballot form used in the Spring ballot has been retained. **SEE THE "QU" SECTION OF THIS NEWSLETTER FOR THE FORM.** Also, please fill out the questionnaire portion of the ballot. This information is important to DEC, as it points out which requests are important to a particular segment of the VAX community.

The returns from this ballot will be totalled, and Digital will provide a formal response to the 10 items which receive the most votes. The results and DEC's responses will be given at the VAX SYSTEM SIG SYSTEM IMPROVEMENT REQUESTS session of the Fall 1986 DECUS Symposium in San Francisco.

### Instructions For Voting

The ballot form contains two sections, a "support" section and an "oppose" section. To indicate your support for an SIR, enter its number in the "support" section of the ballot. You may list from zero to fifteen SIR's in this section. To indicate your opposition to an SIR you consider detrimental, enter its number in the "oppose" section. You may list from zero to five SIR's in this section.

Please return your ballot **IMMEDIATELY**. To allow time for DEC to respond, **BALLOTS RECEIVED AFTER AUGUST 29 CANNOT BE COUNTED.**

If there are other DECUS members at your site, feel free to duplicate the ballot and pass it around. However, any ballot

not specifying a DECUS membership number will not be counted.  
Only one ballot per member will be accepted.

VMS Internals

SIR: F86-1

Abstract: Allow an RMS OPEN request to proceed asynchronously

Description: Add the capability to have RMS OPENS proceed asynchronously and to be followed in the application by a WAITEF or AST delivery. This can be very important for time critical applications. It is clear that at the system level an OPEN is not synchronous since several disk operations and/or ACP calls may be involved in the execution of a single OPEN.

SIR: F86-2

Abstract: Expand scope of wildcard characters in file specifications.

Description: It would be useful to add certain pattern matching wildcards to RMS file name processing. Some suggestions:

- ^A match any alphabetic
- ^D match any decimal digit
- ^S match any separator (\$,\_)
- ^X match any single character (same as %)
- >=T match any character "greater than" (in ASCII collating sequence) or equal to "T".
- <=T match any character less than or equal to "T"
- !=T match any character not equal to "T"

An example:

Directory GET>=CSTRING^D^D.C

would produce:

Directory ...

GETCSTRING32.C;1 GETDSTRING17.C;1 GETXSTRING54.C;1

SIR: F86-3

Abstract: Search list support for file creation.

Description: Currently file access via search list will follow the list until a success is found or it will fail after the last member of the search list. Creation must succeed on the first member of the list. Generalize this so that creation will occur in the first member of the list where it is allowed.

SIR: F86-4

Abstract: Allow remapping of VT200 BACKSPACE, ESCAPE, and LINEFEED keys to their "correct" values while in VT200 mode instead of getting VT200 type escape sequences.

Description: The terminal driver should be optionally able to remap these keys to their correct values rather than expecting the application (over which we may have no control as with TECO) to reparse the VT200 escape sequences produced by these keys.

SIR: F86-5

Abstract: Improve support for AUTOBAUDed terminals.

Description: AUTOBAUD is relevant only to initial input for interactive terminal lines. It should be possible to set a speed on these units which would be relevant when the line were used as a slave output device. Thus

```
SET TERMINAL/AUTOBAUD/SPEED=300
```

Would mean "Use 300 when it is allocated by another process; autobaud when used interactively".

Furthermore

```
SET TERMINAL/AUTOBAUD=(300,1200,2400)
```

would mean "Try those 3 speeds only".

SIR: F86-6

Abstract: Provide for signalling a process when it is detached from its physical terminal.

Description: Allow a mechanism similar to Control-C AST, or an associated mailbox read AST, so that a process can be signalled when the phone hangs up or a DISCONNECT is issued. Certain application may then want to do some clean up and terminate due to the sensitive nature of the application.

SIR: F86-7

Abstract: Make the disconnectable terminal capability available for sessions initiated by SET HOST.

Description: The lack of disconnectable terminals when using DECnet SET HOST is a great hindrance. The needs for protection from loss of communication and for quick context switching are present even when SET HOST is used to accomplish a login.

SIR: F86-8

Abstract: SET TERMINAL should be able to set permanent characteristics on terminals which are "cloned" from a template UCB such as LTxx, RTxx, and NVxx.

Description: One needs to set characteristics on various cloned terminal types. For example, SYSPASSWORD might be appropriate for locally connected terminals, but not for LAT terminals. The default terminal characteristics should be settable by a command such as

```
SET TERMINAL LTA0/PERMANENT/NOSYSPASSWORD
```

applied to the template device.

SIR: F86-9

Abstract: Provide a facility to flush the command line recall buffer(s).

Description: The command line recall buffer (both in DCL and in the terminal driver) can contain sensitive information. A facility is required which would allow a user to insure that these buffers are cleared. This should be available both from a DCL command and via program call.

SIR: F86-10

Abstract: Add more formatting directives to F\$FAO and SYS\$FAO.

Description: Useful additions:

```
!NO includes string "NO" if argument, nothing of true.
!YN same as above for "YES"
!nRS Right justified string truncated at left if length > n.
!nRF, !nRC, !nRD likewise
!nAB insert ASCII value of character in low byte of
argument n times. (equivalent of !n*c).
```

SIR: F86-11

Abstract: Add a "trimmed string" directive to F\$FAO and SYS\$FAO.

Description: !TS should be supported. It would insert a string with trailing blanks removed. This would be handy when using fixed length strings.

SIR: F86-12

Abstract: Add Foreign language support to VMS, possible as a layered product.

Description: Since the HELP file, the DCLTABLES, and the Message files are all modular, provide foreign language versions of them. This is already supported to some extent in Datatrieve. Support for foreign character sets on VT200 series terminals could be integrated with this effort.

SIR: F86-13

Abstract: Support RL01 disk drives.

Description: Many are still installed and software houses and OEMs in particular could use this support. Field Service has been known to support them on Vaxes.

SIR: F86-14

Abstract: Provide a user callable interface to the Traceback facility.

Description: It would be useful to call a traceback without having to issue a signal. This could be done from mainline code, or from a condition handler without having to resignal, so one could traceback and unwind when appropriate.

SIR: F86-15

Abstract: Subprocesses of batch jobs should be flagged as batch. header.

Description: For accounting consistency, all the process components of a batch job should be identifiable as belonging to a batch job. Currently, the subprocesses of a batch job do not set the bit which identifies a batch job.

SIR: F86-16

Abstract: Allow the VMS scheduling quantum to be process specific.

Description: Ability to allow some processes a long quantum and others a short one would make the VMS scheduling scheme much more flexible and would effectively provide an infinite set of scheduling classes within a priority class.

SIR: F86-17

Abstract: Provide a LIB\$PUTERROR service similar to LIB\$PUTOUTPUT.

Description: It would be useful to have a convenient way to write messages to the SYS\$ERROR file in the same way LIB\$PUTOUTPUT is used to write to SYS\$OUTPUT.

SIR: F86-18

Abstract: VMSINSTALL should support simultaneous installs or prevent them.

Description: After a major upgrade, it is useful to try to do multiple installs simultaneously to save time. As part of the checks VMSINSTALL does when it checks resources, it should check if an install is in progress which would preclude simultaneously operation (much as it checks for DECnet running etc.) This might be done with system logical names.

SIR: F86-19

Abstract: Force users with expired passwords to set a new one at log in.

Description: When a user logs in with an expired password, VMS issues a warning message. However, the user often forgets about the warning in the rush to deal with the daily crises, and is then locked out. When a password is expired, the login process should not complete until the user has successfully set a new password.

SIR: F86-20

Abstract: Allow for a SYSGEN DISCONNECT command.

Description: When specifying CSRs etc. one occasionally makes mistakes and one must reboot to clean things up. Add a DISCONNECT command to SYSGEN. The unavoidable loss of system pool space would be acceptable. The current tests used to support unloadable drivers would be sufficient to determine when a device were "idle" for disconnecting.

SIR: F86-21

Abstract: Provide for write-only logical names.

Description: Logical names provide a convenient way of "remembering" information for one or more processes. Some of this information might be sensitive, for example DECnet access control strings. A mechanism should exist which allows logical names to be defined as write-only from equal or less privileged access modes, allowing only more

privileged, system components to access the information.

SIR: F86-22

Abstract: Expand Usernames to have the same character set and length as File names.

Description: Many sites prefer to closely tie usernames to default directories. To do this, the character set and length of user names should parallel that of file specifications, i.e. 39 characters, including "", "\$", and ".".

The period is particularly useful, since it allows the usernames to reflect the directory hierarchy of their login directories. For example,

```
CHEM101.JONES --> [CHEM101.JONES]
ACCOUNTING.JONES --> [ACCOUNTING.JONES]
SALES.SMITH --> [SALES.SMITH]
```

SIR: F86-23

Abstract: Allow the 2 high order digits of the year to be defaulted in time specifications.

Description: Allow defaulting to allow

1-Jun-86

to be mapped into

1-Jun-1986.

This could be done in all absolute time specifications. A minimum of checking would be needed to avoid meaningless cases.

SIR: F86-24

Abstract: Allow 750 Clustered systems to boot completely from disk.

Description: A clustered 750 (under V4.x) boots off the TU58 since certain microcode must be loaded from the TU58. The TU58 is inherently slow and unreliable and does not fit with the "high reliability" aspects of a cluster. Some mechanism should be found to locate all necessary bootstrap components on the disk, as is currently done for non-clustered systems.

SIR: F86-25

Abstract: Allow a repeat specifier in SMG\$ definitions meaning "repeat the following sequence n times".

Description: On an HP terminal there is a "delete single line" command but no "delete multiple line". A repeat specifier could be used to allow SMG to utilize its multiple line delete:

```
deleteline = "!UL<$M>"
```

(where \$M is the HP control sequence).

SIR: F86-26

Abstract: Allow SMG to access a particular pasteboard and terminal from multiple processes.

Description: Allowing multiple processes to access a pasteboard would effectively mean there would be a multiprocess windowing system using SMG. A new process could create a screen which would be "pushed" onto the screen and later this could be "popped" off when the screen was deleted. To implement this one might conceive of classes of pasteboards, i.e. process, group, system, etc., which could be shared among the appropriate processes much like logical names or mailboxes are. An ACP or symbiont process could then "own" a physical terminal and manage the shared pasteboard and the terminal screen.

SIR: F86-27

Abstract: Allow asynchronous terminal input with SMG from subprocesses.

Description: The method used by SMG to allow asynchronous terminal input (SMG\$ENABLEUNSOLICITEDINPUT) is incompatible with running from a SPAWNED subprocess since it uses an associated mailbox. Furthermore one cannot even interrupt a SMG session running in a main process and SPAWN a subprocess once SMG has done any asynchronous IO since there is no way to disable the associated mailbox once it is created.

