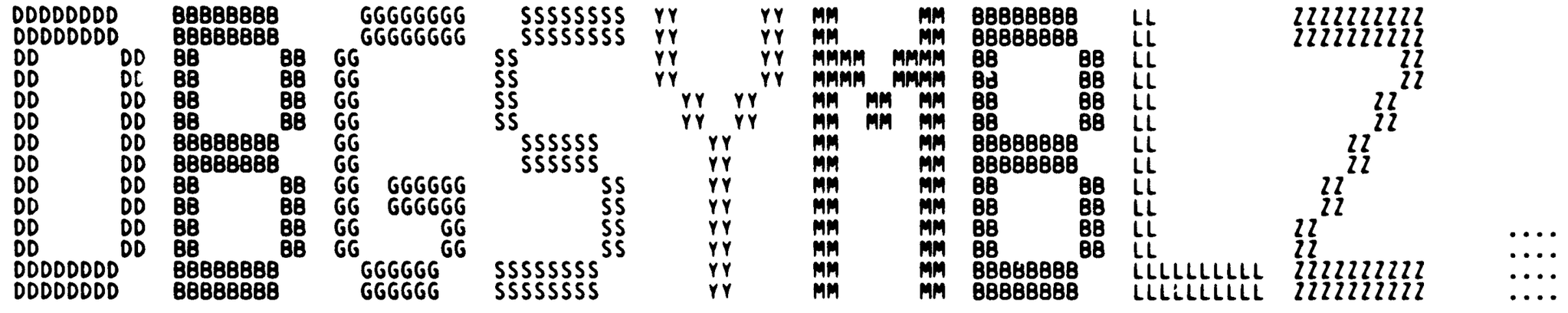
```
DDDDDDDDDDD     EEEEEEEEEEEEEEE  BBBBBBBBBBB      UUU         UUU     GGGGGGGGGGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB     UUU         UUU     GGGGGGGGGGGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB     UUU         UUU     GGGGGGGGGGGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG
DDD         DDD EEEEEEEEEEE      BBBBBBBBBBBB     UUU         UUU GGG
DDD         DDD EEEEEEEEEEE      BBBBBBBBBBBB     UUU         UUU GGG
DDD         DDD EEEEEEEEEEE      BBBBBBBBBBBB     UUU         UUU GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG   GGGGGGGGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG   GGGGGGGGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG   GGGGGGGGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG         GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG         GGG
DDD         DDD EEE              BBB         BBB  UUU         UUU GGG         GGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB      UUUUUUUUUUUUUUUUU     GGGGGGGGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB      UUUUUUUUUUUUUUUUU     GGGGGGGGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB      UUUUUUUUUUUUUUUUU     GGGGGGGGG
```

FILEID**DBGSYMBLZ



```
;     1          0001  0 MODULE DBGSYMBLZ (IDENT = 'V04-000') =
;     2          0002  0
;     3          0003  1 BEGIN
;     4          0004  1
;     5          0005  1 !**************************************************************************
;     6          0006  1 !*                                                                        *
;     7          0007  1 !*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                              *
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;    24          0024  1 !*                                                                        *
;    25          0025  1 !*                                                                        *
;    26          0026  1 !**************************************************************************
;    27          0027  1 !
;    28          0028  1 ! WRITTEN BY
;    29          0029  1 !       Victoria Holt   July, 1982
;    30          0030  1 !
;    31          0031  1 ! MODIFIED BY:
;    32          0032  1 !       R. Title                \
;    33          0033  1 !                       Nov, 1982    >  Added DBG$SYMID_TO_PRIMARY routine
;    34          0034  1 !       P. Sager                /
;    35          0035  1 !
;    36          0036  1 !       P. Sager        Dec, 1982   Rework parts of this module to work better
;    37          0037  1 !                                   for symbolization.
;    38          0038  1 !       R. Title        Feb 1983    Added DUMP_SAT and DUMP_GLOBAL routines
;    39          0039  1 !                                   to aid in performance studies.
;    40          0040  1 !       R. Title        May 1983    Redesigned SAT as tree instead of linked
;    41          0041  1 !                                   list. Wrote SEARCH_BIN_SAT and SEARCH_PROG_SAT
;    42          0042  1 !                                   to utilize new data structure.
;    43          0043  1 !       W. Carrell      Sep 1983    Update DBG$CURRENT_PRIMARY for self_referential
;    44          0044  1 !                                   records
;    45          0045  1 !
;    46          0046  1 ! MODULE FUNCTION
;    47          0047  1 !       This module contains all the routines necessary for parsing and
;    48          0048  1 !       executing the SYMBOLIZE command.
;    49          0049  1 !
;    50          0050  1
;    51          0051  1 REQUIRE 'SRC$:DBGPROLOG.REQ';
;    52          0185  1
;    53          0186  1 FORWARD ROUTINE
;    54          0187  1     DBG$NEXECUTE_SYMBOLIZE,             ! Performs action of SYMBOLIZE xxx.
;    55          0188  1     DBG$NPARSE_SYMBOLIZE,               ! Establishes parse network.
;    56          0189  1     DBG$SEARCH_BIN_SAT,                 ! Search module-level SAT
;    57          0190  1     DBG$SEARCH_PROG_SAT,                ! Search program-level SAT
```

```
;   58          0191  1     DBG$SEARCH_BIN_SAT_REC,          ! Recursive search-sat routine
;   59          0192  1     DBG$SEARCH_PROG_SAT_REC,         ! Recursive search-sat routine
;   60          0193  1     DBG$SEARCH_GLOBAL,               ! Searches Global Symbol Chain
;   61          0194  1     DBG$DUMP_GLOBAL: NOVALUE,        ! Counts length of Global Symbol Chain
;   62          0195  1     DBG$SEARCH_SAT,                  ! Searches SAT to symbolize address.
;   63          0196  1     DBG$DUMP_SAT: NOVALUE,           ! Dump information about SAT
;   64          0197  1     DBG$SEARCH_VAX_CALL_STACK,       ! Searches VAX call stack.
;   65          0198  1     DBG$SYMBOLIZE_REG,               ! Attempts to symbolize register addr.
;   66          0199  1     DBG$SYMID_TO_PRIMARY,            ! Turns SYMID,OFFSET into Primary
;   67          0200  1     DBG$NEW_SYMBOLIZE,               ! New symbolization routine
;   68          0201  1     DBG$PC_TO_SYMID,                 ! Given address, search Module SAT or
;   69          0202  1                                      !       Global symbol chain for RST
;   70          0203  1     FIND_ROUTINE,                    ! Finds routine corresponding to PC.
;   71          0204  1     GET_ADDRESS_DESC,                ! Return Address Descriptor from given
;   72          0205  1                                      !       address representation
;   73          0206  1     GSTADDRESS,                      ! Get GST's address
;   74          0207  1     IS_SYMBOL_BOUND_TO_REG,          ! Determines if symbol is bound to reg.
;   75          0208  1     IS_SYMBOL_PSECT,                 ! Determines if symbol is PSECT
;   76          0209  1     PRINT_REGNAME:  NOVALUE,         ! Encodes register into output buffer.
;   77          0210  1     SEARCH_MODULE_SAT:  NOVALUE,     ! Searches module level SAT for addr.
;   78          0211  1     BUILD_PRIMARY_SUBNODE,           ! Build primary subnode
;   79          0212  1     GET_RECORD_COMPONENT,            ! Get the record component from the list
;   80          0213  1     SYMBOLIZE_ARRAY_ELEMENT,         ! Symbolize to array element
;   81          0214  1     SYMBOLIZE_RECORD_COMPONENT;      ! Symbolize to record component
```

```
;    83          0215  1 EXTERNAL ROUTINE
;    84          0216  1     DBG$BUILD_INVOC_RST,                ! Build RST entry with invocation num
;    85          0217  1     DBG$BUILD_PRIMARY_SUBNODE: NOVALUE, ! Build a subnode for a Primary
;    86          0218  1     DBG$GET_TEMPMEM,                    ! Dynamic memory allocation.
;    87          0219  1     DBG$GET_DST_NAME,                   ! Get the name from DST record
;    88          0220  1     DBG$MAKE_SKELETON_DESC,
;    89          0221  1     DBG$NEWLINE:  NOVALUE,              ! Flush current print line.
;    90          0222  1     DBG$NGET_ADDRESS,                   ! Obtains an address from an address
;    91          0223  1                                         ! expression descriptor.
;    92          0224  1     DBG$NMAKE_ARG_VECT,                 ! Sets up message vector.
;    93          0225  1     DBG$NMATCH,                         ! Matches input to counted strings.
;    94          0226  1     DBG$NNEXT_WORD,                     ! Obtains next word of input.
;    95          0227  1     DBG$NPARSE_ADDRESS,                 ! Parses input and returns an AED.
;    96          0228  1     DBG$PC_TO_LINE_LOOKUP,              ! Looks up line no. for PC addr.
;    97          0229  1     DBG$PRIM_TO_VAL: NOVALUE,           ! Turn Primary into Value
;    98          0230  1     DBG$PRINT:  NOVALUE,                ! Print/format ASCII text.
;    99          0231  1     DBG$PRINT_CONTROL:  NOVALUE,        ! Sets up tabs for DBG$PRINT.
;   100          0232  1     DBG$PRINT_OFFSET:  NOVALUE,         ! Prints value in correct radix.
;   101          0233  1     DBG$PRINT_SYMBOL_PATHNAME: NOVALUE, ! Print symbol name with pathname
;   102          0234  1     DBG$STA_ADDRESS_TO_REGDESCR,        ! Return Register Descriptor for register
;   103          0235  1                                         !       address
;   104          0236  1     DBG$STA_GETSYMOFF,                  ! Convert addr. to symbol and offset.
;   105          0237  1     DBG$STA_LINE_NUM_RST,               ! Build RST Entry for line number
;   106          0238  1     DBG$STA_REGISTER_NAME,              ! Convert Register Descriptor into ASCIC
;   107          0239  1                                         !       name string for the register
;   108          0240  1     DBG$STA_SETCONTEXT: NOVALUE,        ! Set the context for given SYMID
;   109          0241  1     DBG$STA_SYMKIND: NOVALUE,           ! Obtains "kind" of a symbol
;   110          0242  1     DBG$STA_SYMNAME:  NOVALUE,          ! Translates symid to unqualified name.
;   111          0243  1     DBG$STA_SYMSIZE:  NOVALUE,          ! Returns size associated with symid.
;   112          0244  1     DBG$STA_SYMTYPE: NOVALUE,           ! Determine TYPEID from SYMID
;   113          0245  1     DBG$STA_SYMVALUE: NOVALUE,          ! Get the value kind and value
;   114          0246  1     DBG$STA_TYP_RECORD,                 ! Get info about record
;   115          0247  1     DBG$STA_TYPEFCODE,                  ! Obtain FCODE from SYMID
;   116          0248  1     DBG$STA_VARIANT_SELECT,             ! Get a pointer to a variant set RST
;   117          0249  1     SYS$FAO;                            ! Formatter.
;   118          0250  1
;   119          0251  1 EXTERNAL
;   120          0252  1     DBG$GL_CURRENT_PRIMARY,             ! Pointer to the primary being processed
;   121          0253  1     DBG$GB_RADIX: VECTOR[3, BYTE],      ! Radix settings
;   122          0254  1     DBG$GL_ARRSUB_FLAG,                 ! Used for controling array subscripting
;   123          0255  1     DBG$GL_RECCMP_FLAG,                 ! Used for controling record component
;   124          0256  1     DBG$GB_LANGUAGE: BYTE,              ! Current language setting
;   125          0257  1     DBG$FINAL_HANDL,                    ! Call frame exception handler.
;   126          0258  1     DBG$REG_VALUES:  VECTOR[, LONG],    ! Vector of user register values in the
;   127          0259  1                                         ! current context.
;   128          0260  1     DBG$RUNFRAME:    BLOCK[, BYTE],     ! The current user run frame.
;   129          0261  1     RST$START_ADDR:  REF RST$ENTRY,     ! Ptr to 1st module RST entry.
;   130          0262  1     SAT$START_ADDR;                     ! Address of 1st SAT entry on program
;   131          0263  1                                         ! SAT chain.
;   132          0264  1
;   133          0265  1 LITERAL
;   134          0266  1     TAB = 4;                            ! Indentation level for DBG$PRINT_CONTROL.
;   135          0267  1
;   136          0268  1 OWN
;   137          0269  1     OWN_MODULE_BEGIN,                   ! Begin address of the module
;   138          0270  1     OWN_MODULE_END;                     ! End address of the module
;   139          0271  1
```

```
;  141          0272  1 MACRO
;  142        M 0273  1     PRINT_BIT_OFFSET(BIT_OFFSET) =
;  143        M 0274  1         IF .BIT_OFFSET NEQ 0
;  144        M 0275  1         THEN
;  145        M 0276  1             BEGIN
;  146        M 0277  1             DBG$PRINT (UPLIT BYTE (%ASCIC '<'));
;  147        M 0278  1             DBG$PRINT (UPLIT BYTE (%ASCIC '!UL'), .BIT_OFFSET);
;  148        M 0279  1             DBG$PRINT (UPLIT BYTE (%ASCIC ', 0, 0>'));
;  149          0280  1             END;%;
;  150          0281  1
```

```
;  152     0282  1 GLOBAL ROUTINE DBG$NEXECUTE_SYMBOLIZE (VERB_NODE, MESSAGE_VECT) =
;  153     0283  1 !
;  154     0284  1 ! FUNCTION
;  155     0285  1 !       This routine performs the action associated with the SYMBOLIZE xxx
;  156     0286  1 !       command.
;  157     0287  1 !
;  158     0288  1 !       A virtual address is obtained from the command execution tree.  From
;  159     0289  1 !       there, the routine determines what kind of address it is:  a register
;  160     0290  1 !       address, static address, or stack address.  After making that
;  161     0291  1 !       determination, the routine attempts to locate symbols bound to that
;  162     0292  1 !       address by searching the set module chain (in the case of a register
;  163     0293  1 !       address), by searching the SAT (in the case of a static address), or by
;  164     0294  1 !       searching the call stack (in the case of a stack address).  (Symbols
;  165     0295  1 !       whose addresses are too complicated to compute in this last search are
;  166     0296  1 !       ignored.)  Finally the Global Symbol Chain is searched.
;  167     0297  1 !
;  168     0298  1 ! INPUTS
;  169     0299  1 !       VERB_NODE           - A longword containing the address of the command
;  170     0300  1 !                             execution tree verb node.
;  171     0301  1 !
;  172     0302  1 !       MESSAGE_VECT        - The address of a longword to contain the address
;  173     0303  1 !                             of a standard message argument vector on error.
;  174     0304  1 !
;  175     0305  1 ! OUTPUTS
;  176     0306  1 !       An unsigned integer longword completion code.
;  177     0307  1 !
;  178     0308  1 !       On success, all possible symbolizations for the virtual address are
;  179     0309  1 !           sent to the output device.
;  180     0310  1 !
;  181     0311  1 !       On failure (no symbolization found), a message to that effect is printed.
;  182     0312  1 !
;  183     0313  1
;  184     0314  2     BEGIN
;  185     0315  2
;  186     0316  2     MAP
;  187     0317  2         VERB_NODE: REF DBG$VERB_NODE;           ! Ptr to verb node.
;  188     0318  2
;  189     0319  2
;  190     0320  2     LOCAL
;  191     0321  2         ADDRESS_DESC: REF DBG$ADDRESS_DESC,     ! Address descriptor.
;  192     0322  2         BIT_OFFSET,                             ! Bit offset from SYMID
;  193     0323  2         NOUN_NODE: REF DBG$NOUN_NODE,           ! Ptr to noun node.
;  194     0324  2         SYMID: REF RST$ENTRY;                   ! Unique symbol identifier.
;  195     0325  2
;  196     0326  2
;  197     0327  2     ! Recover the noun node.
;  198     0328  2     !
;  199     0329  2     NOUN_NODE = .VERB_NODE[DBG$L_VERB_OBJECT_PTR];
;  200     0330  2
;  201     0331  2
;  202     0332  2     ! Loop through tree.
;  203     0333  2     !
;  204     0334  2     WHILE .NOUN_NODE NEQ 0 DO
;  205     0335  3         BEGIN
;  206     0336  3
;  207     0337  3
;  208     0338  3         ! Set up tabs.
```

```
;  209          0339  3          !
;  210          0340  3          DBG$PRINT_CONTROL (DBG$K_PRT_RESET);
;  211          0341  3
;  212          0342  3
;  213          0343  3          ! Recover address descriptor.
;  214          0344  3          !
;  215          0345  3          ADDRESS_DESC = .NOUN_NODE[DBG$L_NOUN_VALUE];
;  216          0346  3
;  217          0347  3
;  218          0348  3          ! Call the routine that actually does all the work.
;  219          0349  3          ! If no symbolization is possible for the address, print a message to
;  220          0350  3          ! that effect.
;  221          0351  3          !
;  222          0352  3          IF NOT DBG$STA_GETSYMOFF (.ADDRESS_DESC, SYMID, BIT_OFFSET, TRUE)
;  223          0353  3          THEN
;  224          0354  4              BEGIN
;  225          0355  4              DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS_DESC[DBG$L_ADDRESS_BYTE_ADDR]);
;  226          0356  4              PRINT_BIT_OFFSET(ADDRESS_DESC[DBG$L_ADDRESS_BIT_OFFSET]);
;  227          0357  4              DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  228          0358  4              DBG$NEWLINE();
;  229          0359  4              DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  230          0360  4              DBG$PRINT (UPLIT BYTE (%ASCIC 'no symbolization'), 0);
;  231          0361  4              DBG$NEWLINE();
;  232          0362  3              END;
;  233          0363  3
;  234          0364  3
;  235          0365  3          ! Get next noun node.
;  236          0366  3          !
;  237          0367  3          NOUN_NODE = .NOUN_NODE[DBG$L_NOUN_LINK];
;  238          0368  2          END;
;  239          0369  2
;  240          0370  2
;  241          0371  2      ! Routine end.
;  242          0372  2      !
;  243          0373  2      RETURN STS$K_SUCCESS;
;  244          0374  1      END;

                                                                .TITLE  DBGSYMBLZ
                                                                .IDENT  \V04-000\

                                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

                4C  58  21  20  73  73  65  72  64  64  61  0B  00000 P.AAA:   .ASCII  <11>\address !XL\
                                                    3C  01  0000C P.AAB:   .ASCII  <1>\<\
                                                4C  55  21  03  0000E P.AAC:   .ASCII  <3>\!UL\
                                3E  30  20  2C  30  20  2C  07  00012 P.AAD:   .ASCII  <7>\, 0, 0>\
                                                    20  3A  02  0001A P.AAE:   .ASCII  <2>\: \
69  74  61  7A  69  6C  6F  62  6D  79  73  20  6F  6E  10  0001D P.AAF:   .ASCII  <16>\no symbolization\
                                                    6E  6F  0002C

                                                                .PSECT  DBG$OWN,NOEXE,  PIC,2

                                                00000 OWN_MODULE_BEGIN:
                                                                .BLKB   4
                                                00004 OWN_MODULE_END:
                                                                .BLKB   4
```

```
                        .EXTRN  DBG$BUILD_INVOC_RST
                        .EXTRN  DBG$BUILD_PRIMARY_SUBNODE
                        .EXTRN  DBG$GET_TEMPMEM
                        .EXTRN  DBG$GET_DST_NAME
                        .EXTRN  DBG$MAKE_SKELETON_DESC
                        .EXTRN  DBG$NEWLINE, DBG$NGET_ADDRESS
                        .EXTRN  DBG$NMAKE_ARG_VECT
                        .EXTRN  DBG$NMATCH, DBG$NNEXT_WORD
                        .EXTRN  DBG$NPARSE_ADDRESS
                        .EXTRN  DBG$PC_TO_LINE_LOOKUP
                        .EXTRN  DBG$PRIM_TO_VAL
                        .EXTRN  DBG$PRINT, DBG$PRINT_CONTROL
                        .EXTRN  DBG$PRINT_OFFSET
                        .EXTRN  DBG$PRINT_SYMBOL_PATHNAME
                        .EXTRN  DBG$STA_ADDRESS_TO_REGDESCR
                        .EXTRN  DBG$STA_GETSYMOFF
                        .EXTRN  DBG$STA_LINE_NUM_RST
                        .EXTRN  DBG$STA_REGISTER_NAME
                        .EXTRN  DBG$STA_SETCONTEXT
                        .EXTRN  DBG$STA_SYMKIND
                        .EXTRN  DBG$STA_SYMNAME
                        .EXTRN  DBG$STA_SYMSIZE
                        .EXTRN  DBG$STA_SYMTYPE
                        .EXTRN  DBG$STA_SYMVALUE
                        .EXTRN  DBG$STA_TYP_RECORD
                        .EXTRN  DBG$STA_TYPEFCODE
                        .EXTRN  DBG$STA_VARIANT_SELECT
                        .EXTRN  SYS$FAO, DBG$GL_CURRENT_PRIMARY
                        .EXTRN  DBG$GB_RADIX, DBG$GL_ARRSUB_FLAG
                        .EXTRN  DBG$GL_RECCMP_FLAG
                        .EXTRN  DBG$GB_LANGUAGE
                        .EXTRN  DBG$FINAL_HANDL
                        .EXTRN  DBG$REG_VALUES, DBG$RUNFRAME
                        .EXTRN  RST$START_ADDR, SAT$START_ADDR

                        .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                  00FC 00000    .ENTRY  DBG$NEXECUTE_SYMBOLIZE, Save R2,R3,R4,R5,-  ; 0282
                                        R6,R7
                  57 00000000G  00  9E 00002    MOVAB   DBG$PRINT_CONTROL, R7
                  56 00000000G  00  9E 00009    MOVAB   DBG$NEWLINE, R6
                  55 00000000G  00  9E 00010    MOVAB   DBG$PRINT, R5
                  54 00000000'  EF  9E 00017    MOVAB   P.AAA, R4
                  5E            08  C2 0001E    SUBL2   #8, SP
                  50        04  AC  D0 00021    MOVL    VERB_NODE, R0                   ; 0329
                  53        08  A0  D0 00025    MOVL    8(R0), NOUN_NODE
                            5E  13  00029 1$:    BEQL    4$                              ; 0334
                            05  DD  0002B        PUSHL   #5                              ; 0340
                  67            01  FB  0002D    CALLS   #1, DBG$PRINT_CONTROL
                  52            63  D0  00030    MOVL    (NOUN_NODE), ADDRESS_DESC       ; 0345
                            01  DD  00033        PUSHL   #1                              ; 0352
                        04  AE  9F  00035        PUSHAB  BIT_OFFSET
                        0C  AE  9F  00038        PUSHAB  SYMID
                            52  DD  0003B        PUSHL   ADDRESS_DESC
00000000G         00            04  FB  0003D    CALLS   #4, DBG$STA_GETSYMOFF
                  3C            50  E8  00044    BLBS    R0, 3$
```

```
                         62  DD 00047          PUSHL   (ADDRESS_DESC)                          ; 0355
                         54  DD 00049          PUSHL   R4                                     ;
                 65      02  FB 0004B          CALLS   #2, DBG$PRINT                          ;
                     04  A2  D5 0004E          TSTL    4(ADDRESS_DESC)                        ; 0356
                         15  13 00051          BEQL    2$                                     ;
                     0C  A4  9F 00053          PUSHAB  P.AAB                                  ;
                 65      01  FB 00056          CALLS   #1, DBG$PRINT                          ;
                     04  A2  DD 00059          PUSHL   4(ADDRESS_DESC)                        ;
                     0E  A4  9F 0005C          PUSHAB  P.AAC                                  ;
                 65      02  FB 0005F          CALLS   #2, DBG$PRINT                          ;
                     12  A4  9F 00062          PUSHAB  P.AAD                                  ;
                 65      01  FB 00065          CALLS   #1, DBG$PRINT                          ;
                     1A  A4  9F 00068 2$:       PUSHAB  P.AAE                                  ; 0357
                 65      01  FB 0006B          CALLS   #1, DBG$PRINT                          ;
                 66      00  FB 0006E          CALLS   #0, DBG$NEWLINE                        ; 0358
                         04  DD 00071          PUSHL   #4                                     ; 0359
                         01  DD 00073          PUSHL   #1                                     ;
                 67      02  FB 00075          CALLS   #2, DBG$PRINT_CONTROL                  ;
                         7E  D4 00078          CLRL    -(SP)                                  ; 0360
                     1D  A4  9F 0007A          PUSHAB  P.AAF                                  ;
                 65      02  FB 0007D          CALLS   #2, DBG$PRINT                          ;
                 66      00  FB 00080          CALLS   #0, DBG$NEWLINE                        ; 0361
                 53  0B  A3  D0 00083 3$:      MOVL    8(NOUN_NODE), NOUN_NODE                ; 0367
                         A0  11 00087          BRB     1$                                     ; 0334
                 50      01  D0 00089 4$:      MOVL    #1, R0                                 ; 0373
                             04 0008C          RET                                            ; 0374

; Routine Size:  141 bytes,    Routine Base:  DBG$CODE + 0000
```

```
;  246     0375  1 GLOBAL ROUTINE DBG$NPARSE_SYMBOLIZE (INPUT_DESC, VERB_NODE, MESSAGE_VECT) =
;  247     0376  1 !
;  248     0377  1 ! FUNCTION
;  249     0378  1 !       Establishes the parse network for the SYMBOLIZE command, consisting of
;  250     0379  1 !       a verb_node and a linked list of noun nodes.  Each noun node points to
;  251     0380  1 !       an address that is to be symbolized, if possible.
;  252     0381  1 !
;  253     0382  1 ! INPUTS
;  254     0383  1 !       INPUT_DESC      - a longword containing the address of the command
;  255     0384  1 !                         input descriptor.  This should point to the first
;  256     0385  1 !                         character after the SYMBOLIZE keyword.
;  257     0386  1 !
;  258     0387  1 !       VERB_NODE       - A longword containing the address of the command
;  259     0388  1 !                         execution tree verb node.
;  260     0389  1 !
;  261     0390  1 !       MESSAGE_VECT    - The address of a longword to contain the address
;  262     0391  1 !                         of a standard message argument vector on error.
;  263     0392  1 !
;  264     0393  1 ! OUTPUTS
;  265     0394  1 !       An unsigned integer longword completion code.
;  266     0395  1 !
;  267     0396  1 !       The pointer to the input descriptor is advanced to the end of the
;  268     0397  1 !           complete symbolize command.  Normally this means pointing to the
;  269     0398  1 !           terminating carriage return.
;  270     0399  1 !
;  271     0400  1 !       On success, the command execution tree is constructed; ie, noun nodes
;  272     0401  1 !           containing the addresses descriptor to be symbolized are linked to
;  273     0402  1 !           the verb node.
;  274     0403  1 !
;  275     0404  1 !       On failure, the routine signals an error.
;  276     0405  1 !
