```
RRRRRRRRRRR      MMM          MMM     SSSSSSSSSSS
RRRRRRRRRRRR     MMM          MMM     SSSSSSSSSSS
RRRRRRRRRRRR     MMM          MMM     SSSSSSSSSSS
RRR         RRR  MMMMMM    MMMMMM  SSS
RRR         RRR  MMMMMM    MMMMMM  SSS
RRR         RRR  MMMMMM    MMMMMM  SSS
RRR         RRR  MMM   MMM   MMM   SSS
RRR         RRR  MMM   MMM   MMM   SSS
RRR         RRR  MMM   MMM   MMM   SSS
RRRRRRRRRRR      MMM          MMM     SSSSSSSSS
RRRRRRRRRRRR     MMM          MMM     SSSSSSSSS
RRRRRRRRRRRR     MMM          MMM     SSSSSSSSS
RRR   RRR        MMM          MMM             SSS
RRR   RRR        MMM          MMM             SSS
RRR   RRR        MMM          MMM             SSS
RRR      RRR     MMM          MMM             SSS
RRR      RRR     MMM          MMM             SSS
RRR      RRR     MMM          MMM             SSS
RRR         RRR  MMM          MMM  SSSSSSSSSSS
RRR         RRR  MMM          MMM  SSSSSSSSSSS
RRR         RRR  MMM          MMM  SSSSSSSSSSS
```

```
RRRRRRRR    MM      MM    OOOOOO    WW      WW    IIIIII    LL          DDDDDDDD
RRRRRRRR    MM      MM    OOOOOO    WW      WW    IIIIII    LL          DDDDDDDD
RR      RR  MMMM  MMMM  OO      OO  WW      WW      II      LL          DD      DD
RR      RR  MMMM  MMMM  OO      OO  WW      WW      II      LL          DD      DD
RR      RR  MM  MM  MM  OO      OO  WW      WW      II      LL          DD      DD
RR      RR  MM  MM  MM  OO      OO  WW      WW      II      LL          DD      DD
RRRRRRRR    MM      MM  OO  OO  OO  WW      WW      II      LL          DD      DD
RRRRRRRR    MM      MM  OO  OO  OO  WW      WW      II      LL          DD      DD
RR  RR      MM      MM  OOOO    OO  WW  WW  WW      II      LL          DD      DD
RR  RR      MM      MM  OOOO    OO  WW  WW  WW      II      LL          DD      DD
RR    RR    MM      MM  OO      OO  WWWW  WWWW      II      LL          DD      DD      ....
RR    RR    MM      MM  OO      OO  WWWW  WWWW      II      LL          DD      DD      ....
RR      RR  MM      MM    OOOOOO    WW      WW    IIIIII    LLLLLLLLLL  DDDDDDDD        ....
RR      RR  MM      MM    OOOOOO    WW      WW    IIIIII    LLLLLLLLLL  DDDDDDDD        ....

LL            IIIIII      SSSSSSSS
LL            IIIIII      SSSSSSSS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II        SSSSSS
LL              II        SSSSSS
LL              II              SS
LL              II              SS
LL              II              SS
LL              II              SS
LLLLLLLLLL    IIIIII    SSSSSSSS
LLLLLLLLLL    IIIIII    SSSSSSSS
```

Table of contents

```
0000     1          $BEGIN  RMOWILD,000,RM$RMSFILENAME,<DIRECTORY WILDCARDING>,<PIC,NOWRT>
0000     2
0000     3 ;
0000     4 ;*****************************************************************************
0000     5 ;*                                                                           *
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0000    23 ;*                                                                           *
0000    24 ;*                                                                           *
0000    25 ;*****************************************************************************
0000    26 ;
```

```
0000     28 ;++
0000     29 ;
0000     30 ; Facility: rms32
0000     31 ;
0000     32 ; Abstract:
0000     33 ;       this module contains all the routines
0000     34 ;       necessary to perform directory wildcarding
0000     35 ;       in file specification processing.
0000     36 ;
0000     37 ; Environment:
0000     38 ;       vax/vms
0000     39 ;
0000     40 ; Author:
0000     41 ;       Tim Halvorsen   AUG-1979
0000     42 ;
0000     43 ; Modified By:
0000     44 ;
0000     45 ;       V03-013 DGB0020         Donald G. Blair         06-Mar-1984
0000     46 ;               Use full-length fib in order to support access mode
0000     47 ;               protected files.
0000     48 ;
0000     49 ;       V03-012 RAS0252         Ron Schaefer            13-Feb-1984
0000     50 ;               Fix infinite loop caused by calling FMG$MATCH_NAME
0000     51 ;               with a bad descriptor.  Also clean-up a couple of
0000     52 ;               error paths to prevent looping and setup SWB correctly.
0000     53 ;
0000     54 ;       V03-011 RAS0232         Ron Schaefer            9-Jan-1984
0000     55 ;               Have RM$NEXTDIR return an error if the SWB isn't there.
0000     56 ;               The new error is RMS$_NOVALPRS.  This is a consequence
0000     57 ;               of RAS0219.  Could also be used to detect wild-card
0000     58 ;               directory processing without saved context.
0000     59 ;
0000     60 ;       V03-010 RAS0219         Ron Schaefer            8-Dec-1983
0000     61 ;               Change fwa references to FWA$T_SWB to be a separate
0000     62 ;               structure; use additional SWB fields as temp storage
0000     63 ;               and not random FWA cells.
0000     64 ;
0000     65 ;       V03-009 RAS0192         Ron Schaefer            13-Sep-1983
0000     66 ;               Fix bug in parsing UIC-format wildcard directories of
0000     67 ;               rooted devices.  Problem is caused by using the high
0000     68 ;               word of the directory descriptors to contain the
0000     69 ;               group-member flag.   Also fix wrong register on
0000     70 ;               error path.
0000     71 ;
0000     72 ;       V03-008 KBT0583         Keith B. Thompson       12-Aug1983
0000     73 ;               Clean up some fwa constants
0000     74 ;
0000     75 ;       V03-007 KBT0558         Keith B. Thompson       20-Jul-1983
0000     76 ;               Fix a bug introduced in KBT0512
0000     77 ;
0000     78 ;       V03-006 KBT0532         Keith B. Thompson       1-Jun-1983
0000     79 ;               Make RM$INIT_SWB save r8, remove RM$SKIP_SUBTREE and
0000     80 ;               make the SWA defined in fwadef
0000     81 ;
0000     82 ;       V03-005 KBT0524         Keith B. Thompson       23-May-1983
0000     83 ;               Place this beast in with xpfn
0000     84 ;
```

```
0000     85 ;       V03-004 KBT0512         Keith B. Thompson       17-May-1983
0000     86 ;               Make some rooted directory changes and save the fwa
0000     87 ;               descriptor flags.
0000     88 ;
0000     89 ;       V03-003 KBT0490         Keith B. Thompson       10-Feb-1983
0000     90 ;               Temporary fix so that the swb is the correct size
0000     91 ;
0000     92 ;       V03-002 KBT0474         Keith B. Thompson       26-Jan-1983
0000     93 ;               Fix a bug when parsing [...]*.*;* when in the last sub-
0000     94 ;               directory by putting in a check the first time through
0000     95 ;               in nextdir to see if we are all the way down.
0000     96 ;
0000     97 ;       V03-001 KBT0218         Keith B. Thompson       23-Aug-1982
0000     98 ;               Reorganize psects
0000     99 ;
0000    100 ;       V02-022 KEK0018         K. E. Kinnear           9-Feb-1982
0000    101 ;               Fix ASSUME for SWB offset into translation buffers for
0000    102 ;               new length of FWA$T_NAMEBUF.
0000    103 ;
0000    104 ;       V02-021 JWH0001         Jeffrey W. Horn         18-Jan-1982
0000    105 ;               Fix broken subroutine branch.
0000    106 ;
0000    107 ;       V02-020 TMK0025         Todd M. Katz            16-Dec-1981
0000    108 ;               Rip out all SDI stuff in RM$NEXTDIR. RM0WILD will not
0000    109 ;               (better not) be called for anything but files on disks.
0000    110 ;               Also FWA$B_DIRWCFLGS is being set incorrectly on repeated
0000    111 ;               searches involving ellipsis traversal because it is not
0000    112 ;               being set to the value it had after parse before the match
0000    113 ;               routine is called. Fix this bug by resetting FWA$B_DIRWCFLGS
0000    114 ;               to the value it had (before the first search began) before
0000    115 ;               the match attempt is made. This will mean no change in it
0000    116 ;               if there were no ellipsis, but if there were it will end up
0000    117 ;               being set to its new value on a successful match.
0000    118 ;
0000    119 ;       V02-019 TMK0019         Todd M. Katz            25-Nov-1981
0000    120 ;               Skip any subtrees rooted at null length directory
0000    121 ;               filenames. Such subtrees are pruned, and their
0000    122 ;               contents NOT searched.
0000    123 ;
0000    124 ;       V02-018 TMK0018         Todd M. Katz            18-Nov-1981
0000    125 ;               Initialize certain control fields within the SWB to
0000    126 ;               their correct values for UIC directories even if these
0000    127 ;               fields are not needed for wildcard processing. This is
0000    128 ;               to avoid confusion when these fields are looked at.
0000    129 ;
0000    130 ;       V02-017 TMK0014         Todd M. Katz            12-Nov-1981
0000    131 ;               Change a BBC to a BBCC so that the flag SWB$V_FIRST is
0000    132 ;               always cleared after the first time through RM$NEXTDIR
0000    133 ;
0000    134 ;       V02-016 RAS0040         Ron Schaefer            26-Oct-1981
0000    135 ;               Implement rooted directories for concealed devices.
0000    136 ;               When setting the FID of the MFD, use the saved MFD_FID
0000    137 ;               of the rooted directory.
0000    138 ;
0000    139 ;       V02-015 TMK0010         Todd M. Katz            20_Oct_1981
0000    140 ;
0000    141 ;               A check is made to see whether I/O Rundown is in progress
```

```
0000   142 ;               after every ACP call, and if is, RMOWILD is immediately
0000   143 ;               terminated with a status of RMS$_NMF.
0000   144 ;
0000   145 ;       V02-014 TMK0007         Todd M. Katz            28_Aug_1981
0000   146 ;
0000   147 ;               Performance enhancements. Initially, all leading nonwild
0000   148 ;               tokens are made part of the directory string, and their
0000   149 ;               existance is confirmed. Then, each and every remaining token
0000   150 ;               in the pattern string up to, but not including the first
0000   151 ;               ellipsis, represents the pattern for the directory name that
0000   152 ;               is to match it, and these are resolved. All branches below the
0000   153 ;               level of the root of the first ellipsis must be searched for
0000   154 ;               any and all directories. If there are no ellipsis, or above the
0000   155 ;               root of the first ellipsis, crosswise directory tree traversal
0000   156 ;               can only occur if wild nonellipsis tokens were encountered.
0000   157 ;               After each directory name is resolved, a call is made to a
0000   158 ;               matching routine to determine whether the directory string
0000   159 ;               now matches the entered pattern. This routine returns partial
0000   160 ;               or total success, and it can only return failure when it is
0000   161 ;               impossible to match the trailing tokens while within a bounded
0000   162 ;               ellipsis traversal. NOTE: the number of characters in a
0000   163 ;               directory specification is limited to 81 although theoretically
0000   164 ;               it would be possible to have (8 levels * 9 + 8 ... * 3 + 2)
0000   165 ;               = 98 characters.
0000   166 ;
0000   167 ;       V02-013 TMK0006         Todd M. Katz            21_Aug_1981
0000   168 ;               Complete rewrite. The algorithm upon which this module had
0000   169 ;               been formerly based was scrapped, and a completely new one
0000   170 ;               substituted. The new algorithm guarentees that each and
0000   171 ;               every directory specification matching an inputed pattern
0000   172 ;               is touched only once by performing a "pruned" pre-order
0000   173 ;               traversal, and returning only those directories matching
0000   174 ;               the inputed pattern string. Pruned in the sense that not
0000   175 ;               all directories are touched, but rather, as few as possible.
0000   176 ;               Various optimizations have been implemented to reduce
0000   177 ;               extraneous calls to the ACP, and several more, which are
0000   178 ;               required, will be included within a succeeding enhancement.
0000   179 ;
0000   180 ;               Checked this in as new module. Previous edit history invalid.
0000   181 ;
0000   182 ;       V02-012 KEK0007         K. E. Kinnear           11-Aug-1981
0000   183 ;               Change IFB$L_AS_DEV to IFB$L_PRIM_DEV where necessary.
0000   184 ;
0000   185 ;       V02-011 TMK0005         Todd M. Katz            11_Aug_1981
0000   186 ;               Delete errant ASSUME statement within FIND_DIR. It was
0000   187 ;               no longer needed with the addition of the new field
0000   188 ;               FWA$T_WILD.