DCL and Utilities

Abstract: Provide better support for CLI table editing.

Description: In many cases sites desire the ability to permanently modify the distributed CLI tables in order to set up site specific defaults that are different from those provided, limit access to certain commands and add new commands to support their own software. Some mechanism is needed to support these activities, in a way that minimizes the impact of updates to VMS. It would be useful if the VMS update process could at least detect when it had replaced a command definition that contained local modifications.

An additional improvement might be obtained by licensing the CLD TABLE SOURCES only to aid sites in maintaining their customizations.

SIR: F86-29

Abstract: Add new types to DCL command definitions.

Description: A mechanism is needed to extend the built in parameter types and qualifier entries in DCL command definitions. A possible method would be to allow existing type entries to be further qualified. For example:

|                        |                                    |
|------------------------|------------------------------------|
| \$HEX or \$NUMBER(HEX) | Expect a hexadecimal number        |
| \$FILE(NOWILD)         | NO wild card entries in filenames  |
| \$FILE(DEVICE)         | Allows a device name only          |
| \$FILE(NODE,DEVICE)    | Allows a node and/or a device name |

SIR: F86-30

Abstract: Extend the F\$FILEATTRIBUTES lexical function to include ALL file header information.

Description: DCL access to all file header information is needed. The following items would be especially useful:

|     |                                                         |
|-----|---------------------------------------------------------|
| LRL | Longest record length (not the maximum record size MRS) |
| FFB | First free byte in the last block                       |

SIR: F86-31

Abstract: Provide a lexical function to compute the time lapse between two times recorded in standard form.

Description: A DCL routine (and possibly run time support) that would return a standard DELTA TIME when given two valid system times would be useful. This could be used to facilitate accounting for those applications that are run from captive command procs.

SIR: F86-32

Abstract: Provide LIB\$FINDIMAGESYMBOL as a DCL lexical function.

Description: Some Lexical functions (ie F\$FAO) are implemented in DCL as a jacket routine that calls the "real" system service, in this case \$FAO.

A modification of LIB\$FINDIMAGESYMBOL into a DCL lexical function could provide a general case interface to the run time library. Thus all parts of the run time library not specifically supported could be made accessible. A particularly useful tool to advanced DCL writers would be the SMG\$ (Screen Management facility) which could be available via this interface.

SIR: F86-33

Abstract: Add additional capabilities to command line editing.

Description: The following enhancements to the command line recall facility would greatly reduce typing.

1. Increase the depth of the recall buffer.
2. Add a RECALL/NEXT to recall the next command matching the text string found after the currently matched command.
3. Add a RECALL/ANY to recall a command line entry that matches the text string in ANY POSITION. This would allow a search without the comparison starting in column one of the commands.

SIR: F86-34

Abstract: Add a /NOCARRIAGE\_CONTROL switch to the DCL write command.

Description: For users wishing to control plotters, printers, auto dial modems and other strange devices that can't tolerate carriage returns or line feeds in their command string, it is impossible to do so from DCL. If a /NOCARRIAGE\_CONTROL switch or some other mechanism were added to the DCL write command these devices could be initialized and controlled without having to write a program to do so.

SIR: F86-35

Abstract: Provide DCL debugging facilities.

Description: Many command procedures are very complex and have the potential for drastic side effects if miscoded. It would be very helpful to have tools available to assist in debugging DCL procedures. A useful function would be a mechanism to check DCL syntax, without executing the images involved. A similar feature is available in the RSX world and has proven to be very valuable there.

Some additional capabilities could include a reference check for labels and possibly a cross reference to their references and identification of undefined labels.

Any additional tools which could be used to help debug DCL procedures would also be useful. Despite assertions that "DCL is not an applications language", many organizations (including Digital) find it appropriate to implement large DCL command procedures. Tools are needed to assist in this area.

SIR: F86-36

Abstract: System managers often wish to run a DCL command procedure against a large number of files.

Description: It is frequently necessary to run a DCL command procedure that applies to a large number or all of the files in a directory. Some form of enhanced open capability that supports wildcards would facilitate performing this type of task. For example,

```
$OPEN/SEARCH/DONE=label LOGICAL-NAME[:] .dat
```

This command would close any file currently opened to the specified logical name and open the next file found that matched the file-spec generator. If no files remained that match the file-spec generator the /DONE=label would be branched to.

It would be the users responsibility to insure that any logical names or search lists that exist do not cause this command to go into an infinite loop.

SIR: F86-37

Abstract: VMS should provide some assistance in DCL to allow the operator response to a REQUEST/REPLY to be easily accessed.

Description: Currently a user is forced to define SYSS\$OUTPUT in a command procedure to be a temporary file, then OPEN that file and search for the operator response text. This is complicated by continuing changes to the response format as each new version of VMS comes out.

A reliable solution to this problem would be to provide some mechanism to receive the text and only the text typed by the operator. A possible mechanism for this would be to add a reserved symbol \$TEXT to the permanent symbol table (like \$STATUS etc) in which REQUEST/REPLY could deposit the answer text. This could also be useful with many other commands as well as user programs. An alternative method would be to add a switch to the command which would declare a symbol to receive the answer text. I.E.  
REQUEST/REPLY/TO=TAPES/ANSWER\_SYMBOL=WAYBILL -  
"What courier waybill number will be used to ship the tape?"

Examination of the DCL symbol WAYBILL would show the answer.

WAYBILL = "NONE, The TU81+ just ate the darn thing"

SIR: F86-38

Abstract: Provide a mechanism to set the creation and modification dates for files.

Description: Sometimes it is necessary for configuration management or for distribution of software to ensure that all files have a certain date and time. It is understood that any user who uses this feature is running the risk of creating problems by setting file dates in the future or messing up audit trails by invalidating past creation dates.

The user of this facility would be responsible for any inconsistencies introduced by a BACKUP of files that had future creation dates.

This feature if implemented might be better done as a utility program available in SYSS\$MANAGER than as an extension to the SET FILE command.

SIR: F86-39

Abstract: SHOW PROCESS/CONTINUOUS is inadequate for large images.

Description: When watching a large process the actual memory that is in use by the process is frequently outside of the address range supported by SHOW PROCESS/CONTINUOUS. Some form of specification that allows the user to specify the address range for the display or an automatic mechanism to properly select the window address range is needed.

While this may seem like a trivial request, SHOW PROCESS/CONTINUOUS is a useful tool for diagnosing poor paging behavior in applications. It is the only such tool available on a standard VMS system.

SIR: F86-40

Abstract: Allow TYPE to access a file that is currently open for write.

Description: The TYPE command should have an option which allows read access to a file no matter what sharing options are allowed by other accessors of the file. BACKUP/IGNORE=INTERLOCK is not an acceptable solution if a very large file is involved.

Such a function would be used primarily for troubleshooting, and with the realization that the file contents displayed might be inconsistent or incomplete. Hopefully, this function could be accomplished through the cooperation of the file system. If that is not possible, TYPE should be able to directly process the disk blocks and interpret the record (at least for non-indexed files).

SIR: F86-41

Abstract: Give DIRECTORY an easy way to list only the oldest n versions of files.

Description: It is currently very difficult to find out what files have more than n versions. It is possible by use of the ;-2, ;-3 version numbers to find out which files have 3 or 4 versions respectively but if you have a version limit on the order of 99 this becomes very boring.

A better approach would be to parallel the PURGE/KEEP=n form and support a DIRECTORY/EXCLUDE=LATEST:n or DIRECTORY/VERSIONSAFTER=n to give all files that have more than n versions.

SIR: F86-42

Abstract: Enhance RENAME and COPY to allow additional wildcard name modification for the output filespec.

Description: This feature would make it very easy to rename or copy large numbers of files with similar names For example:

RENAME ABC.BAS; DEF.BAS;

Some restrictions on the pattern formations would obviously have to apply, but the ability to do partial substitutions across corresponding fields of the filespecs would be a good start.

SIR: F86-43

Abstract: Eliminate potential problems in the treatment of synonym directories by DELETE, PURGE and DIRECTORY.

Description: When a DELETE or PURGE is issued in a directory that is a synonym an error should be returned and the user encouraged to use the command SET FILE/REMOVE.

Directory needs a switch i.e. DIRECTORY/SYNONYM to identify those directories and files that have two directory entries but only one file. It is understood that this feature may require extensive processing time to accomplish or not be supportable until the file system is modified to facilitate support.

SIR: F86-44

Abstract: DCL doesn't support VT2xx shifted function keys.

Description: There should be a supported way to define the contents of the VT2xx shifted function keys. This might be done with DEFINE/KEY, although the definition would be stored in the terminal, rather than in the host.

The user would have to be responsible for ensuring that the terminal memory was not overfilled, and not use the setup reset function which deletes these keys! It would be useful to also have an option which cleared all such definitions, reducing the chances that sensitive information would be left stored in the keys.

SIR: F86-45



Abstract: Support general file system access to VMS text libraries.

Description: Text libraries provide a very convenient way of grouping large numbers of small, related files. However, their usefulness is limited because the library elements cannot be edited, copied, etc. directly. VMS should be enhanced to provide direct read and write access to library contents.

An elegant use of this concept would be to provide a form of filespec that supported a notation identifying which entry in the library filespec was wanted. I.E.

```
EDIT/EDT
NODE::DEVICE::[DIRECTORY]FILENAME(entry).EXT;VERSION
```

Ideally, it should also be possible to store executable programs in the library and run them directly.

SIR: F86-46

Abstract: Document the protocol interface to MAIL.

Description: Many large sites have a need to integrate mail systems on diverse computer systems. MAIL.EXE as of VMS 4.0 contains hooks for external mail systems. This interface should be documented. This should be done independently of any efforts involving the Message Router layered product.

SIR: F86-47

Abstract: Provide support for non printable attachments to messages in MAIL.

Description: A needed extension to MAIL would be an ability to send mail that is not directly printable to a user. This could be a file that is set up for a word processor with embedded control sequences or possibly an object or execute file.

The most important reason for having such a facility is that it allows files to be transferred between network users without the need for coordinated proxies, exchange of passwords, or undue relaxation of file protections.

The desired features of this enhancement would be some form of switch to indicate that a file was being attached, and a way for mail to indicate this to the user on receipt of the mail. The indication should also be kept in the database to be shown on the mail directory. Note it should not be possible for the user to directly view the attachment

within MAIL, to avoid accidental or malicious transmission of terminal control Escape sequences.

SIR: F86-48

Abstract: Enhance VMS Mail.