;  277     0406  1
;  278     0407  2     BEGIN
;  279     0408  2
;  280     0409  2     MAP
;  281     0410  2         INPUT_DESC: REF BLOCK [,BYTE],          ! Ptr. to input desc.
;  282     0411  2         VERB_NODE: REF DBG$VERB_NODE;           ! Ptr. to verb node.
;  283     0412  2
;  284     0413  2     LOCAL
;  285     0414  2         ADDRPTR,                                ! Pointer to an address
;  286     0415  2                                                 !       representation
;  287     0416  2         ADDRESS_DESC: REF DBG$ADDRESS_DESC,     ! Pointer to an Addr. Desc.
;  288     0417  2         NOUN_NODE: REF DBG$NOUN_NODE,           ! Object of verb
;  289     0418  2         NEXT_NOUN_NODE: REF DBG$NOUN_NODE,      ! Temporary object.
;  290     0419  2         STATUS;
;  291     0420  2
;  292     0421  2
;  293     0422  2     BIND
;  294     0423  2         DBG$CS_CR       = UPLIT BYTE (1, DBG$K_CAR_RETURN),
;  295     0424  2         DBG$CS_COMMA    = UPLIT BYTE (1, DBG$K_COMMA);
;  296     0425  2
;  297     0426  2
;  298     0427  2     ! Need to be sure that the user has provided some sort of input after
;  299     0428  2     ! the verb.  If not, construct message_vect and return.
;  300     0429  2     !
;  301     0430  2     IF DBG$NMATCH (.INPUT_DESC, DBG$CS_CR, 1)
;  302     0431  2     THEN
```

```
;  303     0432  2          SIGNAL (DBG$_NEEDMORE);
;  304     0433  2
;  305     0434  2
;  306     0435  2      ! Construct the first noun node.
;  307     0436  2      !
;  308     0437  2      NOUN_NODE = DBG$GET_TEMPMEM (DBG$K_NOUN_NODE_SIZE);
;  309     0438  2
;  310     0439  2
;  311     0440  2      ! Link in the noun node.
;  312     0441  2      !
;  313     0442  2      VERB_NODE[DBG$L_VERB_OBJECT_PTR] = .NOUN_NODE;
;  314     0443  2
;  315     0444  2
;  316     0445  2      ! Loop until input is exhausted.
;  317     0446  2      !
;  318     0447  2      WHILE (NOT DBG$NMATCH (.INPUT_DESC, DBG$CS_CR, 1)) AND
;  319     0448  2          (.INPUT_DESC[DSC$W_LENGTH] NEQ 0) DO
;  320     0449  3          BEGIN
;  321     0450  3
;  322     0451  3
;  323     0452  3          ! Attempt to parse the input_desc.  If successful, dbg$nparse_address
;  324     0453  3          ! returns the address of an address expression descriptor.
;  325     0454  3          !
;  326     0455  3          STATUS = DBG$NPARSE_ADDRESS (.INPUT_DESC, ADDRPTR,
;  327     0456  3                                       .DBG$GB_RADIX[DBG$B_RADIX_INPUT],
;  328     0457  3                                       TOKEN$K_TERM_COMMA, .MESSAGE_VECT);
;  329     0458  3          SELECTONE .STATUS OF
;  330     0459  3              SET
;  331     0460  3
;  332     0461  3
;  333     0462  3              ! If successful, then get the address bound to the entity
;  334     0463  3              ! described by the address expression descriptor.  Success
;  335     0464  3              ! also implies the end of input.
;  336     0465  3              !
;  337     0466  3              [STS$K_SUCCESS]:
;  338     0467  4                  BEGIN
;  339     0468  4                  ADDRESS_DESC = DBG$GET_TEMPMEM (DBG$K_ADDRESS_DESC_SIZE);
;  340     0469  4                  IF NOT GET_ADDRESS_DESC (.ADDRPTR, .ADDRESS_DESC, .MESSAGE_VECT)
;  341     0470  4                  THEN
;  342     0471  4                      RETURN STS$K_SEVERE;
;  343     0472  4                  NOUN_NODE[DBG$L_NOUN_VALUE] = .ADDRESS_DESC;
;  344     0473  3                  END;
;  345     0474  3
;  346     0475  3
;  347     0476  3              ! If a warning is returned, a comma may have been discovered in
;  348     0477  3              ! the input stream.  Check for this.  If there is no comma, a
;  349     0478  3              ! syntax error has occurred.  If a comma is present, there must
;  350     0479  3              ! be more input or else error.  If all is OK, then get the address
;  351     0480  3              ! bound to the entity described by the address expression
;  352     0481  3              ! descriptor.  A warning implies further input, so must link in
;  353     0482  3              ! another noun node.
;  354     0483  3              !
;  355     0484  3              [STS$K_WARNING]:
;  356     0485  4                  BEGIN
;  357     0486  4                  IF NOT DBG$NMATCH (.INPUT_DESC, DBG$CS_COMMA, 1)
;  358     0487  4                  THEN
;  359     0488  4                      SIGNAL (DBG$_CMDSYNERR, 1, DBG$NNEXT_WORD (.INPUT_DESC));
```

```
;  360     0489  4
;  361     0490  4                 IF DBG$NMATCH (.INPUT_DESC, DBG$CS_CR, 1)
;  362     0491  4                 THEN
;  363     0492  4                     SIGNAL (DBG$_NEEDMORE);
;  364     0493  4
;  365     0494  4                 ADDRESS_DESC = DBG$GET_TEMPMEM (DBG$K_ADDRESS_DESC_SIZE);
;  366     0495  4                 IF NOT GET_ADDRESS_DESC (.ADDRPTR, .ADDRESS_DESC, .MESSAGE_VECT)
;  367     0496  4                 THEN
;  368     0497  4                     RETURN STS$K_SEVERE;
;  369     0498  4                 NOUN_NODE[DBG$L_NOUN_VALUE] = .ADDRESS_DESC;
;  370     0499  4                 NEXT_NOUN_NODE = DBG$GET_TEMPMEM (DBG$K_NOUN_NODE_SIZE);
;  371     0500  4                 NOUN_NODE[DBG$L_NOUN_LINK] = .NEXT_NOUN_NODE;
;  372     0501  4                 NOUN_NODE = .NEXT_NOUN_NODE;
;  373     0502  3                 END;
;  374     0503  3
;  375     0504  3
;  376     0505  3             ! Anything else, return severe error.
;  377     0506  3             !
;  378     0507  3             [OTHERWISE]:
;  379     0508  4                 BEGIN
;  380     0509  4                 RETURN STS$K_SEVERE;
;  381     0510  3                 END;
;  382     0511  3
;  383     0512  3             TES;
;  384     0513  3
;  385     0514  3
;  386     0515  3         ! End of WHILE loop.
;  387     0516  3         !
;  388     0517  2         END;
;  389     0518  2
;  390     0519  2
;  391     0520  2     ! End of routine.
;  392     0521  2     !
;  393     0522  2     RETURN STS$K_SUCCESS;
;  394     0523  1     END;


                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

                            0D  01  0002E P.AAG:  .BYTE   1, 13                                 ;
                            2C  01  00030 P.AAH:  .BYTE   1, 44                                 ;

                                          DBG$CS_CR=        P.AAG
                                          DBG$CS_COMMA=     P.AAH


                                                .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                              07FC  00000       .ENTRY  DBG$NPARSE_SYMBOLIZE, Save R2,R3,R4,R5,R6,- ; 0375
                                                        R7,R8,R9,R10                            ;
                5A 00000000G   00  9E 00002     MOVAB   LIB$SIGNAL, R10                         ;
                59 00000000'   EF  9E 00009     MOVAB   DBG$CS_CR, R9                           ;
                58 00000000G   00  9E 00010     MOVAB   DBG$GET_TEMPMEM, R8                     ;
                57 00000000G   00  9E 00017     MOVAB   DBG$NMATCH, R7                          ;
                5E             04  C2 0001E     SUBL2   #4, SP                                  ;
                               01  DD 00021     PUSHL   #1                                      ; 0430
```

```
                                59  DD 00023          PUSHL   R9                                      ;
                          52    04  AC  D0 00025      MOVL    INPUT_DESC, R2                          ;
                                52  DD 00029          PUSHL   R2                                      ;
                          67        03  FB 0002B      CALLS   #3, DBG$NMATCH                          ;
                          09        50  E9 0002E      BLBC    R0, 1$                                  ;
                             000280D0 8F  DD 00031      PUSHL   #164048                                 ; 0432
                          6A        01  FB 00037      CALLS   #1, LIB$SIGNAL                          ;
                                04  DD 0003A 1$:      PUSHL   #4                                      ; 0437
                          68        01  FB 0003C      CALLS   #1, DBG$GET_TEMPMEM                     ;
                          53        50  D0 0003F      MOVL    R0, NOUN_NODE                           ;
                          50    08  AC  D0 00042      MOVL    VERB_NODE, R0                           ; 0442
                    08    A0        53  D0 00046      MOVL    NOUN_NODE, 8(R0)                        ;
                                01  DD 0004A 2$:      PUSHL   #1                                      ; 0447
                              0204  8F  BB 0004C      PUSHR   #^M<R2,R9>                              ;
                          67        03  FB 00050      CALLS   #3, DBG$NMATCH                          ;
                          03        50  E9 00053      BLBC    R0, 4$                                  ;
                                00AD 31  00056 3$:      BRW     10$                                     ;
                                62  B5 00059 4$:      TSTW    (R2)                                    ; 0448
                                F9  13 0005B        BEQL    3$                                      ;
                                0C  AC  DD 0005D        PUSHL   MESSAGE_VECT                        ; 0457
                                01  DD 00060          PUSHL   #1                                      ; 0455
                          7E 00000000G  00  9A 00062    MOVZBL  DBG$GB_RADIX, -(SP)                     ; 0456
                                0C  AE  9F 00069        PUSHAB  ADDRPTR                             ; 0455
                                52  DD 0006C          PUSHL   R2                                      ;
                00000000G 00        05  FB 0006E      CALLS   #5, DBG$NPARSE_ADDRESS                  ;
                          55        50  D0 00075      MOVL    R0, STATUS                              ;
                          01        55  D1 00078      CMPL    STATUS, #1                              ; 0466
                                1D  12 0007B        BNEQ    6$                                      ;
                                02  DD 0007D          PUSHL   #2                                      ; 0468
                          68        01  FB 0007F      CALLS   #1, DBG$GET_TEMPMEM                     ;
                          54        50  D0 00082      MOVL    R0, ADDRESS_DESC                        ;
                                0C  AC  DD 00085        PUSHL   MESSAGE_VECT                        ; 0469
                                54  DD 00088          PUSHL   ADDRESS_DESC                        ;
                                08  AE  DD 0008A        PUSHL   ADDRPTR                             ;
                    0000V       CF  03  FB 0008D      CALLS   #3, GET_ADDRESS_DESC                    ;
                          6D        50  E9 00092      BLBC    R0, 9$                                  ;
                          63        54  D0 00095      MOVL    ADDRESS_DESC, (NOUN_NODE)               ; 0472
                                B0  11  00098 5$:       BRB     2$                                      ; 0458
                                55  D5 0009A 6$:       TSTL    STATUS                                  ; 0484
                                64  12 0009C        BNEQ    9$                                      ;
                                01  DD 0009E          PUSHL   #1                                      ; 0486
                                02  A9  9F 000A0        PUSHAB  DBG$CS_COMMA                        ;
                                52  DD 000A3          PUSHL   R2                                      ;
                          67        03  FB 000A5      CALLS   #3, DBG$NMATCH                          ;
                          16        50  E8 000A8      BLBS    R0, 7$                                  ;
                                52  DD 000AB          PUSHL   R2                                      ; 0488
                00000000G 00        01  FB 000AD      CALLS   #1, DBG$NNEXT_WORD                      ;
                                50  DD 000B4          PUSHL   R0                                      ;
                                01  DD 000B6          PUSHL   #1                                      ;
                             00028EB8 8F  DD 000B8      PUSHL   #167608                                 ;
                          6A        03  FB 000BE      CALLS   #3, LIB$SIGNAL                          ;
                                01  DD 000C1 7$:       PUSHL   #1                                      ; 0490
                              0204  8F  BB 000C3      PUSHR   #^M<R2,R9>                              ;
                          67        03  FB 000C7      CALLS   #3, DBG$NMATCH                          ;
                          09        50  E9 000CA      BLBC    R0, 8$                                  ;
                             000280D0 8F  DD 000CD      PUSHL   #164048                                 ; 0492
                          6A        01  FB 000D3      CALLS   #1, LIB$SIGNAL                          ;
```

```
                        02  DD 000D6 8$:     PUSHL   #2                                      ; 0494
                    68  01  FB 000D8         CALLS   #1, DBG$GET_TEMPMEM                     ;
                    54  50  DD 000DB         MOVL    R0, ADDRESS_DESC                        ;
                    0C  AC  DD 000DE         PUSHL   MESSAGE_VECT                            ; 0495
                        54  DD 000E1         PUSHL   ADDRESS_DESC                            ;
                    08  AE  DD 000E3         PUSHL   ADDRPTR                                 ;
              0000V CF      03  FB 000E6     CALLS   #3, GET_ADDRESS_DESC                    ;
                    14      50  E9 000EB     BLBC    R0, 9$                                  ;
                    63      54  DD 000EE     MOVL    ADDRESS_DESC, (NOUN_NODE)               ; 0498
                            04  DD 000F1     PUSHL   #4                                      ; 0499
                    68      01  FB 000F3     CALLS   #1, DBG$GET_TEMPMEM                     ;
                    56      50  DD 000F6     MOVL    R0, NEXT_NOUN_NODE                      ;
                 08 A3      56  DD 000F9     MOVL    NEXT_NOUN_NODE, 8(NOUN_NODE)            ; 0500
                    53      56  DD 000FD     MOVL    NEXT_NOUN_NODE, NOUN_NODE               ; 0501
                            96  11 00100     BRB     5$                                      ; 0458
                    50      04  DD 00102 9$:     MOVL    #4, R0                             ; 0509
                                04 00105     RET                                             ;
                    50      01  DD 00106 10$:    MOVL    #1, R0                             ; 0522
                                04 00109     RET                                             ; 0523

; Routine Size:  266 bytes,    Routine Base:  DBG$CODE + 008D
```

```
;  396     0524  1 GLOBAL ROUTINE DBG$SEARCH_BIN_SAT (BASE_NODE, ADDRESS,
;  397     0525  1                                     MACRO_OR_SHARE_FLAG, PSECT_FLAG)=
;  398     0526  1 !
;  399     0527  1 ! FUNCTION
;  400     0528  1 !       This routine searches a linked SAT list starting at BASE_NODE
;  401     0529  1 !       and returns a pointer to a SAT entry containing ADDRESS (or zero
;  402     0530  1 !       if no SAT entry was found).
;  403     0531  1 !
;  404     0532  1 !       This routine is called to search a module-level SAT. It is called
;  405     0533  1 !       by DBG$SEARCH_PROG_SAT.
;  406     0534  1 !
;  407     0535  1 !       The SAT chain that this routine searches is a linked list which
;  408     0536  1 !       is sorted by start address of the symbol. We just loop through
;  409     0537  1 !       the list looking for the static symbol which contains the given
;  410     0538  1 !       address and is the best match.
;  411     0539  1 !
;  412     0540  1 !       On a linear SAT, which we currently have,
;  413     0541  1 !       this routine is functionally equivalent to DBG$SEARCH_BIN_SAT_REC.
;  414     0542  1 !       The _REC routine is more general in that it also accepts a SAT
;  415     0543  1 !       which is organized as a binary tree. However, until we start
;  416     0544  1 !       building binary tree SATs, we will stick with this routine.
;  417     0545  1 !       The _REC routine differs in implementation in that it is recursive,
;  418     0546  1 !       which can be a problem in that it uses a lot of stack.
;  419     0547  1 !
;  420     0548  1 ! INPUTS
;  421     0549  1 !       BASE_NODE -     The base of the SAT list
;  422     0550  1 !       ADDRESS   -     The desired address.
;  423     0551  1 !       MACRO_OR_SHARE_FLAG-    True for language MACRO and also true
;  424     0552  1 !                       for static address chains that come from shareable
;  425     0553  1 !                       images.
;  426     0554  1 !       PSECT_FLAG-     Says whether it is OK to symbolize to a PSECT.
;  427     0555  1 !
;  428     0556  1 ! OUTPUTS
;  429     0557  1 !       A pointer to the found SAT entry is returned.
;  430     0558  1 !       Zero is returned if no SAT entry was found.
;  431     0559  1 !
;  432     0560  2     BEGIN
;  433     0561  2     LOCAL
;  434     0562  2         BEST_SATPTR: REF SAT$ENTRY,
;  435     0563  2         SATPTR: REF SAT$ENTRY;
;  436     0564  2
;  437     0565  2
;  438     0566  2     ! Loop through the SAT chain.
;  439     0567  2     !
;  440     0568  2     BEST_SATPTR = 0;
;  441     0569  2     SATPTR = .BASE_NODE;
;  442     0570  2     WHILE .SATPTR NEQ 0 DO
;  443     0571  3         BEGIN
;  444     0572  3
;  445     0573  3
;  446     0574  3         ! If the address we are looking for is before the current SAT entry
;  447     0575  3         ! then stop searching.
;  448     0576  3         !
;  449     0577  3         IF .ADDRESS LSSA .SATPTR[SAT$L_START]
;  450     0578  3         THEN
;  451     0579  3             EXITLOOP;
;  452     0580  3
```

```
;  453          0581  3
;  454          0582  3          ! Choose this symbol if its range covers the address. Don't choose
;  455          0583  3          ! psects unless PSECT_FLAG is set. Don't check the end address
;  456          0584  3          ! for language MACRO or for symbols from shareable images.
;  457          0585  3          !
;  458          0586  4          IF .PSECT_FLAG OR (NOT IS_SYMBOL_PSECT(.SATPTR[SAT$L_RSTPTR]))
;  459          0587  3          THEN
;  460          0588  4              IF .MACRO_OR_SHARE_FLAG OR (.ADDRESS LEQA .SATPTR[SAT$L_END])
;  461          0589  3              THEN
;  462          0590  3                  BEST_SATPTR = .SATPTR;
;  463          0591  3
;  464          0592  3
;  465          0593  3          ! Link to next SAT entry.
;  466          0594  3          !
;  467          0595  3          SATPTR = .SATPTR[SAT$L_FLINK];
;  468          0596  2          END;
;  469          0597  2
;  470          0598  2
;  471          0599  2      ! Return the SATPTR we have found. This will be zero if we
;  472          0600  2      ! fell out of the loop not finding a match.
;  473          0601  2      !
;  474          0602  2      RETURN .BEST_SATPTR;
;  475          0603  1      END;


                                        000C 00000          .ENTRY  DBG$SEARCH_BIN_SAT, Save R2,R3          ; 0524
                                    53  D4 00002          CLRL    BEST_SATPTR                             ; 0568
                               52   04  AC  D0 00004          MOVL    BASE_NODE, SATPTR                       ; 0569
                                    29  13 00008 1$:        BEQL    5$                                      ; 0570
                           04   A2   08  AC  D1 0000A          CMPL    ADDRESS, 4(SATPTR)                      ; 0577
                                    22  1F 0000F          BLSSU   5$
                               0B   10  AC  E8 00011          BLBS    PSECT_FLAG, 2$                          ; 0586
                                    0C  A2  DD 00015          PUSHL   12(SATPTR)
                          0000V     CF      01  FB 00018          CALLS   #1, IS_SYMBOL_PSECT
                                    0E      50  E8 0001D          BLBS    R0, 4$
                                    07  0C  AC  E8 00020 2$:      BLBS    MACRO_OR_SHARE_FLAG, 3$                 ; 0588
                           08   A2   08  AC  D1 00024          CMPL    ADDRESS, 8(SATPTR)
                                    03  1A 00029          BGTRU   4$
                               53       52  D0 0002B 3$:      MOVL    SATPTR, BEST_SATPTR                     ; 0590
                               52       62  D0 0002E 4$:      MOVL    (SATPTR), SATPTR                        ; 0595
                                    D5  11 00031          BRB     1$                                      ; 0570
                               50       53  D0 00033 5$:      MOVL    BEST_SATPTR, R0                         ; 0602
                                        04 00036          RET                                             ; 0603

; Routine Size:  55 bytes,    Routine Base:  DBG$CODE + 0197
```

```
;  477          0604  1 GLOBAL ROUTINE DBG$SEARCH_PROG_SAT (BASE_NODE, ADDRESS, BYTE_OFFSET) =
;  478          0605  1 !
;  479          0606  1 ! FUNCTION
;  480          0607  1 !       This routine searches the program-level
;  481          0608  1 !       SAT list starting at BASE_NODE
;  482          0609  1 !       and returns a pointer to the SAT entry which contains ADDRESS
;  483          0610  1 !       and whose start address is closest to ADDRESS. (or zero
;  484          0611  1 !       if no SAT entry was found).
;  485          0612  1 !
;  486          0613  1 !       This routine walks the linear list of program-level SATs, finding
;  487          0614  1 !       one whose range covers the given address. Then, for each one of
;  488          0615  1 !       those that it finds, it calls DBG$SEARCH_BIN_SAT to search the
;  489          0616  1 !       module-level SAT for the closest symbol whose address range
;  490          0617  1 !       covers the given address.
;  491          0618  1 !
;  492          0619  1 !       On a linear SAT, which we currently have,
;  493          0620  1 !       this routine is functionally equivalent to DBG$SEARCH_PROG_SAT_REC.
;  494          0621  1 !       The _REC routine is more general in that it also accepts a SAT
;  495          0622  1 !       which is organized as a binary tree. However, until we start
;  496          0623  1 !       building binary tree SATs, we will stick with this routine.
;  497          0624  1 !       The _REC routine differs in implementation in that it is recursive,
;  498          0625  1 !       which can be a problem in that it uses a lot of stack.
;  499          0626  1 !
;  500          0627  1 ! INPUTS
;  501          0628  1 !       BASE_NODE -     The base of the SAT list
;  502          0629  1 !       ADDRESS   -     The desired address.
;  503          0630  1 !       BYTE_OFFSET -   Return the byte offset associated with the symbolization
;  504          0631  1 !                          in this address.
;  505          0632  1 !
;  506          0633  1 ! OUTPUTS
;  507          0634  1 !       A pointer to the found SAT entry is returned.
;  508          0635  1 !       Zero is returned if no SAT entry was found.
;  509          0636  1 !
;  510          0637  2     BEGIN
;  511          0638  2     LOCAL
;  512          0639  2         BEST_SATPTR: REF SAT$ENTRY,
;  513          0640  2         BEST_OFFSET,
;  514          0641  2         OFFSET,
;  515          0642  2         MODRSTPTR: REF RST$ENTRY,
;  516          0643  2         SATPTR: REF SAT$ENTRY,
;  517          0644  2         TEMP_SATPTR: REF SAT$ENTRY;
;  518          0645  2
;  519          0646  2
;  520          0647  2     ! Loop through the SAT chain.
;  521          0648  2     !
;  522          0649  2     BEST_SATPTR = 0;
;  523          0650  2     BEST_OFFSET = 999999999;
;  524          0651  2     SATPTR = .BASE_NODE;
;  525          0652  2     WHILE .SATPTR NEQ 0 DO
;  526          0653  3         BEGIN
;  527          0654  3
;  528          0655  3
;  529          0656  3         ! If the address we are looking for is before the current SAT entry
;  530          0657  3         ! then terminate the search.
;  531          0658  3         !
;  532          0659  3         IF .ADDRESS LSSA .SATPTR[SAT$L_START]
;  533          0660  3         THEN
```

```
;  534     0661  3              EXITLOOP;
;  535     0662  3
;  536     0663  3
;  537     0664  3          ! If the address we are looking for lies within the current
;  538     0665  3          ! program-level SAT then search the module-level SAT.
;  539     0666  3          !
;  540     0667  3          IF .ADDRESS LEQA .SATPTR[SAT$L_END]
;  541     0668  3          THEN
;  542     0669  4              BEGIN
;  543     0670  4              MODRSTPTR = .SATPTR[SAT$L_RSTPTR];
;  544     0671  4              IF .MODRSTPTR[RST$V_MU^SET]
;  545     0672  4              THEN
;  546     0673  5                  BEGIN
;  547     0674  5                  TEMP_SATPTR = DBG$SEARCH_BIN_SAT (
;  548     0675  5                                .MODRSTPTR[RST$L_SAT_PTR],
;  549     0676  5                                .ADDRESS,
;  550     0677  5                                (.MODRSTPTR[RST$B_LANGUAGE] EQL DBG$K_MACRO) OR
;  551     0678  5                                 .MODRSTPTR[RST$V_SHARE_IMAGE],
;  552     0679  5                                 FALSE);
;  553     0680  5
;  554     0681  5                  ! If the module-level search yielded a candidate, choose
;  555     0682  5                  ! it if it is a closer match than the best so far.
;  556     0683  5                  !
;  557     0684  5                  IF .TEMP_SATPTR NEQ 0
;  558     0685  5                  THEN
;  559     0686  6                      BEGIN
;  560     0687  6                      OFFSET = .ADDRESS - .TEMP_SATPTR[SAT$L_START];
;  561     0688  6                      IF .OFFSET LSS .BEST_OFFSET
;  562     0689  6                      THEN
;  563     0690  7                          BEGIN
;  564     0691  7                          BEST_SATPTR = .TEMP_SATPTR;
;  565     0692  7                          BEST_OFFSET = .OFFSET;
;  566     0693  7                          END
;  567     0694  6                      ELSE IF .OFFSET EQL .BEST_OFFSET
;  568     0695  6                      THEN
;  569     0696  7                          BEGIN
;  570     0697  7                          IF .TEMP_SATPTR[SAT$L_END] LSS .BEST_SATPTR[SAT$L_END]
;  571     0698  7                          THEN
;  572     0699  8                              BEGIN
;  573     0700  8                              BEST_SATPTR = .TEMP_SATPTR;
;  574     0701  8                              BEST_OFFSET = .OFFSET;
;  575     0702  7                              END;
;  576     0703  6                          END;
;  577     0704  5                      END;
;  578     0705  4                  END;
;  579     0706  3              END;
;  580     0707  3
;  581     0708  3              ! Link to the next SATPTR and loop.
;  582     0709  3              !
;  583     0710  3              SATPTR = .SATPTR[SAT$L_FLINK];
;  584     0711  2              END;
;  585     0712  2
;  586     0713  2          ! Return the best candidate.
;  587     0714  2          !