0000   189 ;
0000   190 ;       V02-010 TMK0004         Todd M. Katz            10_Aug_1981
0000   191 ;               Correction of the parameter FWA$C_MAXDIRLEN to its
0000   192 ;               correct size of 81 resulted in a much larger SWB.
0000   193 ;               Since only 79 bytes are required ([] are not copied
0000   194 ;               into SWB$T_PATTERN), a change was made to reflect this
0000   195 ;               and to take advantage of a new scratch field, FWA$T_WILD.
0000   196 ;
0000   197 ;       V02-009 TMK0001         Todd M. Katz            29_Jul_1981
0000   198 ;               Fix some problems with handling of bounded elipsis
```

```
0000   199 ;               and multiple wild card directory specifications.
0000   200 ;               Changes included deletion of SWB$B_WCCLEVEL, extension
0000   201 ;               of SWB$B_ROOT to a word, the addition of one flag to
0000   202 ;               SWB$W_FLAGS (SWB$V_ROOT), and minor alterations to
0000   203 ;               the depth-first search algorithm in order to resolve
0000   204 ;               the existing problems. Two routines (UP_PARENT and
0000   205 ;               STRIP_NONWILD) were completely rewritten.
0000   206 ;
0000   207 ;       V02-008 PSK0003         Paulina Knibbe          27-Apr-1981
0000   208 ;               Fix some problems with handling of FWA$B_DIRLN
0000   209 ;
0000   210 ;       V02-007 PSK0002         Paulina Knibbe          18-Nov-1980
0000   211 ;               Clear the wild directory bit for trailing specified
0000   212 ;               directories when there is a bounded elipsis
0000   213 ;
0000   214 ;       V02-006 PSK0001         Paulina Knibbe          12-Nov-1980
0000   215 ;               Set the correct wild directory bit in the FWA if the directory
0000   216 ;               name was originally specified by an elipsis
0000   217 ;
0000   218 ;       V02-005 MCN0002         Maria del C. Nasr       03-Sep-1980
0000   219 ;               Fix branch to prevent infinite loop on parse of
0000   220 ;               [A.B.*]*.* when B does not exist.
0000   221 ;
0000   222 ;       V02-004 REFORMAT        Ron Schaefer    25-Jul-1980
0000   223 ;               Reformat the source
0000   224 ;
0000   225 ;       V003    TMH0003         Tim Halvorsen   05-FEB-1980
0000   226 ;               if sdi device, return with mfd without accessing device.
0000   227 ;
0000   228 ;       V002    TMH0002         Tim Halvorsen   04-JAN-1980
0000   229 ;               fix [*.obj] from failing to do check after copy_nonwild
0000   230 ;               which ensures that the directory up to that point exists.
0000   231 ;               fix [...a...] to return [...a] as well as the subtree
0000   232 ;               below it -- required a check following bounded match
0000   233 ;               to check if the elipsis exit should be taken immediately.
0000   234 ;               add $devdef to generate short literals on checks.
0000   235 ;
0000   236 ;       V001    TMH0001         Tim Halvorsen   12-NOV-1979
0000   237 ;               consolidate multiple asterisks from [*,*] into a single
0000   238 ;               asterisk so that ods-1 can use [*,*] (since character
0000   239 ;               wildcarding is not yet done for ods-1).
0000   240 ;               fix bug in nextdir so that a non-wild directory string
0000   241 ;               is checked immediately to make sure that it exists.
0000   242 ;               fix bug in next_child so that maperr is called with r8
0000   243 ;               pointing to the fab rather than the swb.
0000   244 ;--
```

```
0000    246          .SBTTL  DEFINITIONS
0000    247
0000    248 ;
0000    249 ; symbol definitions
0000    250 ;
0000    251
0000    252          $FIDDEF
0000    253          $DEVDEF                         ; device characteristics
0000    254          $FABDEF                         ; fab definitions
0000    255          $FIBDEF                         ; fib definitions
0000    256          $FSCBDEF                        ; fscb bit definitions
0000    257          $FWADEF                         ; fwa definitions
0000    258          $IFBDEF                         ; ifab definitions
0000    259          $IMPDEF                         ; i/o segment definitions
0000    260          $IODEF                          ; i/o function codes
0000    261          $NAMDEF                         ; nam definitions
0000    262          $RMSDEF                         ; rms error codes
0000    263          $SSDEF                          ; system error codes
0000    264          $SWBDEF                         ; swb definitions
```

```
                     0000   266          .SBTTL  RM$INIT_SWB, Initialize SWB for Wildcarding
                     0000   267
                     0000   268 ;++
                     0000   269 ;
                     0000   270 ; RM$INIT_SWB: initialize swb for wildcarding
                     0000   271 ;
                     0000   272 ;       this routine takes the parsed directory specification,
                     0000   273 ;       and recreates the input file directory specification, minus
                     0000   274 ;       the delimiter brackets, in the SWB for later use. It also
                     0000   275 ;       initializes various fields within the SWB for use later on.
                     0000   276 ;
                     0000   277 ; Inputs:
                     0000   278 ;
                     0000   279 ;       r9  = ifab address
                     0000   280 ;       r10 = fwa address
                     0000   281 ;
                     0000   282 ; Outputs:
                     0000   283 ;       R0 success/fail
                     0000   284 ;--
                     0000   285
                     0000   286 RM$INIT_SWB::
                58   DD 0000   287          PUSHL   R8                      ; save fab
                     0002   288
                     0002   289 ;
                     0002   290 ; Allocate swb buffer for expanded string
                     0002   291 ;
                     0002   292
              58  4C AA DO 0002   293          MOVL    FWA$L_SWB_PTR(R10),R8   ; already have one?
                     19 12 0006   294          BNEQ    5$
           52  0052 8F 3C 0008   295          MOVZWL  #SWB$C_BLN/4,R2         ; size of structure
            00000000'EF 16 000D   296          JSB     RM$GETBLK1              ; get space
                  7D 50 E9 0013   297          BLBC    R0,90$                  ; quit if no room
               08 A1  2A 90 0016   298          MOVB    #SWB$C_BID,SWB$B_BID(R1); set block id
               4C AA  51 DO 001A   299          MOVL    R1,FWA$L_SWB_PTR(R10)   ; set ptr
                  58  51 DO 001E   300          MOVL    R1,R8                   ; mov ptr to right register
                     0021   301
                     0021   302 ;
                     0021   303 ; If the directory specification was not in UIC format, then recreate it in
                     0021   304 ; the SWB keeping track of the number of nonelllipses tokens, the token number
                     0021   305 ; of the first ellipsis (if there is one), and setting various flags as
                     0021   306 ; required.
                     0021   307 ;
                     0021   308
                     68 D4 0021   309 5$:      CLRL    (R8)                    ; clear flags
                  04 A8 D4 0023   310          CLRL    SWB$B_MINIMUM(R8)       ; and counters
                  05 AA 90 0026   311          MOVB    FWA$B_DIRWCFLGS(R10),-  ; save the wild-card context
                  07 A8   0029   312                  SWB$B_DIRWCFLGS(R8)     ; present on entry in the SWB
               53 48 A8 9E 002B   313          MOVAB   SWB$T_PATTERN_BUF(R8),R3; initialize pattern descriptor with
            10 A8  53 DO 002F   314          MOVL    R3,SWB$Q_PATTERN+4(R8)  ; address of pattern buffer
         56  0130 CA 9E 0033   315          MOVAB   FWA$Q_DIR1(R10),R6      ; obtain address of first descriptor
            5B 6A  1B E0 0038   316          BBS     #FWA$V_GRPMBR,(R10),70$ ; branch if UIC format
               57  08 DO 003C   317          MOVL    #FWA$C_MAXSUBDIR+1,R7   ; maximum number of dirs in a spec
                     003F   318
                     66 B5 003F   319 10$:    TSTW    (R6)                    ; end of directory names?
                     26 13 0041   320          BEQL    40$                     ; branch if so
                  03 A8 96 0043   321          INCB    SWB$B_TOKENS_LEFT(R8)   ; increment number of tokens counter
        63  04 B6   66 28 0046   322          MOVC3   (R6),@4(R6),(R3)        ; copy current directory into buffer
```

```
                83   2E   90  004B   323          MOVB    #^A/./,(R3)+                    ; and append delimiter
             0F 66   10   E5  004E   324          BBCC    #FSCB$V_ELIPS,(R6),30$          ; ellipsis following this directory?
                                0052   325                                                  ;  (clear it so it's not displayed again)
                     06   E2  0052   326          BBSS    #SWB$V_ELLIPSIS_EXISTS,-        ; if this is the very first ellipsis
                   06 68      0054   327                  (R8),20$                        ; encountered, set the ellipsis exists
                   03 A8  81  0056   328          ADDB3   SWB$B_TOKENS_LEFT(R8),-         ; flag, and save the token number of
                06 A8    01    0059   329                  #1,SWB$B_FIRST_E(R8)            ; ellipsis for future reference
             83    2E2E 8F   B0  005C   330 20$:   MOVW    #^A/../,(R3)+                   ; make delimiter into ellipsis
                     66   B4  0061   331 30$:   CLRW    (R6)                            ; initialize this slot to null
                   56 08      C0  0063   332          ADDL2   #8,R6                           ; skip to next descriptor
                   D6 57      F5  0066   333          SOBGTR  R7,10$                          ; loop until done
                                0069   334
          FE A3    2E2E 8F   B1  0069   335 40$:   CMPW    #^A/../,-2(R3)                  ; is there a trailing ellipsis?
                     02   13  006F   336          BEQL    50$                             ; yes leave it
                     53   D7  0071   337          DECL    R3                              ; no, remove trailing delimiter
                                0073   338
                   08 57      83  0073   339 50$:   SUBB3   R7,#FWA$C_MAXSUBDIR+1,-       ; compute the maximum success level
                05 A8          0076   340                  SWB$B_MAXIMUM(R8)               ; presuppossing there are no ellipses
                     06   E1  0078   341          BBC     #SWB$V_ELLIPSIS_EXISTS,-        ; but if an ellipsis was encountered,
                   04 68      007A   342                  (R8),60$                        ; then the maximum level is reset to
                   05 A8  90  007C   343          MOVB    #FWA$C_MAXSUBDIR+1,-            ; allow for searches to the lowest
                                007E   344                  SWB$B_MAXIMUM(R8)               ; subdirectory level supported
                                0080   345
       0C A8   53   10 A8  C3  0080   346 60$:   SUBL3   SWB$Q_PATTERN+4(R8),R3,-        ; compute the length of the pattern
                                0086   347                  SWB$Q_PATTERN(R8)               ; and put it in the pattern descriptor
                                0086   348          SSB     #SWB$V_FIRST,(R8)               ; set first time through bit
                    0361   30  008A   349          BSBW    PARSE_PATTERN                   ; parse the very first pattern
                   2E AA   94  008D   350          CLRB    FWA$B_DIRLEN(R10)               ; mark no directory names yet
                                0090   351          RMSSUC
                      58 8ED0  0093   352 90$:   POPL    R8                              ; restore fab
                               05  0096   353          RSB
```

```
                     0097   355
                     0097   356 ;
                     0097   357 ; if the directory specification is in UIC format, then expand both group
                     0097   358 ; and member strings to three characters each, and store them together as
                     0097   359 ; the only token, provided neither is wild. if either or both is wild, then
                     0097   360 ; the wild strings are copied directly into the buffer without expansion,
                     0097   361 ; and one token is created as before.
                     0097   362 ;
                     0097   363
        57   28  D0  0097   364 70$:    MOVL    #FWA$V_WILD_GRP,R7          ; start of directory wildcard bits
             16  10  009A   365         BSBB    UIC_EXPAND                  ; expand group portion
             57  D6  009C   366         INCL    R7                          ; skip to next wildcard bit
             12  10  009E   367         BSBB    UIC_EXPAND                  ; expand member portion
      0202   8F  B0  00A0   368         MOVW    #^X0202,-                   ; both the minimum and maximum success
        04   A8          00A4   369                 SWB$B_MINIMUM(R8)       ; levels are 2 for UIC directories
2A2A 8F    FE  A3  B1  00A6   370         CMPW    -2(R3),#^A'**'              ; last 2 characters = '*'?