Description: There are many enhancements to VMS MAIL that would increase its functionality and ease of use.

DEC should consider incorporating the following features (found in the TOPS-10/20 MS mail utility) into VMS MAIL, particularly the user interface commands:

- Prompt for a list of users to be cc'd on the message. It is often useful to distinguish these users from the primary recipients of the message.
- Allow the message to be manipulated before it is sent. In particular, allow the text, "to" and "cc" lists and subject to be edited or changed.
- Allow the user to perform a directory of messages based on search criteria, including
  - before a specified date
  - since a specified date
  - from a certain user
  - subject (a subset of the subject string)
  - forward and reverse chronological order
- Make the DELETE command accept a range or list of messages.
- Allow one or more VMS files to be inserted into the text of the message at the place the user is typing.
- Add a qualifier to the FORWARD command to allow retention of a copy of the message for future reference.
- Allow the specification of an EDT startup command file specifically tailored for use in mail, to allow easy entry of signature blocks etc.

A means of preventing users from spawning out of MAIL is required for MAIL to be used in a captive account. Perhaps a MAIL/NOSPAWN qualifier.

When a distribution file is specified, the expanded names should optionally be listed so that all recipients can see to whom the message was sent.

There is strong user interest in seeing improvements in VMS MAIL, as shown by volume of SIR's received, and the presence of a MAIL SIR in the Spring 86 Top-10. MAIL has high visibility within most sites, and is becoming increasingly important as organizations come to depend on electronic communications. Therefore, we believe Digital should consider improvements to VMS Mail as a high priority item.

SIR: F86-49

Abstract: Support indirect entries for help libraries.

Description: Add support for synonym and indirect entries in a HELP library in a fashion similar to RSX. This would save space and aid maintenance by reducing the number of entries to modify for similar changes. For example, a synonym could be defined as:

```
1 NAME
#OTHER_NAME
```

When you type NAME or OTHERNAME both entries give the same text response (multiple keys).

An indirect reference might look like:

```
2 SUB_TOPIC
@SUB_TOPIC.TXT or @HELPLIB/EXTRACT=SUB_TOPIC_TEXT
```

When you type SUBTOPIC HELP either gets the text from the indirect file SUBTOPIC.TXT (@ option) or from the module SUBTOPICTEXT in library HELPLIB.HLB (@HELPLIB option)

SIR: F86-50

Abstract: Improve the performance of HELP by changing the structure of help files.

Description: The performance of HELP could be improved by changing the structure of the HELP file. The current LIBRARY files, ISAM files or some other file format could be used. ISAM files would allow for system wide shared buffers.

A suggested method is to have the contents of each record or member be the text to be displayed, and the key or module name be constructed from the keys of all of the "parent" records.

SIR: F86-51

Abstract: Enhance support for RT11 media in EXCHANGE.

Description: Some additions to EXCHANGE would improve support for those users who need to move files between VMS and RT11 based systems.

1. Support for RT11 tape formats.
2. INITIALIZE/BADBLOCKS should write bad block information in the form that RT-11 needs. This is needed to safely create RT-11 volumes.
3. A SQUEEZE option would be useful when insufficient contiguous space is available to create a file on an RT-11 disk.
4. [UN]PROTECT should be implemented.

SIR: F86-52

Abstract: Add the ability to copy part of a file to COPY.

Description: Provide the COPY command with the ability to copy parts of a file such as the first n blocks, the last n blocks, the first n records or the last n records. The choice of copying records or blocks will depend on the file itself.

This feature if applied to any keyed file may be restricted in such a fashion that rebuilding of the key information would be the user's responsibility or it may produce a sequentially accessible file only.

SIR: F86-53

Abstract: Add additional capabilities to the DUMP utility.

Description: The following are useful features to add to the DUMP utility:

1. Suppress repeated lines that are identical, i.e. all zero or contain exactly the same pattern when printed.
2. A summary dump giving only the length and first line of information.
3. A scan mode that would provide a summary of the number of records of each length that were found in the file.

| I.E. | LENGTH | OCCURRENCES | FIRST OCCURRENCE |
|------|--------|-------------|------------------|
|      | 80     | 3450        | 1                |

81 1 387

Total Records Found = 3451

4. Support more data types like RADIX50 for RSX  
compatibility, /FLOATING

/DOUBLE, /G\_FLOATING and /H\_FLOATING for binary data.

SIR: F86-54

Abstract: Provide a page header on printed MAIL messages that  
clearly identifies the username requesting the print.

Description: When MAIL messages are PRINTed by mail and the TO  
list was a distribution list, there is no way to tell who  
is printing the message on a queue which has neither flag  
nor burst pages enabled. Because of this it would be  
helpful to add a qualifier /HEADER to the MAIL PRINT  
command. Also provide a MAIL characteristic PRINTHEADER or  
something similar for setting this up as the default for  
any user.

Commercial

SIR: F86-55

Abstract: Provide for dependency networks of print and batch  
jobs.

Description: Large production shops often have the need to  
specify the interdependencies of related batch and print  
jobs. For example Job A must run first, then jobs B and C  
can start; D follows B; E follows D and C; F and G follow E  
as shown in the example below.

The network relationships should be established at the time the  
jobs are submitted, not after they start executing. In  
many cases process slots cannot be afforded just to  
synchronize. Jobs should be networkable independent of the  
specific queues they are submitted to.

An example job dependency network diagram

```
 /--> B --> D -\
A-> \-----> C -/
 -> E -> /--> G
 \-----> F
```

SIR: F86-56

Abstract: Increase the completeness, accuracy and level of  
detail in VMS accounting records.

Description: Examples include the following:

1. Stock name for print jobs
2. Physical device name(s) for Virtual and LAT terminal  
sessions
3. QIO counts, by device, for each ALLOCATED device and  
each SHARED device.
4. Report the terminal maximum speed (larger of TRANSMIT  
and RECEIVE)
5. Record the number of logical and physical mounts for  
each tape and disk drive (if any)
6. Record the name of the queue a job was submitted to as  
well as the device or specific queue it executed on.

SIR: F86-57

Abstract: Provide improved support for terminal auxiliary  
printer ports so that printer output can be interleaved  
with screen and keyboard I/O

Description: This facility must provide configurability of:

1. Device independent I/O at driver characteristic level
2. Same level of support as a "normal" printer
3. Terminal driver should know how to "turn on" the  
printer, and should be able to interleave I/O
4. The sphere of influence of this capability is "process  
local" as opposed to system wide

SIR: F86-58

Abstract: SHOW QUE/BRIEF should display the currently mounted  
form and a list of forms required by pending jobs.

Description: It would be helpful for operators and users to have current and pending forms displayed by the /BRIEF qualifier. Currently only the "pending" status is displayed. This makes it necessary for operators to wade through the output of /FULL in order to find out what forms are being waited on.

SIR: F86-59

Abstract: Provide flag page formatting capabilities separate from the job formatting.

Description: Many printers and queue forms are set up so that the formatting (particularly width) allows for proper printing of jobs such as 13 Characters/in. on an LAL00. Unfortunately, usually it is desired that the flag and burst pages be controlled by a different width setting than the user's job form specifies. It is not enough to have a flag page setup module capability. A flag page width parameter is needed. This parameter should probably be a queue specific parameter and not controlled by a flag page specific form.

SIR: F86-60

Abstract: VMS Mount services should include "For READ" or "For WRITE" or "WITH RING" or "WITHOUT RING" in messages to the operator when requesting a tape be mounted.

Description: MOUNT/NOWRITE should generate a request for "WITHOUT RING" or "For READ ONLY" and MOUNT/WRITE the opposite so that operators can quickly determine what is needed.

SIR: F86-61

Abstract: Enhance RMS to provide capability to have an ISAM file with optional secondary keys.

Description: For example, only 20% of the records of a file have a need for secondary keys. Other records should not have secondary keys. Null keys are not appropriate as the other records have random data in the field that would be used as secondary key.

SIR: F86-62

Abstract: Provide disk management tools to aid in discovery of fragmentation and file disorganization problems.

Description: Provide utilities for measuring the degree of fragmentation of a disk drive and for measuring the level of disorganization of RMS ISAM files. This will aid System Managers and Users in knowing when they have situations that call for corrective action. If a users suspects that an ISAM file has gotten out of hand, they could easily check how bad it is without going to the expense of running CONVERT. Instead users now are stuck with "If it's not broke don't fix it, but I can't tell if it's broke, so I guess I better fix it just in case.")

SIR: F86-63

Abstract: Provide a fast file scan.

Description: The CONVERT utility can scan through an RMS ISAM file at lightning speed. It would be helpful in many instances to have a utility with a callable interface that would provide a high speed scan capability. This capability would be satisfactory with a random record order as long as it's fast.

To avoid locking at the record level, the scan could be granted exclusive access to the whole file. This scan capability would be useful for building sub- datafiles from large ones(for Datatrieve) and for standard financial batch jobs such as bill/report generation.

SIR: F86-64

Abstract: A spooled device and utilities that support spooling should provide a capability for specifying a form name.

Description: In many cases use of the DEFAULT form on a print queue is not desirable in cases where no form can be specified. Any utility that allows printing through a QUEUE specification should support a FORMNAME specification. Similarly, SET DEVICE/SPOOLED should permit the specification of a FORMNAME to use with spooling.

SIR: F86-65

Abstract: All references to forms in displays of any kind should show the form name in preference to the number.

Description: There is very little use for the form number to the system manager or user once the names have been defined. All displays relating to forms - SHOW QUEUE and SHOW/FORM - should display the name only unless /FULL is specified. It should not be necessary to see or to know the form number except when deleting one. Also commands related to forms definition and management should be consistent. DEFINE/FORM and SHOW/FORM rather than SHOW

QUEUE/FORM. All of these requirements apply equally to queue Characteristics as well as forms.

SIR: F86-66

Abstract: Expand the number of form names beyond 127.

Description: In some environments there are a variety of different small printers on the same cluster. Because of the many variations in font, pitch, etc. it is easy to get up to a large number of forms in a hurry.

This is especially important in an environment where there are many printers with different forms mounted on each one so as to enable queueing to a single SYSSPRINT and the proper printer will be determined by the specified form.

SIR: F86#67

Abstract: Provide a capability to set operator notification on selected print queues.

Description: A facility that looked something like INITIALIZE/QUEUE/NOTIFY queuname would cause each job completion to log a message to PRINTER operator consoles as well as OPERATOR.LOG via the OPCOM facility.

This facility would be useful for security reasons and to help locate "lost" listings.

SIR: F86-68

Abstract: Provide SORT with a simple way to put a sequential file into descending order.