;  588     0715  2          IF .BEST_SATPTR NEQ 0
;  589     0716  2          THEN
;  590     0717  2              .BYTE_OFFSET = .BEST_OFFSET;
```

```
;  591          0718  2      RETURN .BEST_SATPTR;
;  592          0719  1      END;


                                                                                                                   ; R
                                    00FC 00000          .ENTRY  DBG$SEARCH_PROG_SAT, Save R2,R3,R4,R5,R6,R7   ; 0604
                                 55   D4 00002          CLRL    BEST_SATPTR                                   ; 0649
                 56 3B9AC9FF     8F   D0 00004          MOVL    #999999999, BEST_OFFSET                       ; 0650
                 53        04    AC   D0 0000B          MOVL    BASE_NODE, SATPTR                             ; 0651
                                 58   13 0000F 1$:      BEQL    5$                                            ; 0652
          04     A3        08    AC   D1 00011          CMPL    ADDRESS, 4(SATPTR)                            ; 0659
                                 51   1F 00016          BLSSU   5$                                            ;
          08     A3        08    AC   D1 00018          CMPL    ADDRESS, 8(SATPTR)                            ; 0667
                                 45   1A 0001D          BGTRU   4$                                            ;
                 52        0C    A3   D0 0001F          MOVL    12(SATPTR), MODRSTPTR                         ; 0670
                 3D        28    A2   E9 00023          BLBC    40(MODRSTPTR), 4$                             ; 0671
                                 7E   D4 00027          CLRL    -(SP)                                         ; 0674
                                 51   D4 00029          CLRL    R1                                            ; 0677
                           29    A2   95 0002B          TSTB    41(MODRSTPTR)                                 ;
                                 02   12 0002E          BNEQ    2$                                            ;
                                 51   D6 00030          INCL    R1                                            ;
 57       28    A2         01    04   EF 00032 2$:      EXTZV   #4, #1, 40(MODRSTPTR), R7                     ; 0678
                7E         51    57   C9 00038          BISL3   R7, R1, -(SP)                                 ;
                           08    AC   DD 0003C          PUSHL   ADDRESS                                       ; 0676
                           18    A2   DD 0003F          PUSHL   24(MODRSTPTR)                                 ; 0675
          83     AF              04   FB 00042          CALLS   #4, DBG$SEARCH_BIN_SAT                        ;
                                 50   D5 00046          TSTL    TEMP_SATPTR                                   ; 0684
                                 1A   13 00048          BEQL    4$                                            ;
      54  08     AC        04    A0   C3 0004A          SUBL3   4(TEMP_SATPTR), ADDRESS, OFFSET               ; 0687
                 56              54   D1 00050          CMPL    OFFSET, BEST_OFFSET                           ; 0688
                                 09   19 00053          BLSS    3$                                            ;
                                 0D   12 00055          BNEQ    4$                                            ; 0694
          08     A5        08    A0   D1 00057          CMPL    8(TEMP_SATPTR), 8(BEST_SATPTR)                ; 0697
                                 06   18 0005C          BGEQ    4$                                            ;
                 55              50   D0 0005E 3$:      MOVL    TEMP_SATPTR, BEST_SATPTR                      ; 0700
                 56              54   D0 00061          MOVL    OFFSET, BEST_OFFSET                           ; 0701
                 53              63   D0 00064 4$:      MOVL    (SATPTR), SATPTR                              ; 0710
                                 A6   11 00067          BRB     1$                                            ; 0652
                                 55   D5 00069 5$:      TSTL    BEST_SATPTR                                   ; 0715
                                 04   13 0006B          BEQL    6$                                            ;
          0C     BC              56   D0 0006D          MOVL    BEST_OFFSET, @BYTE_OFFSET                     ; 0717
                 50              55   D0 00071 6$:      MOVL    BEST_SATPTR, R0                               ; 0718
                                      04 00074          RET                                                   ; 0719

; Routine Size:  117 bytes,    Routine Base:  DBG$CODE + 01CE
```

```
;  594          0720  1 GLOBAL ROUTINE DBG$SEARCH_BIN_SAT_REC (BASE_NODE, ADDRESS,
;  595          0721  1                                       MACRO_OR_SHARE_FLAG, PSECT_FLAG)=
;  596          0722  1 !
;  597          0723  1 ! FUNCTION
;  598          0724  1 !       This routine searches the binary SAT tree starting at BASE_NODE
;  599          0725  1 !       and returns a pointer to a SAT entry containing ADDRESS (or zero
;  600          0726  1 !       if no SAT entry was found).
;  601          0727  1 !
;  602          0728  1 !       This routine is called to search a module-level SAT. It is called
;  603          0729  1 !       by DBG$SEARCH_PROG_SAT.
;  604          0730  1 !
;  605          0731  1 !       The tree is organized so that at any point in the search, if we
;  606          0732  1 !       are at node NODE, then: If the desired address is less than the
;  607          0733  1 !       range in NODE, then follow the RIGHT_SON link. If the desired
;  608          0734  1 !       address is greater than the range in NODE, then follow the
;  609          0735  1 !       LEFT_SON link. If we try to follow a link and the link is zero
;  610          0736  1 !       then we failed to find a matching SAT entry.
;  611          0737  1 !       If the address is in the range, then of course we are done.
;  612          0738  1 !
;  613          0739  1 !       This routine is designed so that it will work on the "old" linear
;  614          0740  1 !       list data structure (this just being the extreme case of an
;  615          0741  1 !       unbalanced tree). However, for now we are still calling the
;  616          0742  1 !       old non-recursive search_sat routines. This one is not yet
;  617          0743  1 !       being used.
;  618          0744  1 !
;  619          0745  1 ! INPUTS
;  620          0746  1 !       BASE_NODE -     The base of the SAT tree
;  621          0747  1 !       ADDRESS   -     The desired address.
;  622          0748  1 !       MACRO_OR_SHARE_FLAG-    True for language MACRO and also true
;  623          0749  1 !                       for static address chains that come from shareable
;  624          0750  1 !                       images.
;  625          0751  1 !       PSECT_FLAG-     Says whether it is OK to symbolize to a PSECT.
;  626          0752  1 !
;  627          0753  1 ! OUTPUTS
;  628          0754  1 !       A pointer to the found SAT entry is returned.
;  629          0755  1 !       Zero is returned if no SAT entry was found.
;  630          0756  1 !
;  631          0757  2     BEGIN
;  632          0758  2     MAP
;  633          0759  2         BASE_NODE: REF SAT$ENTRY;                                  20
;  634          0760  2     LOCAL                                                          20
;  635          0761  2         SATP'R: REF SAT$ENTRY;
;  636          0762  2
;  637          0763  2     ! Bottom level of the recursion.
;  638          0764  2     !
;  639          0765  2     IF .BASE_NODE EQL 0
;  640          0766  2     THEN
;  641          0767  2         RETURN 0;
;  642          0768  2
;  643          0769  2     ! If the address we are looking for is before the current SAT entry
;  644          0770  2     ! then follow the left son.
;  645          0771  2     !
;  646          0772  2     IF .ADDRESS LSSA .BASE_NODE[SAT$L_START]
;  647          0773  2     THEN
;  648          0774  2         RETURN DBG$SEARCH_BIN_SAT_REC(.BASE_NODE[SAT$L_LEFTSON], .ADDRESS,
;  649          0775  2                                       .MACRO_OR_SHARE_FLAG, .PSECT_FLAG);
;  650          0776  2
```

```
;  651          0777  2      ! If the address we are looking for falls after the start of the
;  652          0778  2      ! current SAT entry then follow the right son. If this search
;  653          0779  2      ! yields a matching SAT then return it.
;  654          0780  2      !
;  655          0781  2      SATPTR = DBG$SEARCH_BIN_SAT_REC(.BASE_NODE[SAT$L_RIGHTSON], .ADDRESS,
;  656          0782  2                                      .MACRO_OR_SHARE_FLAG, .PSECT_FLAG);
;  657          0783  2      IF .SATPTR NEQ 0
;  658          0784  2      THEN
;  659          0785  2          RETURN .SATPTR;
;  660          0786  2
;  661          0787  2      ! Don't symbolize to PSECTs unless PSECT_FLAG is set.
;  662          0788  2      !
;  663          0789  2      IF (.PSECT_FLAG) OR
;  664          0790  3         (NOT IS_SYMBOL_PSECT (.BASE_NODE[SAT$L_RSTPTR]))
;  665          0791  2      THEN
;  666          0792  3          BEGIN
;  667          0793  3
;  668          0794  3          ! Check for the address being in the range of the SAT entry.
;  669          0795  3          ! But, in language MACRO, choose this symbolization - don't
;  670          0796  3          ! do the check for the address being in the correct range.
;  671          0797  3          ! Also, don't do this check for shareable image modules.
;  672          0798  3          ! The reason is that in these cases we do not get the right
;  673          0799  3          ! length information for the static item.
;  674          0800  3          !
;  675          0801  3          IF .MACRO_OR_SHARE_FLAG OR
;  676          0802  4            (.ADDRESS LEQA .BASE_NODE[SAT$L_END])
;  677          0803  3          THEN
;  678          0804  3              RETURN .BASE_NODE;
;  679          0805  2          END;
;  680          0806  2
;  681          0807  2      ! Failed to find a match. Return 0.
;  682          0808  2      !
;  683          0809  2      RETURN 0;
;  684          0810  1      END;

                                0004 00000          .ENTRY  DBG$SEARCH_BIN_SAT_REC, Save R2                 ; 0720
      52        04    AC   D0 00002          MOVL    BASE_NODE, R2                                   ; 0765
                      45   13 00006          BEQL    4$                                              ;
04    A2        08    AC   D1 00008          CMPL    ADDRESS, 4(R2)                                  ; 0772
                      0F   1E 0000D          BGEQU   1$                                              ;
      7E        0C    AC   7D 0000F          MOVQ    MACRO_OR_SHARE_FLAG, -(SP)                      ; 0775
                08    AC   DD 00013          PUSHL   ADDRESS                                         ; 0774
                10    A2   DD 00016          PUSHL   16(R2)                                          ;
E3    AF              04   FB 00019          CALLS   #4, DBG$SEARCH_BIN_SAT_REC                      ;
                           04 0001D          RET                                                     ;
      7E        0C    AC   7D 0001E 1$:      MOVQ    MACRO_OR_SHARE_FLAG, -(SP)                      ; 0782
                08    AC   DD 00022          PUSHL   ADDRESS                                         ; 0781
                      62   DD 00025          PUSHL   (R2)                                            ;
D5    AF              04   FB 00027          CALLS   #4, DBG$SEARCH_BIN_SAT_REC                      ;
                      50   D5 0002B          TSTL    SATPTR                                          ; 0783
                      20   12 0002D          BNEQ    5$                                              ;
      0B        10    AC   E8 0002F          BLBS    PSECT_FLAG, 2$                                  ; 0789
                0C    A2   DD 00033          PUSHL   12(R2)                                          ; 0790
```

```
                0000V CF          01 FB 00036          CALLS   #1, IS_SYMBOL_PSECT                     ;
                   0F             50 E8 0003B          BLBS    R0, 4$                                  ;
                   07     0C      AC E8 0003E 2$:      BLBS    MACRO_OR_SHARE_FLAG, 3$                 ; 0801
                08 A2     08      AC D1 00042          CMPL    ADDRESS, 8(R2)                          ; 0802
                                  04 1A 00047          BGTRU   4$                                      ;
                   50             52 D0 00049 3$:      MOVL    R2, R0                                  ; 0804
                                  04 0004C             RET                                             ;
                                  50 D4 0004D 4$:      CLRL    R0                                      ; 0810
                                  04 0004F 5$:         RET                                             ;

; Routine Size:  80 bytes,    Routine Base:  DBG$CODE + 0243
```

```
;  686     0811  1 GLOBAL ROUTINE DBG$SEARCH_PROG_SAT_REC (BASE_NODE, ADDRESS, BYTE_OFFSET) =
;  687     0812  1 !
;  688     0813  1 ! FUNCTION
;  689     0814  1 !       This routine searches the binary program-level
;  690     0815  1 !       SAT tree starting at BASE_NODE
;  691     0816  1 !       and returns a pointer to the SAT entry which contains ADDRESS
;  692     0817  1 !       and whose start address is closest to ADDRESS. (or zero
;  693     0818  1 !       if no SAT entry was found).
;  694     0819  1 !
;  695     0820  1 !       The tree is organized so that at any point in the search, if we
;  696     0821  1 !       are at node NODE, then: If the desired address is less than the
;  697     0822  1 !       range in NODE, then follow the LEFT_SON link. If the desired
;  698     0823  1 !       address is greater than the range in NODE, then follow the
;  699     0824  1 !       RIGHT_SON link. If we try to follow a link and the link is zero
;  700     0825  1 !       then we terminate the search.
;  701     0826  1 !
;  702     0827  1 !       Once a candidate program-level SAT is found, this routine calls
;  703     0828  1 !       SEARCH_BIN_SAT to search the module-level SAT.
;  704     0829  1 !
;  705     0830  1 !       This routine is designed so that it will work on the "old" linear
;  706     0831  1 !       list data structure (this just being the extreme case of an
;  707     0832  1 !       unbalanced tree). However, for now we are still calling the
;  708     0833  1 !       old non-recursive search_sat routines. This one is not yet
;  709     0834  1 !       being used.
;  710     0835  1 !
;  711     0836  1 !       The routine is intended to be a replacement for the DBG$SEARCH_SAT
;  712     0837  1 !       routine.
;  713     0838  1 !
;  714     0839  1 ! INPUTS
;  715     0840  1 !       BASE_NODE -     The base of the SAT tree
;  716     0841  1 !       ADDRESS   -     The desired address.
;  717     0842  1 !       BYTE_OFFSET -   Return the byte offset associated with the symbolization
;  718     0843  1 !                          in this address.
;  719     0844  1 !
;  720     0845  1 ! OUTPUTS
;  721     0846  1 !       A pointer to the found SAT entry is returned.
;  722     0847  1 !       Zero is returned if no SAT entry was found.
;  723     0848  1 !
;  724     0849  2     BEGIN
;  725     0850  2     MAP
;  726     0851  2         BASE_NODE: REF SAT$ENTRY;
;  727     0852  2
;  728     0853  2     LOCAL
;  729     0854  2         OFFSET,
;  730     0855  2         OFFSET_1,
;  731     0856  2         MODRSTPTR: REF RST$ENTRY,
;  732     0857  2         SATPTR: REF SAT$ENTRY,
;  733     0858  2         SATPTR_1: REF SAT$ENTRY;
;  734     0859  2
;  735     0860  2     ! Bottom level of the recursion.
;  736     0861  2     !
;  737     0862  2     IF .BASE_NODE EQL 0
;  738     0863  2     THEN
;  739     0864  2         RETURN 0;
;  740     0865  2
;  741     0866  2     ! If the address we are looking for is before the current SAT entry
;  742     0867  2     ! then follow the left son.
```

```
;  743          0868  2      !
;  744          0869  2      IF .ADDRESS LSSA .BASE_NODE[SAT$L_START]
;  745          0870  2      THEN
;  746          0871  2          RETURN DBG$SEARCH_PROG_SAT_REC(.BASE_NODE[SAT$L_LEFTSON], .ADDRESS,
;  747          0872  2                                         .BYTE_OFFSET);
;  748          0873  2
;  749          0874  2      ! If the address we are looking for falls after the start of the
;  750          0875  2      ! current SAT entry then follow the right son.
;  751          0876  2      !
;  752          0877  2      SATPTR = DBG$SEARCH_PROG_SAT_REC(.BASE_NODE[SAT$L_RIGHTSON], .ADDRESS, OFFSET);
;  753          0878  2
;  754          0879  2      ! If the address we are looking for also lies within the current
;  755          0880  2      ! program-level SAT then search the module-level SAT.
;  756          0881  2      !
;  757          0882  2      IF .ADDRESS LEQA .BASE_NODE[SAT$L_END]
;  758          0883  2      THEN
;  759          0884  3          BEGIN
;  760          0885  3          MODRSTPTR = .BASE_NODE[SAT$L_RSTPTR];
;  761          0886  3          IF .MODRSTPTR[RST$V_MODSET]
;  762          0887  3          THEN
;  763          0888  3              SATPTR_1 = DBG$SEARCH_BIN_SAT_REC (
;  764          0889  3                         .MODRSTPTR[RST$L_SAT_PTR],
;  765          0890  3                         .ADDRESS,
;  766          0891  3                         (.MODRSTPTR[RST$B_LANGUAGE] EQL DBG$K_MACRO) OR
;  767          0892  3                          .MODRSTPTR[RST$V_SHARE_IMAGE],
;  768          0893  3                         FALSE)
;  769          0894  3          ELSE
;  770          0895  3              SATPTR_1 = 0;
;  771          0896  3          IF .SATPTR_1 NEQ 0
;  772          0897  3          THEN
;  773          0898  3              OFFSET_1 = .ADDRESS - .SATPTR_1[SAT$L_START];
;  774          0899  2          END;
;  775          0900  2
;  776          0901  2      ! If both of our candidate SATPTR's are zero then we have failed
;  777          0902  2      ! to find a match so return zero.
;  778          0903  2      !
;  779          0904  3      IF (.SATPTR EQL 0) AND (.SATPTR_1 EQL 0)
;  780          0905  2      THEN
;  781          0906  2          RETURN 0;
;  782          0907  2
;  783          0908  2      ! If only one candidate is zero then return the other one.
;  784          0909  2      !
;  785          0910  2      IF .SATPTR EQL 0
;  786          0911  2      THEN
;  787          0912  3          BEGIN
;  788          0913  3          .BYTE_OFFSET = .OFFSET_1;
;  789          0914  3          RETURN .SATPTR_1;
;  790          0915  2          END;
;  791          0916  2      IF .SATPTR_1 EQL 0
;  792          0917  2      THEN
;  793          0918  3          BEGIN
;  794          0919  3          .BYTE_OFFSET = .OFFSET;
;  795          0920  3          RETURN .SATPTR;
;  796          0921  2          END;
;  797          0922  2
;  798          0923  2      ! Both are non-zero. Return the one with the smaller offset.
;  799          0924  2      !
```

```
;  800          0925  2      IF .OFFSET LSS .OFFSET_1
;  801          0926  2      THEN
;  802          0927  3          BEGIN
;  803          0928  3          .BYTE_OFFSET = .OFFSET;
;  804          0929  3          RETURN .SATPTR;
;  805          0930  2          END;
;  806          0931  2      IF .OFFSET GTR .OFFSET_1
;  807          0932  2      THEN
;  808          0933  3          BEGIN
;  809          0934  3          .BYTE_OFFSET = .OFFSET_1;
;  810          0935  3          RETURN .SATPTR_1;
;  811          0936  2          END;
;  812          0937  2
;  813          0938  2      ! The offsets are equal. Return the one with the smaller end address.
;  814          0939  2      !
;  815          0940  2      IF .SATPTR[SAT$L_END] LSS .SATPTR_1[SAT$L_END]
;  816          0941  2      THEN
;  817          0942  3          BEGIN
;  818          0943  3          .BYTE_OFFSET = .OFFSET;
;  819          0944  3          RETURN .SATPTR;
;  820          0945  3          END
;  821          0946  2      ELSE
;  822          0947  3          BEGIN
;  823          0948  3          .BYTE_OFFSET = .OFFSET_1;
;  824          0949  3          RETURN .SATPTR_1;
;  825          0950  2          END;
;  826          0951  1      END;

                                001C 00000          .ENTRY  DBG$SEARCH_PROG_SAT_REC, Save R2,R3,R4  ; 0811
          5E                    04  C2 00002          SUBL2   #4, SP
          52          04        AC  D0 00005          MOVL    BASE_NODE, R2                           ; 0862
                                68  13 00009          BEQL    6$
          53          08        AC  D0 0000B          MOVL    ADDRESS, R3                             ; 0869
    04    A2                    53  D1 0000F          CMPL    R3, 4(R2)
                                0D  1E 00013          BGEQU   1$
                      0C        AC  DD 00015          PUSHL   BYTE_OFFSET                             ; 0872
                                53  DD 00018          PUSHL   R3                                      ; 0871
                      10        A2  DD 0001A          PUSHL   16(R2)
    DF    AF                    03  FB 0001D          CALLS   #3, DBG$SEARCH_PROG_SAT_REC
                                04  00021          RET
                    4008        8F  BB 00022 1$:      PUSHR   #^M<R3,SP>                              ; 0877
                                62  DD 00026          PUSHL   (R2)
    D4    AF                    03  FB 00028          CALLS   #3, DBG$SEARCH_PROG_SAT_REC
          54                    50  D0 0002C          MOVL    R0, SATPTR
    08    A2                    53  D1 0002F          CMPL    R3, 8(R2)                               ; 0882
                                34  1A 00033          BGTRU   5$
          50          0C        A2  D0 00035          MOVL    12(R2), MODRSTPTR                       ; 0885
          21          28        A0  E9 00039          BLBC    40(MODRSTPTR), 3$                       ; 0886
                                7E  D4 0003D          CLRL    -(SP)                                   ; 0888
                                51  D4 0003F          CLRL    R1                                      ; 0891
                      29        A0  95 00041          TSTB    41(MODRSTPTR)
                                02  12 00044          BNEQ    2$
                                51  D6 00046          INCL    R1
```

```
                52      28  A0          01          04  EF 00048 2$:    EXTZV   #4, #1, 40(MODRSTPTR), R2          ;0892
                    7E      51          52  C9 0004E    BISL3   R2, R1, -(SP)                                    ;
                                        53  DD 00052    PUSHL   R3                                              ;0890
                                    18  A0  DD 00054    PUSHL   24(MODRSTPTR)                                   ;0889
                        FF54    CF      04  FB 00057    CALLS   #4, DBG$SEARCH_BIN_SAT_REC                      ;
                                            02  11 0005C    BRB     4$                                          ;0888
                                            50  D4 0005E 3$:   CLRL    SATPTR_1                                ;0895
                                            50  D5 00060 4$:   TSTL    SATPTR_1                                ;0896
                                            05  13 00062    BEQL    5$                                          ;
                    51          53      04  A0  C3 00064    SUBL3   4(SATPTR_1), R3, OFFSET_1                   ;0898
                                            53  D4 00069 5$:   CLRL    R3                                      ;0904
                                            54  D5 0006B    TSTL    SATPTR                                      ;
                                            06  12 0006D    BNEQ    7$                                          ;
                                            53  D6 0006F    INCL    R3                                          ;
                                            50  D5 00071    TSTL    SATPTR_1                                    ;
                                            22  13 00073 6$:   BEQL    10$                                         ;
                                1A          53  E8 00075 7$:   BLBS    R3, 9$                                  ;0910
                                            50  D5 00078    TSTL    SATPTR_1                                    ;0916
                                            0E  13 0007A    BEQL    8$                                          ;
                                51          6E  D1 0007C    CMPL    OFFSET, OFFSET_1                            ;0925
                                            09  19 0007F    BLSS    8$                                          ;
                                            0F  14 00081    BGTR    9$                                          ;0931
                        08      A0      08  A4  D1 00083    CMPL    8(SATPTR), 8(SATPTR_1)                      ;0940
                                            08  18 00088    BGEQ    9$                                          ;
                        0C      BC          6E  D0 0008A 8$:   MOVL    OFFSET, @BYTE_OFFSET                    ;0943
                                50          54  D0 0008E    MOVL    SATPTR, R0                                  ;0947
                                            04  00091    RET                                                     ;
                        0C      BC          51  D0 00092 9$:   MOVL    OFFSET_1, @BYTE_OFFSET                  ;0948
                                            04  00096    RET                                                     ;0947
                                            50  D4 00097 10$:   CLRL    R0                                      ;0951
                                            04  00099    RET                                                     ;

; Routine Size:  154 bytes,    Routine Base:  DBG$CODE + 0293
```

```
;  828     0952  1 GLOBAL ROUTINE DBG$SEARCH_GLOBAL(ADDR, P_SYMID, P_BIT_OFFSET, PRINT_FLAG) =
;  829     0953  1 !
;  830     0954  1 ! FUNCTION
;  831     0955  1 !       This routine searches the GLOBAL symbol chain in an attempt to
;  832     0956  1 !       symbolize the address.
;  833     0957  1 !
;  834     0958  1 !       NOTE: This routine is searching the whole Global symbol chain
;  835     0959  1 !       if the proper global symbol is not found.  If we can be sure
;  836     0960  1 !       the global symbol chain is ordered.  We can stop the searching
;  837     0961  1 !       as soon as we have passed the address range.
;  838     0962  1 !
;  839     0963  1 ! INPUTS
;  840     0964  1 !       ADDR            - Address Descriptor.
;  841     0965  1 !
;  842     0966  1 !       P_SYMID         - The address of a longword location to receive the
;  843     0967  1 !                         unique symbol RST pointer.
;  844     0968  1 !
;  845     0969  1 !       P_BIT_OFFSET    - The bit offset off of P_SYMID.
;  846     0970  1 !
;  847     0971  1 !       PRINT_FLAG      - If false, no output will be done.  If true, then
;  848     0972  1 !                         the symbolization of the virtual address will be
;  849     0973  1 !                         output to the terminal.
;  850     0974  1 !
;  851     0975  1 ! OUTPUTS
;  852     0976  1 !       If successful, the routine prints the symbolization of the address
;  853     0977  1 !       (if the print flag was set).  P_SYMID contains the RST pointer of
;  854     0978  1 !       the symbol that matched.  P_BIT_OFFSET contains the bit offset.
;  855     0979  1 !       The routine returns TRUE.  If the address is not found in the
;  856     0980  1 !       global symbol chain, then P_SYMID is zero and P_BIT_OFFSET is set
;  857     0981  1 !       to the bit offset field from ADDR.
;  858     0982  1 !
;  859     0983  1
;  860     0984  2     BEGIN
;  861     0985  2
;  862     0986  2     MAP
;  863     0987  2         ADDR: REF DBG$ADDRESS_DESC;
;  864     0988  2                                                                          2C
;  865     0989  2     BIND                                                                 74
;  866     0990  2         SYMID           = .P_SYMID: REF RST$ENTRY,                       2C
;  867     0991  2         BIT_OFFSET      = .P_BIT_OFFSET;                                 69
;  868     0992  2
;  869     0993  2     LOCAL
;  870     0994  2         ADDRESS,                            ! Byte Address
;  871     0995  2         BEST_MATCH_VALUE,                   ! The best match value we found
;  872     0996  2         BYTE_OFFSET,                        ! Byte offset
;  873     0997  2         DSTPTR: REF DST$RECORD,             ! Pointer to DST record in GST
;  874     0998  2         GSTPTR: REF RST$ENTRY,              ! GST RST pointer
;  875     0999  2         GST_VALUE,                          ! GST value
;  876     1000  2         NAME: REF VECTOR[,BYTE];            ! Pointer to counted ASCII string
;  877     1001  2
;  878     1002  2
;  879     1003  2     ADDRESS = .ADDR[DBG$L_ADDRESS_BYTE_ADDR];
;  880     1004  2     BIT_OFFSET = .ADDR[DBG$L_ADDRESS_BIT_OFFSET];
;  881     1005  2     BYTE_OFFSET = 0;
;  882     1006  2     SYMID = 0;
;  883     1007  2     GSTPTR = .RST$START_ADDR[RST$L_SYMCHNPTR];
;  884     1008  2     WHILE TRUE DO
```

```
;  885          1009  3          BEGIN
;  886          1010  3
;  887          1011  3
;  888          1012  3          ! Check to see if we have no more Global Symbols.
;  889          1013  3          !