             D2  12  00AC   371         BNEQ    60$                         ; branch if not
             53  D7  00AE   372         DECL    R3                          ; if so, 1 asterisk will do just fine
             CE  11  00B0   373         BRB     60$                         ; setup pattern descriptor
                     00B2   374
                     00B2   375 ;
                     00B2   376 ; expand the nonwild group/member string out to three characters, and place
                     00B2   377 ; it in the buffer. if the group/member is wild, copy it into the pattern
                     00B2   378 ; buffer as is.  NOTE: Don't use SOBGEQ since the descriptor will have flags
                     00B2   379 ;
                     00B2   380
                     00B2   381 UIC_EXPAND:
        50   86  D0  00B2   382         MOVL    (R6)+,R0                    ; get length of string
     0D 6A   57  E0  00B5   383         BBS     R7,(R10),30$                ; skip leading zeros if wild
   51   03   50  A3  00B9   384         SUBW3   R0,#3,R1                    ; number of leading zeros to insert
             05  11  00BD   385         BRB     20$                         ; get into loop
        83   30  90  00BF   386 10$:    MOVB    #^A/0/,(R3)+                ; store leading zero
             51  B7  00C2   387         DECW    R1                          ; count down
             F9  14  00C4   388 20$:    BGTR    10$                         ; as many as needed
 63     96   50  28  00C6   389 30$:    MOVC3   R0,@(R6)+,(R3)              ; store rest of string
                 05  00CA   390         RSB
```

```
                        00CB   392          .SBTTL  RM$NEXTDIR, Get Next Directory to Search
                        00CB   393
                        00CB   394 ;++
                        00CB   395 ;
                        00CB   396 ; RM$NEXTDIR: Get next directory to search
                        00CB   397 ;
                        00CB   398 ;       get the next directory which matches the wildcard
                        00CB   399 ;       pattern in the directory specification.
                        00CB   400 ;
                        00CB   401 ; inputs:
                        00CB   402 ;
                        00CB   403 ;       R9  = ifab address
                        00CB   404 ;       R10 = fwa address
                        00CB   405 ;       R11 = impure area address
                        00CB   406 ;
                        00CB   407 ; outputs:
                        00CB   408 ;
                        00CB   409 ;       R8 - destroyed
                        00CB   410 ;       R0 = nmf if no more files to search, else status
                        00CB   411 ;
                        00CB   412 ;       the fib is updated with the did of the next
                        00CB   413 ;       directory to be used in file searches.
                        00CB   414 ;
                        00CB   415 ;--
                        00CB   416
                        00CB   417 RM$NEXTDIR::
58   4C AA    D0        00CB   418          MOVL    FWA$L_SWB_PTR(R10),R8   ; get swb address
          0B  13        00CF   419          BEQL    5$                      ; branch if isn't one
                        00D1   420
                        00D1   421 ;
                        00D1   422 ; the very first time this routine is called, all leading nonwild tokens are
                        00D1   423 ; copied into FWA descriptors, their existance is verified, and a starting
                        00D1   424 ; DID is setup in the FIB for the remainder of the token string. at this
                        00D1   425 ; point, the minimum directory traversal string can be set, and a check is
                        00D1   426 ; made as to whether the current directory specification is sufficient to
                        00D1   427 ; match the entered pattern. note that if the base ends up as the MFD, the
                        00D1   428 ; initial match attempt can be skipped (there is nothing to match) and
                        00D1   429 ; the first UFD can be retrieved. if all tokens are nonwild, then there is
                        00D1   430 ; nothing more to do and a status of success can be returned.
                        00D1   431 ;
                        00D1   432
2E 68    05     E5      00D1   433          BBCC    #SWB$V_FIRST,(R8),20$   ; do only if first time through
      0421     30        00D5   434          BSBW    SET_BASE                ; copy all leading nonwild tokens,
   07 50       E8        00D8   435          BLBS    R0,10$                  ; find the base DID, and return
               05        00DB   436          RSB                             ; if thereare any problems
                         00DC   437
                         00DC   438 5$:      RMSERR  NOVALPRS                ; no preceding $parse
               05        00E1   439          RSB
                         00E2   440
   2E AA     90          00E2   441 10$:     MOVB    FWA$B_DIRLEN(R10),-     ; set the minimum success level
   04 A8                 00E5   442                  SWB$B_MINIMUM(R8)       ; for traversal
   01 A8     95          00E7   443          TSTB    SWB$B_PATLEN(R8)        ; if all tokens in the entered pattern
         06  13          00EA   444          BEQL    11$                     ;  were nonwild then immediately return
   2E AA     91          00EC   445          CMPB    FWA$B_DIRLEN(R10),-     ; if we are at the bottom also return
         08                00EF   446                  #FWA$C_MAXSUBDIR+1
         03  12          00F0   447          BNEQ    12$                     ; else continue
      00FB   31          00F2   448 11$:     BRW     110$                    ; return success and the DID
```

```
                     00F5   449
                     00F5   450 12$:    TSTB    FWA$B_DIRLEN(R10)          ; if there were leading nonwild tokens
          2E AA 95   00F5   450          BEQL    15$                        ; with other tokens following them
             03 13   00F8   451          BRW     70$                        ; then check for pattern-string match
           0099 31   00FA   452 15$:    MOVL    (R8),SWB$L_SCRATCH_PAT(R8) ; else move pattern of first dir name
    14 A8    68 D0   00FD   453          BRB     40$                        ; to search for into field & go search
             2E 11   0101   454
                     0103   455 ;
                     0103   456 ; traverse down one level by getting the first subdirectory of the current
                     0103   457 ; directory and appending it. under the following conditions, downward
                     0103   458 ; traversal is aborted in favor of traversing across: the SWB traversal flag
                     0103   459 ; is set; the current directory's level is the maximum traversal level; the
                     0103   460 ; current directory has no subdirectories; the current directory represents
                     0103   461 ; the MFD (i.e. the sole directory is the current directory 000000.dir;1).
                     0103   462 ; if the token string has been exhausted, or if the current directory has no
                     0103   463 ; subdirectories and is at the minimum traversal level, then there are no
                     0103   464 ; directories to be located.
                     0103   465 ;
                     0103   466
          01 A8 95   0103   467 20$:    TSTB    SWB$B_PATLEN(R8)           ; if token string has been exhausted
             03 12   0106   468          BNEQ    25$                        ; then signal no more files,
           00D5 31   0108   469          BRW     90$                        ; otherwise continue
    2F 68    04 E4   010B   470 25$:    BBSC    #SWB$V_TRAVERSE,(R8),45$;  if we are to traverse, then traverse
          05 A8 91   010F   471          CMPB    SWB$B_MAXIMUM(R8),-        ; if we have reached the maximum
             2E AA   0112   472          FWA$B_DIRLEN(R10)                  ; traversal level then branch so as to
             28 13   0114   473          BEQL    45$                        ; begin traversing across
                     0116   474          SSB     #SWB$V_ELLIPSIS,-          ; only traverse down other than first
                     0116   475          SWB$L_SCRATCH_PAT(R8)              ; time through if have seen an ellipsis
                     011B   476
                     011B   477 ;
                     011B   478 ; if the base directory (i.e. the directory whose file ID is in the DID
                     011B   479 ; of the FIB) is not the MFD, then continue the downward traversal
                     011B   480 ;
                     011B   481
    54    0130 CA 7D 011B   482 30$:    MOVQ    FWA$Q_DIR1(R10),R4         ; get first directory's descriptor
             0298 30   0120   483          BSBW    CHK_MFD                    ; check for mfd,  if so
               0C 12   0123   484          BNEQ    40$                        ; then continue the downward traversal
          04 A8 97   0125   485          DECB    SWB$B_MINIMUM(R8)          ; otherwise decrement the minimum
               06 E0   0128   486          BBS     #SWB$V_ELLIPSIS_EXISTS,-;  traversal level, and the maximum
             20 68     012A   487          (R8),55$                           ; traversal level if there are any
          05 A8 97   012C   488          DECB    SWB$B_MAXIMUM(R8)          ; ellipsis in the entered pattern and
             1B 11   012F   489          BRB     55$                        ; begin crosswise traversal
                     0131   490
          0204 CA D4 0131   491 40$:    CLRL    FWA$T_FIBBUF+-             ; clear the wildcard context within the
                     0135   492          FIB$L_WCC(R10)                     ; FIB to get the first subdirectory
             00BC 30   0135   493          BSBW    NEXT_SUBDIR                ; get first subdirectory of current dir
          53 50 E9   0138   494          BLBC    R0,67$                     ; branch if error occurred otherwise
          58 51 E8   013B   495          BLBS    R1,70$                     ; see if dir spec now matches pattern
                     013E   496
```

```
                     013E   498
                     013E   499 ;
                     013E   500 ; traverse across the directory tree. if we are now at the minimum traversal
                     013E   501 ; level, then there are no more directories to find, otherwise, we back up to
                     013E   502 ; the level of a wild directory by stripping off the lowest level directory,
                     013E   503 ; calling match to retrieve the characteristics of the directory name to be
                     013E   504 ; searched for, and repeating this process as long as the pattern returned
                     013E   505 ; is nonwild. once the level of a wild directory has been reached, the next
                     013E   506 ; directory at the same level matching the returned pattern is found by using
                     013E   507 ; the stripped off directory name to resynchronize the ACP. note that if any
                     013E   508 ; time match returns a status of total success, this can only be do to the
                     013E   509 ; presence of an ellipsis, and any directory will satisfy the pattern.
                     013E   510 ;
                     013E   511
                     013E   512 45$:     CSB     #SWB$V_VALID_DID,(R8)     ; DID is no longer valid
          2E AA   91 0142   513 50$:     CMPB    FWA$B_DIRLEN(R10),-       ; if at minimum traversal level and
          04 A8      0145   514                    SWB$B_MINIMUM(R8)         ; no subdirectory was found then exit
             03   14 0147   515             BGTR    55$                       ; else continue with the crosswise
           0094   31 0149   516             BRW     90$                       ; traversal across the directory tree
                  014C   517
           0302   30 014C   518 55$:     BSBW    PREV_DIR                  ; strip off the lowest level directory
        7E   54   7D 014F   519             MOVQ    R4,-(SP)                  ; and save its descriptor
             68   DD 0152   520             PUSHL   (R8)                      ; save current token context
     56  04 A8   9A 0154   521             MOVZBL  SWB$B_MINIMUM(R8),R6      ; set descriptor index of 1st wild dir
           0184   30 0158   522             BSBW    MATCH                     ; retrieve pattern of dir to search for
             68 8ED0 015B   523             POPL    (R8)                      ; restore current token context and
        54   8E   7D 015E   524             MOVQ    (SP)+,R4                  ; descriptor of stripped of directory
          07 51   E8 0161   525             BLBS    R1,60$                    ; if total success returned then branch
             02   E1 0164   526             BBC     #SWB$V_WILD,-             ; if the pattern returned was of a
        E3 14 A8      0166   527                    SWB$L_SCRATCH_PAT(R8),55$       ; nonwild token then repreat process
             05   11 0169   528             BRB     65$                       ; otherwise continue across traversal
                  016B   529 60$:     SSB     #SWB$V_ELLIPSIS,-         ; when total success is returned, set
                  016B   530                    SWB$L_SCRATCH_PAT(R8)     ; it up so anything will match pattern
                  0170   531
     6C A9   54   06   C1 0170   532 65$:     ADDL3   #6,R4,IFB$L_RNS_LEN(R9) ; the stripped directory's length (plus
             65   54   28 0175   533             MOVC3   R4,(R5),-         ; 6 for .dir;1) & its name are together
           04B6   CA      0178   534                    FWA$T_NAMEBUF(R10)        ; used to resynchronize the ACP
63 2020313B 5249442E   8F   7D 017B   535             MOVQ    #^A\.DIR;1  \,(R3)        ; append .dir;1 to the directory name
           0204   CA   01   D0 0186   536             MOVL    #1,FWA$T_FIBBUF+-         ; indicate that the ACP is to
                  018B   537                    FIB$L_WCC(R10)            ; resynchronize by setting a bit
                0066   30 018B   538             BSBW    NEXT_SUBDIR               ; get next directory at the same level
             2C 50   E9 018E   539 67$:     BLBC    R0,80$                    ; error   - go handle it
             02 51   E8 0191   540             BLBS    R1,70$                    ; success - check for pattern match
                A8   11 0194   541             BRB     45$                       ; failure - continue 1 level up
```

```
                     0196   543
                     0196   544 ;
                     0196   545 ; determine the match status of the current directory specification against
                     0196   546 ; the pattern. there are three possible outcomes. the match could be totally
                     0196   547 ; successful, in which case the next directory meeting the stated requirements
                     0196   548 ; has been found. the match could be partially successful indicating that
                     0196   549 ; while the current specification matches the leading part of the pattern
                     0196   550 ; it is insufficient for a total match, and downward traversing should
                     0196   551 ; continue. finally, the match could be a total failure. this can only occur
                     0196   552 ; if we are traversing within a bounded ellipsis, and can never hope to
                     0196   553 ; match the trailing tokens from the current level. we continue by traversing
                     0196   554 ; across.