Description: For sorting sequential variable length record files it would be helpful for SORT to have a capability to specify a "rest of record" SIZE parameter in the /FIELD or /KEY qualifier. Another alternative would be to provide a global qualifier /DESCENDING.

SORT is difficult to use on variable length record files since it may be impossible to correctly specify a key length. You can not usually know that you won't exceed the size of some record in the file by specifying any particular SIZE value.

Also SORT should be enhanced to provide user selected TAB expansion for comparison purposes. Spacing in text files is often a combination of blanks and tabs. This capability would enhance sorting of variable length records as well.

SIR: F86-69

Abstract: Support ACL's on print and batch queues.

Description: ACL's are needed to control the usage of print devices, print queues, and batch queues. The UIC-based protections are now available on queues, but ACL's are not, so the system manager does not have sufficient granularity in granting access to the system queues and print devices. There are some system managers who would like to set up batch or print queues that could only be accessed by users holding a particular identifier. ACL's can be placed on physical devices, but they only control the ability of users to allocate the devices and do not control their ability to use shared devices such as printers.

SIR: F86-70

Abstract: Better control over DECnet remote file access.

Description: The RMS file protection defines WORLD access to include all those outside the owner's group. It would be useful to define several classes of users as follows:

1. All WORLD users on the local node.
2. All users local to this VAXcluster.
3. All users on nodes within this DECnet area.

LOGINOUT currently gives a process the Identifier NETWORK if that process is being created in response to a network request. It would be useful to get greater granularity of access control for network processes by having additional identifiers created based up the node, cluster, and area from which the access is being attempted. This capability might possibly be achieved by having the File Access Listener, LOGINOUT, or some other privileged image set up the additional process Identifiers.

SIR: F86-71

Abstract: Support secondary passwords in DECnet access control strings.

Description: VMS 4 allows user accounts to have two passwords. However, DECnet does not allow the secondary passwords to be used in access control strings. The only way such accounts can be used through DECnet is via proxy logins.

SIR: F86-72

Abstract: Enhance COPY to copy ACL's.

Description: The COPY utility does not currently handle ACL's. It should be enhanced to propagate any ACL's from the source file to the destination file. However, there may be many times when a user is copying another user's file in order to modify it for his/her own purpose. It is likely that in such cases the user would not want to propagate ACL's from the original file. Therefore, this capability should be available via an additional qualifier to COPY, e.g., /PROPAGATE.

SIR: F86-73

Abstract: Allow different system password for each terminal.

Description: VMS 4 currently supports a single system password that must be entered before VMS identifies itself. There are times when the system manager would like to set up different system passwords for several different classes of terminals. VMS should support a different system password for each terminal, perhaps via a command of the form SET TERM/SYSPWD=xxxxxx, so that the system manager will have maximum flexibility in setting up many classes of terminals with each having a different system password.

SIR: F86-74

Abstract: End-to-end DES encryption should be provided within DECnet-VAX.

Description: The VAX/VMS system should support end-to-end DES encryption within DECnet-VAX with a separate DES key being used for each DECnet logical connection. This should be implemented at the NSP level, so that it is transparent to the user. The system manager should be able to activate or deactivate DES encryption between his VAX and any other VAX (that supports that feature). Privileged users on intermediate nodes can read and/or modify data being routed through their nodes or observe data in transit across an Ethernet, and not all nodes in a large DECnet network are equally trustworthy. End-to-end DES encryption would serve to protect this data in transit. Also, DES might be used to protect need-to-know access to classified data in a network.

SIR: F86-75

Abstract: Provide a prompting mechanism for DECnet passwords.

Description: There should be an automatic mechanism by which password prompting would occur when a DECnet access control string is specified with only a username. At the minimum, the COPY command should provide this prompting capability. This is an important security feature for heterogeneous DECnet's where some nodes do not support proxy logins.

#### VMS Languages and Tools

SIR: F86-76

Abstract: DEC should provide a CMS/MMS toolkit that is compatible between VMS and ULTRIX.

Description: Some software projects are developed on VMS and UNIX systems. It is desired to have a compatible CMS/MMS toolkit, to make development easier.

SIR: F86-77

Abstract: Provide a "date" data type in high level languages.

Description: Many CDD/Datatrieve database systems contain data with date and time information. Accessing this data based on date and time can be difficult from a high-level language, if the "date" data type is not supported. Date arithmetic should be supported, perhaps with the Run-Time Library.

SIR: F86-78

Abstract: DSR needs the capability to include graphics in documents.

Description: DSR should be enhanced to be able to include graphics in documents. Other text-formatting products that have this capability. However, it might be expensive to purchase such a product, and it would be expensive to convert RUNOFF files to a new format.

SIR: F86-79

Abstract: Enhance RUNOFF to provide special device features.

Description: Many printers, DEC as well as non-DEC, have features like pitch control, alternate character sets, proportional spacing, etc. RUNOFF should have commands to include the necessary escape sequences to drive these devices. There should be ways to simulate these features on devices which don't support these features. Non-DEC devices should be supported, perhaps through the SMGS-like definitions.

SIR: F86-80

Abstract: RUNOFF should provide the capability to define user-escape sequences for highlighting on non-DEC printers.

Description: RUNOFF should provide the capability to define user-escape sequences for highlighting on non-DEC printers. A possible syntax is:

```
RUNOFF/HIGHLIGHT=(BOLD="...",UNDERLINE="...",ITALIC="...")
RUNOFF/NOHIGHLIGHT=(BOLD="...",UNDERLINE="...",ITALIC="...")
```

SIR: F86-81

Abstract: The Fortran OPEN statement should support setting file protections.

Description: It should be possible to set the protection on a file as it is created. The value for this keyword would be a standard VMS specifier ("S:REW,..."). INQUIRE should be able to return the current protection of a file.

SIR: F86-82

Abstract: Fortran should support intrinsic functions in DATA statements.

Description: The Fortran compiler should accept the following statements:

```
DATA IDWORD /ISHFT(10,16)/
DATA PI /2.*ACOS(0.)/
```

The first data statement is useful for generating double-word entries for system services. The second data statement demonstrates a precision-independent way to generate PI.

SIR: F86-83

Abstract: The /SHOW qualifier should default to "NOMAP" for Fortran compiler listings.

Description: There are few uses for the storage map in the Fortran listing. This should be suppressed, by default, to save paper.

SIR: F86-84

Abstract: The Fortran compiler should be able to generate code to perform a "read with prompt" terminal I/O.

Description: The Fortran compiler should be able to generate code to perform a "read with prompt" terminal I/O, so that typing a Control-R will cause the prompt string to be re-displayed.

SIR: F86-85

Abstract: The addresses shown in a MACRO-32 listing should be the same as those displayed in the debugger.

Description: MACRO-32 listings show addresses relative to the base of the PSECT. DEBUG shows them relative to the last label it knows about. Once you step past the label, it's difficult to determine where you are. Finding breakpoints is also difficult. It should be possible for DEBUG to display addresses relative to the lowest address in the current PSECT in the current module.

SIR: F86-86

Abstract: SPM should be able to report "high-priority" processes separately.

Description: On a busy system with batch jobs and time-sharing processes, the CPU is almost always busy, and disk I/O is occurring. It is currently impossible to determine how much of the machine is being used for "high-priority" processes (interactive processes, symbionts, job controller, etc.). SPM should be able to report when a "high-priority" process has the CPU, and the time each "high-priority" process spent waiting for disk I/O, system pool space, or locks.

SIR: F86-87

Abstract: Provide an SOS interface for TPU.

Description: An SOS interface should be developed for TPU. There are still many non-ANSI terminals used for program development. Full screen editing tends to be more expensive, and many users resist learning another editor.

Abstract: The EDT interface to TPU should provide full EDT emulation.

Description: The EDT interface to TPU should include support for EDT line-mode commands and the "no-keypad" mode operation.

SIR: F86-89

Abstract: TPU needs to be made more intelligent about updating the screen.

Description: TPU unnecessarily redraws portions of the screen, after deleting marked text in EDT emulation mode. Also, TPU updates the screen during the middle of executing a LEARNed sequence, instead of just at the end. It would be desirable if TPU took advantage of the SMG facility that is in VMS to perform screen updating. Foreign terminals would be better supported as a result.

SIR: F86-90

Abstract: DEC should provide more useful TPU primitives.

Description: TPU provides just enough support to implement only the EVE and EDT interfaces. A user who tries to use TPU to implement another editor encounters too many problems, due to a lack of TPU primitives. Note that both LSE and NOTES required additions to the TPU Bliss modules, so that they could be implemented in TPU. DEC needs to commit a budget and/or staff to expand the horizons of the TPU builtins.

SIR: F86-91

Abstract: Provide sources of all example programs and command procedures.

Description: The sources of all example programs and command procedures which appear in the VMS documentation set should be supplied in SYS\$EXAMPLES. The exceptions would be examples that are incomplete or are less than a few lines long. This would save everyone considerable typing, and perhaps insure that the examples work correctly.

SIR: F86-92

Abstract: Provide a standard way to pass Unix-style argument vectors under VMS.

Description: There are several mechanisms for obtaining Unix-like features under VMS. These include true UNIX emulators (like EUNICE), the DECshell, and VAX-11 C, each providing a different set of functionality. It would be useful if Digital would document a standard interface for passing fork()/exec() argument vectors. This would allow easier integration of these similar facilities. It is very likely that third-party vendors would adopt any DEC standard.

#### System Management

SIR: F86-93

Abstract: Accounting Utility should display all active processes as well as those completed in any time interval.

Description: When attempting to track a specific event in a given time interval, which may include the present, the accounting utility will display only those processes that have completed, not those that are currently active. Without active processes included, it is easy to overlook the desired event.

SIR: F86-94

Abstract:

Printer "fallback" mode should use backspace and overprint where possible, on a hardcopy device.

Description: Many "multinational" characters are simply accented, and can be reproduced by overprinting with a backspace and another character. This would be more useful than just printing o's for the characters.

SIR: F86-95

Abstract: More detail about the benefits of installing executables should be included in the Guide to VAX/VMS Performance.

Description: Managers should not have to "blindly" experiment with installed images.

SIR: F86-96



Abstract: Provide an tool to dump SYSUAF.DAT in a textual form which can be used to regenerate the SYSUAF.DAT.

Description: Often, the System Manager needs to recreate the SYSUAF.DAT with the same entries but different characteristics. It would be great if there were a mechanism, (perhaps an AUTHORIZE LIST option) that would dump the UAF contents as a set of AUTHORIZE directives which could be edited and used to regenerate the UAF. Some mechanism of dumping and resetting passwords in encrypted form would be necessary.