;  890          1014  3          IF .GSTPTR EQL 0 THEN EXITLOOP;
;  891          1015  3          $ABORT_ON_CONTROL_Y;
;  892          1016  3          GST_VALUE = GSTADDRESS(.GSTPTR);
;  893          1017  3
;  894          1018  3
;  895          1019  3          ! First check for an exact match because then
;  896          1020  3          ! we can abandon any further looking.
;  897          1021  3          !
;  898          1022  3          IF .ADDRESS EQLA .GST_VALUE
;  899          1023  3          THEN
;  900          1024  4              BEGIN
;  901          1025  4              SYMID = .GSTPTR;
;  902          1026  4              EXITLOOP;
;  903          1027  3              END;
;  904          1028  3
;  905          1029  3
;  906          1030  3          ! Inexact matches are still better than nothing.
;  907          1031  3          !
;  908          1032  3          IF .ADDRESS GTRA .GST_VALUE
;  909          1033  3          THEN
;  910          1034  4              BEGIN
;  911          1035  4
;  912          1036  4
;  913          1037  4              ! A match.  See if we already have one.  If we do not have
;  914          1038  4              ! one, Any one is better than none.
;  915          1039  4              !
;  916          1040  4              IF .SYMID EQL 0
;  917          1041  4              THEN
;  918          1042  4                  SYMID = .GSTPTR
;  919          1043  4
;  920          1044  4
;  921          1045  4              ! Take the new one only if this symbol
;  922          1046  4              ! is closer than the previous best one.
;  923          1047  4              !
;  924          1048  4              ELSE
;  925          1049  5                  BEGIN
;  926          1050  5                  BEST_MATCH_VALUE = GSTADDRESS(.SYMID);
;  927          1051  5                  IF .BEST_MATCH_VALUE  LSSA .GST_VALUE
;  928          1052  5                  THEN
;  929          1053  5                      SYMID = .GSTPTR;
;  930          1054  4                  END;
;  931          1055  4
;  932          1056  3              END;
;  933          1057  3
;  934          1058  3
;  935          1059  3          ! Go back and process the next record.
;  936          1060  3          !
;  937          1061  3          GSTPTR = .GSTPTR[RST$L_SYMCHNPTR];
;  938          1062  2          END;
;  939          1063  2
;  940          1064  2
;  941          1065  2      ! If we didn't find any possible match,
```

```
;  942          1066  2      ! return failure status.
;  943          1067  2      !
;  944          1068  2      IF .SYMID EQL 0
;  945          1069  2      THEN
;  946          1070  2          RETURN 0;
;  947          1071  2
;  948          1072  2      BEST_MATCH_VALUE = GSTADDRESS(.SYMID);
;  949          1073  2      BYTE_OFFSET = .ADDRESS - .BEST_MATCH_VALUE;
;  950          1074  2      IF .BYTE_OFFSET EQL .ADDRESS THEN RETURN 0;
;  951          1075  2
;  952          1076  2
;  953          1077  2      ! If the BEST_MATCH_VALUE is not in the range cover by the MODULE and
;  954          1078  2      ! if the offset is too large, don't take it.
;  955          1079  2      !
;  956          1080  2      IF .BYTE_OFFSET NEQ 0
;  957          1081  2      THEN
;  958          1082  3          BEGIN
;  959          1083  4          IF NOT (.ADDRESS GEQ .OWN_MODULE_BEGIN AND
;  960          1084  4                  .ADDRESS LEQ .OWN_MODULE_END)
;  961          1085  3          THEN
;  962          1086  4              BEGIN
;  963          1087  4              IF .BYTE_OFFSET GTR %X'1000'
;  964          1088  4              THEN
;  965          1089  5                  BEGIN
;  966          1090  5                  SYMID = 0;
;  967          1091  5                  BYTE_OFFSET = 0;
;  968          1092  5                  RETURN 0;
;  969          1093  4                  END;
;  970          1094  4
;  971          1095  3              END;
;  972          1096  3
;  973          1097  2          END;
;  974          1098  2
;  975          1099  2      IF .PRINT_FLAG
;  976          1100  2      THEN
;  977          1101  3          BEGIN
;  978          1102  3          DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;  979          1103  3          PRINT_BIT_OFFSET(BIT_OFFSET);
;  980          1104  3          DBG$PRINT (UPLIT BYTE(%ASCIC ': (global)'));
;  981          1105  3          DBG$NEWLINE();
;  982          1106  3          DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  983          1107  3          DSTPTR = .SYMID[RST$L_DSTPTR];
;  984          1108  3          NAME = DBG$GET_DST_NAME(.DSTPTR);
;  985          1109  3          DBG$PRINT (UPLIT BYTE(%ASCIC '!AC'), .NAME);
;  986          1110  3          IF .BYTE_OFFSET NEQ 0
;  987          1111  3          THEN
;  988          1112  3              DBG$PRINT_OFFSET(.BYTE_OFFSET);
;  989          1113  3          PRINT_BIT_OFFSET(BIT_OFFSET);
;  990          1114  3          DBG$NEWLINE();
;  991          1115  2          END;
;  992          1116  2
;  993          1117  2      BIT_OFFSET = .BIT_OFFSET + .BYTE_OFFSET * 8;
;  994          1118  2      RETURN TRUE;
;  995          1119  1      END;
```

```
                                                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

4C 58 21 20 73 73 65 72 64 64 61 0B 00032 P.AAI:    .ASCII  <11>\address .XL\                                       ;
                                           3C 01 0003E P.AAJ:    .ASCII  <1>\<\                                  ;
                                     4C 55 21 03 00040 P.AAK:    .ASCII  <3>\!UL\                                ;
                        3E 30 20 2C 30 20 2C 07 00044 P.AAL:    .ASCII  <7>\, 0, 0>\                            ;
      29 6C 61 62 6F 6C 67 28 20 3A 0A 0004C P.AAM:    .ASCII  <10>\: (global)\                                  ;
                                     43 41 21 03 00057 P.AAN:    .ASCII  <3>\!AC\                                ;
                                           3C 01 0005B P.AAO:    .ASCII  <1>\<\                                  ;
                                     4C 55 21 03 0005D P.AAP:    .ASCII  <3>\!UL\                                ;
                        3E 30 20 2C 30 20 2C 07 00061 P.AAQ:    .ASCII  <7>\, 0, 0>\                            ;

                                                                                .EXTRN  DBG$GV_CONTROL

                                                                                .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                 0FFC 00000                     .ENTRY  DBG$SEARCH_GLOBAL, Save R2,R3,R4,R5,R6,R7,- ; 0952
                                                                                        R8,R9,R10,R11                                ;
                                  5B      0000V  CF  9E 00002                   MOVAB   GST$ADDRESS, R11                             ;
                                  5A 00000000G   00  9E 00007                   MOVAB   DBG$NEWLINE, R10                             ;
                                  59 00000000G   00  9E 0000E                   MOVAB   DBG$PRINT, R9                                ;
                                  58 00000000'   EF  9E 00015                   MOVAB   P.AAI, R8                                    ;
                                  55         08  AC  D0 0001C                   MOVL    P_SYMID, R5                                  ; 0990
                                  50         04  AC  D0 00020                   MOVL    ADDR, R0                                     ; 1003
                                  53             60  D0 00024                   MOVL    (R0), ADDRESS                                ;
                               0C BC         04  A0  D0 00027                   MOVL    4(R0), aP_BIT_OFFSET                         ; 1004
                                                 54  D4 0002C                   CLRL    BYTE_OFFSET                                  ; 1005
                                                 65  D4 0002E                   CLRL    (R5)                                         ; 1006
                                  50 00000000G   00  D0 00030                   MOVL    RST$START_ADDR, R0                           ; 1007
                                  52         08  A0  D0 00037                   MOVL    8(R0), GSTPTR                                ;
                                                 43  13 0003B 1$:              BEQL    6$                                           ; 1014
                            0D 00000000G   00      01  E1 0003D               BBC     #1, DBG$GV_CONTROL+1, 2$                     ;
                                     000280E8      8F  DD 00045               PUSHL   #164072                                      ;
                                00000000G   00      01  FB 0004B               CALLS   #1, LIB$SIGNAL                               ;
                                                 52  DD 00052 2$:              PUSHL   GSTPTR                                       ; 1016
                                  6B             01  FB 00054                 CALLS   #1, GSTADDRESS                               ;
                                  56             50  D0 00057                 MOVL    R0, GST_VALUE                                ;
                                  56             53  D1 0005A                 CMPL    ADDRESS, GST_VALUE                           ; 1022
                                                 05  12 0005D                 BNEQ    3$                                           ;
                                  65             52  D0 0005F                 MOVL    GSTPTR, (R5)                                 ; 1025
                                                 1C  11 00062                 BRB     6$                                           ; 1024
                                                 14  1B 00064 3$:             BLEQU   5$                                           ; 1032
                                                 65  D5 00066                 TSTL    (R5)                                         ; 1040
                                                 0D  13 00068                 BEQL    4$                                           ;
                                                 65  DD 0006A                 PUSHL   (R5)                                         ; 1050
                                  6B             01  FB 0006C                 CALLS   #1, GSTADDRESS                               ;
                                  57             50  D0 0006F                 MOVL    R0, BEST_MATCH_VALUE                         ;
                                  56             57  D1 00072                 CMPL    BEST_MATCH_VALUE, GST_VALUE                  ; 1051
                                                 03  1E 00075                 BGEQU   5$                                           ;
                                  65             52  D0 00077 4$:             MOVL    GSTPTR, (R5)                                 ; 1053
                                  52         08  A2  D0 0007A 5$:             MOVL    8(GSTPTR), GSTPTR                            ; 1061
                                                 BB  11 0007E                 BRB     1$                                           ; 1008
                                                 65  D5 00080 6$:             TSTL    (R5)                                         ; 1068
                                                 34  13 00082                 BEQL    8$                                           ;
                                                 65  DD 00084                 PUSHL   (R5)                                         ; 1072
                                  6B             01  FB 00086                 CALLS   #1, GSTADDRESS                               ;
                                  57             50  D0 00089                 MOVL    R0, BEST_MATCH_VALUE                         ;
```

```
                54   53          57  C3 0008C          SUBL3   BEST_MATCH_VALUE, ADDRESS, BYTE_OFFSET      ; 1073
                     53          54  D1 00090          CMPL    BYTE_OFFSET, ADDRESS                        ; 1074
                                 23  13 00093          BEQL    8$
                                 54  D5 00095          TSTL    BYTE_OFFSET                                 ; 1080
                                 22  13 00097          BEQL    9$
                00000000'        EF  53 D1 00099          CMPL    ADDRESS, OWN_MODULE_BEGIN               ; 1083
                                 09  19 000A0          BLSS    7$
                00000000'        EF  53 D1 000A2          CMPL    ADDRESS, OWN_MODULE_END                 ; 1084
                                 10  15 000A9          BLEQ    9$
                00001000         8F  54 D1 000AB 7$:      CMPL    BYTE_OFFSET, #4096                      ; 1087
                                 07  15 000B2          BLEQ    9$
                                 65  D4 000B4          CLRL    (R5)                                        ; 1090
                                 54  D4 000B6          CLRL    BYTE_OFFSET                                 ; 1091
                              008B   31 000B8 8$:      BRW     14$                                         ; 1092
                     7A      10      AC  E9 000BB 9$:      BLBC    PRINT_FLAG, 13$                         ; 1099
                                     53  DD 000BF          PUSHL   ADDRESS                                 ; 1102
                                     58  DD 000C1          PUSHL   R8
                     69              02  FB 000C3          CALLS   #2, DBG$PRINT
                     53      0C      BC  D0 000C6          MOVL    @P_BIT_OFFSET, R3                       ; 1103
                                     52  D4 000CA          CLRL    R2
                                     53  D5 000CC          TSTL    R3
                                     16  13 000CE          BEQL    10$
                                     52  D6 000D0          INCL    R2
                             0C      A8  9F 000D2          PUSHAB  P.AAJ
                     69              01  FB 000D5          CALLS   #1, DBG$PRINT
                                     53  DD 000D8          PUSHL   R3
                             0E      A8  9F 000DA          PUSHAB  P.AAK
                     69              02  FB 000DD          CALLS   #2, DBG$PRINT
                             12      A8  9F 000E0          PUSHAB  P.AAL
                     69              01  FB 000E3          CALLS   #1, DBG$PRINT
                             1A      A8  9F 000E6 10$:      PUSHAB  P.AAM                                   ; 1104
                     69              01  FB 000E9          CALLS   #1, DBG$PRINT
                     6A              00  FB 000EC          CALLS   #0, DBG$NEWLINE                         ; 1105
                                     04  DD 000EF          PUSHL   #4                                      ; 1106
                                     01  DD 000F1          PUSHL   #1
                00000000G        00  02  FB 000F3          CALLS   #2, DBG$PRINT_CONTROL
                     50              65  D0 000FA          MOVL    (R5), R0                                ; 1107
                     50      0C      A0  D0 000FD          MOVL    12(R0), DSTPTR
                                     50  DD 00101          PUSHL   DSTPTR                                  ; 1108
                00000000G        00  01  FB 00103          CALLS   #1, DBG$GET_DST_NAME
                                     50  DD 0010A          PUSHL   NAME                                    ; 1109
                             25      A8  9F 0010C          PUSHAB  P.AAN
                     69              02  FB 0010F          CALLS   #2, DBG$PRINT
                                     54  D5 00112          TSTL    BYTE_OFFSET                             ; 1110
                                     09  13 00114          BEQL    11$
                                     54  DD 00116          PUSHL   BYTE_OFFSET                             ; 1112
                00000000G        00  01  FB 00118          CALLS   #1, DBG$PRINT_OFFSET
                     14              52  E9 0011F 11$:      BLBC    R2, 12$                                 ; 1113
                             29      A8  9F 00122          PUSHAB  P.AAO
                     69              01  FB 00125          CALLS   #1, DBG$PRINT
                                     53  DD 00128          PUSHL   R3
                             2B      A8  9F 0012A          PUSHAB  P.AAP
                     69              02  FB 0012D          CALLS   #2, DBG$PRINT
                             2F      A8  9F 00130          PUSHAB  P.AAQ
                     69              01  FB 00133          CALLS   #1, DBG$PRINT
                     6A              00  FB 00136 12$:      CALLS   #0, DBG$NEWLINE                         ; 1114
                     50      0C      BC  D0 00139 13$:      MOVL    @P_BIT_OFFSET, R0                       ; 1117
```

```
                 OC    BC          6044  7E 0013D          MOVAQ   (R0)[BYTE_OFFSET], @P_BIT_OFFSET
                       50            01  D0 00142          MOVL    #1, R0                                  ;  1118
                                         04 00145          RET                                             ;
                                       50  D4 00146 14$:    CLRL    R0                                      ;  1119
                                         04 00148          RET                                             ;

; Routine Size:  329 bytes,    Routine Base:  DBG$CODE + 032D
```

```
;  997          1120  1 GLOBAL ROUTINE DBG$DUMP_GLOBAL: NOVALUE =
;  998          1121  1 !
;  999          1122  1 ! FUNCTION
; 1000          1123  1 !       This routine just counts the number of entries in the GST and
; 1001          1124  1 !       displays the information on the terminal. It is called by the
; 1002          1125  1 !       DUMP GST command (which is enabled by SET DEVELOPER 0) and can
; 1003          1126  1 !       be used as an aid in measuring DEBUG performance.
; 1004          1127  1 !
; 1005          1128  1 ! INPUTS
; 1006          1129  1 !       none.
; 1007          1130  1 !
; 1008          1131  1 ! OUTPUTS
; 1009          1132  1 !       Displays size of GST.
; 1010          1133  1 !
; 1011          1134  2     BEGIN
; 1012          1135  2     LOCAL
; 1013          1136  2         COUNT,
; 1014          1137  2         GSTPTR: REF RST$ENTRY;
; 1015          1138  2
; 1016          1139  2     ! Loop through the GST, counting the number of entries.
; 1017          1140  2     !
; 1018          1141  2     GSTPTR = .RST$START_ADDR[RST$L_SYMCHNPTR];
; 1019          1142  2     COUNT = 0;
; 1020          1143  2     WHILE .GSTPTR NEQ 0 DO
; 1021          1144  3         BEGIN
; 1022          1145  3         COUNT = .COUNT + 1;
; 1023          1146  3         GSTPTR = .GSTPTR[RST$L_SYMCHNPTR];
; 1024          1147  2         END;
; 1025          1148  2
; 1026          1149  2     ! Display the information.
; 1027          1150  2     !
; 1028          1151  2     DBG$PRINT(UPLIT BYTE (%ASCIC 'There are !UL entries in the GST'), .COUNT);
; 1029          1152  2     DBG$NEWLINE();
; 1030          1153  1     END;


                                                        .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

20 4C 55 21 20 65 72 61 20 65 72 65 68 54 20  00069 P.AAR:  .ASCII  \ There are !UL entries in the GST\      ;
20 65 68 74 20 6E 69 20 73 65 69 72 74 6E 65  00078                                                       ;
                                  54 53 47    00087                                                       ;


                                                        .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                    0000 00000          .ENTRY  DBG$DUMP_GLOBAL, Save nothing             ; 1120
                50 00000000G    00  D0 00002            MOVL    RST$START_ADDR, R0                        ; 1141
                50          08  A0  D0 00009            MOVL    8(R0), GSTPTR                             ;
                                51  D4 0000D            CLRL    COUNT                                     ; 1142
                                50  D5 0000F 1$:        TSTL    GSTPTR                                    ; 1143
                                08  13 00011            BEQL    2$                                        ;
                                51  D6 00013            INCL    COUNT                                     ; 1145
                50          08  A0  D0 00015            MOVL    8(GSTPTR), GSTPTR                         ; 1146
                                F4  11 00019            BRB     1$                                        ; 1143
                                51  DD 0001B 2$:        PUSHL   COUNT                                     ; 1151
```

```
                    00000000'  EF  9F 0001D          PUSHAB  P.AAR                                    ;
          00000000G   00       02  FB 00023          CALLS   #2, DBG$PRINT                           ;
          00000000G   00       00  FB 0002A          CALLS   #0, DBG$NEWLINE                         ; 1152
                                   04 00031          RET                                             ; 1153

; Routine Size:  50 bytes,    Routine Base:  DBG$CODE + 0476
```

```
;1032     1154  1 GLOBAL ROUTINE DBG$SEARCH_SAT(ADDR, P_SYMID, P_BIT_OFFSET, PRINT_FLAG) =
;1033     1155  1 !
;1034     1156  1 ! FUNCTION
;1035     1157  1 !       This routine searches both the program level and the module level SAT in an
;1036     1158  1 !       attempt to symbolize the input address.  If the address is found to be
;1037     1159  1 !       an instruction address, the routine will attempt to symbolize it as a line
;1038     1160  1 !       number and byte offset from the start of the line.
;1039     1161  1 !
;1040     1162  1 !       If the address turns out to be a data address, this routine will see if it
;1041     1163  1 !       corresponds to any static symbol.  If so, the symbol most immediately preceding
;1042     1164  1 !       the address (or an exact match) and a positive offset (or 0) will be returned,
;1043     1165  1 !       along with the value TRUE.
;1044     1166  1 !       Symbolization will not be done to array elements or record components; only the
;1045     1167  1 !       outer level static data item will be returned as the symbol.
;1046     1168  1 !
;1047     1169  1 !       If no suitable symbolization can be found, then the routine returns false, and
;1048     1170  1 !       symid is 0.
;1049     1171  1 !
;1050     1172  1 ! INPUTS:
;1051     1173  1 !       ADDR            - Address descriptor.
;1052     1174  1 !
;1053     1175  1 !       P_SYMID         - The address of a longword location to receive the "symbol
;1054     1176  1 !                         identifier".
;1055     1177  1 !
;1056     1178  1 !       P_BIT_OFFSET    - The bit offset off of P_SYMID.
;1057     1179  1 !
;1058     1180  1 !       PRINT_FLAG      - If false, no output will be done.  If true, then all symbols that
;1059     1181  1 !                         match the virtual address will be output to the terminal.  (There
;1060     1182  1 !                         may be more than one match, such as would occur in FORTRAN common.)
;1061     1183  1 !
;1062     1184  1 !       5th Parameter   - If this routine is called from DBG$PC_TO_SYMID, this
;1063     1185  1 !                         parameter is set to TRUE.  If this is the case, the
;1064     1186  1 !                         line symid will not be created.
;1065     1187  1 !
;1066     1188  1 ! OUTPUTS:
;1067     1189  1 !       SYMID           - A symbol identifier which uniquely identifies the symbol which best
;1068     1190  1 !                         symbolizes the input address.
;1069     1191  1 !
;1070     1192  1 !       If the PRINT_FLAG has a value of TRUE, then output of all matched symbols
;1071     1193  1 !       to the terminal will occur.
;1072     1194  1 !
;1073     1195  1
;1074     1196  2     BEGIN
;1075     1197  2
;1076     1198  2     MAP
;1077     1199  2         ADDR: REF DBG$ADDRESS_DESC;             ! Pointer to Address Desc.
;1078     1200  2
;1079     1201  2     BUILTIN
;1080     1202  2         ACTUALCOUNT;
;1081     1203  2
;1082     1204  2     BIND
;1083     1205  2         SYMID           = .P_SYMID: REF RST$ENTRY,  ! Best symbol identifier.
;1084     1206  2         BIT_OFFSET      = .P_BIT_OFFSET;            ! Bit offset.
;1085     1207  2
;1086     1208  2     LOCAL
;1087     1209  2         ADDRESS,                                    ! Byte address from Addr. Desc.
;1088     1210  2         BYTE_OFFSET,                                ! Byte offset from RS'PTR
```

```
;  1089          1211  2          MODRSTPTR:      REF RST$ENTRY,          ! The module RST ptr.
;  1090          1212  2          MODULE_FOUND,                           ! Module found/not found flag.
;  1091          1213  2          PROG_SATPTR:    REF SAT$ENTRY,          ! Program level SAT ptr.
;  1092          1214  2          RSTPTR:         REF RST$ENTRY,          ! The symbol's RST ptr.
;  1093          1215  2          SYMBOL_NAME:    REF BLOCK[,BYTE],       ! Ptr to counted string.
;  1094          1216  2          TMP_BYTE_OFFSET;                        ! Tmp offset for calc closest
;  1095          1217  2                                                  !   symbol.
;  1096          1218  2
;  1097          1219  2
;  1098          1220  2      ! Initialize.
;  1099          1221  2      !
;  1100          1222  2      ADDRESS = .ADDR[DBG$L_ADDRESS_BYTE_ADDR];
;  1101          1223  2      BIT_OFFSET = .ADDR[DBG$L_ADDRESS_BIT_OFFSET];
;  1102          1224  2      BYTE_OFFSET = -1;
;  1103          1225  2      SYMID = 0;
;  1104          1226  2      MODULE_FOUND = FALSE;
;  1105          1227  2      OWN_MODULE_BEGIN = 0;
;  1106          1228  2      OWN_MODULE_END = 0;
;  1107          1229  2
;  1108          1230  2
;  1109          1231  2      ! Search through the program level static address table, looking
;  1110          1232  2      ! for a module that covers the address.
;  1111          1233  2      !
;  1112          1234  2      PROG_SATPTR = .SAT$START_ADDR;
;  1113          1235  2      WHILE .PROG_SATPTR NEQ 0 DO
;  1114          1236  3          BEGIN
;  1115          1237  3
;  1116          1238  3
;  1117          1239  3          ! If current SAT entry is past the address we are looking for,
;  1118          1240  3          ! then exitloop.  Can do this because SAT is sorted on start
;  1119          1241  3          ! address.
;  1120          1242  3          !
;  1121          1243  3          IF .PROG_SATPTR[SAT$L_START] GTRA .ADDRESS
;  1122          1244  3          THEN
;  1123          1245  3              EXITLOOP;
;  1124          1246  3
;  1125          1247  3
;  1126          1248  3          ! If the given address is in the correct range, then go ahead
;  1127          1249  3          ! and search the module-level SAT.
;  1128          1250  3          !
;  1129          1251  3          IF (.PROG_SATPTR[SAT$L_START] LEQA .ADDRESS) AND
;  1130          1252  4             (.PROG_SATPTR[SAT$L_END]   GEQA .ADDRESS)
;  1131          1253  3          THEN
;  1132          1254  4              BEGIN
;  1133          1255  4
;  1134          1256  4              ! Search the module level SAT.
;  1135          1257  4              !
;  1136          1258  4              SEARCH_MODULE_SAT (.PROG_SATPTR, .ADDRESS, MODRSTPTR, RSTPTR,
;  1137          1259  4                                 TMP_BYTE_OFFSET, .PRINT_FLAG);
;  1138          1260  4
;  1139          1261  4
;  1140          1262  4              ! If this is the first module found, then print the address.
;  1141          1263  4              !
;  1142          1264  5              IF (.PRINT_FLAG) AND (NOT .MODULE_FOUND)
;  1143          1265  4              THEN
;  1144          1266  5                  BEGIN
;  1145          1267  5                  DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
```

```
;  1146          1268  5                 PRINT_BIT_OFFSET(BIT_OFFSET);
;  1147          1269  5                 DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  1148          1270  5                 DBG$NEWLINE();
;  1149          1271  5                 DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  1150          1272  4                 END;
;  1151          1273  4             MODULE_FOUND = TRUE;
;  1152          1274  4
;  1153          1275  4
;  1154          1276  4             ! Calculate offset; determine what to print.
;  1155          1277  4             !
;  1156          1278  4             SELECTONE TRUE OF
;  1157          1279  4                 SET
;  1158          1280  4
;  1159          1281  4
;  1160          1282  4                 ! If the module is not set, then print a message to that
;  1161          1283  4                 ! effect.
;  1162          1284  4                 !
;  1163          1285  4                 [.MODRSTPTR[RST$V_MODSET] EQL 0]:
;  1164          1286  5                     BEGIN
;  1165          1287  5                     IF .PRINT_FLAG
;  1166          1288  5                     THEN
;  1167          1289  6                         BEGIN
;  1168          1290  6                         DBG$STA_SYMNAME (.MODRSTPTR, SYMBOL_NAME);
;  1169          1291  6                         DBG$PRINT (UPLIT BYTE (%ASCIC 'in module !AC, module not set'), .SYMBOL_NAME);
;  1170          1292  6                         DBG$NEWLINE();
;  1171          1293  5                         END;
;  1172          1294  4                     END;
;  1173          1295  4
;  1174          1296  4
;  1175          1297  4                 ! If the module is set, but the RST pointer is 0, then the
;  1176          1298  4                 ! address was found in the module, but could not be symbolized.
;  1177          1299  4                 ! Print a message to this effect.
;  1178          1300  4                 !