                     0196   555 ;
                     0196   556
4C 6A    1B    E0    0196   557 70$:    BBS     #FWA$V_GRPMBR,(R10),100$; if UIC then total success
         68    DD    019A   558         PUSHL   (R8)                    ; save the current token information
56   04  A8    9A    019C   559         MOVZBL  SWB$B_MINIMUM(R8),R6    ; set descriptor index of 1st wild dir
     07  A8    90    01A0   560         MOVB    SWB$B_DIRWCFLGS(R8),-   ; reinitialize the directory wildcard
     05  AA          01A3   561                 FWA$B_DIRWCFLGS(R10)    ; context to its value before 1st srch
       0137    30    01A5   562         BSBW    MATCH                   ; determine state of the match
         68 8ED0     01A8   563         POPL    (R8)                    ; restore current token information
     38  51    E8    01AB   564         BLBS    R1,100$                 ; total success   - find dir's DID
     07  A8    90    01AE   565         MOVB    SWB$B_DIRWCFLGS(R8),-   ;                   restore wild card
     05  AA          01B1   566                 FWA$B_DIRWCFLGS(R10)    ;                   directory context
     96  50    E9    01B3   567         BLBC    R0,55$                  ; failure         - traverse across
                     01B6   568         CSB     #SWB$V_VALID_DID,(R8)   ; partial success - set DID invalid
       FF5E    31    01BA   569         BRW     30$                     ;                   and traverse down
```

```
                        01BD    571
                        01BD    572 ;
                        01BD    573 ; if an error occurred during the attempt to find the next directory, or the
                        01BD    574 ; DID of the next directory, traversal of the current subtree must be aborted
                        01BD    575 ; to avoid looping on the same error. if the directory specification on entry
                        01BD    576 ; was wild and the directory was not found, or was do to illegal directory
                        01BD    577 ; format, this traversal takes place immediately. in all other circumstances
                        01BD    578 ; the error is immediately reported.
                        01BD    579 ;
                        01BD    580
                        01BD    581 80$:    SSB     #SWB$V_TRAVERSE,(R8)    ; set the SWB traverse flag
              1C  E1    01C1    582         BBC     #FWA$V_WILD_DIR,-       ; if the directory specification was
            2E 6A       01C3    583         (R10),T20$              ; nonwild then report the error
        51  24 A9  D0    01C5    584         MOVL    IFB$L_LAST_FAB(R9),R1   ; obtain the address of the FAB
            0C A1  B1    01C9    585         CMPW    FAB$L_STV(R1),-         ; if the directory or DID could not
          0910 8F       01CC    586         #SS$_NOSUCHFILE         ; be found then continue the
              08  13    01CF    587         BEQL    85$             ; crosswise traversal one level up
            0C A1  B1    01D1    588         CMPW    FAB$L_STV(R1),-         ; if the error was not do to illegal
          0828 8F       01D4    589         #SS$_BADIRECTORY        ; directory format then report the
              1A  12    01D7    590         BNEQ    120$            ; error immediately
                        01D9    591 85$:    CSB     #SWB$V_TRAVERSE,(R8)    ; clear traversal bit,
             FF5E  31    01DD    592         BRW     45$             ; and go traverse
                        01E0    593
                        01E0    594 ;
                        01E0    595 ; if there are no more files to search, return indicating no more files.
                        01E0    596 ;
                        01E0    597
                        01E0    598 90$:    RMSERR  NMF                     ; indicate that there are no more
                  05    01E5    599         RSB                             ; directories to search and return
                        01E6    600
                        01E6    601 ;
                        01E6    602 ; if a directory specification has been found that matches the entered pattern,
                        01E6    603 ; find the DID of the directory specification (unless it is still valid),
                        01E6    604 ; and return success.
                        01E6    605 ;
                        01E6    606
    06 68       05  E4  01E6    607 100$:   BBSC    #SWB$V_FIRST,(R8),110$  ; first time through then DID is valid
              0326  30  01EA    608         BSBW    FIND_DIR                ; find the DID of the directory spec
            CD 50   E9  01ED    609         BLBC    R0,80$                  ; go handle any errors encountered
                        01F0    610 110$:   RMSSUC                          ; else indicate success and
                  05    01F3    611 120$:   RSB                             ; return
                        01F4    612
```

```
                                01F4   614          .SBTTL  NEXT_SUBDIR, Find the Next Subdirectory
                                01F4   615
                                01F4   616 ;++
                                01F4   617 ;
                                01F4   618 ; NEXT_SUBDIR:  find the next subdirectory
                                01F4   619 ;
                                01F4   620 ;       find the next subdirectory of the current directory specification.
                                01F4   621 ;       the next subdirectory might be the first subdirectory within the
                                01F4   622 ;       current specification, if we are currently traversing down the
                                01F4   623 ;       directory tree, or it might be the next subdirectory after the last
                                01F4   624 ;       subdirectory located within this directory specification, if we are
                                01F4   625 ;       traversing across the directory tree. if a subdirectory is found,
                                01F4   626 ;       it is appended to the current directory specification.
                                01F4   627 ;
                                01F4   628 ; inputs:
                                01F4   629 ;
                                01F4   630 ;       r8  = SWB address
                                01F4   631 ;       r9  = IFAB address
                                01F4   632 ;       r10 = FWA address
                                01F4   633 ;
                                01F4   634 ; outputs:
                                01F4   635 ;
                                01F4   636 ;       r0 = status
                                01F4   637 ;       r1 = false if no subdirectories left
                                01F4   638 ;            true if subdirectory located
                                01F4   639 ;
                                01F4   640 ;--
                                01F4   641
                                01F4   642 NEXT_SUBDIR:
                                01F4   643
                                01F4   644 ;
                                01F4   645 ; construct the file name to search for within the current directory
                                01F4   646 ; specification. the SWB field SWB$L_SCRATCH_PAT contains information about
                                01F4   647 ; the subdirectory we are to search for. *.dir;1 is always searched for
                                01F4   648 ; whenever we are "within" an ellipsis, or an ellipsis has been encountered
                                01F4   649 ; in the building of the current specification; otherwise pattern information
                                01F4   650 ; is present within within the FWA field.
                                01F4   651 ;
                                01F4   652
          53    18 A8    9E    01F4   653          MOVAB   SWB$T_SCRATCH_BUF(R8),R3; obtain the address of the buffer
       018C CA    53    D0    01F8   654          MOVL    R3,FWA$Q_RNS+4(R10)     ; and move it into the descriptor
                  00    E1    01FD   655          BBC     #SWB$V_ELLIPSIS,-       ; if the pattern in the buffer is
           05 14 A8          0201   656                  SWB$L_SCRATCH_PAT(R8),5$        ; that of an ellipsis, then we are
            83    2A    90    0202   657          MOVB    #^A'*',(R3)+            ; to search for *.dir;1 so we move a *
                  0E    11    0205   658          BRB     10$                     ; into the buffer and go append .dir;1
                              0207   659
          50    15 A8    9A    0207   660 5$:      MOVZBL  SWB$L_SCRATCH_PAT+1(R8),R0      ; create a descriptor of the directo
          51    16 A8    9A    020B   661          MOVZBL  SWB$L_SCRATCH_PAT+2(R8),R1      ; we are to search for in r0/r1 and
    63    10 B841    50    28    020F   662          MOVC3   R0,@SWB$Q_PATTERN+4-     ; move the name of the directory
                              0215   663                  (R8)[R1],(R3)           ; into the buffer
                              0215   664
     83    5249442E 8F    D0    0215   665 10$:     MOVL    #^A\.DIR\,(R3)+         ; append the file type to the dir name
           83    313B 8F    B0    021C   666          MOVW    #^A';1',(R3)+           ; append the version number to the name
0188 CA    53    018C CA    C3    0221   667          SUBL3   FWA$Q_RNS+4(R10),R3,-   ; compute the length of the dir name to
                              0229   668                  FWA$Q_RNS(R10)          ; be searched for into its descriptor
                              0229   669
                              0229   670 ;
```

```
                          0229   671 ; the DID of the current directory specification must be found and placed
                          0229   672 ; in the FIB in order to perform searches using the ACP.
                          0229   673 ;
                          0229   674
0A 68    05    E4         0229   675          BBSC    #SWB$V_FIRST,(R8),15$   ; if this is the first time through
           07    E0       022D   676          BBS     #SWB$V_VALID_DID,-      ; or the DID is still valid, then it
         06 68              022F   677                  (R8),15$                ; is not necessary to find the DID
          02DF    30       0231   678          BSBW    FIND_DIR                ; if there is any problem finding the
         7A 50    E9       0234   679          BLBC    R0,70$                  ; DID of the current specification
                           0237   680                                          ; return immediately, else continue
                           0237   681
                           0237   682 ;
                           0237   683 ; required as input to the ACP (or the routine which is responsible for
                           0237   684 ; calling the ACP) is that a descriptor of the FIB exist in FWA$Q_FIB(R10),
                           0237   685 ; that name string wildcarding be turned on within the FIB, and that the
                           0237   686 ; descriptor of the result buffer be initialized with the size of the
                           0237   687 ; maximum possible file name string. RM$STALL also requires that general
                           0237   688 ; register R8 contains the address of the FAB.
                           0237   689 ;
                           0237   690
          40 8F    9A       0237   691 15$:     MOVZBL  #FIB$C_LENGTH,-         ; load the length of the FIB
          10 AA             023A   692                  FWA$Q_FIB(R10)          ; into the FIB descriptor
        01F4 CA    9E       023C   693          MOVAB   FWA$T_FIBBUF(R10),-     ; load the address of the FIB
          14 AA             0240   694                  FWA$Q_FIB+4(R10)        ; into the FIB descriptor
                    3C      0242   695          MOVZWL  #FWA$S_NAMEBUF+-        ; initialize the length field
                            0243   696                  FWA$S_TYPEBUF+-         ;  of the result descriptor
                            0243   697                  FWA$S_VERBUF,-          ;  with the maximum size that
  0170 CA   012E 8F         0243   698                  FWA$Q_NAME(R10)         ;  a file name can be
            0100 8F    B0   0249   699          MOVW    #FIB$M_WILD,-           ; set the bit within the FIB which
            0208 CA         024D   700                  FWA$T_FIBBUF+-          ; indicates that a wildcard name
                            0250   701                  FIB$W_NMCTL(R10)        ; search is to be performed
                            0250   702
```

```
                     0250   704 ;
                     0250   705 ; the ACP will search for the next directory within the current directory
                     0250   706 ; specification, whose DID is already resident within the FIB, because the
                     0250   707 ; name string wildcard bit has been set and the input descriptor points to a
                     0250   708 ; buffer containing the string to be searched for. if the FIB field FIB$L_WCC
                     0250   709 ; has been cleared, then to the ACP the next directory is the very first
                     0250   710 ; subdirectory in the current directory specification which matches the pattern
                     0250   711 ; in the buffer. on the other hand, if this same field has been set to one,
                     0250   712 ; then the next directory is the first subdirectory in the current directory
                     0250   713 ; specification which matches the pattern in the buffer, and follows the
                     0250   714 ; subdirectory described by the descriptor FWA$Q_NAME(R10) (contains the
                     0250   715 ; address of the buffer containing the subdirectory's name), and the longword
                     0250   716 ; IFB_L_RNS_LEN(R9) (contains the length of the subdirectory's name). the
                     0250   717 ; following are the parameters required by the ACP to be present on the
                     0250   718 ; current stack when it is called.
                     0250   719 ;
                     0250   720 ;       P1      #IO$_ACCESS             - ACP function code
                     0250   721 ;       P2      FWA$Q_RNS(R10)          - address of the input name descriptor
                     0250   722 ;       P3      IFB$L_RNS_LEN(R9)       - longword to recieve result name's
                     0250   723 ;                                         length, and input as previous
                     0250   724 ;                                         position in directory
                     0250   725 ;       P4      FWA$Q_NAME(R10)         - address of result descriptor and
                     0250   726 ;                                         input to ACP as previous position
                     0250   727 ;                                         in directory
                     0250   728 ;       P5      0
                     0250   729 ;       P6      0
                     0250   730 ;
                     0250   731
    58   24 A9   D0  0250   732 20$:    MOVL    IFB$L_LAST_FAB(R9),R8   ; of the FAB into R8, and go
         7E   7C     0254   733         CLRQ    -(SP)                   ; place P5 & P6 on stack
     0170 CA   9F    0256   734         PUSHAB  FWA$Q_NAME(R10)         ; push result descriptor address - P4
       6C A9   9F    025A   735         PUSHAB  IFB$L_RNS_LEN(R9)       ; push length field - P3
     0188 CA   9F    025D   736         PUSHAB  FWA$Q_RNS(R10)          ; push input name descriptor - P2
       50    32    3C  0261   737         MOVZWL  #IO$_ACCESS,R0          ; set ACP function code in R0
00000000'EF   16    0264   738         JSB     RM$FCPFNC               ; call the ACP and wait for reply
                     026A   739
         04   E0     026A   740         BBS     #IMP$V_IORUNDOWN,-      ; if I/O Rundown is in progress,
       44 6B         026C   741                 (R11),75$               ; then RMOWILD is prematurely aborted
    58   4C AA   D0  026E   742         MOVL    FWA$L_SWB_PTR(R10),R8   ; recover SWB address
       43 50   E9    0272   743         BLBC    R0,80$                  ; branch if no errors
                     0275   744
                     0275   745 ;
                     0275   746 ; the ACP found the next subdirectory - extract it for processing. if the
                     0275   747 ; directory name has a null length, go resynchronize the ACP and find the
                     0275   748 ; next directory. subtrees rooted at null length directory filenames are
                     0275   749 ; pruned.