SIR: F86-97

Abstract: Enhance DCL command SET LOGINS to allow a UIC specification.

Description: It would be useful to be able to set login limits for users by groups. On a CAD/CAM system there are times we want to control which group has access to the computer at specific times.

SIR: F86-98

Abstract: Enhance SYSSYSTEM:SHUTDOWN.COM to include an option to continue the shutdown if all interactive and batch processes are stopped.

Description: Many times a system manager needs to give 15 minutes notice before a shutdown, and finds that 5 minutes later all users have logged off and there is no batch activity. In these cases, the system will not shutdown until the remaining ten minutes has elapsed. An option to shutdown immediately after all user processes have logged out would save time.

SIR: F86-99

Abstract: Support for the changing requirements of applications is needed in user validations. Both AUTHORIZE and DISKQUOTA should be enhanced to permit placing a user in one or more classes of unique combinations of quotas and privileges.

Description: It should be possible to designate a user as a member of at least one class that has associated with it certain quotas and privileges that are automatically inherited by that user. This would permit the UAF entries of all users of a package to be changed by a single change to the class prototype, instead of the current method of changing one user at a time. A class prototype would specify only those extraordinary quotas and privileges needed by the users of a particular software package. A

user entry in more than one class would inherit the maximum setting for a parameter.

SIR: F86-100

Abstract: Provide backup output logging of the first and last file name on a tape save-set.

Description: In most BACKUP operations, the files on the tape are in alphabetical or some reasonably known order. If the first and last file name on the tape were known, then all of the files on that tape would also be known. This would speed up the file recovery time on a multi-volume tape save-set.

SIR: F86-101

Abstract: Load all of stand-alone backup into memory for operation, and enhance stand-alone backup to always respond promptly to Control-Y at the console, and allow the entry of another backup command.

Description: Loading all of stand-alone backup into memory would avoid rewinding a TU58, or slow floppy accesses. These contribute to a much slower method of backing up a system. Stand-alone backup should respond promptly to a control-Y, and then should allow another command to be entered, rather than having to reload stand-alone backup when an error in typing the command occurs.

#### Large Systems

SIR: F86-102

Abstract: Provide a callable interface to the operator messaging services that permits query calls to OPCOM or its replacement.

Description: The current OPCOM interfaces are inadequate for a commercial environment with lots of tape mounts and other requests coming up on cluster consoles. In order to improve on what exists, it would be helpful to have a mechanism to ask OPCOM for outstanding requests of a particular or a subset of operator classes. This would lend to the building of an interactive request management tool which would run on a video or hardcopy terminal. Pending forms should generate requests to PRINTER operators so that this mechanism will cover 99% of the requests an operator needs to handle. Any functionality that crosses the boundaries of SYSSNDJBC and SYSSNDOPR should be

consistent between them. If this is not possible due to compatibility problems, invent a new call that will complement and/or eventually replace these.

SIR: F86-103

Abstract: Enhance the ALLOCATE command to allow requests to be queued.

Description: Enhance the ALLOCATE command to enable a user to optionally queue the allocation request when all qualifying devices are busy. Device allocation should be handled by a queue manager similar to the VMS V4.0 print queue manager, and the allocation request queues should be made cluster wide to support cluster-visible devices.

User functions should include the ability to specify characteristics required of a generic device, the automatic notification of allocation, the ability to delete an allocation request, the ability to examine the allocation request queue, and the ability to do other interactive processing while waiting for an allocation request to be granted.

Operator functions should include the ability to mark failing devices as unavailable and the ability to force a deallocate. Manager functions should include the ability to define device characteristics and specify physical devices as possessing those characteristics.

Device allocation and deallocation should place records in the accounting file so that charge back accounting can be done for allocated devices.

A mechanism for avoiding deadlocks when multiple devices are allocated should be provided.

Examples:

```
$ ALLOCATE/QUEUED/WAIT TAPE$CLASS:-
 /CHARACTERISTICS=(DENSITY:6250) LOGICAL_TAPE
```

(Queue an allocation request for a tape drive with 6250 bpi capability and wait until the allocation has completed.)

```
$ ALLOCATE/QUEUED/NOWAIT/NOTIFY DISK$CLASS:-
 /CHARACTERISTICS=(RA60) MY_DISK_PACK
```

(Queue an allocation request for an RA60 disk drive return control to my terminal. Notify me when allocation has completed.)

```
$ ALLOCATE/NOQUEUED TERMINAL$CLASS:-
```

/CHAR=(AUTODIAL,BAUD:1200 DIAL\_OUT\_MODEM

(Allocate a terminal device with a 1200 baud autodial modem but don't queue the request. Give an error if all such devices are allocated.)

SIR: F86-104

Abstract: VMS should implement tape automatic volume recognition and provide the security normally associated with volume labeling.

Description: VMS should provide a complete implementation of automatic volume recognition for tapes, that may be enabled/disabled by the operator on a per drive basis. This means that (with AVR enabled), when a tape is mounted, the system checks possible labels and honors mount requests without operator intervention, if possible. If a job needs 4 tapes, the operator can mount them all if enough drives are available and then forget about them until somebody else needs the tape drives. It should also be possible for a user to request a tape mount based solely on the tape's label and density. The user should not be required to know what physical devices implement a particular tape density on a particular system. VMS should also support a "visual id" or "slot number" which is displayed in all operator messages related to the mount.

It should be possible to operate a VMS system in a mode where all tapes are under system/operator control. This means that they are pre-initialized and users are not allowed to change the labeling on the tape without special privilege. The BACKUP utility must also conform to such labeling restrictions, thereby insuring that the BACKUP data is written onto the proper reels. VMS should require explicit operator intervention for unlabeled tapes. It is not acceptable that an unlabeled tape which happens to be on a drive be automatically assigned.

SIR: F86-105

Abstract: Provide a BACKUP/OPERATOR capability.

Description: Currently, when the BACKUP command is run interactively, request for additional tape volumes are directed to the interactive terminal. In a large systems environment, users are typically not encouraged to enter the machine room. All tape requests are handled by system operators. It should be possible to specify that all BACKUP tape requests be directed to the system operator.

Abstract: Support TCP/IP on VMS.

Description: The TCP/IP protocol is one of the most widely supported network protocols for interconnection of workstations and mid-sized computers. It is frequently necessary to incorporate VAXs into such a mixed-vendor network. The TCP/IP protocol should be supported by DEC under VMS to allow such connections.

SIR: F86-107

Abstract: All utilities should use a standard format for printable output.

Description: Printable output generated by VAX utilities and compilers comes in a great variety of record formats and carriage control conventions. A particularly awkward convention is the use of embedded ASCII control characters to generate multiple print lines from a single record. There appears to be no standard for this or any other mechanism. As a result it is very difficult to print "printable" output on non-DEC printers or transmit it through heterogeneous networks. Digital should document a standard record format and carriage control convention and modify all facilities to conform to this convention. As an alternative, Digital should provide a utility which converts all currently used formats into a standard format. It seems that this functionality currently exists, distributed between the print symbiont, device driver, and "DEC standard" printers.

SIR: F86-108

Abstract: Provide an in-line help facility in VMS

Description: Help is available in VMS, but it would be very useful to have this information available as the command is being typed, where it could be used to get a list of options for the next portion of the command. Frequently users cannot remember the name of the particular qualifier they want, so they must abort the command, and run the HELP program to find the qualifier. VMS would be much easier to use if the user merely had to type a special character (such as a question mark) and a RETURN to have DCL display a list of what it was expecting to see and retype the command line up to the point where the user requested help. (This is similar to the in-line help provided by the TOPS-20 operating system.)

SIR: F86-109

Abstract: VMS should provide filename completion on user request

Description: With the advent of long filenames, it has become a chore to type in the entire file specification. VMS should provide a facility similar to TOPS-20 filename recognition in which the operating system will fill out the rest of the filename when the user enters the ESCape key.

For example, if a directory contained files MARCHDATA.INPUT and MYMESSAGES.LIS, and the user typed "MA<ESC>", VMS should fill out "RCHDATA.INPUT".

SIR: F86-110

Abstract: VMS should implement an UNDELETE command.

Description: Users frequently delete files by mistake. VMS should provide an UNDELETE command which allows them to be retrieved. VMS should also provide an EXPUNGE command, which causes deleted files to be removed and their space reclaimed.

When the user DELETes a file, the file should be marked for deletion, but not actually removed from the file system. The DIRECTORY command should not display the file, except when a /DELETED qualifier is used. When the user (or system operator) issues an EXPUNGE command, all files matching the file specification that are marked for deletion should be removed.

The /VERSION\_LIMIT qualifier would indicate how many versions of a file should be kept (in both a deleted and undeleted state) before automatic EXPUNGING occurs.

A new qualifier (perhaps /KEEP\_LIMIT) would indicate how many versions should remain undeleted. /KEEP\_LIMIT=1 would mean that as new versions of the files are generated, all previous versions would be marked as deleted. Only as many versions as specified by /VERSION\_LIMIT would be allowed before the oldest version was expunged.

The system should perform an automatic expunge of the connected directory and login directory complex when the LOGOUT command is issued.

SIR: F86-111

Abstract: Provide a separate file "date last read" from "expiration date".

Description: VMS provides the ability to maintain a pseudo "date of last access" for files by using a volume wide file retention period to update an expiration date. It would be desirable to have the ability to maintain the date a file was last read, as well as maintain an explicit expiration date for a file. Knowing for certain the date and time a file was last read can be an important security tool. The date the file was last read should be separate from the date the file was last created and the date the file was last modified.

SIR: F86-112

Abstract: Allow a privileged user the ability to link one terminal to another.

Description: VMS should support a facility which would allow a privileged user to link his terminal to another terminal. This link would at minimum allow the privileged user to issue commands as if they were typed from the other keyboard. This capability would be useful to "cleanup" whatever was running on the remote terminal before its process was deleted. Ideally, the facility should also allow the privileged user to see all output directed to the target terminal. This would allow for fully interactive "hand=holding" or consulting for user problems.

SIR: F86-113

Abstract: Provide for single command initiation of the compile, link, execute sequence.

Description: VMS should implement the TOPS-10/20 COMPILE, LOAD and EXECUTE commands.

The COMPILE command invokes the appropriate compiler based on filetype (e.g., .FOR for FORTRAN, .MAR for MACRO). The specific compiler can also be explicitly specified by a qualifier (/FORTRAN, /MACRO). The COMPILE command examines the date on the .OBJ file with the same name as the source file to determine if a recompilation is necessary.

The LOAD command adds a LINK invocation to the COMPILE. The EXECUTE does the COMPILE and LOAD, and then runs the resulting executable image.