;  1179          1301  4                 [.RSTPTR EQL 0]:
;  1180          1302  5                     BEGIN
;  1181          1303  5                     IF .PRINT_FLAG
;  1182          1304  5                     THEN
;  1183          1305  6                         BEGIN
;  1184          1306  6                         DBG$STA_SYMNAME (.MODRSTPTR, SYMBOL_NAME);
;  1185          1307  6                         DBG$PRINT (UPLIT BYTE (%ASCIC 'in module !AC, no symbolization'), .SYMBOL_NAME);
;  1186          1308  6                         DBG$NEWLINE();
;  1187          1309  5                         END;
;  1188          1310  4                     END;
;  1189          1311  4
;  1190          1312  4
;  1191          1313  4                 ! There is a symbolization.
;  1192          1314  4                 !
;  1193          1315  4                 [OTHERWISE]:
;  1194          1316  5                     BEGIN
;  1195          1317  5
;  1196          1318  5
;  1197          1319  5                     ! If there is currently no symbolization for the address, then
;  1198          1320  5                     ! assume this one to be the best.
;  1199          1321  5                     ! If there is a prior symbolization, see if this one is better.
;  1200          1322  5                     ! If the offset is 0, there can be no better match.
;  1201          1323  5                     !
;  1202          1324  6                     IF (.MODRSTPTR[RST$V_MODSET]) AND (.BYTE_OFFSET NEQ 0)
```

```
;  1203          1325  5                    THEN
;  1204          1326  5                        IF (.BYTE_OFFSET LSS 0) OR
;  1205          1327  6                           (.TMP_BYTE_OFFSET LSS .BYTE_OFFSET)
;  1206          1328  5                        THEN
;  1207          1329  6                            BEGIN
;  1208          1330  6                            SYMID = .RSTPTR;
;  1209          1331  6                            BYTE_OFFSET = .TMP_BYTE_OFFSET;
;  1210          1332  5                            END;
;  1211          1333  5
;  1212          1334  5
;  1213          1335  5                    ! If the print_flag is set, output the symbolization.
;  1214          1336  5                    !
;  1215          1337  5                    IF .PRINT_FLAG
;  1216          1338  5                    THEN
;  1217          1339  6                        BEGIN
;  1218          1340  6
;  1219          1341  6
;  1220          1342  6                        ! Build the ASCII string for the symbol.
;  1221          1343  6                        !
;  1222          1344  6                        DBG$PRINT_SYMBOL_PATHNAME(.RSTPTR);
;  1223          1345  6                        IF .TMP_BYTE_OFFSET NEQ 0
;  1224          1346  6                        THEN
;  1225          1347  6                            DBG$PRINT_OFFSET (.TMP_BYTE_OFFSET);
;  1226          1348  6                        PRINT_BIT_OFFSET(BIT_OFFSET);
;  1227          1349  6                        DBG$NEWLINE();
;  1228          1350  5                        END;
;  1229          1351  5
;  1230          1352  4                    END;
;  1231          1353  4                TES;
;  1232          1354  3            END;
;  1233          1355  3
;  1234          1356  3
;  1235          1357  3            ! Get the next program level SAT entry.
;  1236          1358  3            !
;  1237          1359  3            PROG_SATPTR = .PROG_SATPTR[SAT$L_FLINK];
;  1238          1360  2            END;
;  1239          1361  2
;  1240          1362  2        IF .SYMID EQL 0
;  1241          1363  2        THEN
;  1242          1364  3            BEGIN
;  1243          1365  3            BYTE_OFFSET = 0;
;  1244          1366  3            BIT_OFFSET = .BYTE_OFFSET * 8 + .BIT_OFFSET;
;  1245          1367  3            RETURN .MODULE_FOUND;
   1246          1368  2            END;
   1247          1369  2
;  1248          1370  2
;  1249          1371  2        ! This is called from DBG$PC_TO_SYMID.  Line rst entry will not be
;  1250          1372  2        ! created.  DBG$SEARCH_SAT serves as RST look up.
;  1251          1373  2        !
;  1252          1374  2        IF ACTUALCOUNT() EQL 5
;  1253          1375  2        THEN
;  1254          1376  3            BEGIN
;  1255          1377  3            BIT_OFFSET = .BYTE_OFFSET * 8 + .BIT_OFFSET;
;  1256          1378  3            RETURN .MODULE_FOUND;
;  1257          1379  2            END;
;  1258          1380  2
;  1259          1381  2
```

```
;1260     1382  2      ! If the address is a code address, then print the symbol
;1261     1383  2      ! name and corresponding line number.  If there is no line
;1262     1384  2      ! number, then just print the routine name and offset.
;1263     1385  2      !
;1264     1386  2      IF (.SYMID[RST$B_KIND] EQL RST$K_ROUTINE) OR
;1265     1387  2         (.SYMID[RST$B_KIND] EQL RST$K_BLOCK) OR
;1266     1388  2         (.SYMID[RST$B_KIND] EQL RST$K_LABEL) OR
;1267     1389  3         (.SYMID[RST$B_KIND] EQL RST$K_ENTRY)
;1268     1390  2      THEN
;1269     1391  3          BEGIN
;1270     1392  3          LOCAL
;1271     1393  3              LINE_NO,                    ! Line no. corresponding to code address.
;1272     1394  3              STMT_NO,                    ! statement no.
;1273     1395  3              START_PC,                   ! Beginning pc address for line.
;1274     1396  3              END_PC,                     ! Dummy.
;1275     1397  3              MOD_SYMID : REF RST$ENTRY,  ! Dummy.
;1276     1398  3              TMP_OFFSET,                 ! Temporay offset
;1277     1399  3              TMP_SYMID : REF RST$ENTRY;  ! Temporay symid for %line
;1278     1400  3
;1279     1401  3
;1280     1402  3          ! Lookup the line number; if found, then print the symbol name
;1281     1403  3          ! and line number.
;1282     1404  3          !
;1283     1405  3          MOD_SYMID = .MODRSTPTR;
;1284     1406  4          IF (DBG$PC_TO_LINE_LOOKUP (.ADDRESS, LINE_NO, STMT_NO,
;1285     1407  4                                     START_PC, END_PC, MOD_SYMID))
;1286     1408  4          AND ((.LINE_NO NEQ 0) OR (.STMT_NO NEQ 0))
;1287     1409  3          THEN
;1288     1410  4              BEGIN
;1289     1411  5              IF (.BYTE_OFFSET NEQ 0) OR (.SYMID[RST$B_KIND] EQL RST$K_BLOCK)
;1290     1412  4              THEN
;1291     1413  5                  BEGIN
;1292     1414  5                  SYMID = DBG$STA_LINE_NUM_RST(.SYMID, .LINE_NO, .STMT_NO,
;1293     1415  5                                               .START_PC, .END_PC);
;1294     1416  5                  BYTE_OFFSET = .ADDRESS - .START_PC;
;1295     1417  5
;1296     1418  5
;1297     1419  5                  ! Set the following for printing purpose.
;1298     1420  5                  !
;1299     1421  5                  TMP_SYMID = .SYMID;
;1300     1422  5                  TMP_OFFSET = .BYTE_OFFSET;
;1301     1423  5                  END
;1302     1424  5
;1303     1425  4              ELSE
;1304     1426  5                  BEGIN
;1305     1427  5                  IF .PRINT_FLAG
;1306     1428  5                  THEN
;1307     1429  6                      BEGIN
;1308     1430  6                      TMP_SYMID = DBG$STA_LINE_NUM_RST(.SYMID, .LINE_NO,
;1309     1431  6                          .STMT_NO, .START_PC, .END_PC);
;1310     1432  6                      TMP_OFFSET = .ADDRESS - .START_PC;
;1311     1433  6                      TMP_SYMID[RST$L_UPSCOPEPTR] = .SYMID[RST$L_UPSCOPEPTR];
;1312     1434  5                      END;
;1313     1435  4                  END;
;1314     1436  4
;1315     1437  4
;1316     1438  4              IF .PRINT_FLAG
```

```
;  1317          1439  4              THEN
;  1318          1440  5                  BEGIN
;  1319          1441  5                  DBG$PRINT_SYMBOL_PATHNAME (.TMP_SYMID);
;  1320          1442  5
;  1321          1443  5
;  1322          1444  5                  ! If the start pc is less than the code address, then
;  1323          1445  5                  ! print the line offset.
;  1324          1446  5                  !
;  1325          1447  5                  IF .TMP_OFFSET GTR 0
;  1326          1448  5                  THEN
;  1327          1449  5                      DBG$PRINT_OFFSET (.TMP_OFFSET);
;  1328          1450  5                  PRINT_BIT_OFFSET(BIT_OFFSET);
;  1329          1451  5                  DBG$NEWLINE();
;  1330          1452  4                  END;
;  1331          1453  3              END;
;  1332          1454  2          END;
;  1333          1455  2
;  1334          1456  2
;  1335          1457  2      ! End of routine.  If the symbol was located in some module, then
;  1336          1458  2      ! MODULE_FOUND is true; otherwise the routine returns false.
;  1337          1459  2      ! Set offset to original address if no symbolization.
;  1338          1460  2      !
;  1339          1461  2      BIT_OFFSET = .BYTE_OFFSET * 8 + .BIT_OFFSET;
;  1340          1462  2      RETURN .MODULE_FOUND;
;  1341          1463  2
;  1342          1464  1      END;


                                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

                4C  58  21  20  73  73  65  72  64  64  61  0B  0008A P.AAS:   .ASCII  <11>\address !XL\
                                                    3C  01  00096 P.AAT:   .ASCII  <1>\<\
                                                4C  55  21  03  00098 P.AAU:   .ASCII  <3>\!UL\
                                    3E  30  20  2C  30  20  2C  07  0009C P.AAV:   .ASCII  <7>\, 0, 0>\
                                                    20  3A  02  000A4 P.AAW:   .ASCII  <2>\: \
2C  43  41  21  20  65  6C  75  64  6F  6D  20  6E  69  1D  000A7 P.AAX:   .ASCII  <29>\in module !AC, module not set\
74  65  73  20  74  6F  6E  20  65  6C  75  64  6F  6D  20  000B6
2C  43  41  21  20  65  6C  75  64  6F  6D  20  6E  69  1F  000C5 P.AAY:   .ASCII  <31>\in module !AC, no symbolization\
69  74  61  7A  69  6C  6F  62  6D  79  73  20  6F  6E  20  000D4
                                                    6E  6F  000E3
                                                    3C  01  000E5 P.AAZ:   .ASCII  <1>\<\
                                                4C  55  21  03  000E7 P.ABA:   .ASCII  <3>\!UL\
                                    3E  30  20  2C  30  20  2C  07  000EB P.ABB:   .ASCII  <7>\, 0, 0>\
                                                    3C  01  000F3 P.ABC:   .ASCII  <1>\<\
                                                4C  55  21  03  000F5 P.ABD:   .ASCII  <3>\!UL\
                                    3E  30  20  2C  30  20  2C  07  000F9 P.ABE:   .ASCII  <7>\, 0, 0>\


                                                                .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                    0FFC 00000          .ENTRY  DBG$SEARCH_SAT, Save R2,R3,R4,R5,R6,R7,R8,- ; 1154
                                                                                R9,R10,R11
                                5B 00000000'        EF  9E 00002        MOVAB   P.AAS, R11
                                5E                  24  C2 00009        SUBL2   #36, SP
                                58          08      AC  D0 0000C        MOVL    P_SYMID, R8                                 ; 1205
```

```
                54        0C    AC  D0 00010          MOVL    P_BIT_OFFSET, R4                        ; 1206
                50        04    AC  D0 00014          MOVL    ADDR, R0                                ; 1222
                57              60  D0 00018          MOVL    (R0), ADDRESS
                64        04    A0  D0 0001B          MOVL    4(R0), (R4)                             ; 1223
                55              01  CE 0001F          MNEGL   #1, BYTE_OFFSET                         ; 1224
                                68  D4 00022          CLRL    (R8)                                    ; 1225
                                5A  D4 00024          CLRL    MODULE_FOUND                            ; 1226
            00000000'           EF  7C 00026          CLRQ    OWN_MODULE_BEGIN                        ; 1227
                53 00000000G    00  D0 0002C          MOVL    SAT$START_ADDR, PROG_SATPTR             ; 1234
                                03  12 00033 1$:      BNEQ    3$                                      ; 1235
                              011D  31 00035 2$:      BRW     16$
                57        04    A3  D1 00038 3$:      CMPL    4(PROG_SATPTR), ADDRESS                 ; 1243
                                F7  1A 0003C          BGTRU   2$
                57        08    A3  D1 0003E          CMPL    8(PROG_SATPTR), ADDRESS                 ; 1252
                                03  1E 00042          BGEQU   5$
                              0108  31 00044 4$:      BRW     15$
                59        10    AC  D0 00047 5$:      MOVL    PRINT_FLAG, R9                          ; 1259
                                59  DD 0004B          PUSHL   R9
                                04  AE  9F 0004D      PUSHAB  TMP_BYTE_OFFSET                         ; 1258
                                0C  AE  9F 00050      PUSHAB  RSTPTR
                                14  AE  9F 00053      PUSHAB  MODRSTPTR
                              0088  8F  BB 00056      PUSHR   #^M<R3,R7>
          0000V CF                  06  FB 0005A      CALLS   #6, SEARCH_MODULE_SAT
                4E                  59  E9 0005F      BLBC    R9, 7$                                  ; 1264
                4B                  5A  E8 00062      BLBS    MODULE_FOUND, 7$
                                    57  DD 00065      PUSHL   ADDRESS                                 ; 1267
                                    5B  DD 00067      PUSHL   R11
      00000000G 00                  02  FB 00069      CALLS   #2, DBG$PRINT
                                    64  D5 00070      TSTL    (R4)                                    ; 1268
                                    20  13 00072      BEQL    6$
                                0C  AB  9F 00074      PUSHAB  P.AAT
      00000000G 00                  01  FB 00077      CALLS   #1, DBG$PRINT
                                    64  DD 0007E      PUSHL   (R4)
                                0E  AB  9F 00080      PUSHAB  P.AAU
      00000000G 00                  02  FB 00083      CALLS   #2, DBG$PRINT
                                12  AB  9F 0008A      PUSHAB  P.AAV
      00000000G 00                  01  FB 0008D      CALLS   #1, DBG$PRINT
                                1A  AB  9F 00094 6$:  PUSHAB  P.AAW                                   ; 1269
      00000000G 00                  01  FB 00097      CALLS   #1, DBG$PRINT
      00000000G 00                  00  FB 0009E      CALLS   #0, DBG$NEWLINE                         ; 1270
                                    04  DD 000A5      PUSHL   #4                                      ; 1271
                                    01  DD 000A7      PUSHL   #1
      00000000G 00                  02  FB 000A9      CALLS   #2, DBG$PRINT_CONTROL
                5A                  01  D0 000B0 7$:  MOVL    #1, MODULE_FOUND                        ; 1273
                52        08    AE  D0 000B3          MOVL    MODRSTPTR, R2                           ; 1285
                17        28    A2  E8 000B7          BLBS    40(R2), 8$
                86              59  E9 000BB          BLBC    R9, 4$                                  ; 1287
                                0C  AE  9F 000BE      PUSHAB  SYMBOL_NAME                             ; 1290
                                52  DD 000C1          PUSHL   R2
      00000000G 00                  02  FB 000C3      CALLS   #2, DBG$STA_SYMNAME
                                0C  AE  DD 000CA      PUSHL   SYMBOL_NAME                             ; 1291
                                1D  AB  9F 000CD      PUSHAB  P.AAX
                                1B  11 000D0          BRB     9$
                56        04    AE  D0 000D2 8$:      MOVL    RSTPTR, R6                              ; 1301
                                1E  12 000D6          BNEQ    10$
                74              59  E9 000D8          BLBC    R9, 15$                                 ; 1303
                                0C  AE  9F 000DB      PUSHAB  SYMBOL_NAME                             ; 1306
```

```
                         52  DD 000DE          PUSHL   R2
                         02  FB 000E0          CALLS   #2, DBG$STA_SYMNAME
                      0C AE  DD 000E7          PUSHL   SYMBOL_NAME                     ;1307
                      3B AB  9F 000EA          PUSHAB  P.AAY
                         02  FB 000ED 9$:      CALLS   #2, DBG$PRINT
                         52  11 000F4          BRB     14$                             ;1308
                      11 28  A2  E9 000F6 10$:  BLBC    40(R2), 12$                     ;1324
                         55  D5 000FA          TSTL    BYTE_OFFSET
                         0D  13 000FC          BEQL    12$
                         05  19 000FE          BLSS    11$                             ;1326
                      55 6E  D1 00100          CMPL    TMP_BYTE_OFFSET, BYTE_OFFSET    ;1327
                         06  18 00103          BGEQ    12$
                      68 56  D0 00105 11$:      MOVL    R6, (R8)                        ;1330
                      55 6E  D0 00108          MOVL    TMP_BYTE_OFFSET, BYTE_OFFSET    ;1331
                      41 59  E9 0010B 12$:      BLBC    R9, 15$                         ;1337
                         56  DD 0010E          PUSHL   R6                              ;1344
00000000G   00           01  FB 00110          CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME
                         6E  D5 00117          TSTL    TMP_BYTE_OFFSET                 ;1345
                         09  13 00119          BEQL    13$
                         6E  DD 0011B          PUSHL   TMP_BYTE_OFFSET                 ;1347
00000000G   00           01  FB 0011D          CALLS   #1, DBG$PRINT_OFFSET
                         64  D5 00124 13$:      TSTL    (R4)                            ;1348
                         20  13 00126          BEQL    14$
                      5B AB  9F 00128          PUSHAB  P.AAZ
00000000G   00           01  FB 0012B          CALLS   #1, DBG$PRINT
                         64  DD 00132          PUSHL   (R4)
                      5D AB  9F 00134          PUSHAB  P.ABA
00000000G   00           02  FB 00137          CALLS   #2, DBG$PRINT
                      61 AB  9F 0013E          PUSHAB  P.ABB
00000000G   00           01  FB 00141          CALLS   #1, DBG$PRINT
00000000G   00           00  FB 00148 14$:      CALLS   #0, DBG$NEWLINE                 ;1349
                         53  63  D0 0014F 15$:  MOVL    (PROG_SATPTR), PROG_SATPTR      ;1359
                          FEDE 31 00152          BRW     1$                              ;1235
                         56  68  D0 00155 16$:  MOVL    (R8), R6                        ;1362
                             05  12 00158      BNEQ    18$
                             55  D4 0015A      CLRL    BYTE_OFFSET                     ;1365
                          00DD   31 0015C 17$:  BRW     26$                             ;1366
                         05  6C  91 0015F 18$:  CMPB    (AP), #5                        ;1374
                             F8  13 00162      BEQL    17$
                         53 14   A6  9A 00164  MOVZBL  20(R6), R3                      ;1386
                         02  53  91 00168      CMPB    R3, #2
                             0F  13 0016B      BEQL    19$
                         03  53  91 0016D      CMPB    R3, #3                          ;1387
                             0A  13 00170      BEQL    19$
                         04  53  91 00172      CMPB    R3, #4                          ;1388
                             05  13 00175      BEQL    19$
                         08  53  91 00177      CMPB    R3, #8                          ;1389
                             E0  12 0017A      BNEQ    17$
                   10 AE 08  AE  D0 0017C 19$:  MOVL    MODRSTPTR, MOD_SYMID            ;1405
                         10  AE  9F 00181      PUSHAB  MOD_SYMID                       ;1406
                         18  AE  9F 00184      PUSHAB  END_PC
                         20  AE  9F 00187      PUSHAB  START_PC
                         28  AE  9F 0018A      PUSHAB  STMT_NO
                         30  AE  9F 0018D      PUSHAB  LINE_NO
                             57  DD 00190      PUSHL   ADDRESS
00000000G   00               06  FB 00192      CALLS   #6, DBG$PC_TO_LINE_LOOKUP
                         C0  50  E9 00199      BLBC    R0, 17$
```

```
                        20 AE  D5 0019C          TSTL    LINE_NO                                 ; 1408
                           05  12 0019F          BNEQ    20$                                     ;
                        1C AE  D5 001A1          TSTL    STMT_NO                                 ;
                           B6  13 001A4          BEQL    17$                                     ;
                           55  D5 001A6 20$:      TSTL    BYTE_OFFSET                             ; 1411
                           05  12 001A8          BNEQ    21$                                     ;
                     03    53  91 001AA          CMPB    R3, #3                                  ;
                           25  12 001AD          BNEQ    22$                                     ;
                        14 AE  DD 001AF 21$:      PUSHL   END_PC                                  ; 1415
                        1C AE  DD 001B2          PUSHL   START_PC                                ;
                        24 AE  DD 001B5          PUSHL   STMT_NO                                 ; 1414
                        2C AE  DD 001B8          PUSHL   LINE_NO                                 ;
                           56  DD 001BB          PUSHL   R6                                      ;
   00000000G            00     05  FB 001BD      CALLS   #5, DBG$STA_LINE_NUM_RST                ;
                        68     50  D0 001C4      MOVL    R0, (R8)                                ;
55                      57  18 AE  C3 001C7      SUBL3   START_PC, ADDRESS, BYTE_OFFSET          ; 1416
                        50     68  D0 001CC      MOVL    (R8), TMP_SYMID                         ; 1421
                        53     55  D0 001CF      MOVL    BYTE_OFFSET, TMP_OFFSET                 ; 1422
                               23  11 001D2      BRB     23$                                     ; 1411
                        64  10 AC  E9 001D4 22$:  BLBC    PRINT_FLAG, 26$                         ; 1427
                        14 AE  DD 001D8          PUSHL   END_PC                                  ; 1431
                        1C AE  DD 001DB          PUSHL   START_PC                                ;
                        24 AE  DD 001DE          PUSHL   STMT_NO                                 ;
                        2C AE  DD 001E1          PUSHL   LINE_NO                                 ; 1430
                           56  DD 001E4          PUSHL   R6                                      ;
   00000000G            00     05  FB 001E6      CALLS   #5, DBG$STA_LINE_NUM_RST                ;
53                      57  18 AE  C3 001ED      SUBL3   START_PC, ADDRESS, TMP_OFFSET           ; 1432
          10            A0  10 A6  D0 001F2      MOVL    16(R6), 16(TMP_SYMID)                   ; 1433
                        41  10 AC  E9 001F7 23$:  BLBC    PRINT_FLAG, 26$                         ; 1438
                           50  DD 001FB          PUSHL   TMP_SYMID                               ; 1441
   00000000G            00     01  FB 001FD      CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME           ;
                           53  D5 00204          TSTL    TMP_OFFSET                              ; 1447
                           09  15 00206          BLEQ    24$                                     ;
                           53  DD 00208          PUSHL   TMP_OFFSET                              ; 1449
   00000000G            00     01  FB 0020A      CALLS   #1, DBG$PRINT_OFFSET                    ;
                           64  D5 00211 24$:      TSTL    (R4)                                    ; 1450
                           20  13 00213          BEQL    25$                                     ;
                     69    AB  9F 00215          PUSHAB  P.ABC                                   ;
   00000000G            00     01  FB 00218      CALLS   #1, DBG$PRINT                           ;
                           64  DD 0021F          PUSHL   (R4)                                    ;
                     6B    AB  9F 00221          PUSHAB  P.ABD                                   ;
   00000000G            00     02  FB 00224      CALLS   #2, DBG$PRINT                           ;
                     6F    AB  9F 0022B          PUSHAB  P.ABE                                   ;
   00000000G            00     01  FB 0022E      CALLS   #1, DBG$PRINT                           ;
   00000000G            00     00  FB 00235 25$:  CALLS   #0, DBG$NEWLINE                        ; 1451
                        74   9445  7E 0023C 26$:  MOVAQ   @(R4)+[BYTE_OFFSET], -(R4)            ; 1461
                        50     5A  D0 00240      MOVL    MODULE_FOUND, R0                        ; 1462
                                   04 00243      RET                                             ; 1464

; Routine Size:  580 bytes,    Routine Base:  DBG$CODE + 04A8
```

```
;  1344          1465  1 GLOBAL ROUTINE DBG$DUMP_SAT: NOVALUE =
;  1345          1466  1 !
;  1346          1467  1 ! FUNCTION
;  1347          1468  1 !       This routine displays information about the Static Address Table.
;  1348          1469  1 !       It is called from the DUMP SAT command, which is enabled via
;  1349          1470  1 !       SET DEVELOPER 0. The information can be used as an aid to
;  1350          1471  1 !       studying the performance of the debugger.
;  1351          1472  1 !
;  1352          1473  1 ! INPUTS
;  1353          1474  1 !       none.
;  1354          1475  1 !
;  1355          1476  1 ! OUTPUTS
;  1356          1477  1 !       The length of each modules SAT chain is displayed at the terminal.
;  1357          1478  1 !
;  1358          1479  2     BEGIN
;  1359          1480  2     LOCAL
;  1360          1481  2         COUNT,
;  1361          1482  2         MODNAME,
;  1362          1483  2         MODRSTPTR: REF RST$ENTRY,
;  1363          1484  2         PROGSAT_COUNT,
;  1364          1485  2         PROG_SATPTR: REF SAT$ENTRY,
;  1365          1486  2         SATPTR: REF SAT$ENTRY;
;  1366          1487  2
;  1367          1488  2     ! Loop through the program-level SAT.
;  1368          1489  2     !
;  1369          1490  2     PROG_SATPTR = .SAT$START_ADDR;
;  1370          1491  2     PROGSAT_COUNT = 0;
;  1371          1492  2     WHILE .PROG_SATPTR NEQ 0 DO
;  1372          1493  3         BEGIN
;  1373          1494  3         PROGSAT_COUNT = .PROGSAT_COUNT + 1;
;  1374          1495  3         MODRSTPTR = .PROG_SATPTR[SAT$L_RSTPTR];
;  1375          1496  3         !
;  1376          1497  3         ! Loop through each module-level SAT, keeping a count of entries.
;  1377          1498  3         !
;  1378          1499  3         SATPTR = .MODRSTPTR[RST$L_SAT_PTR];
;  1379          1500  3         COUNT = 0;
;  1380          1501  3         WHILE .SATPTR NEQ 0 DO
;  1381          1502  4             BEGIN
;  1382          1503  4             COUNT = .COUNT + 1;
;  1383          1504  4             SATPTR = .SATPTR[SAT$L_FLINK];
;  1384          1505  3             END;
;  1385          1506  3         !
;  1386          1507  3         ! Display the information for this module SAT.
;  1387          1508  3         !
;  1388          1509  3         DBG$STA_SYMNAME (.MODRSTPTR, MODNAME);
;  1389          1510  3         DBG$PRINT(UPLIT BYTE(%ASCIC 'module !AC: !UL'), .MODNAME, .COUNT);
;  1390          1511  3         DBG$NEWLINE();
;  1391          1512  3         !