                     0275   750 ;
                     0275   751
    54   6C A9   3C  0275   752 40$:    MOVZWL  IFB$L_RNS_LEN(R9),R4    ; get a descriptor of the result's file
55   04B6 CA   9E    0279   753         MOVAB   FWA$T_NAMEBUF(R10),R5   ; name by chopping off the substring
       54    06    C2  027E   754         SUBL2   #6,R4                   ; .dir;1 and resetting the length
             1E    13  0281   755         BEQL    55$                     ; if null length, go resynch ACP
                     0283   756
                     0283   757 ;
                     0283   758 ; if the file found by the ACP was the MFD itself (i.e. the file 000000.dir;1)
                     0283   759 ; then skip it by recalling the ACP giving it this file as its current position
                     0283   760 ; within the MFD. this is so directory specifications such as [*...], [*], and
```

```
                     0283   761 ; [*,*] won't return the MFD.
                     0283   762 ;
                     0283   763
          0135   30  0283   764          BSBW    CHK_MFD                 ; check for mfd, if so the reset
            19   13  0286   765          BEQL    55$                     ; and resynchronize the ACP
                     0288   766
                     0288   767 ;
                     0288   768 ; if the directory was given in UIC format (but wild !!), then make sure
                     0288   769 ; only numeric directory names will be accepted as valid UIC format names.
                     0288   770 ;
                     0288   771
        1C 6A   1B   E1  0288   772 45$:    BBC     #FWA$V_GRPMBR,(R10),60$ ; branch if not in UIC format
            50   54   7D  028C   773          MOVQ    R4,R0                   ; duplicate result name descriptor
                     028F   774
            30   61   91  028F   775 50$:    CMPB    (R1),#^A'0'             ; if the name coallates lower then any
                 0D   1F  0292   776          BLSSU   55$                     ; valid UIC name - traverse across
            37   81   91  0294   777          CMPB    (R1)+,#^A'7'            ; if the result name coallates higher
                 42   1A  0297   778          BGTRU   90$                     ; then any valid UIC name, then
              F3 50   F5  0299   779          SOBGTR  R0,50$                  ; go return no more files
                     029C   780
            06   54   D1  029C   781          CMPL    R4,#6                   ; if the result name is 6 numbers long
                 07   13  029F   782          BEQL    60$                     ; then it is a valid UIC name
                     02A1   783
      0204 CA   01   D0  02A1   784 55$:    MOVL    #1,FWA$T_FIBBUF+-       ; resynchronize the ACP to continue
                     02A6   785                  FIB$L_WCC(R10)          ; the search, reload the address
                A8   11  02A6   786          BRB     20$                     ; look for the next subdirectory
                     02A8   787
                     02A8   788 ;
                     02A8   789 ; append the new subdirectory name to the current directory specification
                     02A8   790 ; and return success - i.e. a subdirectory was found.
                     02A8   791 ;
                     02A8   792
             0223    30  02A8   793 60$:    BSBW    APPEND_DIR              ; append the subdirectory
          51   01   D0  02AB   794          MOVL    #1,R1                   ; indicate that a subdirectory was
          50   01   D0  02AE   795 65$:    MOVL    #1,R0                   ; found by setting both r0 and r1
                05   02B1   796 70$:    RSB                             ; before returning
                     02B2   797
                     02B2   798 75$:    RMSERR  NMF                     ; setting a default error of no more
                05   02B7   799          RSB                             ; files in R0 and returning
                     02B8   800
                     02B8   801 ;
                     02B8   802 ; we divide ACP errors into two catagories - fatal and nonfatal. nonfatal
                     02B8   803 ; errors, such as no more subdirectories within the current directory
                     02B8   804 ; specification, are handled by this module. fatal errors maybe handled by this
                     02B8   805 ; module depending upon their nature. both types of errors usaully result in
                     02B8   806 ; the traversal continuing, but in a crosswise manner one level up from the
                     02B8   807 ; level of the current directory specification.
                     02B8   808 ;
                     02B8   809
    0910 8F   50   B1  02B8   810 80$:    CMPW    R0,#SS$_NOSUCHFILE      ; if the ACP was unable to find a
                1C   13  02BD   811          BEQL    90$                     ; subdirectory return no such file
    0930 8F   50   B1  02BF   812          CMPW    R0,#SS$_NOMOREFILES     ; if the ACP found no more files in the
                15   13  02C4   813          BEQL    90$                     ; sequence return no more files
                58   DD  02C6   814          PUSHL   R8                      ; save the SWB address
      58    24 A9   D0  02C8   815          MOVL    IFB$L_LAST_FAB(R9),R8   ; storing other errors requires a(FAB)
                     02CC   816          RMSERR  FND,RT                  ; set default error
     00000000'EF    16  02D1   817          JSB     RMS$MAPERR              ; map to RMS error
```

```
58 8ED0  02D7   818          POPL    R8                      ; restore SWB address to R8
      05 02DA   819          RSB                             ; return fatal error
         02DB   820
51   D4  02DB   821 90$:     CLRL    R1                      ; indicate that no subdirectory was
CF   11  02DD   822          BRB     65$                     ; found and no fatal error
```

```
                     824          .SBTTL  MATCH, Compare Directory Specification with Pattern String
                     825
                     826 ;++
                     827 ;
                     828 ; MATCH:        compare directory specification with pattern string
                     829 ;
                     830 ;       this routine is responsible for comparing the current directory
                     831 ;       specification with the current pattern string. it makes this comparison
                     832 ;       one token/pattern at a time, recursively calling itself with the
                     833 ;       remainder of the pattern string and/or directory specification when it
                     834 ;       finds the current token matches the current directory name. the
                     835 ;       algorithm employed will try all possible matching combinations when
                     836 ;       ellipses are involved inorder to attempt to find a suitable
                     837 ;       configuration. note that it is in the very nature of the directory
                     838 ;       wildcarding algorithm, that this routine can fail only when we
                     839 ;       have traversed down too deeply, because of an ellipsis, such that the
                     840 ;       input pattern can never be matched. most often, a status of total
                     841 ;       or partial success is returned, and in the latter case, information
                     842 ;       about the next directory to look for is returned as well.
                     843 ;
                     844 ; inputs:
                     845 ;
                     846 ;       r6  = descriptor index of current directory name
                     847 ;       r8  = swb
                     848 ;       r10 = fwa
                     849 ;
                     850 ; outputs:
                     851 ;
                     852 ;       r0 = true if match was successful, false for fatal
                     853 ;       r1 = degree of success - total or partial
                     854 ;            meaningless if r0 = false
                     855 ;
                     856 ;       FWA$B_DIRWCFLGS is set appropriately if the match was totally
                     857 ;       successful, trashed otherwise
                     858 ;
                     859 ;       SWB$L_SCRATCH_PAT contains information about the next directory to search fo
                     860 ;       when a status of partial success is returned
                     861 ;
                     862 ;--
                     863
52   0130 CA46   7D  02DF    864 MATCH:  MOVQ    FWA$Q_DIR1(R10)[R6],R2  ; get current directory's descriptor
                     02E5    865
                     02E5    866 ;
                     02E5    867 ; if there are tokens remaining but no directories, this means that not
                     02E5    868 ; enough of the tree has been downward traversed to match the input pattern
                     02E5    869 ; string. a status of partial success is returned so that the downward
                     02E5    870 ; traversal will continue as is required. there is one exception. if the
                     02E5    871 ; current token is an unbounded ellipsis (and thus the last token), it
                     02E5    872 ; matches the empty current directory, so a status of total success is
                     02E5    873 ; returned.
                     02E5    874 ;
                     02E5    875
          01 A8   95 02E5    876         TSTB    SWB$B_PATLEN(R8)        ; if there are no more tokens left
             6B   13 02E8    877         BEQL    70$                     ; then branch to handle that condition
             52   B5 02EA    878         TSTW    R2                      ; if both tokens & directories are left
             0E   12 02EC    879         BNEQ    10$                     ; branch to handle that condition too
             00   E1 02EE    880         BBC     #SWB$V_ELLIPSIS,-       ; if the current token is an unbounded
```

```
                07 68      02F0   881                     (R8),1$                         ; ellipsis then return success, else
          03 68    01  E0  02F2   882             BBS     #SWB$V_BOUNDED,(R8),1$          ; return partial success as the current
                0097  31  02F6   883             BRW     120$                            ; directory specification is too short
                0079  31  02F9   884 1$:         BRW     110$
                          02FC   885
                          02FC   886 ;
                          02FC   887 ; if there are both tokens and directories remaining, and the current token
                          02FC   888 ; is an unbounded ellipsis (and thus the last token), we match the current
                          02FC   889 ; directory with the ellipsis, move onto the next directory, and recurse.
                          02FC   890 ; matching the directory with the ellipsis requires adjustment of the
                          02FC   891 ; directory wild card context.
                          02FC   892 ;
                          02FC   893
                    00    E1    02FC   894 10$:     BBC     #SWB$V_ELLIPSIS,-               ; if the current token is not an
                 0D 68            02FE   895                     (R8),30$                ; ellipsis branch, but if it is an
          64 68    01    E1    0300   896             BBC     #SWB$V_BOUNDED,(R8),95$ ; unbounded ellipsis, then match the
                                0304   897                                             ; current directory against the
                                0304   898                                             ; ellipsis, and go continue
```

```
                     0304   900 ;
                     0304   901 ; if there are both tokens and directories remaining, and the current token
                     0304   902 ; is not a bounded ellipsis, then the action take depends upon the nature of
                     0304   903 ; the token. if the token is a bounded ellipsis, the current directory name
                     0304   904 ; is matched against the ellipsis bounds. if the match succeeds, we recurse
                     0304   905 ; with the next token and directory. if the match fails, and it is impossible
                     0304   906 ; to ever match the entire input pattern from the current directory depth, we
                     0304   907 ; return failure, otherwise, we match the current directory with the ellipsis
                     0304   908 ; and recurse with the next directory name. finally, if the current token is
                     0304   909 ; not an ellipsis, we match it directly with the current directory name.
                     0304   910 ; success is handled as above. failure means that we must have prematurely
                     0304   911 ; matched an ellipsis bounds. our course of action is to back up to the last
                     0304   912 ; ellipsis, match the bounds directory to the ellipsis, and continue the
                     0304   913 ; recursion.
                     0304   914 ;
                     0304   915
          7E   52    7D   0304   916 20$:    MOVQ    R2,-(SP)                ; save the current directory descriptor
            00CA     30   0307   917         BSBW    NEXT_PATTERN            ; roll forward to the next token
          52   8E    7D   030A   918         MOVQ    (SP)+,R2                ; restore the directory descriptor
                     030D   919
       54   01 A8    9A   030D   920 30$:    MOVZBL  SWB$B_PATLEN(R8),R4     ; create a descriptor for the current
       55   02 A8    9A   0311   921         MOVZBL  SWB$B_PPOS(R8),R5       ; token by moving its length into r4
       55   10 A8    C0   0315   922         ADDL2   SWB$Q_PATTERN+4(R8),R5  ; and computing its address in r5
    52   FFFF0000 8F    CA   0319   923         BICL2   #^XFFFF0000,R2          ; clear any stale FSCB bits
         00000000'EF    16   0320   924         JSB     FMG$MATCH_NAME          ; test for token-directory name match
            05 50       E9   0326   925         BLBC    R0,40$                  ; branch if no match
              00A8      30   0329   926         BSBW    NEXT_PATTERN            ; if they match, roll forward to next
                3C      11   032C   927         BRB     100$                    ; token, and go recurse once more
                     032E   928
              0158      30   032E   929 40$:    BSBW    PREV_PATTERN            ; roll back to previous token and if it
    27 68       00      E1   0331   930         BBC     #SWB$V_ELLIPSIS,(R8),90$; isn't an ellipsis continue rollback
              005F      30   0335   931         BSBW    SET_WCC                 ; otherwise match directory to ellipsis
          07    56      91   0338   932         CMPB    R6,#FWA$C_MAXSUBDIR     ; if we are at the maximum depth then
                13      1E   033B   933         BGEQU   60$                     ; go return failure otherwise go
        0138 CA46       D5   033D   934         TSTL    FWA$Q_DIR1+8(R10)[R6]   ; if there are no more directories, go
                26      12   0342   935         BNEQ    100$                    ;  test if pattern can ever be matched
                     0344   936                                                 ; continue the recursion
                     0344   937
          03 A8      83   0344   938 50$:    SUBB3   SWB$B_TOKENS_LEFT(R8),- ; if we are at a directory depth such
    54    05 A8           0347   939                 SWB$B_MAXIMUM(R8),R4    ; that the input pattern can never be
    2E AA    54      91   034A   940         CMPB    R4,FWA$B_DIRLEN(R10)    ; matched, go return failure, otherwise
                25      1E   034E   941         BGEQU   110$                    ; we go return partial success
                     0350   942
                50      D4   0350   943 60$:    CLRL    R0                      ; if we are to return failure we clear
                51      D4   0352   944         CLRL    R1                      ; both general registers r0 and r1
                        05   0354   945         RSB                             ; and return to recurse upwards
```

```
                     0355   947
                     0355   948 ;
                     0355   949 ; if there are neither tokens nor directories left, then the directory
                     0355   950 ; specification does match the pattern, and so we go return total success.