These three commands are a great aid to users doing program development, and help to eliminate unnecessary recompiles of modules in large programs.

SIR: F86-114

Abstract: "Unbundle" the functions of the CAPTIVE login flag

Description: The login flag CAPTIVE is currently the only way to enforce the execution of the command file specified in the /LGICMD field. Unfortunately, CAPTIVE also disables the use of the login /DISK qualifier and implies the flags DEFCLI, DISCTLY, and LOCKPWD. This is not necessary when the /LGICMD field contains a full file spec for the procedure. Control of the /DISK qualifier and of the /LGICMD should be available as separate flags.

SIR: F86-115

Abstract: Maximum length of account strings should be increased.

Description: The VMS account string field associated with a process should be expanded to 39 characters to provide increased flexibility.

SIR: F86-116

Abstract: Provide support for simple project accounting.

Description: The Spring 1985 VAX SIR Ballot contained a request for project accounting in VMS. Digital's response was "We also feel that project accounting is very important...We feel that this is a reasonably complex area and, as such, some of the enhancements that we intend to make in this area will appear over time."

Project accounting is something that is desperately needed at large sites. In its simplest form, project accounting should provide a SET PROJECT command that would write a process accounting record, and start recording a new record with a new account string specified by the user. The account string should be verified before these actions take place. The system manager should be allowed to set up a file which specifies which UIC's are permitted to use individual account strings.

Many sites have immediate government or internal security requirements for "one username per user" level of accountability. DEC should provide this form of project accounting until their full-blown system is available.

SIR: F86-117

### VAX System SIG Committee List

As of January 8, 1986

Abstract: VMS should record the account string on files.

Description: VMS should record the user's account string in the file header when the file is created. The string could then be used at user sites to do some form of disk space accounting.

SIR: F86-118

Abstract: VMS should checkpoint its process accounting records so entire login sessions are not lost when the system crashes.

Description: When the system crashes, no accounting records for logged in processes are written. VMS should provide a mechanism for periodic checkpointing of the records it is collecting so that when the system comes up after a crash, partial records may be written to the accounting file that reflect the information up to the last checkpoint before the crash.

SIR: F86-119

Abstract: SHOW USERS, SHOW SYSTEM should optionally display the image names.

Description: It is often useful to be able to see the name of the image a user is running. Presently only users with WORLD privilege can get this information. The SHOW USERS and SHOW SYSTEM commands should have a qualifier which would make them return this information. Output might look like this:

| VAX/VMS  | V4.3         | 20-MAY-1986 | 23:21:54.00 | Uptime | 3   | 08:27:11    |
|----------|--------------|-------------|-------------|--------|-----|-------------|
| Pid      | Process Name | Image       | State       | Pri    | CPU |             |
| 00000080 | NULL         | (DCL)       | COM         | 0      | 3   | 06:35:37.11 |
| 00000081 | SWAPPER      | (DCL)       | HIB         | 16     | 0   | 00:00:23.34 |
| 00000084 | ERRFMT       | ERRFMT      | HIB         | 8      | 0   | 00:00:08.99 |
| 00000085 | OPCOM        | OPCOM       | LEF         | 8      | 0   | 00:00:02.24 |
| 0000008E | OPNS_OPA0    | (DCL)       | LEF         | 7      | 0   | 00:00:05.51 |
| 000001CB | SMITH_VTA58  | (DCL)       | CUR         | 4      | 0   | 00:00:22.31 |
| 000001CC | TPU_SMITH    | TPU         | LEF         | 7      | 0   | 00:00:13.03 |

Availability of this option might be controlled by a system logical name for the benefit of sites which consider the image name to be sensitive information.

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## INPUT/OUTPUT

### A SIG Information Interchange

A form for INPUT/OUTPUT submissions is available at the back of the issue.

#### INPUT/OUTPUT 500

Caption: SET HOST/DTE TTxx/DIAL=(NUMBER=#,MODEM=DF224) - Reply to I/O # 499

Message: A Pageswapper article is in the works regarding SET HOST with the "Scholar". Bob McCormick of Video Communications Incorporated in Feeding Hills, Massachusetts has sent me a manuscript but I need to get it in machine-readable form as it contains numeric data for patches etc.

Contact: Larry Kilgallen  
Box 81, MIT Station  
Cambridge, MA 02139-0901

Date: April 29, 1986

#### INPUT/OUTPUT 501

Caption: RK05 driver neede for VAX750 (VMS V4.3)

Message: We would very much like to connect our old RK05 disk drives presently on our 11/70 system to the VAX750. If anyone has a driver available and has successfully done this, we would love to hear from you.

Contact: Sheila Taylor  
National Institutes of Health  
National Institute of Dental Research  
Building 30, Room B23  
Bethesda, MD 20892  
Telephone (301) 496-1621

Date: March 27, 1986

#### INPUT/OUTPUT 502

Caption: SET HOST/DTE on RACAL/VADIC 3451-PA

Message: I would appreciate any help anyone could offer on using the DCL command SET HOST/DTE to dial out from our VAX (VMS V4.1) via a RACAL/VADIC 3451-PA (programmable, autodial) modem connected to a DZ11 port.

Contact: Roger Van Dok  
Energy Fues Nuclear, Incorporated  
1200 17th Street, Suite 2500  
Denver, CO 80202  
(303) 623-8317

Date: May 6, 1986

#### INPUT/OUTPUT 503

Caption: File Transfer to IBM

Message: At the present time we are trying to transfe files from a VAX 11/750 to an IBM mainframe. We don't have DECnet on our system. We do have a software package called Linkware, which will transfer the files for us. What we would like to be able to do is to transfer the files through our synchronous port. In order to get our synchronous port operational we would have to write a device driver, which we don't have the resources or the time to do. We are wondering if anyone out there has done this and if they could send us any information. We would appreciate anything we could get.

Contact: Cheryl Kowalik and Nancy McGuire  
Programmer/Analysts  
Monroe Orleans 2 Board of Cooperative Educational Services  
3599 Big Ridge Road  
Spencerport, NY 14559  
(716) 352-2400

Date: May 9, 1986

INPUT/OUTPUT 504

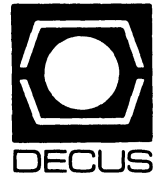
Caption: Datatrieve record definition for MONITOR

Message: I would like to know if anyone knows of a Datatrieve record definition for the binary recording file created by the MONITOR utility. I have read the MONITOR supplement doc, but am hoping someone else has already created DTR definitions. This would be useful for using DTR for data reduction and to make simple plots like USERMODE vs. TIME, etc.

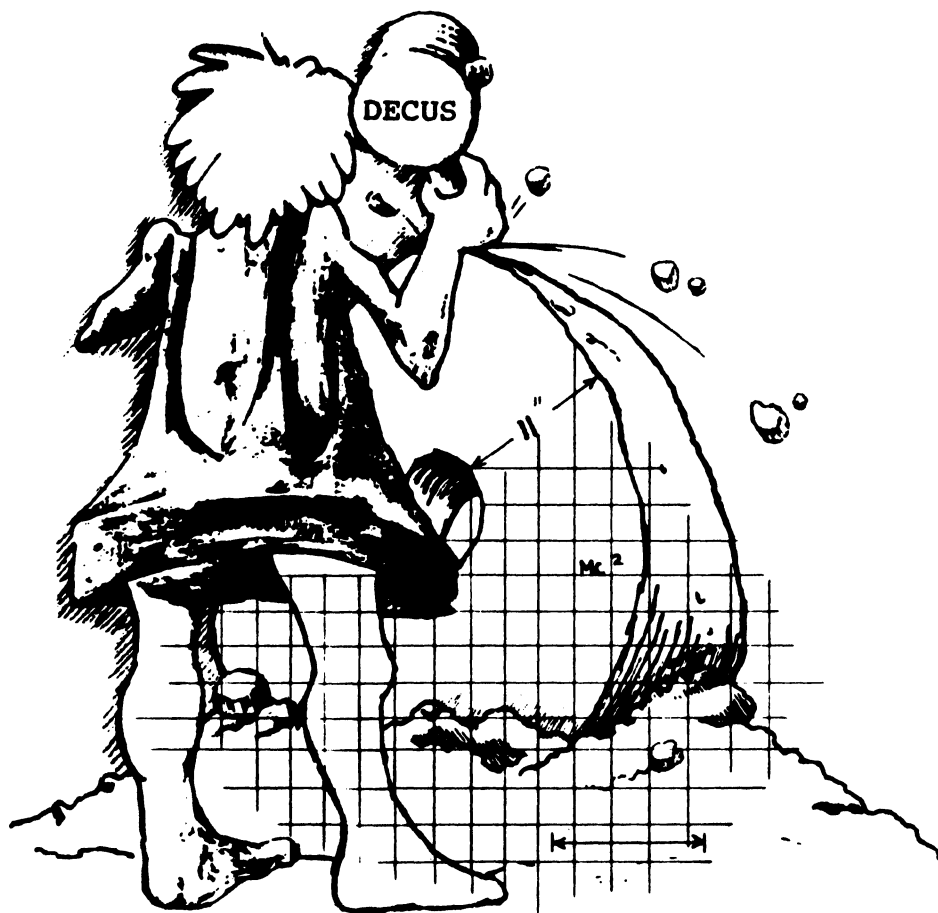
Contact: John F. Priebe  
Edison State College  
1973 Edison Drive  
Piqua, OH 45356  
Telephone (513) 778-8600

Date: May 16, 1986





# LIBRARY



# DECUS PROGRAM LIBRARY

## NEW LIBRARY PROGRAMS AVAILABLE FOR THE RAINBOW SERIES OF COMPUTERS

**DECUS NO:** RB-107 **Title:** MS/DOS Comms Selection **Version:** January 1986

**Operating System:** MS/DOS **Source Language:** Various **Memory Required:** 128K **Hardware Required:** A modem **Keywords:** KERMIT, Utilities - MS/DOS

**Abstract:** These programs can be used for transmitting files with error correction across phone lines. Of LCTERM, KERMIT and DECMINI, LCTERM and DECMINI are the most comprehensive and support the KERMIT protocol as well as other common protocols.

DECMINI and LCTERM are fairly self documenting; start them up and have a play with them. KERMIT comes with documentation, which you will want to read.

Again, you will not need all three programs; select the one most suited to you and stick with it.