;  1392          1513  3         PROG_SATPTR = .PROG_SATPTR[SAT$L_FLINK];
;  1393          1514  2         END;
;  1394          1515  2     DBG$PRINT(UPLIT BYTE(%ASCIC 'length of program SAT: !UL'), .PROGSAT_COUNT);
;  1395          1516  2     DBG$NEWLINE();
;  1396          1517  1     END;


                                                        .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0
```

```
55 21 20 3A 43 41 21 20 65 6C 75 64 6F 6D 0F 00101 P.ABF:  .ASCII  <15>\module !AC: !UL\                    ;
                                          4C 00110                                                       ;
67 6F 72 70 20 66 6F 20 68 74 67 6E 65 6C 1A 00111 P.ABG:  .ASCII  <26>\length of program SAT: !UL\        ;
      4C 55 21 20 3A 54 41 53 20 6D 61 72 00120                                                         ;


                                                           .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                01FC 00000         .ENTRY  DBG$DUMP_SAT, Save R2,R3,R4,R5,R6,R7,R8   ; 1465
                                58 00000000G    00   9E 00002    MOVAB   DBG$NEWLINE, R8                           ;
                                57 00000000G    00   9E 00009    MOVAB   DBG$PRINT, R7                             ;
                                5E              04   C2 00010    SUBL2   #4, SP                                    ;
                                52 00000000G    00   D0 00013    MOVL    SAT$START_ADDR, PROG_SATPTR               ; 1490
                                                55   D4 0001A    CLRL    PROGSAT_COUNT                             ; 1491
                                                52   D5 0001C 1$: TSTL    PROG_SATPTR                               ; 1492
                                                38   13 0001E    BEQL    4$                                        ;
                                                55   D6 00020    INCL    PROGSAT_COUNT                             ; 1494
                                53        0C    A2   D0 00022    MOVL    12(PROG_SATPTR), MODRSTPTR                ; 1495
                                54        18    A3   D0 00026    MOVL    24(MODRSTPTR), SATPTR                     ; 1499
                                                56   D4 0002A    CLRL    COUNT                                     ; 1500
                                                54   D5 0002C 2$: TSTL    SATPTR                                    ; 1501
                                                07   13 0002E    BEQL    3$                                        ;
                                                56   D6 00030    INCL    COUNT                                     ; 1503
                                54              64   D0 00032    MOVL    (SATPTR), SATPTR                          ; 1504
                                                F5   11 00035    BRB     2$                                        ; 1501
                                      4008      8F   BB 00037 3$: PUSHR   #^M<R3,SP>                               ; 1509
                          00000000G  00         02   FB 0003B    CALLS   #2, DBG$STA_SYMNAME                       ;
                                                56   DD 00042    PUSHL   COUNT                                     ; 1510
                                         04     AE   DD 00044    PUSHL   MODNAME                                   ;
                                   00000000'    EF   9F 00047    PUSHAB  P.ABF                                     ;
                                67              03   FB 0004D    CALLS   #3, DBG$PRINT                             ;
                                68              00   FB 00050    CALLS   #0, DBG$NEWLINE                           ; 1511
                                52              62   D0 00053    MOVL    (PROG_SATPTR), PROG_SATPTR                ; 1513
                                                C4   11 00056    BRB     1$                                        ; 1492
                                                55   DD 00058 4$: PUSHL   PROGSAT_COUNT                             ; 1515
                                   00000000'    EF   9F 0005A    PUSHAB  P.ABG                                     ;
                                67              02   FB 00060    CALLS   #2, DBG$PRINT                             ;
                                68              00   FB 00063    CALLS   #0, DBG$NEWLINE                           ; 1516
                                                     04 00066    RET                                               ; 1517

; Routine Size:  103 bytes,    Routine Base:  DBG$CODE + 06EC
```

```
;  1398          1518  1 GLOBAL ROUTINE DBG$SEARCH_VAX_CALL_STACK(ADDR, P_SYMID, P_BIT_OFFSET, PRINT_FLAG) =
;  1399          1519  1 !
;  1400          1520  1 ! FUNCTION
;  1401          1521  1 !       This routine searches the VAX call stack in an attempt to symbolize the
;  1402          1522  1 !       address.
;  1403          1523  1 !
;  1404          1524  1 ! INPUTS
;  1405          1525  1 !       ADDR            - Address Descriptor.
;  1406          1526  1 !
;  1407          1527  1 !       P_SYMID         - The address of a longword location to receive the
;  1408          1528  1 !                         unique symbol identifier.
;  1409          1529  1 !
;  1410          1530  1 !       P_BIT_OFFSET    - The bit offset off of P_SYMID.
;  1411          1531  1 !
;  1412          1532  1 !
;  1413          1533  1 !       PRINT_FLAG      - If false, no output will be done.  If true, then
;  1414          1534  1 !                         the symbolization of the virtual address will be
;  1415          1535  1 !                         output to the terminal.
;  1416          1536  1 !
;  1417          1537  1 ! OUTPUTS
;  1418          1538  1 !       If successful, the routine prints the symbolization of the address
;  1419          1539  1 !       (if the print flag was set).  The location defined by P_SYMID contains
;  1420          1540  1 !       the RST pointer (unique symbol identifier) of the symbol that matched.
;  1421          1541  1 !       The location defined by P_BIT_OFFSET contains the bit offset.  The routine
;  1422          1542  1 !       returns true.  All of this occurs even if only a partial symbolization
;  1423          1543  1 !       is possible (eg. just routine name).
;  1424          1544  1 !
;  1425          1545  1 !       If the address is not found in the stack frame, then P_SYMID is 0, and
;  1426          1546  1 !       P_BIT_OFFSET is .ADDR's bit offset field.  The routine returns false.
;  1427          1547  1 !
;  1428          1548  1
;  1429          1549  2     BEGIN
;  1430          1550  2
;  1431          1551  2     MAP
;  1432          1552  2         ADDR: REF DBG$ADDRESS_DESC;
;  1433          1553  2
;  1434          1554  2     BIND
;  1435          1555  2         SYMID           = .P_SYMID:  REF RST$ENTRY,  ! Unique symbol identifier.
;  1436          1556  2         BIT_OFFSET      = .P_BIT_OFFSET;             ! Offset off of FP.
;  1437          1557  2
;  1438          1558  2     LITERAL
;  1439          1559  2         FP = 13,
;  1440          1560  2         SP = 14,
;  1441          1561  2         LONGWORD = 4;
;  1442          1562  2
;  1443          1563  2     LOCAL
;  1444          1564  2         ADDRESS,                                 ! Byte address
;  1445          1565  2         BYTE_OFFSET,                             ! Byte offset
;  1446          1566  2         COUNT,                                   ! Invocation count
;  1447          1567  2         ENDADDR,                                 ! End address of routine
;  1448          1568  2         FRAME_FOUND_FLAG,                        !
;  1449          1569  2         FRAMEPTR        : REF BLOCK[, BYTE],     ! Ptr to current VAX call frame.
;  1450          1570  2         FRAMEPTR2       : REF BLOCK[, BYTE],     ! Ptr to current VAX call frame.
;  1451          1571  2         PCVAL,                                   ! Current PC.
;  1452          1572  2         PCVAL2,                                  ! Current PC.
;  1453          1573  2         TMP_BYTE_OFFSET,                         ! Tmp offset for calc closest symbol.
;  1454          1574  2         VALSPEC         : REF DST$VAL_SPEC,      ! Ptr to DST value spec.
```

```
;  1455          1575  2          TMP_SYMID       : REF RST$ENTRY,        ! Temp ptr to symbol RST entry.
;  1456          1576  2          MODRSTPTR       : REF RST$ENTRY,        ! Module RST pointer
;  1457          1577  2          RSTPTR          : REF RST$ENTRY,        ! Routine RST ptr.
;  1458          1578  2          RSTPTR2         : REF RST$ENTRY,        ! Routine RST ptr.
;  1459          1579  2          SATPTR          : REF SAT$ENTRY,        !
;  1460          1580  2          STARTADDR,                              ! Start address of routine
;  1461          1581  2          SYMBOL_NAME     : REF BLOCK[, BYTE],    ! Ptr to counted ASCII string.
;  1462          1582  2          SPVAL           : REF VECTOR[, LONG],   ! Current call frame SP value.
;  1463          1583  2          REGMASK         : BITVECTOR[16];        ! Reg save mask from the call frame.
;  1464          1584  2
;  1465          1585  2
;  1466          1586  2      ! Initialize the SP, PC and frame pointer to their current (top of stack)
;  1467          1587  2      ! values.
;  1468          1588  2      !
;  1469          1589  2      PCVAL = .DBG$RUNFRAME[DBG$L_USER_PC];
;  1470          1590  2      SPVAL = .DBG$RUNFRAME[DBG$L_USER_SP];
;  1471          1591  2      FRAMEPTR = .DBG$RUNFRAME[DBG$L_USER_FP];
;  1472          1592  2
;  1473          1593  2
;  1474          1594  2      ! Assume symbolization not possible.
;  1475          1595  2      !
;  1476          1596  2      SYMID = 0;
;  1477          1597  2      BYTE_OFFSET = -1;
;  1478          1598  2      ADDRESS = .ADDR[DBG$L_ADDRESS_BYTE_ADDR];
;  1479          1599  2      BIT_OFFSET = .ADDR[DBG$L_ADDRESS_BIT_OFFSET];
;  1480          1600  2
;  1481          1601  2
;  1482          1602  2      ! Loop through the stack.
;  1483          1603  2      !
;  1484          1604  2      WHILE TRUE DO
;  1485          1605  3          BEGIN
;  1486          1606  3
;  1487          1607  3
;  1488          1608  3          ! If we are at the bottom of the stack, then exit the loop.
;  1489          1609  3          !
;  1490          1610  3          IF (.PCVAL EQL 0) OR
;  1491          1611  4             (.FRAMEPTR[SF$A_HANDLER] EQL DBG$FINAL_HANDL)
;  1492          1612  3          THEN
;  1493          1613  3              EXITLOOP;
;  1494          1614  3
;  1495          1615  3
;  1496          1616  3          ! See if there is local data on top of the stack.
;  1497          1617  3          !
;  1498          1618  3          IF .FRAMEPTR GTRA .SPVAL
;  1499          1619  3          THEN
;  1500          1620  3
;  1501          1621  3
;  1502          1622  3              ! There is, so see if address is within the data area.
;  1503          1623  3              !
;  1504          1624  3              IF (.ADDRESS GEQA .SPVAL) AND
;  1505          1625  4                 (.ADDRESS LSSA .FRAMEPTR)
;  1506          1626  3              THEN
;  1507          1627  4                  BEGIN
;  1508          1628  4                  RSTPTR = FIND_ROUTINE (.PCVAL, .PRINT_FLAG);
;  1509          1629  4                  IF .RSTPTR EQL 0
;  1510          1630  4                  THEN
;  1511          1631  5                      BEGIN
```

```
;  1512          1632  5                 IF .PRINT_FLAG
;  1513          1633  5                 THEN
;  1514          1634  6                     BEGIN
;  1515          1635  6                     DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;  1516          1636  6                     PRINT_BIT_OFFSET(BIT_OFFSET);
;  1517          1637  6                     DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  1518          1638  6                     DBG$NEWLINE();
;  1519          1639  6                     DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  1520          1640  6                     DBG$PRINT (UPLIT BYTE (%ASCIC 'data item on stack in unknown module'));
;  1521          1641  6                     DBG$NEWLINE();
;  1522          1642  5                     END;
;  1523          1643  5
;  1524          1644  5                 RETURN TRUE;
;  1525          1645  4                 END;
;  1526          1646  4
;  1527          1647  4             IF .RSTPTR[RST$B_KIND] EQL RST$K_MODULE
;  1528          1648  4             THEN
;  1529          1649  5                 BEGIN
;  1530          1650  5
;  1531          1651  5
;  1532          1652  5                 ! We have located the PC in a module, but since the module
;  1533          1653  5                 ! is not set, can't get any more information other than
;  1534          1654  5                 ! module name.  Print that.
;  1535          1655  5                 !
;  1536          1656  5                 IF .PRINT_FLAG
;  1537          1657  5                 THEN
;  1538          1658  6                     BEGIN
;  1539          1659  6                     DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;  1540          1660  6                     PRINT_BIT_OFFSET(BIT_OFFSET);
;  1541          1661  6                     DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  1542          1662  6                     DBG$NEWLINE();
;  1543          1663  6                     DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  1544          1664  6                     DBG$STA_SYMNAME (.RSTPTR, SYMBOL_NAME);
;  1545          1665  6                     DBG$PRINT (UPLIT BYTE (%ASCIC 'data item on stack in module !AC'), .SYMBOL_NAME);
;  1546          1666  6                     IF .RSTPTR[RST$V_MODSET]
;  1547          1667  6                     THEN
;  1548          1668  6                         DBG$PRINT( UPLIT BYTE (%ASCIC ', module set'))
;  1549          1669  6                     ELSE
;  1550          1670  6                         DBG$PRINT( UPLIT BYTE (%ASCIC ', module not set'));
;  1551          1671  6
;  1552          1672  6                     DBG$NEWLINE();
;  1553          1673  5                     END;
;  1554          1674  5                 RETURN TRUE;
;  1555          1675  4                 END;
;  1556          1676  4
;  1557          1677  4
;  1558          1678  4             ! We have found the routine containing the PC.  Try for further
;  1559          1679  4             ! symbolization.
;  1560          1680  4             !
;  1561          1681  4             MODRSTPTR = .RSTPTR;
;  1562          1682  4             WHILE .MODRSTPTR[RST$B_KIND] NEQ RST$K_MODULE DO
;  1563          1683  4                 MODRSTPTR = .MODRSTPTR[RST$L_UPSCOPEPTR];
;  1564          1684  4             TMP_SYMID = .MODRSTPTR[RST$L_SYMHDRPTR];
;  1565          1685  4
;  1566          1686  4
;  1567          1687  4             ! Search through the routine to find the symbol most immediately
;  1568          1688  4             ! preceding the given address.
```

```
;  1569     1689  4                !
;  1570     1690  4            WHILE .TMP_SYMID NEQ 0 DO
;  1571     1691  5                BEGIN
;  1572     1692  5                LOCAL
;  1573     1693  5                    TMPPTR;
;  1574     1694  5
;  1575     1695  5
;  1576     1696  5                ! Get the DST value spec for the symbol.  If the symbol
;  1577     1697  5                ! is not bound to FP (or SP), then the valspec will be 0.
;  1578     1698  5                !
;  1579     1699  5                VALSPEC = IS_SYMBOL_BOUND_TO_REG (.TMP_SYMID, FP);
;  1580     1700  5                TMPPTR = .FRAMEPTR;
;  1581     1701  5                IF .VALSPEC EQL 0
;  1582     1702  5                THEN
;  1583     1703  6                    BEGIN
;  1584     1704  6                    VALSPEC = IS_SYMBOL_BOUND_TO_REG (.TMP_SYMID, SP);
;  1585     1705  6
;  1586     1706  6
;  1587     1707  6                    ! In here we need to do a special check for JSB routine
;  1588     1708  6                    ! local variables. (usually it is defined as SP - offset
;  1589     1709  6                    ! in DST).  The address of those variables are usually
;  1590     1710  6                    ! relative to SP pointer at the execution time.  We do
;  1591     1711  6                    ! not have the correct information for SP.  So we do
;  1592     1712  6                    ! our best guess at this case.  Ignore it if we think
;  1593     1713  6                    ! we have found this case.
;  1594     1714  6                    !                                                      ;
;  1595     1715  6                    IF .VALSPEC NEQ 0
;  1596     1716  6                    THEN
;  1597     1717  7                        BEGIN
;  1598     1718  7                        IF .VALSPEC[DST$L_VS_VALUE] LSS 0
;  1599     1719  7                        THEN
;  1600     1720  7                            VALSPEC = 0
;  1601     1721  7                        ELSE
;  1602     1722  7                            TMPPTR = .SPVAL;
;  1603     1723  6                        END;
;  1604     1724  6
;  1605     1725  5                END;
;  1606     1726  5
;  1607     1727  5
;  1608     1728  5            IF .VALSPEC NEQ 0
;  1609     1729  5            THEN
;  1610     1730  6                BEGIN
;  1611     1731  6
;  1612     1732  6
;  1613     1733  6                ! See if the symbol is a displacement off of the FP,
;  1614     1734  6                ! or SP.
;  1615     1735  6                !
;  1616     1736  6                IF NOT .VALSPEC[DST$V_VS_INDIRECT] AND
;  1617     1737  6                   .VALSPEC[DST$V_VS_DISP]
;  1618     1738  6                THEN
;  1619     1739  7                    BEGIN
;  1620     1740  7                    IF .TMP_SYMID[RST$L_UPSCOPEPTR] EQL .RSTPTR
;  1621     1741  7                    THEN
;  1622     1742  8                        BEGIN
;  1623     1743  8
;  1624     1744  8
;  1625     1745  8                        ! If this is the first match, or a better
```

```
;  1626     1746  8                    ! match, set symid and offset.
;  1627     1747  8                    !
;  1628     1748  8                    TMP_BYTE_OFFSET = .ADDRESS -
;  1629     1749  8                            ( TMPPTR + .VALSPEC[DST$L_VS_VALUE]);
;  1630     1750  9                    IF ((.TMP_BYTE_OFFSET LSS .BYTE_OFFSET) AND
;  1631     1751  9                        (.TMP_BYTE_OFFSET GEQ 0))
;  1632     1752  9                    OR (.BYTE_OFFSET LSS 0)
;  1633     1753  8                    THEN
;  1634     1754  9                        BEGIN
;  1635     1755  9                        SYMID = .TMP_SYMID;
;  1636     1756  9                        BYTE_OFFSET = .TMP_BYTE_OFFSET;
;  1637     1757  8                        END;
;  1638     1758  7                    END;
;  1639     1759  6                END;
;  1640     1760  5            END;
;  1641     1761  5
;  1642     1762  5
;  1643     1763  5            ! If the offset is 0, have found a perfect match.
;  1644     1764  5            !
;  1645     1765  5            IF .BYTE_OFFSET EQL 0
;  1646     1766  5            THEN
;  1647     1767  5                EXITLOOP;
;  1648     1768  5
;  1649     1769  5
;  1650     1770  5            ! Loop for next symbol.
;  1651     1771  5            !
;  1652     1772  5            TMP_SYMID = .TMP_SYMID[RST$L_SYMCHNPTR];
;  1653     1773  4            END;
;  1654     1774  4
;  1655     1775  4        ! Before returning, we want to take care of the case
;  1656     1776  4        ! where the found SYMID was declared in a routine
;  1657     1777  4        ! with several invocations on the stack. We walk down
;  1658     1778  4        ! the stack again, counting the times we pass the routine.
;  1659     1779  4        ! This enables us to attach an invocation number to
;  1660     1780  4        ! the SYMID.
;  1661     1781  4        !
;  1662     1782  4        COUNT = 0;
;  1663     1783  4        IF .SYMID NEQ 0
;  1664     1784  4        THEN
;  1665     1785  5            BEGIN
;  1666     1786  5            STARTADDR = .RSTPTR[RST$L_STARTADDR];
;  1667     1787  5            ENDADDR = .RSTPTR[RST$L_ENDADDR];
;  1668     1788  5            PCVAL2 = .DBG$RUNFRAME[DBG$L_USER_PC];
;  1669     1789  5            FRAMEPTR2 = .DBG$RUNFRAME[DBG$L_USER_FP];
;  1670     1790  5            WHILE .FRAMEPTR2 LSS .FRAMEPTR DO
;  1671     1791  6                BEGIN
;  1672     1792  7                IF (.PCVAL2 GEQU .STARTADDR) AND (.PCVAL2 LEQU .ENDADDR)
;  1673     1793  6                THEN
;  1674     1794  7                    BEGIN
;  1675     1795  7
;  1676     1796  7
;  1677     1797  7                    ! The PC from this CALL frame is in the address range of the routine
;  1678     1798  7                    ! we are looking for.  However, to make sure the PC is not really in
;  1679     1799  7                    ! a nested routine within the desired routine, we search the Module
;  1680     1800  7                    ! SAT starting at the desired routine's SAT entry looking for nested
;  1681     1801  7                    ! routines which cover the CALL frame's PC value.  If we find such a
;  1682     1802  7                    ! routine, the CALL frame is not for the desired routine.
```

```
;  1683     1803  7                !
;  1684     1804  7                FRAME_FOUND_FLAG = TRUE;
;  1685     1805  7                SATPTR = .RSTPTR[RST$L_RTNSATPTR];
;  1686     1806  7
;  1687     1807  7                ! WARNING -- We can get into trouble here.  Previously, we have
;  1688     1808  7                ! assumed that the SAT is always around.  This may not be the
;  1689     1809  7                ! case if this module has been canceled.  There are times when
;  1690     1810  7                ! the module could be canceled and then set again to make us
;  1691     1811  7                ! believe the the SAT is valid for this RST, but it is not!  To
;  1692     1812  7                ! correct the problem, when a module is canceled the field
;  1693     1813  7                ! RST$L_RTNSATPTR is set to ZERO for each routine.
;  1694     1814  7                ! So if the module for this RST has been canceled, SATPTR will
;  1695     1815  7                ! be zero from the above statement. The problem is that this
;  1696     1816  7                ! assumes there are no nested routines that truly require the
;  1697     1817  7                ! correct context information.  This is, of course, WRONG.  A
;  1698     1818  7                ! way of saving and getting to the SAT information must be
;  1699     1819  7                ! found in the future.  B.A. Becker  MAY-1984
;  1700     1820  7                !
;  1701     1821  7                IF .SATPTR NEQ 0
;  1702     1822  7                THEN
;  1703     1823  7                    SATPTR = .SATPTR[SAT$L_FLINK];
;  1704     1824  7
;  1705     1825  7                WHILE TRUE DO
;  1706     1826  8                    BEGIN
;  1707     1827  8                    LOCAL
;  1708     1828  8                        NEW_RSTPTR: REF RST$ENTRY;
;  1709     1829  8
;  1710     1830  8
;  1711     1831  8                    ! If there are no more SAT entries in the chain or if they no
;  1712     1832  8                    ! longer cover the PCVAL address, exit the SAT loop.
;  1713     1833  8                    !
;  1714     1834  8                    IF .SATPTR EQL 0 THEN EXITLOOP;
;  1715     1835  8                    IF .SATPTR[SAT$L_START] GTRU .PCVAL2 THEN EXITLOOP;
;  1716     1836  8
;  1717     1837  8
;  1718     1838  8                    ! If this SAT entry is for a routine which covers the PCVAL
;  1719     1839  8                    ! address, we clear FRAME_FOUND_FLAG because the PC is in this
;  1720     1840  8                    ! nested routine instead of the routine we are looking for.
;  1721     1841  8                    !
;  1722     1842  8                    NEW_RSTPTR = .SATPTR[SAT$L_RSTPTR];
;  1723     1843  8                    IF (.PCVAL2 GEQU .SATPTR[SAT$L_START]) AND
;  1724     1844  8                       (.PCVAL2 LEQU .SATPTR[SAT$L_END])   AND
;  1725     1845  9                       (.NEW_RSTPTR[RST$B_KIND] EQL RST$K_ROUTINE)
;  1726     1846  8                    THEN
;  1727     1847  9                        BEGIN
;  1728     1848  9                        FRAME_FOUND_FLAG = FALSE;
;  1729     1849  9                        EXITLOOP;
;  1730     1850  8                        END;
;  1731     1851  8
;  1732     1852  8                    ! Link on to the next SAT entry.
;  1733     1853  8                    !
;  1734     1854  8                    SATPTR = .SATPTR[SAT$L_FLINK];
;  1735     1855  7                    END;
;  1736     1856  7
;  1737     1857  7                ! If the CALL frame we found really is for the desired routine,
;  1738     1858  7                ! then increment the invocation court.
;  1739     1859  7                !
```

```
;1740    1860  7                    IF .FRAME_FOUND_FLAG
;1741    1861  7                    THEN
;1742    1862  7                        COUNT = .COUNT + 1;
;1743    1863  6                    END;
;1744    1864  6
;1745    1865  6                ! Keep looping through the stack.
;1746    1866  6                !
;1747    1867  6                PCVAL2 = .FRAMEPTR2[SF$L_SAVE_PC];
;1748    1868  6                FRAMEPTR2 = .FRAMEPTR2[SF$L_SAVE_FP];
;1749    1869  5                END;
;1750    1870  4            END;
;1751    1871  4
;1752    1872  4        ! Now build a new SYMID which includes the invocation number.
;1753    1873  4        !
;1754    1874  4        IF .COUNT GTR 0
;1755    1875  4        THEN
;1756    1876  4            SYMID = DBG$BUILD_INVOC_RST(.SYMID, .COUNT);
;1757    1877  4
;1758    1878  4        ! If a symbol was not found, then just print the routine name.
;1759    1879  4        ! Otherwise, print the symbol pathname (and offset, if
;1760    1880  4        ! applicable).
;1761    1881  4        !
;1762    1882  4        IF .PRINT_FLAG
;1763    1883  4        THEN
;1764    1884  5            BEGIN
;1765    1885  5            DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;1766    1886  5            PRINT_BIT_OFFSET(BIT_OFFSET);
;1767    1887  5            DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;1768    1888  5            DBG$NEWLINE();
;1769    1889  5            DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;1770    1890  5            IF .SYMID EQL 0
;1771    1891  5            THEN
;1772    1892  6                BEGIN
;1773    1893  6                DBG$PRINT (UPLIT BYTE (%ASCIC 'data item on stack in routine '));
;1774    1894  6                DBG$PRINT_SYMBOL_PATHNAME(.RSTPTR);
;1775    1895  6                END
;1776    1896  6
;1777    1897  5            ELSE
;1778    1898  6                BEGIN
;1779    1899  6                DBG$PRINT_SYMBOL_PATHNAME(.SYMID);
;1780    1900  6                IF .BYTE_OFFSET NEQ 0
;1781    1901  6                THEN
;1782    1902  6                    DBG$PRINT_OFFSET (.BYTE_OFFSET);
;1783    1903  6                PRINT_BIT_OFFSET(BIT_OFFSET);
;1784    1904  5                END;
;1785    1905  5            DBG$NEWLINE();
;1786    1906  4            END;
;1787    1907  4
;1788    1908  4            IF .BYTE_OFFSET LSS 0 THEN SYMID = 0;
;1789    1909  4            IF .SYMID EQL 0 THEN BYTE_OFFSET = 0;
;1790    1910  4            BIT_OFFSET = .BYTE_OFFSET * 8 + .BIT_OFFSET;
;1791    1911  4            RETURN TRUE;
;1792    1912  3            END;
;1793    1913  3
;1794    1914  3
;1795    1915  3        ! It was not a local data item, so see if it is a call frame address.
;1796    1916  3        ! Determine what the value of SP will be when this call frame is torn
```

```
;1797    1917  3          ! down by the RET instruction.  The new SP value will be the bottom
;1798    1918  3          ! boundary of this call frame.
;1799    1919  3          !