                     0355   951 ; if there are no tokens left, but there are directories, this means we
                     0355   952 ; must have prematurely matched an ellipsis bounds. our course of action
                     0355   953 ; is to backup to the last ellipsis, match the bounds directory to the
                     0355   954 ; ellipsis, and continue the recursion.
                     0355   955 ;
                     0355   956
           52   D5   0355   957 70$:    TSTL    R2                      ; if there are not any tokens or
           37   13   0357   958         BEQL    120$                    ; directories then go return success
         012D   30   0359   959         BSBW    PREV_PATTERN            ; otherwise backup one token
                     035C   960
                     035C   961 ;
                     035C   962 ; when a rollback to the last encountered ellipsis is specified, the
                     035C   963 ; directory matching the ellipsis's bounds is now matched against the ellipsis
                     035C   964 ; itself, the wild card directory context is appropriately altered, and we
                     035C   965 ; attempt to continue the matching process from this position.
                     035C   966 ;
                     035C   967
         012A   30   035C   968 90$:    BSBW    PREV_PATTERN            ; now rollback one token and one
           56   D7   035F   969         DECL    R6                      ; directory, unless can't back up any,
        EC 50   E9   0361   970         BLBC    R0,60$                  ; and if token is not an
    F4 68   00   E1   0364   971         BBC     #SWB$V_ELLIPSIS,(R8),90$; ellipsis continue rollback, otherwise
           2D   10   0368   972 95$:    BSBB    SET_WCC                 ; match dir to ellipsis and continue
                     036A   973
                     036A   974 ;
                     036A   975 ; we want to see if the remaining directory specification matches the
                     036A   976 ; remaining pattern tokens. Thus, we increment the directory descriptor index
                     036A   977 ; to the descriptor of the next directory, and we recurse by having match
                     036A   978 ; call match.
                     036A   979 ;
                     036A   980
07       56   91   036A   981 100$:   CMPB    R6,#FWA$C_MAXSUBDIR     ; if we are the maximum directory level
           21   13   036D   982         BEQL    120$                    ; then go return total success
           56   D6   036F   983         INCL    R6                      ; increment dir index to next position
         FF6B   30   0371   984         BSBW    MATCH                   ; see if remaining dir & tokens match
                05   0374   985         RSB                             ; return final result
```

```
                     0375   987
                     0375   988 ;
                     0375   989 ; if a status of partial success is to be returned, general register r0 is
                     0375   990 ; set to one, general register r1 is cleared, the information about the next
                     0375   991 ; directory to search for is place in the temporary buffer SWB$L_SCRATCH_PAT,
                     0375   992 ; and we return to initiate upwards recursion.
                     0375   993 ;
                     0375   994
        51   D4      0375   995 110$:   CLRL    R1                              ; partial success requires a zeroed r1
14 A8   68   D0      0377   996         MOVL    (R8),SWB$L_SCRATCH_PAT(R8)      ; put token characteristics into buf
        06   E1      037B   997         BBC     #SWB$V_ELLIPSIS_EXISTS,-        ; if no ellipsis exists in the input
     14 68           037D   998                 (R8),130$                       ; pattern go return partial success
        00   E0      037F   999         BBS     #SWB$V_ELLIPSIS,-               ; if the current token is an ellipsis
     10 68           0381  1000                 (R8),130$                       ; go return partial success
     2E AA   91      0383  1001         CMPB    FWA$B_DIRLEN(R10),-             ; if there there are ellipses but they
     06 A8           0386  1002                 SWB$B_FIRST_E(R8)               ; all follow the current token then
        09   1F      0388  1003         BLSSU   130$                            ; go return partial success
             88      038A  1004         BISB2   #SWB$M_ELLIPSIS!-               ; otherwise set the ellipsis and wild
                     038B  1005                 SWB$M_WILD,-                    ; bits in the returned buffer so that
14 A8        05      038B  1006                 SWB$L_SCRATCH_PAT(R8)           ; *.dir;1 will be searched for and
        03   11      038E  1007         BRB     130$                            ; go return partial success
                     0390  1008
                     0390  1009 ;
                     0390  1010 ; if a status of total success is to be returned, both general registers r0
                     0390  1011 ; and r1 are set to one before we return to initiate upwards recursion.
                     0390  1012 ;
                     0390  1013
   51   01   D0      0390  1014 120$:   MOVL    #1,R1                           ; for total success, set both
   50   01   D0      0393  1015 130$:   MOVL    #1,R0                           ; general registers r0 and r1
             05      0396  1016         RSB                                     ; before returning
```

```
                     0397  1018          .SBTTL  SET_WCC, Maintain Directory Wildcard Context
                     0397  1019
                     0397  1020 ;++
                     0397  1021 ;
                     0397  1022 ; SET_WCC:      maintain directory wildcard context
                     0397  1023 ;
                     0397  1024 ;       this routine adjusts the directory wild card context so that it is
                     0397  1025 ;       consistant with the current directory specification. it is only
                     0397  1026 ;       called when a directory name is matched to an ellipsis becomming
                     0397  1027 ;       wild, and requiring that the appropriate bit (corresponding to its
                     0397  1028 ;       level-1) be set within this field.
                     0397  1029 ;
                     0397  1030 ; inputs:
                     0397  1031 ;
                     0397  1032 ;       r6  = number of bit to be set after shifting subfield
                     0397  1033 ;       r10 = fwa
                     0397  1034 ;
                     0397  1035 ; outputs:
                     0397  1036 ;
                     0397  1037 ;       FWA$B_DIRWCFLGS with a context appropriate for the current
                     0397  1038 ;       directory specification
                     0397  1039 ;
                     0397  1040 ;--
                     0397  1041
                     0397  1042 SET_WCC:
        50   08  56  C3  0397  1043          SUBL3   R6,#FWA$C_MAXSUBDIR+1,R0; get length of subfield to be shifted
51  05 AA   50  56  EF  039B  1044          EXTZV   R6,R0,-                 ; extract the FWA$B_DIRWCFLGS subfield
                     03A1  1045                  FWA$B_DIRWCFLGS(R10),R1 ; to be shifted to the left, shift the
        51   51  01  9C  03A1  1046          ROTL    #1,R1,R1                ; subfield one bit to the left,
05 AA   50   56  51  F0  03A5  1047          INSV    R1,R6,R0,-              ; reinsert the shifted subfield, and
                     03AB  1048                  FWA$B_DIRWCFLGS(R10)    ; set the bit corresponding to the
                     03AB  1049          SSB     R6,FWA$B_DIRWCFLGS(R10) ; directory now matching the ellipsis
                 05  03B0  1050          RSB                             ; return
```

```
                        03B1  1052          .SBTTL  CHK_MFD, Check Current Token to Match MFD
                        03B1  1053
                        03B1  1054 ;++
                        03B1  1055 ;
                        03B1  1056 ; CHK_MFD:      check for mfd
                        03B1  1057 ;
                        03B1  1058 ;       this routine checks the current token to see if it is the mfd
                        03B1  1059 ;
                        03B1  1060 ; inputs:
                        03B1  1061 ;
                        03B1  1062 ;       r4/r5  = descriptor of current token
                        03B1  1063 ;       r10 = fwa, particularly fwa$t_fibbuf
                        03B1  1064 ;
                        03B1  1065 ; outputs:
                        03B1  1066 ;
                        03B1  1067 ;       Z-bit = set iff mfd
                        03B1  1068 ;
                        03B1  1069 ;--
                        03B1  1070
                        03B1  1071 MFD_FID:
           00040004     03B1  1072          .LONG   <FID$C_MFD@16>+FID$C_MFD ; fid of the mfd
                        03B5  1073 MFD_NAME:
 30 30 30 30 30 30      03B5  1074          .ASCII  \000000\                 ; ascii name of mfd
                        03BB  1075
                        03BB  1076 CHK_MFD:
       F3 AF    D1     03BB  1077          CMPL    B^MFD_FID,-              ; if the base directory (i.e. the
     01FE CA             03BE  1078                  FWA$T_FIBBUF+-           ; directory whose file ID is in the DID
                         03C1  1079                  FIB$W_DID(R10)           ; of the FIB) is not the MFD, then
          10   12        03C1  1080          BNEQ    10$                      ; can't be the mfd
       54  06   B1        03C3  1081          CMPW    #6,R4                    ; if the file does not have exactly six
           0B   12        03C6  1082          BNEQ    10$                      ;  chars then it can't be 000000.dir;1
    65   EA AF   D1        03C8  1083          CMPL    B^MFD_NAME,(R5)          ; if the directory isn't 000000.dir;1
           05   12        03CC  1084          BNEQ    10$                      ; then continue the downward traversal
 04 A5     E4 AF   B1      03CE  1085          CMPW    B^MFD_NAME,4(R5)         ;
                         05  03D3  1086 10$:    RSB                            ; return
```

```
                     03D4  1088
                     03D4  1089          .SBTTL  NEXT_PATTERN, Skip to Next Pattern Token
                     03D4  1090
                     03D4  1091 ;++
                     03D4  1092 ;
                     03D4  1093 ; NEXT_PATTERN: skip to next pattern token
                     03D4  1094 ;
                     03D4  1095 ;       skip to the next token in the pattern string.  a
                     03D4  1096 ;       token is defined to be any directory name or an
                     03D4  1097 ;       ellipsis. after skipping to the next token, it
                     03D4  1098 ;       is parsed.
                     03D4  1099 ;
                     03D4  1100 ; inputs:
                     03D4  1101 ;
                     03D4  1102 ;       r8 = swb address
                     03D4  1103 ;
                     03D4  1104 ; outputs:
                     03D4  1105 ;
                     03D4  1106 ;--
                     03D4  1107
                     03D4  1108 NEXT_PATTERN:
03 68   00    E0     03D4  1109          BBS     #SWB$V_ELLIPSIS,(R8),10$; if the current token is not an
     03 A8    97     03D8  1110          DECB    SWB$B_TOKENS_LEFT(R8)   ; ellipsis, decrement the token counter
                     03DB  1111
     01 A8    80     03DB  1112 10$:     ADDB2   SWB$B_PATLEN(R8),-      ; position the pattern offset
     02 A8           03DE  1113                  SWB$B_PPOS(R8)          ; to the next delimiter
     02 A8    91     03E0  1114          CMPB    SWB$B_PPOS(R8),-        ; if there are no more tokens (i.e. we
     0C A8           03E3  1115                  SWB$Q_PATTERN(R8)       ;  have reached the end of the token
        07    1E     03E5  1116          BGEQU   PARSE_PATTERN           ;  string) or if the next token is an
        03    E1     03E7  1117          BBC     #SWB$V_DELIMITER,-      ; ellipsis, then there is no
     03 68           03E9  1118                  (R8),PARSE_PATTERN      ; need to bypass the delimiter token
     02 A8    96     03EB  1119          INCB    SWB$B_PPOS(R8)          ; too, otherwise, there is such a need
                     03EE  1120                                          ; drop thru to parse_pattern
```

```
                     03EE  1122          .SBTTL  PARSE_PATTERN, Parse Current Pattern Token
                     03EE  1123
                     03EE  1124 ;++
                     03EE  1125 ;
                     03EE  1126 ; PARSE_PATTERN: parse current pattern token
                     03EE  1127 ;
                     03EE  1128 ;       set the length and characteristics flags of the
                     03EE  1129 ;       current token in the pattern string.