**Restrictions:** MS/DOS V2.11 or higher is required.

**Sources not included.**

**Media (Service Charge Code):** One RX50 Diskette (JA)

**DECUS NO:** RB-111 **Title:** MS/DOS KERMIT **Version:** V2.28, April 1986

**Author:** Frank da Cruz, Columbia University **Submitted by:** Brian Nelson, University of Toledo **Operating System:** MS/DOS V2, CP/M **Source Language:** 8088 Assembly Lang. **Keywords:** KERMIT

**Abstract:** MS/DOS KERMIT is a program that implements the KERMIT file transfer protocol for the IBM PC, XT, and AT and several other machines using the Intel 8086 processor family (8088, 80286 etc.) and operating system family (PC-DOS or MS-DOS, henceforth referred to collectively as MS/DOS or simply DOS).

The program operates under version 2.0 and above of DOS. It runs in approximately 80K of memory - over and above the memory used by DOS - which means that your system should have at least 128K of RAM to use version 2 of MS/DOS KERMIT.

Some capabilities of MS/DOS KERMIT are local and remote operation, transfers text and binary files, wildcard send, X/Y interruption, filename collision avoidance, time out, 8th-bit prefixing, repeat count prefixing, alternate block checks, terminal emulation, communications settings, transmit BREAK, IBM mainframe communication, session logging, act as server, talk to server, advanced commands for servers, local file management, command/init files and command macros.

**Assoc. Documentation:** There is other documentation available from Columbia University.

**Sources not included.**

**Media (Service Charge Code):** User's Manual (EB), One RX50 Diskette (JA) **Format:** MS/DOS

## NEW LIBRARY PROGRAMS AVAILABLE FOR CP/M

**DECUS NO:** CPM-267 **Title:** Electronic Grade Book **Version:** August 1985

**Author:** Linda C. Petty, Hampton University, Hampton, VA **Submitted by:** Ellen F. Rosen, College of William and Mary, Williamsburg, VA **Operating System:** CP/M-80/80 **Source Language:** MBASIC **Memory Required:** 64K **Software Required:** MBASIC-86 Interpreter **Hardware Required:** Printer for Hardcopy **Keywords:** Educational Applications

**Abstract:** Electronic Grade Book will not only record and maintain student grades, but also will calculate the mean and standard deviation for any examination. It will calculate final course grades and indicate how many standard deviations away from the mean an individual student's grade lies. The program permits different numbers of scores per student and also permits different weightings of each test score for the final grade calculations. The program will alphabetize a class roll, print the class roll, and print the final grade sheet.

**Media (Service Charge Code):** One RX50 Diskette (JA)

**DECUS NO:** CPM-269 **Title:** CP/M-86 KERMIT **Version:** V2.28, April 1986

**Author:** Frank da Cruz, Columbia University **Submitted by:** Brian Nelson, University of Toledo **Operating System:** MS/DOS V2, CP/M **Source Language:** 8088 Assembly Lang. **Keywords:** KERMIT

**Abstract:** This version of KERMIT is designed to support any CP/M-86 system. It supports the Digital Equipment Corporation Rainbow-100 and the NEC Advanced Personal Computer. It is very similar to CP/M-80 and MS/DOS KERMIT.

Some capabilities of KERMIT-86 are local operation, transfers text files, transfers binary files, wildcard send, X/Y interruption, filename collision avoidance, time out, 8th-bit prefixing, terminal emulation (VT100), communication settings, transmit BREAK, IBM communication, session logging, talk to server, local file management, and command/init files.

**Assoc. Documentation:** There is other documentation available from Columbia University.

**Sources not included.**

**Media (Service Charge Code):** User's Manual (EA), One RX50 Diskette (JA) **Format:** CP/M

## NEW LIBRARY PROGRAMS AVAILABLE FOR THE PDP-11 COMPUTER FAMILY

**DECUS NO:** 11-SP-86 **Title:** Symposium Tape from the RT-11 SIG, FALL 1985, Australia **Version:** FALL 1985

**Operating System:** RT-11 V5 **Source Language:** MACRO-11, FORTRAN 77, FORTRAN IV, BASIC-11 **Keywords:** Data Base Management, KERMIT, Symposia Tapes - RT-11, Utilities - Disk - RT-11

**Abstract:** The following describes the programs found in the different logical disk files on this symposium tape

ARL85.DSK Collection of handy utilities - see README.1st on this area.  
CHESTR.DSK VIRDSK: Virtual FORTRAN Arrays on Disc; BCOPY & SAVD: disc utilities to help dealing with bad blocks on discs; CTTY - a markedly upgraded CONSOL; RADIX (try it with R RADIX).

DBSMN1.DSK DBSMN2.DSK GAMMA1.DSK GAMMA2.DSK Ray DiMarco's Database, version 3.1.

IRVINE.DSK Programs supplied to the public domain from the Sir Charles Gairdner Hospital, Perth. Mostly nuclearmedicine programs with a few other tacked on for interest.

HELP Collection: Multi-task scheduler (simple) - SCHED; RUNOFF listing of XXDP documentation;

MATRIX.DSK customized for both RT5.1 & TSX+5.1; simple FORTRAN program (LIST) for producing paginated listings (with date & time) from text files.

NZPAT.DSK A pre-release version of an update of a previous DECUS matrix package for both real and complex variables.

PLOTIV.DSK A generally useful file examining and patching utility including output available in MACRO mnemonics.

PLOT77.DSK Plot packages for FORTRAN-IV for driving ReGis terminals and HPGL plotters at choice.

SPELL1.DSK Ibid. FORTRAN-77. [Only tested under TSX+so far].

SPELL2.DSK Ray DiMarco's Spelling Checking Program.

RDB.DSK Miscellaneous PASCAL programs for the VAX.

RUNOFF.DSK Chester Wilson's program; bug fixes only since last release.

TTLIB.DSK Chester Wilson's VT100 library, including "C" sources.

KER1V1.DSK KERMIT, as provided by Jim Morris with modifications to allow running correctly as a virtual jobunder XM courtesy of Stephen Hirsch.

KER2V1.DSK KERMIT, as provided by Ray DiMarco with modifications to facilitate its use under TSX (normal version chews up too much CPU time by sitting in a loop).

No guarantees are made as to completeness, usability or quality of the programs on the tape and the material has not been checked or reviewed.

**Media (Service Charge Code):** 2400' Magnetic Tape (PS Format) RT-11

**DECUS NO:** 11-S-P-87 **Title:** Symposium Tape from the RT-11 SIG, Fall 1985, Anaheim **Version:** Fall 1985

**Author:** Various **Submitted by:** R. W. Barnard, Sandia National Laboratories, Albuquerque, NM **Operating System:** RT-11 V5.0 and later **Source Language:** BASIC-PLUS2, FORTRAN 77, MACRO-11 **Memory Required:** Specified in individual programs **Software Required:** If necessary, it will be specified in individual programs. **Hardware Required:** If necessary, it will be specified in individual programs. **Keywords:** KERMIT, RUNOFF, Symposia Tapes - RT-11

**Abstract:** The symposium tape from the RT-11 SIG contains eighteen packages in subdevice format. The tape includes an annotated directory TAPDIR.TXT, and instructions for RT-11 and RSTS users or recovering files from subdevices. The tape contains the following submissions:

- KERMIT file transfer protocol (version 2.39) for RT-11, RSX-11, RSTS/E and P/OS.
- Fourth DECUS release of the plotting package HGRAF, including virtual array support.
- New, debugged version of Bonner Lab RUNOFF, including recent bug fixes since the Fall, 1984 Symposium.
- Improved version of UCL+ user command linkage (version 7.49).
- A FORTRAN 77/RT-11 OTS update kit, routines for writing virtual arrays to disk, diagnostic overlay handler, aircraft landing simulator.
- "Foolproof" way for setting system date and time.
- Utilities for manipulating directories, including taking directories of subdevices without mounting them, utilities for comparing two directories, printing time-stamped output, reading and writing magnetic tape in various ways.
- Two versions of the FLECS translator.
- The FORTH programming environment.

No guarantees are made as to the completeness, usability or quality of the programs on tape and the material has not been checked or reviewed.

**Media (Service Charge Code):** 2400' Magnetic Tape (PS Format) RT-11, 1600 BPI ONLY

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Seed Software Corp.  
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Houston, TX 77259-1293  
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P.O. Box 52661  
Atlanta, GA 30355  
(404) 231-1484

### UNISIG

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Cupertino, CA 95014  
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-----  
SUBMITTING ARTICLES TO THE HMS SIG NEWSLETTER  
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The purpose of the HMS SIG Newsletter is to serve as a forum to share information related to DEC hardware with the members of the SIG. As such, the existence of the newsletter is entirely dependent on your contributions. If you have an HHK item, a better or safer way to do something, product news, a tutorial article of general interest, etc., we are interested in publishing it in the newsletter. It is intended that the HMS SIG Newsletter be published at least four times a year.

There are several ways to submit material for the newsletter:

- o The Hardware Submission Form in the back of the newsletter can be used for brief items (there is not enough room if you have a lot to say).
- o You can send me camera-ready hard-copy (this saves me a lot of typing).
- o I will accept submissions on floppys. I can handle RX50's or 8" diskettes (either density, single or double sided). I prefer RT-11 format, if possible, but I can probably handle RSX or VMS stuff somehow. I will return your diskette(s), of course.
- o Those of you that have access to DCS can send things to username WALKER. I check DCS daily.
- o I am also on CompuServe as "Bill Walker 71066,24".

In any event, if you have anything to submit, send it! If it is a mess, but I can read it, I will get it in the newsletter somehow. Finally, if you have any question about submitting material, call me. My telephone number is listed below.

Contributions can be sent to:

|                    |    |                         |
|--------------------|----|-------------------------|
| HMS Editor         |    | William K. Walker       |
| DECUS              | OR | Monsanto Research Corp. |
| BPO2               | == | P.O. Box 32 A-152       |
| 249 Northboro Road |    | Miamisburg, OH 45342    |
| Marlboro, MA 01752 |    | (513) 865-3557          |

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**Description and Examples:** (Use additional pages as necessary.)

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Donald E. Stern, Jr., DTR/4GL SIG Newsletter Editor  
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# DATAGRAM

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## OFFICE AUTOMATION SIG SYSTEM IMPROVEMENT REQUEST SUBMISSION FORM

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### HARDWARE IMPROVEMENT

DECmate \_\_\_\_\_  
PRO-Series \_\_\_\_\_  
Rainbow \_\_\_\_\_  
Other \_\_\_\_\_

### SOFTWARE IMPROVEMENT

ALL-IN-1 \_\_\_\_\_ WPS \_\_\_\_\_  
CP/M (DECmate) \_\_\_\_\_ P/OS \_\_\_\_\_  
CP/M (Rainbow) \_\_\_\_\_ MS-DOS \_\_\_\_\_  
Other \_\_\_\_\_

**ABSTRACT** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**DESCRIPTION** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

E. Catherine Ditamore  
ARA Services  
Corp MIS  
Independence Square West  
Philadelphia, Pa. 19106



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)

Would you be willing to be placed on a list of contacts? If so, what areas?