;1800    1920  3          REGMASK = .FRAMEPTR[SF$W_SAVE_MASK];
;1801    1921  3          SPVAL = FRAMEPTR[SF$L_SAVE_REGS];
;1802    1922  3          INCR I FROM 0 TO 11 DO
;1803    1923  3              IF .REGMASK[.I] THEN SPVAL = .SPVAL + LONGWORD;
;1804    1924  3          SPVAL = .SPVAL + .FRAMEPTR[SF$V_STACKOFFS];
;1805    1925  3          IF .FRAMEPTR[SF$V_CALLS]
;1806    1926  3          THEN
;1807    1927  3              SPVAL = .SPVAL + 4*(.SPVAL[0] + 1);
;1808    1928  3
;1809    1929  3
;1810    1930  3          ! See if the address falls into the current call frame (which is bounded
;1811    1931  3          ! by the current frameptr and the sp value just calculated).
;1812    1932  3          !
;1813    1933  3          IF (.ADDRESS GEQA .FRAMEPTR) AND
;1814    1934  4             (.ADDRESS LSSA .SPVAL)
;1815    1935  3          THEN
;1816    1936  4              BEGIN
;1817    1937  4
;1818    1938  4
;1819    1939  4              ! Find the routine that contains the PC.
;1820    1940  4              !
;1821    1941  4              RSTPTR = FIND_ROUTINE (.PCVAL, .PRINT_FLAG);
;1822    1942  4              IF .RSTPTR EQL 0
;1823    1943  4              THEN
;1824    1944  5                  BEGIN
;1825    1945  5                  IF .PRINT_FLAG
;1826    1946  5                  THEN
;1827    1947  6                      BEGIN
;1828    1948  6                      DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;1829    1949  6                      PRINT_BIT_OFFSET(BIT_OFFSET);
;1830    1950  6                      DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;1831    1951  6                      DBG$NEWLINE();
;1832    1952  6                      DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;1833    1953  6                      DBG$PRINT (UPLIT BYTE (%ASCIC 'stack frame address in unknown module'));
;1834    1954  6                      DBG$NEWLINE();
;1835    1955  5                      END;
;1836    1956  5
;1837    1957  5                  RETURN TRUE;
;1838    1958  4                  END;
;1839    1959  4
;1840    1960  4          IF .RSTPTR[RST$B_KIND] EQL RST$K_MODULE
;1841    1961  4          THEN
;1842    1962  5              BEGIN
;1843    1963  5
;1844    1964  5
;1845    1965  5              ! We have located the PC in a module, but since the module
;1846    1966  5              ! is not set, can't get any more information other than
;1847    1967  5              ! module name.  Print that.
;1848    1968  5              !
;1849    1969  5              IF .PRINT_FLAG
;1850    1970  5              THEN
;1851    1971  6                  BEGIN
;1852    1972  6                  DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;1853    1973  6                  PRINT_BIT_OFFSET(BIT_OFFSET);
```

```
;  1854          1974  6                    DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  1855          1975  6                    DBG$NEWLINE();
;  1856          1976  6                    DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  1857          1977  6                    DBG$STA_SYMNAME (.RSTPTR, SYMBOL_NAME);
;  1858          1978  6                    DBG$PRINT (UPLIT BYTE (%ASCIC
;  1859          1979  6                        'stack frame address in module !AC'), .SYMBOL_NAME);
;  1860          1980  6                    IF .RSTPTR[RST$V_MODSET]
;  1861          1981  6                    THEN
;  1862          1982  6                        DBG$PRINT( UPLIT BYTE (%ASCIC ', module set'))
;  1863          1983  6                    ELSE
;  1864          1984  6                        DBG$PRINT( UPLIT BYTE (%ASCIC ', module not set'));
;  1865          1985  6
;  1866          1986  6                    DBG$NEWLINE();
;  1867          1987  5                    END;
;  1868          1988  5
;  1869          1989  5                RETURN TRUE;
;  1870          1990  5                END
;  1871          1991  5
;  1872          1992  4            ELSE
;  1873          1993  4
;  1874          1994  4                ! Module is set.  Print the routine name.
;  1875          1995  4                !
;  1876          1996  4                BEGIN
;  1877          1997  5                IF .PRINT_FLAG
;  1878          1998  5                THEN
;  1879          1999  5                    BEGIN
;  1880          2000  6                    DBG$PRINT ( UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;  1881          2001  6                    PRINT_BIT_OFFSET(BIT_OFFSET);
;  1882          2002  6                    DBG$PRINT ( UPLIT BYTE (%ASCIC ': '));
;  1883          2003  6                    DBG$NEWLINE();
;  1884          2004  6                    DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  1885          2005  6                    DBG$PRINT ( UPLIT BYTE (%ASCIC 'stack call frame'), 0);
;  1886          2006  6                    TMP_BYTE_OFFSET = .ADDRESS - .FRAMEPTR;
;  1887          2007  6                    IF .TMP_BYTE_OFFSET NEQ 0
;  1888          2008  6                    THEN
;  1889          2009  6                        DBG$PRINT_OFFSET(.TMP_BYTE_OFFSET);
;  1890          2010  6                    PRINT_BIT_OFFSET(BIT_OFFSET);
;  1891          2011  6                    DBG$PRINT (UPLIT BYTE (%ASCIC ' for routine '));
;  1892          2012  6                    DBG$PRINT_SYMBOL_PATHNAME(.RSTPTR);
;  1893          2013  6                    DBG$NEWLINE();
;  1894          2014  6                    END;
;  1895          2015  5
;  1896          2016  5                RETURN TRUE;
;  1897          2017  5                END;
;  1898          2018  4
;  1899          2019  4            END;
;  1900          2020  3
;  1901          2021  3
;  1902          2022  3            ! Not found yet.  Get information for next stack frame.
;  1903          2023  3            !
;  1904          2024  3            PCVAL = .FRAMEPTR[SF$L_SAVE_PC];
;  1905          2025  3            FRAMEPTR = .FRAMEPTR[SF$L_SAVE_FP];
;  1906          2026  3
;  1907          2027  3            END;
;  1908          2028  2
;  1909          2029  2
;  1910          2030  2
```

```
;  1911          2031  2     ! Address was not found in a call frame.
;  1912          2032  2     !
;  1913          2033  2     RETURN FALSE;
;  1914          2034  2
;  1915          2035  1     END;


                                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

                4C 58 21 20 73 73 65 72 64 64 61 0B 0012C P.ABH:  .ASCII  <11>\address !XL\                  ;
                                              3C 01 00138 P.ABI:  .ASCII  <1>\<\                          ;
                                           4C 55 21 03 0013A P.ABJ:  .ASCII  <3>\'UL\                     ;
                                  3E 30 20 2C 30 20 2C 07 0013E P.ABK:  .ASCII  <7>\, 0, 0>\               ;
                                              20 3A 02 00146 P.ABL:  .ASCII  <2>\: \                      ;
73 20 6E 6F 20 6D 65 74 69 20 61 74 61 64 24 00149 P.ABM:  .ASCII  \$data item on stack in unknown module\ ;
6E 77 6F 6E 6B 6E 75 20 6E 69 20 6B 63 61 74 00158                                                        ;
                                     65 6C 75 64 6F 6D 20 00167                                           ;
                4C 58 21 20 73 73 65 72 64 64 61 0B 0016E P.ABN:  .ASCII  <11>\address !XL\                 ;
                                              3C 01 0017A P.ABO:  .ASCII  <1>\<\                          ;
                                           4C 55 21 03 0017C P.ABP:  .ASCII  <3>\!UL\                     ;
                                  3E 30 20 2C 30 20 2C 07 00180 P.ABQ:  .ASCII  <7>\, 0, 0>\               ;
                                              20 3A 02 00188 P.ABR:  .ASCII  <2>\: \                      ;
73 20 6E 6F 20 6D 65 74 69 20 61 74 61 64 20 0018B P.ABS:  .ASCII  \ data item on stack in module !AC\     ;
20 65 6C 75 64 6F 6D 20 6E 69 20 6B 63 61 74 0019A                                                        ;
                                              43 41 21 001A9                                              ;
      74 65 73 20 65 6C 75 64 6F 6D 20 2C 0C 001AC P.ABT:  .ASCII  <12>\, module set\                     ;
73 20 74 6F 6E 20 65 6C 75 64 6F 6D 20 2C 10 001B9 P.ABU:  .ASCII  <16>\, module not set\                  ;
                                              74 65 001C8                                                 ;
                4C 58 21 20 73 73 65 72 64 64 61 0B 001CA P.ABV:  .ASCII  <11>\address !XL\                ;
                                              3C 01 001D6 P.ABW:  .ASCII  <1>\<\                          ;
                                           4C 55 21 03 001D8 P.ABX:  .ASCII  <3>\!UL\                     ;
                                  3E 30 20 2C 30 20 2C 07 001DC P.ABY:  .ASCII  <7>\, 0, 0>\               ;
                                              20 3A 02 001E4 P.ABZ:  .ASCII  <2>\: \                      ;
73 20 6E 6F 20 6D 65 74 69 20 61 74 61 64 1E 001E7 P.ACA:  .ASCII  <30>\data item on stack in routine \    ;
65 6E 69 74 75 6F 72 20 6E 69 20 6B 63 61 74 001F6                                                        ;
                                              20 00205                                                    ;
                                              3C 01 00206 P.ACB:  .ASCII  <1>\<\                          ;
                                           4C 55 21 03 00208 P.ACC:  .ASCII  <3>\!UL\                     ;
                                  3E 30 20 2C 30 20 2C 07 0020C P.ACD:  .ASCII  <7>\, 0, 0>\               ;
                4C 58 21 20 73 73 65 72 64 64 61 0B 00214 P.ACE:  .ASCII  <11>\address !XL\                ;
                                              3C 01 00220 P.ACF:  .ASCII  <1>\<\                          ;
                                           4C 55 21 03 00222 P.ACG:  .ASCII  <3>\!UL\                     ;
                                  3E 30 20 2C 30 20 2C 07 00226 P.ACH:  .ASCII  <7>\, 0, 0>\               ;
                                              20 3A 02 0022E P.ACI:  .ASCII  <2>\: \                      ;
64 61 20 65 6D 61 72 66 20 6B 63 61 74 73 25 00231 P.ACJ:  .ASCII  \%stack frame address in unknown module\;
77 6F 6E 6B 6E 75 20 6E 69 20 73 73 65 72 64 00240                                                        ;
                                     65 6C 75 64 6F 6D 20 6E 0024F                                        ;
                4C 58 21 20 73 73 65 72 64 64 61 0B 00257 P.ACK:  .ASCII  <11>\address !XL\                ;
                                              3C 01 00263 P.ACL:  .ASCII  <1>\<\                          ;
                                           4C 55 21 03 00265 P.ACM:  .ASCII  <3>\!UL\                     ;
                                  3E 30 20 2C 30 20 2C 07 00269 P.ACN:  .ASCII  <7>\, 0, 0>\               ;
                                              20 3A 02 00271 P.ACO:  .ASCII  <2>\: \                      ;
64 61 20 65 6D 61 72 66 20 6B 03 61 74 73 21 00274 P.ACP:  .ASCII  \!stack frame address in module !AC\    ;
65 6C 75 64 6F 6D 20 6E 69 20 73 73 65 72 64 00283                                                        ;
                                           43 41 21 20 00292                                              ;
      74 65 73 20 65 6C 75 64 6F 6D 20 2C 0C 00296 P.ACQ:  .ASCII  <12>\, module set\                     ;
```

```
73 20 74 6F 6E 20 65 6C 75 64 6F 6D 20 2C 10 002A3 P.ACR:  .ASCII  <16>\, module not set\                    ;
                                          74 65 002B2                                                      ;
         4C 58 21 20 73 73 65 72 64 64 61 0B 002B4 P.ACS:  .ASCII  <11>\address .XL\                       ;
                                          3C 01 002C0 P.ACT:  .ASCII  <1>\<\                               ;
                                    4C 55 21 03 002C2 P.ACU:  .ASCII  <3>\!UL\                             ;
                              3E 30 20 2C 30 20 2C 07 002C6 P.ACV:  .ASCII  <7>\, 0, 0>\                   ;
                                          20 3A 02 002CE P.ACW:  .ASCII  <2>\: \                           ;
61 72 66 20 6C 6C 61 63 20 6B 63 61 74 73 10 002D1 P.ACX:  .ASCII  <16>\stack call frame\                    ;
                                          65 6D 002E0                                                      ;
                                          3C 01 002E2 P.ACY:  .ASCII  <1>\<\                               ;
                                    4C 55 21 03 002E4 P.ACZ:  .ASCII  <3>\!UL\                             ;
                              3E 30 20 2C 30 20 2C 07 002E8 P.ADA:  .ASCII  <7>\, 0, 0>\                   ;
   20 65 6E 69 74 75 6F 72 20 72 6F 66 20 0D 002F0 P.ADB:  .ASCII  <13>\ for routine \                       ;


                                                          .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                       0FFC 00000         .ENTRY  DBG$SEARCH_VAX_CALL_STACK, Save R2,R3,R4,-  ; 1518
                                                                  R5,R6,R7,R8,R9,R10,R11                       ;
                                    5E        30  C2 00002        SUBL2   #48, SP                              ;
                               28   AE    08   AC  D0 00005        MOVL    P_SYMID, 40(SP)                      ; 1555
                                    59    0C   AC  D0 0000A        MOVL    P_BIT_OFFSET, R9                     ; 1556
                               20   AE 00000000G 00 7D 0000E        MOVQ    DBG$RUNFRAME+60, SPVAL               ; 1590
                                    54 00000000G 00 D0 00016        MOVL    DBG$RUNFRAME+56, FRAMEPTR            ; 1591
                                          28   BE  D4 0001D        CLRL    @40(SP)                              ; 1596
                               1C   AE         01  CE 00020        MNEGL   #1, BYTE_OFFSET                      ; 1597
                                    50    04   AC  D0 00024        MOVL    ADDR, R0                             ; 1598
                                    58         60  D0 00028        MOVL    (R0), ADDRESS                        ;
                                    69    04   A0  D0 0002B        MOVL    4(R0), (R9)                          ; 1599
                                          24   AE  D5 0002F 1$:     TSTL    PCVAL                                ; 1610
                                               0A  13 00032        BEQL    2$                                   ;
                                    50 00000000G 00  9E 00034        MOVAB   DBG$FINAL_HANDL, R0                  ; 1611
                                    50         64  D1 0003B        CMPL    (FRAMEPTR), R0                       ;
                                               03  12 0003E 2$:     BNEQ    3$                                   ;
                                          055F 31  00040        BRW     59$                                  ;
                               20   AE         54  D1 00043 3$:     CMPL    FRAMEPTR, SPVAL                      ; 1618
                                               03  1A 00047        BGTRU   5$                                   ;
                                          031F 31  00049 4$:     BRW     38$                                  ;
                               20   AE         58  D1 0004C 5$:     CMPL    ADDRESS, SPVAL                       ; 1624
                                               F7  1F 00050        BLSSU   4$                                   ;
                                    54         58  D1 00052        CMPL    ADDRESS, FRAMEPTR                    ; 1625
                                               F2  1E 00055        BGEQU   4$                                   ;
                                         10    AC  DD 00057        PUSHL   PRINT_FLAG                           ; 1628
                                         28    AE  DD 0005A        PUSHL   PCVAL                                ;
                          0000V        CF         02  FB 0005D        CALLS   #2, FIND_ROUTINE                     ;
                                    52         50  D0 00062        MOVL    R0, RSTPTR                           ;
                                               68  12 00065        BNEQ    7$                                   ; 1629
                                    6D    10   AC  E9 00067        BLBC    PRINT_FLAG, 8$                       ; 1632
                                               58  DD 0006B        PUSHL   ADDRESS                              ; 1635
                                    00000000'  EF  9F 0006D        PUSHAB  P.ABH                                ;
                     00000000G      00         02  FB 00073        CALLS   #2, DBG$PRINT                        ;
                                               69  D5 0007A        TSTL    (R9)                                 ; 1636
                                               29  13 0007C        BEQL    6$                                   ;
                                    00000000'  EF  9F 0007E        PUSHAB  P.ABI                                ;
                     00000000G      00         01  FB 00084        CALLS   #1, DBG$PRINT                        ;
                                               69  DD 0008B        PUSHL   (R9)                                 ;
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                00000000'  EF  9F 0008D          PUSHAB  P.ABJ                                    ;
00000000G  00              02  FB 00093          CALLS   #2, DBG$PRINT                           ;
                00000000'  EF  9F 0009A          PUSHAB  P.ABK                                   ;
00000000G  00              01  FB 000A0          CALLS   #1, DBG$PRINT                           ;
                00000000'  EF  9F 000A7 6$:      PUSHAB  P.ABL                                   ; 1637
00000000G  00              01  FB 000AD          CALLS   #1, DBG$PRINT                           ;
00000000G  00              00  FB 000B4          CALLS   #0, DBG$NEWLINE                         ; 1638
                           04  DD 000BB          PUSHL   #4                                      ; 1639
                           01  DD 000BD          PUSHL   #1                                      ;
00000000G  00              02  FB 000BF          CALLS   #2, DBG$PRINT_CONTROL                   ;
                00000000'  EF  9F 000C6          PUSHAB  P.ABM                                   ; 1640
                      0099 31  000CC          BRW     12$                                     ;
             01       14   A2  91 000CF 7$:      CMPB    20(RSTPTR), #1                          ; 1647
                           03  13 000D3          BEQL    8$                                      ;
                      009A 31  000D5          BRW     13$                                     ;
             03       10   AC  E8 000D8 8$:      BLBS    PRINT_FLAG, 9$                          ; 1656
                      04B3 31  000DC          BRW     57$                                     ;
                           58  DD 000DF 9$:      PUSHL   ADDRESS                                 ; 1659
                00000000'  EF  9F 000E1          PUSHAB  P.ABN                                   ;
00000000G  00              02  FB 000E7          CALLS   #2, DBG$PRINT                           ;
                           69  D5 000EE          TSTL    (R9)                                    ; 1660
                           29  13 000F0          BEQL    10$                                     ;
                00000000'  EF  9F 000F2          PUSHAB  P.ABO                                   ;
00000000G  00              01  FB 000F8          CALLS   #1, DBG$PRINT                           ;
                           69  DD 000FF          PUSHL   (R9)                                    ;
                00000000'  EF  9F 00101          PUSHAB  P.ABP                                   ;
00000000G  00              02  FB 00107          CALLS   #2, DBG$PRINT                           ;
                00000000'  EF  9F 0010E          PUSHAB  P.ABQ                                   ;
00000000G  00              01  FB 00114          CALLS   #1, DBG$PRINT                           ;
                00000000'  EF  9F 0011B 10$:     PUSHAB  P.ABR                                   ; 1661
00000000G  00              01  FB 00121          CALLS   #1, DBG$PRINT                           ;
00000000G  00              00  FB 00128          CALLS   #0, DBG$NEWLINE                         ; 1662
                           04  DD 0012F          PUSHL   #4                                      ; 1663
                           01  DD 00131          PUSHL   #1                                      ;
00000000G  00              02  FB 00133          CALLS   #2, DBG$PRINT_CONTROL                   ;
                      2C   AE  9F 0013A          PUSHAB  SYMBOL_NAME                             ; 1664
                           52  DD 0013D          PUSHL   RSTPTR                                  ;
00000000G  00              02  FB 0013F          CALLS   #2, DBG$STA_SYMNAME                     ;
                      2C   AE  DD 00146          PUSHL   SYMBOL_NAME                             ; 1665
                00000000'  EF  9F 00149          PUSHAB  P.ABS                                   ;
00000000G  00              02  FB 0014F          CALLS   #2, DBG$PRINT                           ;
             08       28   A2  E9 00156          BLBC    40(RSTPTR), 11$                         ; 1666
                00000000'  EF  9F 0015A          PUSHAB  P.ABT                                   ; 1668
                           06  11 00160          BRB     12$                                     ;
                00000000'  EF  9F 00162 11$:     PUSHAB  P.ABU                                   ; 1670
00000000G  00              01  FB 00168 12$:     CALLS   #1, DBG$PRINT                           ;
                      0419 31  0016F          BRW     56$                                     ; 1672
             55           52  D0 00172 13$:     MOVL    RSTPTR, MODRSTPTR                       ; 1681
             01       14   A5  91 00175 14$:     CMPB    20(MODRSTPTR), #1                       ; 1682
                           06  13 00179          BEQL    15$                                     ;
             55       10   A5  D0 0017B          MOVL    16(MODRSTPTR), MODRSTPTR                ; 1683
                           F4  11 0017F          BRB     14$                                     ;
             56       08   A5  D0 00181 15$:     MOVL    8(MODRSTPTR), TMP_SYMID                 ; 1684
                           6F  13 00185 16$:     BEQL    22$                                     ; 1690
                           0D  DD 00187          PUSHL   #13                                     ; 1699
                           56  DD 00189          PUSHL   TMP_SYMID                               ;
      0000V  CF            02  FB 0018B          CALLS   #2, IS_SYMBOL_BOUND_TO_REG              ;
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                        57      50  D0 00190          MOVL    R0, VALSPEC                                     ;
                        5B      54  D0 00193          MOVL    FRAMEPTR, TMPPTR                        1700    ;
                                57  D5 00196          TSTL    VALSPEC                                 1701    ;
                                1B  12 00198          BNEQ    18$                                             ;
                                0E  DD 0019A          PUSHL   #14                                     1704    ;
                                56  DD 0019C          PUSHL   TMP_SYMID                                       ;
                    0000V       CF  02 FB 0019E       CALLS   #2, IS_SYMBOL_BOUND_TO_REG                      ;
                                57  50 D0 001A3       MOVL    R0, VALSPEC                                     ;
                                    0D 13 001A6       BEQL    18$                                     1715    ;
                            01      A7  D5 001A8      TSTL    1(VALSPEC)                              1718    ;
                                    04  18 001AB      BGEQ    17$                                             ;
                                    57  D4 001AD      CLRL    VALSPEC                                 1720    ;
                                    04  11 001AF      BRB     18$                                             ;
                        5B      20  AE  D0 001B1  17$: MOVL    SPVAL, TMPPTR                           1722    ;
                                    57  D5 001B5  18$: TSTL    VALSPEC                                 1728    ;
                                    32  13 001B7      BEQL    21$                                             ;
                    2E                  02  E0 001B9 BBS     #2, (VALSPEC), 21$                      1736    ;
                    2A                  03  E1 001BD BBC     #3, (VALSPEC), 21$                      1737    ;
                        52          10  A6  D1 001C1      CMPL    16(TMP_SYMID), RSTPTR                   1740    ;
                                    24  12 001C5      BNEQ    21$                                             ;
                    50              5B  01  A7  C1 001C7 ADDL3   1(VALSPEC), TMPPTR, R0                  1749    ;
                18  AE              58  50  C3 001CC SUBL3   R0, ADDRESS, TMP_BYTE_OFFSET                       ;
                    1C  AE          18  AE  D1 001D1      CMPL    TMP_BYTE_OFFSET, BYTE_OFFSET            1750    ;
                                    05  18 001D6      BGEQ    19$                                             ;
                                    18  AE  D5 001D8      TSTL    TMP_BYTE_OFFSET                         1751    ;
                                    05  18 001DB      BGEQ    20$                                             ;
                                    1C  AE  D5 001DD  19$: TSTL    BYTE_OFFSET                             1752    ;
                                    09  18 001E0      BGEQ    21$                                             ;
                    28  BE              56  D0 001E2  20$: MOVL    TMP_SYMID, @40(SP)                      1755    ;
                    1C  AE          18  AE  D0 001E6      MOVL    TMP_BYTE_OFFSET, BYTE_OFFSET            1756    ;
                                    1C  AE  D5 001EB  21$: TSTL    BYTE_OFFSET                             1765    ;
                                    06  13 001EE      BEQL    22$                                             ;
                        56          08  A6  D0 001F0      MOVL    8(TMP_SYMID), TMP_SYMID                 1772    ;
                                    8F  11 001F4      BRB     16$                                     1690    ;
                                10  AE  D4 001F6  22$: CLRL    COUNT                                   1782    ;
                                28  BE  D5 001F9      TSTL    @40(SP)                                 1783    ;
                                    6D  13 001FC      BEQL    27$                                             ;
            04  AE          18  A2  D0 001FE      MOVL    24(RSTPTR), STARTADDR                   1786    ;
                6E          1C  A2  D0 00203      MOVL    28(RSTPTR), ENDADDR                     1787    ;
            14  AE  00000000G 00  D0 00207      MOVL    DBG$RUNFRAME+64, PCVAL2                 1788    ;
                5A  00000000G 00  D0 0020F      MOVL    DBG$RUNFRAME+56, FRAMEPTR2              1789    ;
                54              5A  D1 00216  23$: CMPL    FRAMEPTR2, FRAMEPTR                     1790    ;
                                50  18 00219      BGEQ    27$                                             ;
            04  AE          14  AE  D1 0021B      CMPL    PCVAL2, STARTADDR                       1792    ;
                                3E  1F 00220      BLSSU   26$                                             ;
                6E          14  AE  D1 00222      CMPL    PCVAL2, ENDADDR                                 ;
                                38  1A 00226      BGTRU   26$                                             ;
            0C  AE              01  D0 00228      MOVL    #1, FRAME_FOUND_FLAG                    1804    ;
                53          20  A2  D0 0022C      MOVL    32(RSTPTR), SATPTR                      1805    ;
                                27  13 00230      BEQL    25$                                     1821    ;
                53              63  D0 00232  24$: MOVL    (SATPTR), SATPTR                        1823    ;
                                22  13 00235      BEQL    25$                                     1834    ;
            14  AE          04  A3  D1 00237      CMPL    4(SATPTR), PCVAL2                       1835    ;
                                1B  1A 0023C      BGTRU   25$                                             ;
                50          0C  A3  D0 0023E      MOVL    12(SATPTR), NEW_RSTPTR                  1842    ;
            04  A3          14  AE  D1 00242      CMPL    PCVAL2, 4(SATPTR)                       1843    ;
                                E9  1F 00247      BLSSU   24$                                             ;
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                08   A3        14   AE  D1 00249          CMPL    PCVAL2, 8(SATPTR)                       ; 1844
                                    E2  1A 0024E          BGTRU   24$
                     02        14   A0  91 00250          CMPB    20(NEW_RSTPTR), #2                      ; 1845
                                    DC  12 00254          BNEQ    24$
                               0C   AE  D4 00256          CLRL    FRAME_FOUND_FLAG                        ; 1848
                     03        0C   AE  E9 00259 25$:     BLBC    FRAME_FOUND_FLAG, 26$                   ; 1860
                               10   AE  D6 0025D          INCL    COUNT                                   ; 1862
                14   AE        10   AA  D0 00260 26$:     MOVL    16(FRAMEPTR2), PCVAL2                   ; 1867