                     03EE  1130 ;
                     03EE  1131 ; inputs:
                     03EE  1132 ;
                     03EE  1133 ;       r8 = swb address
                     03EE  1134 ;
                     03EE  1135 ; outputs:
                     03EE  1136 ;
                     03EE  1137 ;       swb$b_patlen = length of token, 0 if none
                     03EE  1138 ;       swb$b_flags  = flags describing token
                     03EE  1139 ;
                     03EE  1140 ;--
                     03EE  1141
                     03EE  1142 PARSE_PATTERN:
     68    0F   8A   03EE  1143          BICB2   #SWB$M_ELLIPSIS!-       ; clear status flags
                     03F1  1144                  SWB$M_BOUNDED!-
                     03F1  1145                  SWB$M_WILD!-
                     03F1  1146                  SWB$M_DELIMITER,(R8)
  52   0C A8   7D   03F1  1147          MOVQ    SWB$Q_PATTERN(R8),R2    ; get string descriptor
  51   02 A8   9A   03F5  1148          MOVZBL  SWB$B_PPOS(R8),R1       ; current offset into string
     53   51   C0   03F9  1149          ADDL2   R1,R3                   ; address of string left
     52   51   C2   03FC  1150          SUBL2   R1,R2                   ; length of string left
          4B   13   03FF  1151          BEQL    50$                     ; branch if nothing left
                     0401  1152
                     0401  1153 ;
                     0401  1154 ; check if token is an ellipsis
                     0401  1155 ;
                     0401  1156
     03    52   D1   0401  1157 20$:    CMPL    R2,#3                   ; 3 characters left?
           18   1F   0404  1158          BLSSU   10$                     ; branch if not
2E2E 8F    63   B1   0406  1159          CMPW    (R3),#^A'..'            ; ellipsis?
           11   12   040B  1160          BNEQ    10$                     ; branch if not
     68    07   88   040D  1161          BISB2   #SWB$M_ELLIPSIS!-       ; mark ellipsis is current
                     0410  1162                  SWB$M_BOUNDED!-
                     0410  1163                  SWB$M_WILD,(R8)
     03    52   D1   0410  1164          CMPL    R2,#3                   ; anything following ellipsis?
           04   1A   0413  1165          BGTRU   5$                      ; branch if yes
                     0415  1166          CSB     #SWB$V_BOUNDED,(R8)     ; mark unbounded
     52    03   D0   0419  1167 5$:      MOVL    #3,R2                   ; set length of ellipsis
           2E   11   041C  1168          BRB     50$
                     041E  1169
                     041E  1170 ;
                     041E  1171 ; find delimiter following token
                     041E  1172 ;
                     041E  1173
63   52    2E   3A   041E  1174 10$:     LOCC    #^A'.',R2,(R3)          ; find next dot in string
           15   13   0422  1175          BEQL    30$                     ; branch if not found
                     0424  1176          SSB     #SWB$V_DELIMITER,(R8)   ; assume 1 char, delimiter following
     03    50   D1   0428  1177          CMPL    R0,#3                   ; if there are 3 characters left
           0C   19   042B  1178          BLSS    30$
```

```
                2E2E 8F    01 A1    B1  042D  1179          CMPW    1(R1),#^A'..'           ; then check for ellipsis following
                           04 12    0433  1180          BNEQ    30$                     ; branch if not
                                    0435  1181          CSB     #SWB$V_DELIMITER,(R8)   ; if so, set no delimiter after token
                                    0439  1182
                                    0439  1183 ;
                                    0439  1184 ; if token has wild characters, set wild flag
                                    0439  1185 ;
                                    0439  1186
                      52    50 C2 0439  1187 30$:    SUBL2   R0,R2                   ; length of token passed by
                63    52    2A 3A 043C  1188          LOCC    #^A'*',R2,(R3)          ; search token for wild *
                           06 12    0440  1189          BNEQ    40$                     ; if found, set bit
                63    52    25 3A 0442  1190          LOCC    #^A'%',R2,(R3)          ; search token for wild %
                           04 13    0446  1191          BEQL    50$                     ; if not found, set length
                                    0448  1192 40$:    SSB     #SWB$V_WILD,(R8)        ; mark token has wild characters
                                    044C  1193
                                    044C  1194 ;
                                    044C  1195 ; set length of new token in string (r2 = length)
                                    044C  1196 ;
                                    044C  1197
                   01 A8    52    90  044C  1198 50$:    MOVB    R2,SWB$B_PATLEN(R8)     ; set token length
                                    05  0450  1199          RSB                             ; return
```

```
                     0451  1201          .SBTTL  PREV_DIR, Strip one Directory Name from Directory Specification
                     0451  1202
                     0451  1203 ;++
                     0451  1204 ;
                     0451  1205 ; PREV_DIR: strip one directory name from directory specification
                     0451  1206 ;
                     0451  1207 ;       strip the last directory name from the current
                     0451  1208 ;       directory specification being built.
                     0451  1209 ;
                     0451  1210 ; inputs:
                     0451  1211 ;
                     0451  1212 ;       r10 = fwa address
                     0451  1213 ;
                     0451  1214 ; outputs:
                     0451  1215 ;
                     0451  1216 ;       r4/r5 = descriptor of stripped directory name
                     0451  1217 ;       r0    = false if no names left to strip, else true
                     0451  1218 ;
                     0451  1219 ;--
                     0451  1220
                     0451  1221 PREV_DIR:
  16 6A    1B   E1   0451  1222          BBC     #FWA$V_GRPMBR,(R10),10$ ; branch if not uic format
        14    10   0455  1223          BSBB    10$                     ; strip member portion
     2C 50    E9   0457  1224          BLBC    R0,90$                  ; branch if nothing left
50   0130 CA   3C   045A  1225          MOVZWL  FWA$Q_DIR1(R10),R0      ; obtain length of group portion
0130 CA   54   A0   045F  1226          ADDW2   R4,FWA$Q_DIR1(R10)      ; concatenate group and member i.e.
   65   54   28   0464  1227          MOVC3   R4,(R5),-               ; append member onto end of group name
  0134 DA40         0467  1228                  @FWA$Q_DIR1+4(R10)[R0]  ; and then strip the whole thing off
                    046B  1229
  51   2E AA   9A   046B  1230 10$:    MOVZBL  FWA$B_DIRLEN(R10),R1    ; get number of slots in use
       51   D7   046F  1231          DECL    R1                      ; backup over last slot
       13   19   0471  1232          BLSS    90$                     ; branch if none left
  2E AA   51   90   0473  1233          MOVB    R1,FWA$B_DIRLEN(R10)    ; store updated slots in use
51  0130 CA41   7E   0477  1234          MOVAQ   FWA$Q_DIR1(R10)[R1],R1  ; address of stripped descriptor
    54   61   7D   047D  1235          MOVQ    (R1),R4                 ; return descriptor to caller
       61   B4   0480  1236          CLRW    (R1)                    ; zero length of FWA descriptor
    50   01   D0   0482  1237          MOVL    #1,R0                   ; indicate success and
             05   0485  1238          RSB                             ; return
                    0486  1239
       50   D4   0486  1240 90$:    CLRL    R0                      ; return error - no names left
             05   0488  1241          RSB
```

```
                     0489  1243          .SBTTL  PREV_PATTERN, Backup to Previous Pattern Token
                     0489  1244
                     0489  1245 ;++
                     0489  1246 ;
                     0489  1247 ; PREV_PATTERN: backup to previous pattern token
                     0489  1248 ;
                     0489  1249 ;       backup one token in the pattern string.
                     0489  1250 ;
                     0489  1251 ; inputs:
                     0489  1252 ;
                     0489  1253 ;       r8 = swb ad  ess
                     0489  1254 ;
                     0489  1255 ; outputs:
                     0489  1256 ;
                     0489  1257 ;       r0 = false if no tokens left to strip, else true
                     0489  1258 ;--
                     0489  1259
                     0489  1260 PREV_PATTERN:
   52   0C A8   7D    0489  1261          MOVQ    SWB$Q_PATTERN(R8),R2    ; get string descriptor
   51   02 A8   9A    048D  1262          MOVZBL  SWB$B_PPOS(R8),R1       ; current offset into string
        38      13    0491  1263          BEQL    80$                     ; branch if already at start
     03 51      D1    0493  1264          CMPL    R1,#3                   ; if the previous token is less than
        18      19    0496  1265          BLSS    5$                      ; two chars then it can't be an ...
52   FD A341   9E    0498  1266          MOVAB   -3(R3)[R1],R2           ; if the previous token does not have
62   2E2E 8F   B1    049D  1267          CMPW    #^A'..',(R2)            ; two consecutive dots it can't be an
        0C      12    04A2  1268          BNEQ    5$                      ; ellipsis, likewise if it doesn't have
FF A341    2E   91    04A4  1269          CMPB    #^A'.',-1(R3)[R1]       ; three consecutive dots it can't be an
        05      12    04A9  1270          BNEQ    5$                      ; ellipsis, but if previous token is an
     51 04      C2    04AB  1271          SUBL2   #3+1,R1                 ; ellipsis, backup 4 places, and go
        0F      11    04AE  1272          BRB     50$                     ; update the position offset
        51      D7    04B0  1273 5$:      DECL    R1                      ; if so, skip over it
        51      D7    04B2  1274 10$:     DECL    R1                      ; skip to previous character
        09      19    04B4  1275          BLSS    50$                     ; branch if at start of string
     2E 6341    91    04B6  1276          CMPB    (R3)[R1],#^A'.'         ; reached a dot?
        F6      12    04BA  1277          BNEQ    10$                     ; branch if not
     03 A8      96    04BC  1278          INCB    SWB$B_TOKENS_LEFT(R8)   ; increment nonellipsis token counter
02 A8   51      81    04BF  1279 50$:     ADDB3   #1,R1,SWB$B_PPOS(R8)    ; store updated offset
     FF27       30    04C4  1280          BSBW    PARSE_PATTERN           ; parse current pattern token
     50 01      D0    04C7  1281          MOVL    #1,R0                   ; indicate success and
        05      05    04CA  1282          RSB                             ; return
        50      D4    04CB  1283 80$:     CLRL    R0                      ; indicate failure and
                05    04CD  1284          RSB                             ; return
```

```
                        04CE  1286          .SBTTL  APPEND_DIR, Append Directory to end of Directory Specification
                        04CE  1287
                        04CE  1288 ;++
                        04CE  1289 ;
                        04CE  1290 ; APPEND_DIR: append directory to end of directory specification
                        04CE  1291 ;
                        04CE  1292 ;       this routine appends a directory name to the end
                        04CE  1293 ;       of the current directory spec being assembled.
                        04CE  1294 ;
                        04CE  1295 ; inputs:
                        04CE  1296 ;
                        04CE  1297 ;       r4/r5 = descriptor of directory name.
                        04CE  1298 ;       r10   = fwa address
                        04CE  1299 ;       r8    = swb address
                        04CE  1300 ;
                        04CE  1301 ; outputs:
                        04CE  1302 ;
                        04CE  1303 ;       r1-r3 destroyed
                        04CE  1304 ;--
                        04CE  1305
                        04CE  1306 APPEND_DIR:
      08 6A    1B   E1  04CE  1307          BBC     #FWA$V_GRPMBR,(R10),10$ ; branch if not uic format
         54    03   D0  04D2  1308          MOVL    #3,R4                   ; only 3 characters in each part
               03   10  04D5  1309          BSBB    10$                     ; append group portion
         55    54   C0  04D7  1310          ADDL2   R4,R5                   ; skip to member portion of string
                        04DA  1311                                          ; and append it by falling thru
      50    2E AA   9A  04DA  1312 10$:     MOVZBL  FWA$B_DIRLEN(R10),R0    ; get number of names in use
51    0130 CA40   7E  04DE  1313          MOVAQ   FWA$Q_DIR1(R10)[R0],R1  ; address of next slot descriptor
         61    54   B0  04E4  1314          MOVW    R4,(R1)                 ; set length in descriptor
      50    04 A1   D0  04E7  1315          MOVL    4(R1),R0                ; get address of buffer from descriptor
         7E    54   7D  04EB  1316          MOVQ    R4,-(SP)                ; save input descriptor
   60    65    54   28  04EE  1317          MOVC3   R4,(R5),(R0)            ; move string into buffer
         54    8E   7D  04F2  1318          MOVQ    (SP)+,R4                ; restore input descriptor
            2E AA   96  04F5  1319          INCB    FWA$B_DIRLEN(R10)       ; increment names in use
                    05  04F8  1320          RSB                             ; return
```

```
                     04F9  1322          .SBTTL  SET_BASE, FIND Base Directory and Determine its Position
                     04F9  1323
                     04F9  1324 ;++
                     04F9  1325 ;
                     04F9  1326 ; SET_BASE:     find base directory and determine its position
                     04F9  1327 ;
                     04F9  1328 ;       the base directory will either be the MFD, if the very first pattern
                     04F9  1329 ;       token is wild, or the last nonwild name after finding either the first
                     04F9  1330 ;       wild token in the pattern string, or the end of the pattern string.