Do you have any features which you would like IAS to include?

Any further comments?

IAS SIG MEMBERSHIP FORM

Please return to:

John Roman  
McDonnell Douglas  
Department N436  
600 McDonnell Blvd.  
Hazelwood, Missouri 63042

# IAS WHIMS

WHAT: (Describe your WHIM) (Please print)

WHY: (Describe the reason for the WHIM)

HOW: (Make any suggestions for a possible implementation)

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_

Please mail to:

Kathleen M. Anderson  
EATON Information Management  
Systems Division  
2017 Cunningham Drive  
Suite 208  
Hampton, Virginia 23666

Phone: (804) 826-1941



# LANGUAGES & TOOLS WISHLIST

Sponsored by the Languages & Tools SIG

DECUS Symposium, Dallas, TX, Apr 28 - May 2, 1986

This Wishlist Survey will convey to DEC the priorities and preferences of language and tools users for new or modified languages and tools.

Return this Wishlist Survey Questionnaire in person to the AI/L&T/UNISIG/APL Campground Host (in Room W-108 in the Convention Center) or drop into any Survey Collection Box in the Campground, in West Ballroom A, B, or D, or in the AI/L&T/UNISIG/APL SIG Suite in the Loews Anatole Hotel (room number available at the General Information Booth). Or return it by mail to: Alan Rizzuto, R.D. #2 Box 459, Delta, Pa. 17314.

A Special Gift is yours for returning 5 survey questionnaires of different types, completed by one person. To claim the prize, bring the filled-out forms in person to the Campground (open 9 a.m.-6 p.m. daily) or Suite (6 p.m.-11 p.m.). In addition, Raffle Prizes will be awarded at drawings to be held during the Languages & Tools SIG Feedback Session, Thursday, 12:00 to 1:00, and the Languages & Tools Wrapup Session, Friday, 1:00 to 2:00, both in West Ballroom A&B. To be eligible for both drawings, enter your name here: \_\_\_\_\_ (you needn't enter your name, except to enter the raffle). You must be present in person to win.

\*\*\*\*\* DEADLINE FOR ENTRY IS AUGUST 15, 1986 \*\*\*\*\*

Vote for a wishlist item by entering a number of points in the space provided to the left of its item number. The maximum number of points allowed for any one entry on this form is 10. The total number of points which may be used for this ballot may not exceed 100.

## COMPILERS

- 1 - DEC should provide a macro capability in Fortran (ie. .IDENT, .TITLE)
- 2 - DEC should provide Fortran qualifiers (/unsigned\_byte - treating byte as an unsigned quantity 0-255) also (/logical\_usage - that checks for a LOGICAL quantity as an integer instead of having to use 0 & 1).
- 3 - DEC should provide compiler front ends to facilitate the development of 3rd party cross-compilers (to standardize the interface).
- 4 - DEC should provide a VAX-11 Basic with an optimizing code generator.
- 5 - DEC should provide C++ compiler (C++ is a version of C with extensions for object oriented programming).
- 6 - DEC should speed up the tasking provided by the VAX Ada compiler.
- 7 - DEC should provide a callable version of the ACS (Ada Compilation System).
- 8 - DEC should enhance ACS so that it no longer does unnecessary compiles when only comments are changed.
- 9 - ACS should be modified so that it is possible to specify a CMS element by class name, rather than just taking the latest version.
- 10 - DEC should provide compiler constructs to allow user to change or add source file & source line information that is propagated to the object file (to facilitate use of LSE & Debug in preprocessor environments).
- 11 - DEC should provide a PDP-11 version of the VAX C compiler.

## CMS/MMS

- 12 - DEC should provide MMS dependency generators for programming and text processing.
- 13 - DEC should allow wildcards on source files in MMS.
- 14 - DEC should allow a "user=" option in CMS, allowing a central person other than the reserver to replace a module.
- 15 - DEC should provide CMS/MMS capability to draw hierarchy diagrams.
- 16 - DEC should provide the ability to handle groups in CMS more like the VMS directory hierarchy.
- 17 - DEC should provide the capability to tie CMS comments into a problem report data base.
- 18 - DEC should allow multi-line remarks for CMS library.

**REQUIREMENTS/DESIGN TOOLS**

- 19 - DEC should provide automated tool support for requirements analysis and design (for example, Yourdon/DeMarco structured analysis/structured design).
- 20 - DEC should provide a PDL (program design language).
- 21 - DEC should provide a means for automatic generation of source code based on formal software requirements.

**ULTRIX SUPPORT**

- 22 - DEC should commit to a policy of implementing tools on Ultrix-32 simultaneously with their VMS implementation.
- 23 - DEC should migrate VAX Ada to Ultrix.
- 24 - DEC should migrate VAX C to Ultrix.

**TRAINING/DOCUMENTATION**

- 25 - DEC should provide a CAI course for TPU.
- 26 - DEC should provide a CAI course for LSE.
- 27 - DEC should publish a comprehensive "HOW TO" guide on how to use all their tools together in a software development environment.
- 28 - DEC should provide consulting services to customers so as to train them on how to use new software tools and how to integrate them into their systems development strategy.

**LSE/TPU**

- 29 - DEC should provide a VI interface for TPU. (VI is a popular UNIX editor).
- 30 - DEC should provide a TECO interface for TPU.
- 31 - DEC should provide a foreign terminal support for TPU.
- 32 - DEC should provide LSE for RSX.

**OTHER**

- 33 - DEC should provide native language Static Analyzers, which would produce reports like global cross references, call trees, and data flow analysis.
- 34 - DEC should provide more test tools such as cause - effect network analyzers and flow graph analyzers.
- 35 - DEC should offer SDML as a product. (SDML (Software Documentation Markup Language) is an internal DEC tool that was used to produce the VMS V4 doc set. It contains generic constructs (e.g. <chapter>) which are translated into Runoff or TeX commands, depending on the target).
- 36 - DEC should provide the offsets, bitmasks, etc. of the system service calls into SDL for use by all layered products.
- 37 - DEC should market a VAX-based, bitmapped, mouse driven programmer's workstation and provide tools that take advantage of this interface.
- 38 - DEC should provide a tool for cataloging software components which would make code reusability feasible.

.....  
**NEW ITEM FOR THE LANGUAGES & TOOLS WISHLIST**

To add a new item to the wishlist, enter it here. Be sure to include your reasons for suggesting the item.

Wishlist Item: \_\_\_\_\_

\_\_\_\_\_

Reasons for proposing this item: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**\*\*\*\*\* DEADLINE FOR ENTRY IS AUGUST 15, 1986 \*\*\*\*\***

## L&T MASTERS APPLICATION

Name \_\_\_\_\_

Business address \_\_\_\_\_

\_\_\_\_\_

Phone number (    ) \_\_\_\_\_

Current position \_\_\_\_\_

How long have you held this position? \_\_\_\_\_

What languages or tools are you knowledgeable about? Briefly describe your experience with each. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are you able to attend at least one symposium each year? \_\_\_\_\_

To be a Master, it isn't necessary to do all the things on the following list, just some of them. Are you able to:

- Write occasional newsletter articles on your products? \_\_\_\_\_
- Speak at a lug meeting in your city? \_\_\_\_\_
- Host Birds-of-a-Feather or Clinic sessions at Symposia? \_\_\_\_\_
- Field test new versions of your product at your work site? \_\_\_\_\_
- Interface with the product's DEC product manager? \_\_\_\_\_
- Act as a reference for the product when the product manager needs a referral? \_\_\_\_\_
- Work with the local salesman when reference is needed? \_\_\_\_\_

At Symposia, return your completed application to the Languages & Tools Campground or Suite, or hand it to any L&T Steering Committee member...OR mail it to:

**Kathy Hornbach, L&T SIG Chair  
Lear Sigler/Instrument Division  
4141 Eastern SE MS 121  
Grand Rapids, MI 49508**





## 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: \_\_\_\_\_

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Contact:

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Telephone \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Mail this form to: Larry Kilgallen, PAGESWAPPER Editor  
Box 81, MIT Station, Cambridge, MA 02139-0901, USA

For information about on-line submission, dial (in the United States): (617) 262-6830 and log in with the username PAGESWAPPER.

PAGESWAPPER - July 1986 - Volume 7 Number 12  
INPUT/OUTPUT Submission Form

Tear out or photocopy reverse to submit an I/O item

Larry Kilgallen, PAGESWAPPER Editor  
Box 81, MIT Station  
Cambridge, MA 02139-0901  
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)**

PAGESWAPPER - July 1986 # Volume 7 Number 12  
System Improvement Request Submission Form

Tear out or photocopy reverse to submit an SIR

Gary L. Grebus  
Battelle Columbus Division  
Room 11-6011  
505 King Avenue  
Columbus, Ohio 43201-2693  
USA

## VAX System SIG Fall 1986 SIR Ballot

DECUS membership number \_\_\_\_\_ (six digits)

Our site uses the following VAX models (check all that apply)

8800 \_\_\_\_\_ 8600/8650 \_\_\_\_\_ 8500 \_\_\_\_\_ 8300/8200 \_\_\_\_\_ MicroVAX \_\_\_\_\_  
11/780, 11/782, 11/785 \_\_\_\_\_ 11/750 \_\_\_\_\_ 11/730, 11/725 \_\_\_\_\_

We use VAX's in the following applications (Check all that apply)

|                                |                                 |
|--------------------------------|---------------------------------|
| Business EDP _____             | Software Development _____      |
| Education _____                | Computer Science Research _____ |
| Data Acquisition/Control _____ | CAD/CAM _____                   |
| Service Bureau _____           | Hardware Development _____      |
| Scientific/Engineering _____   | Office Automation _____         |
| Telecommunications _____       |                                 |
| Other _____                    |                                 |

I support the following as the most important System Improvement Requests. (List from zero to fifteen SIR's):

SIR Number:

-----  
-----  
-----

I oppose the following SIR's as detrimental. (List from zero to five SIR's):

SIR Number:

-----

Mail to:

Gary L. Grebus  
Battelle Columbus Division  
Room 11\*6011  
505 King Avenue  
Columbus, OH 43201

To be counted, your ballot must be received by August 29.

PAGESWAPPER # July 1986 # Volume 7 Number 12  
VAX Systems SIG Fall 1986 SIR Ballot

Tear out or photocopy reverse to vote on SIRs

Gary L. Grebus  
Battelle Columbus Division  
Room 11-6011  
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USA

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