                     04F9  1331 ;       descriptors are created in the FWA, for each of the leading nonwild
                     04F9  1332 ;       names encountered up to and including the base directory. the DID of
                     04F9  1333 ;       the base directory is then set in the FIB. upon return, the current
                     04F9  1334 ;       token will be the first wild token encountered, or the end of the
                     04F9  1335 ;       pattern string if all tokens encountered were nonwild.
                     04F9  1336 ;
                     04F9  1337 ; inputs:
                     04F9  1338 ;
                     04F9  1339 ;       r8  = swb address
                     04F9  1340 ;       r10 = fwa address
                     04F9  1341 ;
                     04F9  1342 ;
                     04F9  1343 ; outputs:
                     04F9  1344 ;
                     04F9  1345 ;       r0 = true if base directory DID has been found
                     04F9  1346 ;            false otherwise
                     04F9  1347 ;--
                     04F9  1348
                     04F9  1349 SET_BASE:
        68    02     E0  04F9  1350          BBS     #SWB$V_WILD,(R8),-      ; if token is wild, then find DID
                     16  04FC  1351                  FIND_DIR
    54    01  A8    9A  04FD  1352          MOVZBL  SWB$B_PATLEN(R8),R4     ; get length of current token
    55    02  A8    9A  0501  1353          MOVZBL  SWB$B_PPOS(R8),R5       ; get offset to current token
    55    10  A8    C0  0505  1354          ADDL2   SWB$Q_PATTERN+4(R8),R5  ; compute address of current token
                C3    10  0509  1355          BSBB    APPEND_DIR              ; append token to directory spec
              FEC6    30  050B  1356          BSBW    NEXT_PATTERN            ; skip to next pattern token
            01  A8    95  050E  1357          TSTB    SWB$B_PATLEN(R8)        ; continue as long as there are
                E6    12  0511  1358          BNEQ    SET_BASE                ; nonwild tokens to copy
                          0513  1359                                          ; drop through to FIND_DIR
```

```
                     0513  1361          .SBTTL  FIND_DIR, Determine Current Directory Position
                     0513  1362
                     0513  1363 ;++
                     0513  1364 ;
                     0513  1365 ; FIND_DIR
                     0513  1366 ;
                     0513  1367 ;       Determine current directory position
                     0513  1368 ;
                     0513  1369 ;       Determine the did of the current result directory
                     0513  1370 ;       specification.
                     0513  1371 ;
                     0513  1372 ; inputs:
                     0513  1373 ;
                     0513  1374 ;       r8  = swb address
                     0513  1375 ;       r9  = ifab address
                     0513  1376 ;       r10 = fwa address
                     0513  1377 ;
                     0513  1378 ; outputs:
                     0513  1379 ;
                     0513  1380 ;       r0 = status
                     0513  1381 ;       the did in the fib is set.
                     0513  1382 ;
                     0513  1383 ;       registers r4,r5,r8 are saved.
                     0513  1384 ;--
                     0513  1385 ;
                     0513  1386
                     0513  1387 FIND_DIR:
   2E AA   95        0513  1388          TSTB    FWA$B_DIRLEN(R10)       ; if the directory specification is
      22   12        0516  1389          BNEQ    20$                     ; not empty then setup to find the DID
6A    3A   E0        0518  1390          BBS     #FWA$V_ROOT_DIR,(R10),- ; if there was a root directory then
      0D              051B  1391                  10$                     ;  get the DID the hard way
FE91  CF   D0        051C  1392          MOVL    W^MFD_FID,-             ; if the directory specification is
01FE  CA             0520  1393                  FWA$T_FIBBUF+-          ;  empty then the DID defaults to the
                     0523  1394                  FIB$W_DID(R10)          ;  DID of the MFD
0202  CA   B4        0523  1395          CLRW    FWA$T_FIBBUF+-          ;
                     0527  1396                  FIB$W_DID_RVN(R10)      ;
      33   11        0527  1397          BRB     40$                     ; go return success
                     0529  1398
                     0529  1399 ;
                     0529  1400 ; In order to get the DID of the rooted MFD we force SETDID to stop searching
                     0529  1401 ; directories by clearing the length of the first normal directory descriptor
                     0529  1402 ;
                     0529  1403
0130  CA   DD        0529  1404 10$:     PUSHL   FWA$Q_DIR1(R10)         ; save it the length
0130  CA   D4        052D  1405          CLRL    FWA$Q_DIR1(R10)         ; clear it
      07   10        0531  1406          BSBB    20$                     ; call SETDID to find the DID
0130  CA 8ED0        0533  1407          POPL    FWA$Q_DIR1(R10)         ; restore the length
      1F   11        0538  1408          BRB     30$                     ; exit
                     053A  1409
0130  8F   BB        053A  1410 20$:     PUSHR   #^M<R4,R5,R8>           ; save registers R4-R8 and the wildcard
0204  CA   DD        053E  1411          PUSHL   FWA$T_FIBBUF+-          ; context over DID lookup by pushing
                     0542  1412                  FIB$L_WCC(R10)          ; them on the current stack
  58   24 A9   D0     0542  1413          MOVL    IFB$L_LAST_FAB(R9),R8   ; obtain the address of the FAB
00000000'EF   16     0546  1414          JSB     RM$SETDID_ALT           ; set DID in the FIB
0204  CA 8ED0        054C  1415          POPL    FWA$T_FIBBUF+-          ; restore registers R4-R8 and the
                     0551  1416                  FIB$L_WCC(R10)          ; wildcard context, saved over DID
0130  8F   BA        0551  1417          POPR    #^M<R4,R5,R8>           ; lookup, from the current stack
```

```
                04  E0  0555  1418          BBS     #IMP$V_IORUNDOWN,-      ; if I/O Rundown is in progress,
             0B 6B      0557  1419                  (R11),TOO$              ; then RMOWILD is prematurely aborted
             07 50  E9  0559  1420  30$:     BLBC    R0,90$                  ; branch if any error
                    055C  1421  40$:     SSB     #SWB$V_VALID_DID,(R8)   ; set the valid DID bit in the SWB
          50    01  D0  0560  1422          MOVL    #1,R0                   ; otherwise indicate success
                05  0563  1423  90$:     RSB                             ; and return
                    0564  1424
       58   24 A9  D0  0564  1425  100$:    MOVL    IFB$L_LAST_FAB(R9),R8   ; abort by obtaining the address of the  FAB
                    0568  1426          RMSERR  NMF                     ;  setting a default error of no more
                    056D  1427                                          ;  files both in R0 and in the FAB,
                05  056D  1428          RSB                             ;  and returning
                    056E  1429
                    056E  1430          .END
```

```
$$.PSECT_EP                     =  00000000
$$RMSTEST                       =  0000001A
$$RMS_PBUGCHK                   =  00000010
$$RMS_TBUGCHK                   =  00000008
$$RMS_UMODE                     =  00000004
APPEND_DIR                         000004CE  R      01
CHK_MFD                            000003BB  R      01
FAB$L_STV                       =  0000000C
FIB$C_LENGTH                    =  00000040
FIB$L_WCC                       =  00000010
FIB$M_WILD                      =  00000100
FIB$W_DID                       =  0000000A
FIB$W_DID_RVN                   =  0000000E
FIB$W_NMCTL                     =  00000014
FID$C_MFD                       =  00000004
FIND_DIR                           00000513  R      01
FMG$MATCH_NAME                     ********    X    01
FSCB$V_ELIPS                    =  00000010
FWA$B_DIRLEN                    =  0000002E
FWA$B_DIRWCFLGS                 =  00000005
FWA$C_MAXSUBDIR                 =  00000007
FWA$L_SWB_PTR                   =  0000004C
FWA$Q_DIRT                      =  00000130
FWA$Q_FIB                       =  00000010
FWA$Q_NAME                      =  00000170
FWA$Q_RNS                       =  00000188
FWA$S_NAMEBUF                   =  00000100
FWA$S_TYPEBUF                   =  00000028
FWA$S_VERBUF                    =  00000006
FWA$T_FIBBUF                    =  000001F4
FWA$T_NAMEBUF                   =  000004B6
FWA$V_GRPMBR                    =  0000001B
FWA$V_ROOT_DIR                  =  0000003A
FWA$V_WILD_DIR                  =  0000001C
FWA$V_WILD_GRP                  =  00000028
IFB$L_LAST_FAB                  =  00000024
IFB$L_RNS_LEN                   =  0000006C
IMP$V_IORUNDOWN                 =  00000004
IO$_ACCESS                      =  00000032
MATCH                              000002DF  R      01
MFD_FID                            000003B1  R      01
MFD_NAME                           000003B5  R      01
NEXT_PATTERN                       000003D4  R      01
NEXT_SUBDIR                        000001F4  R      01
PARSE_PATTERN                      000003EE  R      01
PREV_DIR                           00000451  R      01
PREV_PATTERN                       00000489  R      01
RMS$FCPFNC                         ********    X    01
RMS$GETBLK1                        ********    X    01
RMS$INIT_SWB                       00000000  RG     01
RMS$MAPERR                         ********    X    01
RMS$NEXTDIR                        000000CB  RG     01
RMS$SETDID_ALT                     ********    X    01
RMS$_FND                        =  0001C02A
RMS$_NMF                        =  000182CA
RMS$_NOVALPRS                   =  0001830A
SET_BASE                           000004F9  R      01
SET_WCC                            00000397  R      01
SS$_BADIRECTORY                 =  00000828
SS$_NOMOREFILES                 =  00000930
SS$_NOSUCHFILE                  =  00000910
SWB$B_BID                       =  00000008
SWB$B_DIRWCFLGS                 =  00000007
SWB$B_FIRST_E                   =  00000006
SWB$B_MAXIMUM                   =  00000005
SWB$B_MINIMUM                   =  00000004
SWB$B_PATLEN                    =  00000001
SWB$B_PPOS                      =  00000002
SWB$B_TOKENS_LEFT               =  00000003
SWB$C_BID                       =  0000002A
SWB$C_BLN                       =  00000148
SWB$L_SCRATCH_PAT               =  00000014
SWB$M_BOUNDED                   =  00000002
SWB$M_DELIMITER                 =  00000008
SWB$M_ELLIPSIS                  =  00000001
SWB$M_WILD                      =  00000004
SWB$Q_PATTERN                   =  0000000C
SWB$T_PATTERN_BUF               =  00000048
SWB$T_SCRATCH_BUF               =  00000018
SWB$V_BOUNDED                   =  00000001
SWB$V_DELIMITER                 =  00000003
SWB$V_ELLIPSIS                  =  00000000
SWB$V_ELLIPSIS_EXISTS           =  00000006
SWB$V_FIRST                     =  00000005
SWB$V_TRAVERSE                  =  00000004
SWB$V_VALID_DID                 =  00000007
SWB$V_WILD                      =  00000002
UIC_EXPAND                         000000B2  R      01
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
RM$RMSFILENAME	0000056E (1390.)	01 (1.)	PIC USR CON REL GBL NOSHR EXE RD NOWRT NOVEC BYTE
ABS	00000000 (0.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	30	00:00:00.09	00:00:00.65
Command processing	115	00:00:00.80	00:00:04.45
Pass 1	540	00:00:22.28	00:00:49.62
Symbol table sort	0	00:00:03.47	00:00:05.41
Pass 2	265	00:00:05.45	00:00:12.24
Symbol table output	12	00:00:00.14	00:00:00.48
Psect synopsis output	2	00:00:00.02	00:00:00.05
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	966	00:00:32.26	00:01:13.07

The working set limit was 1950 pages.
127870 bytes (250 pages) of virtual memory were used to buffer the intermediate code.
There were 120 pages of symbol table space allocated to hold 2295 non-local and 96 local symbols.
1430 source lines were read in Pass 1, producing 16 object records in Pass 2.
27 pages of virtual memory were used to define 26 macros.

Macro library statistics

Macro library name	Macros defined
_255DUA28:[RMS.OBJ]RMS.MLB;1	13
_255DUA28:[SYS.OBJ]LIB.MLB;1	1
_255DUA28:[SYSLIB]STARLET.MLB;2	8
TOTALS (all libraries)	22

2427 GETS were required to define 22 macros.

There were no errors, warnings or information messages.

```
MACRO/LIS=LIS$:RMOWILD/OBJ=OBJ$:RMOWILD MSRC$:RMOWILD/UPDATE=(ENH$:RMOWILD)+EXECML$/LIB+LIB$:RMS/LIB
```

RM0XPFN
LIS

RM0SETDID
LIS

RM0SHARE
LIS

RM0WILD
LIS

RM0XAB
LIS

RM0STALL
LIS