                     5A        0C   AA  D0 00265          MOVL    12(FRAMEPTR2), FRAMEPTR2                ; 1868
                                    AB  11 00269          BRB     23$                                     ; 1790
                               10   AE  D5 0026B 27$:     TSTL    COUNT                                   ; 1874
                                    11  15 0026E          BLEQ    28$
                               10   AE  DD 00270          PUSHL   COUNT                                   ; 1876
                               2C   BE  DD 00273          PUSHL   @44(SP)
00000000G       00                   02  FB 00276          CALLS   #2, DBG$BUILD_INVOC_RST
                28   BE              50  D0 0027D          MOVL    R0, @40(SP)
                     03        10   AC  E8 00281 28$:     BLBS    PRINT_FLAG, 29$                         ; 1882
                                 00C8  31 00285          BRW     34$
                                    58  DD 00288 29$:     PUSHL   ADDRESS                                 ; 1885
                          00000000'     EF  9F 0028A          PUSHAB  P.ABV
00000000G       00                   02  FB 00290          CALLS   #2, DBG$PRINT
                                    5B  D4 00297          CLRL    R11                                     ; 1886
                                    69  D5 00299          TSTL    (R9)
                                    2B  13 0029B          BEQL    30$
                                    5B  D6 0029D          INCL    R11
                          00000000'     EF  9F 0029F          PUSHAB  P.ABW
00000000G       00                   01  FB 002A5          CALLS   #1, DBG$PRINT
                                    69  DD 002AC          PUSHL   (R9)
                          00000000'     EF  9F 002AE          PUSHAB  P.ABX
00000000G       00                   02  FB 002B4          CALLS   #2, DBG$PRINT
                          00000000'     EF  9F 002BB          PUSHAB  P.ABY
00000000G       00                   01  FB 002C1          CALLS   #1, DBG$PRINT
                          00000000'     EF  9F 002C8 30$:     PUSHAB  P.ABZ                               ; 1887
00000000G       00                   01  FB 002CE          CALLS   #1, DBG$PRINT
00000000G       00                   00  FB 002D5          CALLS   #0, DBG$NEWLINE                     ; 1888
                                    04  DD 002DC          PUSHL   #4                                      ; 1889
                                    01  DD 002DE          PUSHL   #1
00000000G       00                   02  FB 002E0          CALLS   #2, DBG$PRINT_CONTROL
                     28   BE        D5  00 002E7          TSTL    @40(SP)                                 ; 1890
                                    18  12 002EA          BNEQ    31$
                          00000000'     EF  9F 002EC          PUSHAB  P.ACA                               ; 1893
00000000G       00                   01  FB 002F2          CALLS   #1, DBG$PRINT
                                    52  DD 002F9          PUSHL   RSTPTR                                  ; 1894
00000000G       00                   01  FB 002FB          CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME
                                    45  11 00302          BRB     33$                                     ; 1890
                     28   BE        DD  00 00304 31$:     PUSHL   @40(SP)                                 ; 1899
00000000G       00                   01  FB 00307          CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME
                     1C   AE        D5  00 0030E          TSTL    BYTE_OFFSET                             ; 1900
                                    0A  13 00311          BEQL    32$
                     1C   AE        DD  00 00313          PUSHL   BYTE_OFFSET                             ; 1902
00000000G       00                   01  FB 00316          CALLS   #1, DBG$PRINT_OFFSET
                29                  5B  E9 0031D 32$:     BLBC    R11, 33$                                ; 1903
                          00000000'     EF  9F 00320          PUSHAB  P.ACB
00000000G       00                   01  FB 00326          CALLS   #1, DBG$PRINT
                                    69  DD 0032D          PUSHL   (R9)
                          00000000'     EF  9F 0032F          PUSHAB  P.ACC
00000000G       00                   02  FB 00335          CALLS   #2, DBG$PRINT
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                                00000000'  EF  9F 0033C          PUSHAB  P.ACD
                    00000000G   00         01  FB 00342          CALLS   #1, DBG$PRINT
                    00000000G   00         00  FB 00349 33$:     CALLS   #0, DBG$NEWLINE                 ;1905
                                      1C   AE  D5 00350 34$:     TSTL    BYTE_OFFSET                     ;1908
                                           03  18 00353          BGEQ    35$
                                      28   BE  D4 00355          CLRL    @40(SP)
                                      28   BE  D5 00358 35$:     TSTL    @40(SP)                         ;1909
                                           03  12 0035B          BNEQ    36$
                                      1C   AE  D4 0035D          CLRL    BYTE_OFFSET
                                50    1C   AE  D0 00360 36$:     MOVL    BYTE_OFFSET, R0                 ;1910
                                79        9940  7E 00364          MOVAQ   @(R9)+[R0], -(R9)
                                          0227  31 00368 37$:     BRW     57$                             ;1911
                             08   AE       06  A4  B0 0036B 38$: MOVW    6(FRAMEPTR), REGMASK            ;1920
                             20   AE       14  A4  9E 00370      MOVAB   20(R4), SPVAL                   ;1921
                                           50  D4  00375         CLRL    I                               ;1922
                        04   08   AE            50  E1 00377 39$: BBC     I, REGMASK, 40$                 ;1923
                             20   AE            04  C0 0037C      ADDL2   #4, SPVAL
                        F3                    0B  F3 00380 40$:  AOBLEQ  #11, I, 39$
                   50   07   A4               02  06 EF 00384    EXTZV   #6, #2, 7(FRAMEPTR), R0         ;1924
                             20   AE            50  C0 0038A      ADDL2   R0, SPVAL
                        0E   07   A4            05  E1 0038E      BBC     #5, 7(FRAMEPTR), 41$            ;1925
                                           50  20  BE  D0 00393    MOVL    @SPVAL, R0                      ;1927
                        51   20   AE            04  C1 00397      ADDL3   #4, SPVAL, R1
                             20   AE        6140  DE 0039C        MOVAL   (R1)[R0], SPVAL
                                  54           58  D1 003A1 41$:  CMPL    ADDRESS, FRAMEPTR               ;1933
                                               03  1E 003A4      BGEQU   43$
                                            01ED  31 003A6 42$:   BRW     58$
                             20   AE           58  D1 003A9 43$:  CMPL    ADDRESS, SPVAL                  ;1934
                                               F7  1E 003AD      BGEQU   42$
                                      10   AC  DD 003AF          PUSHL   PRINT_FLAG                      ;1941
                                      28   AE  DD 003B2          PUSHL   PCVAL
                         0000V      CF        02  FB 003B5      CALLS   #2, FIND_ROUTINE
                                   52           50  D0 003BA      MOVL    R0, RSTPTR
                                                68  12 003BD      BNEQ    45$                             ;1942
                                   A5      10   AC  E9 003BF      BLBC    PRINT_FLAG, 37$                 ;1945
                                               58  DD 003C3      PUSHL   ADDRESS                         ;1948
                                00000000'      EF  9F 003C5      PUSHAB  P.ACE
                    00000000G   00             02  FB 003CB      CALLS   #2, DBG$PRINT
                                               69  D5 003D2      TSTL    (R9)                            ;1949
                                               29  13 003D4      BEQL    44$
                                00000000'      EF  9F 003D6      PUSHAB  P.ACF
                    00000000G   00             01  FB 003DC      CALLS   #1, DBG$PRINT
                                               69  DD 003E3      PUSHL   (R9)
                                00000000'      EF  9F 003E5      PUSHAB  P.ACG
                    00000000G   00             02  FB 003EB      CALLS   #2, DBG$PRINT
                                00000000'      EF  9F 003F2      PUSHAB  P.ACH
                    00000000G   00             01  FB 003F8      CALLS   #1, DBG$PRINT
                                00000000'      EF  9F 003FF 44$: PUSHAB  P.ACI                           ;1950
                    00000000G   00             01  FB 00405      CALLS   #1, DBG$PRINT
                    00000000G   00             00  FB 0040C      CALLS   #0, DBG$NEWLINE                 ;1951
                                               04  DD 00413      PUSHL   #4                              ;1952
                                               01  DD 00415      PUSHL   #1
                    00000000G   00             02  FB 00417      CALLS   #2, DBG$PRINT_CONTROL
                                00000000'      EF  9F 0041E      PUSHAB  P.ACJ                           ;1953
                                          FD41  31  00424        BRW     12$
                                      01   14   A2  91 00427 45$: CMPB    20(RSTPTR), #1                  ;1960
                                               03  13 0042B      BEQL    46$
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                 0093  31 00042D          BRW     51$
          03       10  AC  E8 00430 46$:   BLBS    PRINT_FLAG, 47$                 ;1969
                 015B  31 00434           BRW     57$
                   58  DD 00437 47$:      PUSHL   ADDRESS                         ;1972
              00000000' EF  9F 00439       PUSHAB  P.ACK
00000000G   00         02  FB 0043F       CALLS   #2, DBG$PRINT
                   69  D5 00446          TSTL    (R9)                            ;1973
                   29  13 00448          BEQL    48$
              00000000' EF  9F 0044A       PUSHAB  P.ACL
00000000G   00         01  FB 00450       CALLS   #1, DBG$PRINT
                   69  DD 00457          PUSHL   (R9)
              00000000' EF  9F 00459       PUSHAB  P.ACM
00000000G   00         02  FB 0045F       CALLS   #2, DBG$PRINT
              00000000' EF  9F 00466       PUSHAB  P.ACN
00000000G   00         01  FB 0046C       CALLS   #1, DBG$PRINT
              00000000' EF  9F 00473 48$:  PUSHAB  P.ACO                           ;1974
00000000G   00         01  FB 00479       CALLS   #1, DBG$PRINT
00000000G   00         00  FB 00480       CALLS   #0, DBG$NEWLINE                 ;1975
                   04  DD 00487          PUSHL   #4                              ;1976
                   01  DD 00489          PUSHL   #1
00000000G   00         02  FB 0048B       CALLS   #2, DBG$PRINT_CONTROL
                 2C    AE  9F 00492       PUSHAB  SYMBOL_NAME                     ;1977
                   52  DD 00495          PUSHL   RSTPTR
00000000G   00         02  FB 00497       CALLS   #2, DBG$STA_SYMNAME
                 2C    AE  DD 0049E       PUSHL   SYMBOL_NAME                     ;1979
              00000000' EF  9F 004A1       PUSHAB  P.ACP                           ;1978
00000000G   00         02  FB 004A7       CALLS   #2, DBG$PRINT
          08     28    A2  E9 004AE       BLBC    40(RSTPTR), 49$                 ;1980
              00000000' EF  9F 004B2       PUSHAB  P.ACQ                           ;1982
                   06  11 004B8          BRB     50$
              00000000' EF  9F 004BA 49$:  PUSHAB  P.ACR                           ;1984
                 FCA5  31 004C0 50$:       BRW     12$
          03       10  AC  E8 004C3 51$:   BLBS    PRINT_FLAG, 52$                 ;1998
                 00C8  31 004C7           BRW     57$
                   58  DD 004CA 52$:      PUSHL   ADDRESS                         ;2001
              00000000' EF  9F 004CC       PUSHAB  P.ACS
00000000G   00         02  FB 004D2       CALLS   #2, DBG$PRINT
                   5B  D4 004D9          CLRL    R11                             ;2002
                   69  D5 004DB          TSTL    (R9)
                   2B  13 004DD          BEQL    53$
                   5B  D6 004DF          INCL    R11
              00000000' EF  9F 004E1       PUSHAB  P.ACT
00000000G   00         01  FB 004E7       CALLS   #1, DBG$PRINT
                   69  DD 004EE          PUSHL   (R9)
              00000000' EF  9F 004F0       PUSHAB  P.ACU
00000000G   00         02  FB 004F6       CALLS   #2, DBG$PRINT
              00000000' EF  9F 004FD       PUSHAB  P.ACV
00000000G   00         01  FB 00503       CALLS   #1, DBG$PRINT
              00000000' EF  9F 0050A 53$:  PUSHAB  P.ACW                           ;2003
00000000G   00         01  FB 00510       CALLS   #1, DBG$PRINT
00000000G   00         00  FB 00517       CALLS   #0, DBG$NEWLINE                 ;2004
                   04  DD 0051E          PUSHL   #4                              ;2005
                   01  DD 00520          PUSHL   #1
00000000G   00         02  FB 00522       CALLS   #2, DBG$PRINT_CONTROL
                   7E  D4 00529          CLRL    -(SP)                           ;2006
              00000000' EF  9F 0052B       PUSHAB  P.ACX
00000000G   00         02  FB 00531       CALLS   #2, DBG$PRINT
```

```
                18   AE             58              54  C3 00538          SUBL3   FRAMEPTR, ADDRESS, TMP_BYTE_OFFSET      ; 2007
                                                     0A  13 0053D          BEQL    54$                                     ; 2008
                                               18    AE  DD 0053F          PUSHL   TMP_BYTE_OFFSET                         ; 2010
                                    00000000G  00        01  FB 00542          CALLS   #1, DBG$PRINT_OFFSET
                                               29        5B  E9 00549 54$:      BLBC    R11, 55$                        ; 2011
                                                    00000000'  EF  9F 0054C          PUSHAB  P.ACY
                                    00000000G  00        01  FB 00552          CALLS   #1, DBG$PRINT
                                                         69  DD 00559          PUSHL   (R9)
                                                    00000000'  EF  9F 0055B          PUSHAB  P.ACZ
                                    00000000G  00        02  FB 00561          CALLS   #2, DBG$PRINT
                                                    00000000'  EF  9F 00568          PUSHAB  P.ADA
                                    00000000G  00        01  FB 0056E          CALLS   #1, DBG$PRINT
                                                    00000000'  EF  9F 00575 55$:      PUSHAB  P.ADB                       ; 2012
                                    00000000G  00        01  FB 0057B          CALLS   #1, DBG$PRINT
                                                         52  DD 00582          PUSHL   R5PTR                           ; 2013
                                    00000000G  00        01  FB 00584          CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME
                                    00000000G  00        00  FB 0058B 56$:      CALLS   #0, DBG$NEWLINE                 ; 2014
                                               50        01  D0 00592 57$:      MOVL    #1, R0                          ; 2017
                                                             04  00595          RET                                     ; 1997
                      24   AE         10    A4  D0 00596 58$:      MOVL    16(FRAMEPTR), PCVAL                     ; 2025
                                               54        0C  A4  D0 0059B          MOVL    12(FRAMEPTR), FRAMEPTR          ; 2026
                                                        FA8D  31 0059F          BRW     1$                              ; 1604
                                                             50  D4 005A2 59$:      CLRL    R0                              ; 2033
                                                             04  005A4          RET                                     ; 2035

; Routine Size:  1445 bytes,    Routine Base:  DBG$CODE + 0753
```

```
;  1917          2036  1 GLOBAL ROUTINE DBG$SYMBOLIZE_REG(ADDR, P_SYMID, P_BIT_OFFSET, PRINT_FLAG): =
;  1918          2037  1 !
;  1919          2038  1 ! FUNCTION
;  1920          2039  1 !       This routine searches through all set modules in the module chain,
;  1921          2040  1 !       looking for those symbols in the DST that are bound to the register
;  1922          2041  1 !       REGNUM.  Once found, they are printed.  If none are found, a message
;  1923          2042  1 !       to that effect is output.
;  1924          2043  1 !
;  1925          2044  1 ! INPUTS
;  1926          2045  1 !       ADDR            - Address descriptor.
;  1927          2046  1 !
;  1928          2047  1 !       P_SYMID         - The address of a longword to receive the best
;  1929          2048  1 !                         possible symbolization of the register address.
;  1930          2049  1 !
;  1931          2050  1 !       P_BIT_OFFSET    - The bit offset off of SYMID.
;  1932          2051  1 !
;  1933          2052  1 !
;  1934          2053  1 ! OUTPUTS                                                                  ;
;  1935          2054  1 !       On success, prints those symbols (full pathname) that are bound to
;  1936          2055  1 !           the register.  Also returns the best (first) symbolization.
;  1937          2056  1 !
;  1938          2057  1 !       On not finding any symbols bound to the register, a message to that
;  1939          2058  1 !           effect is output.
;  1940          2059  1 !
;  1941          2060  1
;  1942          2061  2     BEGIN
;  1943          2062  2
;  1944          2063  2     MAP
;  1945          2064  2         ADDR            : REF DBG$ADDRESS_DESC;
;  1946          2065  2
;  1947          2066  2     BIND
;  1948          2067  2         SYMID           = .P_SYMID:  REF RST$ENTRY,     ! Best symbolization.
;  1949          2068  2         BIT_OFFSET      = .P_BIT_OFFSET;                ! Bit offset.
;  1950          2069  2
;  1951          2070  2     LOCAL
;  1952          2071  2         ADDRESS,                                        ! Byte address
;  1953          2072  2         BYTE_OFFSET,                                    ! Byte offset
;  1954          2073  2         REGNUM,                                         ! Register number.
;  1955          2074  2         SYMBOL_FOUND,                                   ! One or more symbols found.
;  1956          2075  2         REGNAME         : REF VECTOR[, BYTE],           ! ASCII register name.
;  1957          2076  2         MODRSTPTR       : REF RST$ENTRY,                ! Ptr to current module
;  1958          2077  2                                                         ! RST entry.
;  1959          2078  2         RSTPTR          : REF RST$ENTRY,                ! Unique symbol ID.
;  1960          2079  2         VALSPEC         : REF DST$VAL_SPEC,             ! Ptr to DST record's
;  1961          2080  2                                                         ! value spec.
;  1962          2081  2         BLITRLR         : REF DST$BLI_TRAILER1,         ! Ptr to Bliss DST record
;  1963          2082  2                                                         ! trailer.
;  1964          2083  2         BLIVALSPEC      : BLOCK[8, BYTE]                ! Value spec buffer for
;  1965          2084  2                           FIELD (DST$VS_HDR_FIELDS);    ! Bliss special cases DST.
;  1966          2085  2
;  1967          2086  2
;  1968          2087  2
;  1969          2088  2     ADDRESS = .ADDR[DBG$L_ADDRESS_BYTE_ADDR];
;  1970          2089  2     BIT_OFFSET = .ADDR[DBG$L_ADDRESS_BIT_OFFSET];
;  1971          2090  2
;  1972          2091  2
;  1973          2092  2     ! See if the address is a register address.
```

```
;  1974          2093  2      !
;  1975          2094  2      IF (.ADDRESS LSSA DBG$REG_VALUES[0]) OR
;  1976          2095  3         (.ADDRESS GEQA DBG$REG_VALUES[17])
;  1977          2096  2      THEN
;  1978          2097  2          RETURN FALSE;
;  1979          2098  2
;  1980          2099  2
;  1981          2100  2      ! Set up to look through all set modules for symbols bound to REGNUM.
;  1982          2101  2      !
;  1983          2102  2      IF (MODRSTPTR = .RST$START_ADDR) EQL 0
;  1984          2103  2      THEN
;  1985          2104  2          SIGNAL (DBG$_NOLOCALS);
;  1986          2105  2
;  1987          2106  2
;  1988          2107  2      ! Calculate register number and offset from register address.
;  1989          2108  2      !
;  1990          2109  2      REGNUM = (.ADDRESS - DBG$REG_VALUES[0]) / 4;
;  1991          2110  2      BYTE_OFFSET = .ADDRESS - DBG$REG_VALUES[.REGNUM];
;  1992          2111  2
;  1993          2112  2
;  1994          2113  2      ! Initialize.
;  1995          2114  2      !
;  1996          2115  2      SYMID = 0;
;  1997          2116  2      SYMBOL_FOUND = FALSE;
;  1998          2117  2
;  1999          2118  2
;  2000          2119  2      ! Print register name.
;  2001          2120  2      !
;  2002          2121  2      IF .PRINT_FLAG
;  2003          2122  2      THEN
;  2004          2123  3          BEGIN
;  2005          2124  3          DBG$PRINT (UPLIT BYTE (%ASCIC 'address '), 0);
;  2006          2125  3          PRINT_REGNAME (.ADDRESS);
;  2007          2126  3          PRINT_BIT_OFFSET(BIT_OFFSET);
;  2008          2127  3          DBG$PRINT (UPLIT BYTE (%ASCIC ':  '), 0);
;  2009          2128  3          DBG$NEWLINE();
;  2010          2129  3          DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  2011          2130  2          END;
;  2012          2131  2
;  2013          2132  2
;  2014          2133  2      ! Loop through all set modules.
;  2015          2134  2      !
;  2016          2135  2      WHILE .MODRSTPTR NEQ 0 DO
;  2017          2136  3          BEGIN
;  2018          2137  3
;  2019          2138  3
;  2020          2139  3          $ABORT_ON_CONTROL_Y;
;  2021          2140  3
;  2022          2141  3
;  2023          2142  3          ! Check to see if the module is set.
;  2024          2143  3          !
;  2025          2144  3          IF .MODRSTPTR[RST$V_MODSET]
;  2026          2145  3          THEN
;  2027          2146  4              BEGIN
;  2028          2147  4
;  2029          2148  4
;  2030          2149  4              ! The module was set, so get the first RST entry in the chain.
```

```
;2031     2150  4          !
;2032     2151  4          RSTPTR = .MODRSTPTR[RST$L_SYMCHNPTR];
;2033     2152  4
;2034     2153  4
;2035     2154  4          ! Loop until the module's symbol chain is exhausted.
;2036     2155  4          !
;2037     2156  4          WHILE .RSTPTR NEQ 0 DO
;2038     2157  5              BEGIN
;2039     2158  5
;2040     2159  5
;2041     2160  5              ! See if symbol is bound to the register in question.
;2042     2161  5              !
;2043     2162  5              VALSPEC = IS_SYMBOL_BOUND_TO_REG (.RSTPTR, .REGNUM);
;2044     2163  5
;2045     2164  5
;2046     2165  5              ! If it is, then use the value spec. to print the
;2047     2166  5              ! symbolization.
;2048     2167  5              !
;2049     2168  5              IF .VALSPEC NEQ 0
;2050     2169  5              THEN
;2051     2170  5                  IF .VALSPEC[DST$V_VS_VALKIND] EQL DST$K_VALKIND_REG
;2052     2171  5                  THEN
;2053     2172  6                      BEGIN
;2054     2173  6                      IF .PRINT_FLAG
;2055     2174  6                      THEN
;2056     2175  7                          BEGIN
;2057     2176  7                          DBG$PRINT_SYMBOL_PATHNAME (.RSTPTR);
;2058     2177  7                          IF .BYTE_OFFSET NEQ 0
;2059     2178  7                          THEN
;2060     2179  7                              DBG$PRINT_OFFSET (.BYTE_OFFSET);
;2061     2180  7                          PRINT_BIT_OFFSET(BIT_OFFSET);
;2062     2181  7                          DBG$NEWLINE();
;2063     2182  6                          END;
;2064     2183  6
;2065     2184  6
;2066     2185  6                      ! The best symbolization is the first symbol found that
;2067     2186  6                      ! is bound to this register.  (An arbitrary decision.)
;2068     2187  6                      ! (More work needs to be done to associate the RST with
;2069     2188  6                      !  the scope)
;2070     2189  6                      !
;2071     2190  6                      IF NOT .SYMBOL_FOUND
;2072     2191  6                      THEN
;2073     2192  6                          SYMID = .RSTPTR;
;2074     2193  6                      SYMBOL_FOUND = TRUE;
;2075     2194  5                      END;
;2076     2195  5
;2077     2196  5
;2078     2197  5                  ! Get the next symid in the symbol chain.
;2079     2198  5                  !
;2080     2199  5                  RSTPTR = .RSTPTR[RST$L_SYMCHNPTR];
;2081     2200  4                  END;
;2082     2201  4
;2083     2202  3              END;
;2084     2203  3
;2085     2204  3
;2086     2205  3          ! Get a pointer to the next module in the chain.
;2087     2206  3          !
```

```
;  2088          2207  3          MODRSTPTR = .MODRSTPTR[RST$L_NXTMODPTR];
;  2089          2208  2          END;
;  2090          2209  2
;  2091          2210  2
;  2092          2211  2      ! If NOT .SYMBOL_FOUND, then print out a message saying that there are no
;  2093          2212  2      ! symbols bound to this register address.
;  2094          2213  2      !
;  2095          2214  2      IF .PRINT_FLAG
;  2096          2215  2      THEN
;  2097          2216  3          BEGIN
;  2098          2217  3          IF NOT .SYMBOL_FOUND
;  2099          2218  3          THEN
;  2100          2219  4              BEGIN
;  2101          2220  4              DBG$PRINT (UPLIT BYTE (%ASCIC 'no symbols are bound to '), 0);
;  2102          2221  4              PRINT_REGNAME(.ADDRESS);
;  2103          2222  4              PRINT_BIT_OFFSET(BIT_OFFSET);
;  2104          2223  4              DBG$NEWLINE();
;  2105          2224  3              END;
;  2106          2225  2          END;
;  2107          2226  2
;  2108          2227  2
;  2109          2228  2      ! End of routine.
;  2110          2229  2      !
;  2111          2230  2      IF .SYMID EQL 0 THEN BYTE_OFFSET = 0;
;  2112          2231  2      BIT_OFFSET = .BYTE_OFFSET * 8 + .BIT_OFFSET;
;  2113          2232  2      RETURN TRUE;                                                                                    ;
;  2114          2233  2
;  2115          2234  1      END;

                                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

                                                    20 73 73 65 72 64 64 61 08  002FE P.ADC:  .ASCII  <8>\address \                                    ;
                                                                3C 01  00307 P.ADD:  .ASCII  <1>\<\                                                  ;
                                                             4C 55 21 03  00309 P.ADE:  .ASCII  <3>\!UL\                                             ;
                                                    3E 30 20 2C 30 20 2C 07  0030D P.ADF:  .ASCII  <7>\, 0, 0>\                                      ;
                                                             20 20 3A 03  00315 P.ADG:  .ASCII  <3>\:  \                                             ;
                                                                3C 01  00319 P.ADH:  .ASCII  <1>\<\                                                  ;
                                                             4C 55 21 03  0031B P.ADI:  .ASCII  <3>\!UL\                                             ;
                                                    3E 30 20 2C 30 20 2C 07  0031F P.ADJ:  .ASCII  <7>\, 0, 0>\                                      ;
65 72 61 20 73 6C 6F 62 6D 79 73 20 6F 6E 18  00327 P.ADK:  .ASCII  <24>\no symbols are bound to \                                ;
                                  20 6F 74 20 64 6E 75 6F 62 20  00336                                                                               ;
                                                                3C 01  00340 P.ADL:  .ASCII  <1>\<\                                                  ;
                                                             4C 55 21 03  00342 P.ADM:  .ASCII  <3>\!UL\                                             ;
                                                    3E 30 20 2C 30 20 2C 07  00346 P.ADN:  .ASCII  <7>\, 0, 0>\                                      ;


                                                                .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                             0FFC 00000         .ENTRY  DBG$SYMBOLIZE_REG, Save R2,R3,R4,R5,R6,R7,- ; 2036
                                                                                        R8,R9,R10,R11                                                ;
                                                5B 00000000G   00  9E 00002         MOVAB   DBG$PRINT, R11                                           ;
                                                5A 00000000'   EF  9E 00009         MOVAB   P.ADC, R10                                               ;
                                                5E             08  C2 00010         SUBL2   #8, SP                                                   ;
                                                56       0C    AC  D0 00013         MOVL    P_BIT_OFFSET, R6                                         ; 2068
```

```
                50        04    AC  D0 00017          MOVL    ADDR, R0                                    ; 2088
                52              60  D0 0001B          MOVL    (R0), ADDRESS
                66        04    A0  D0 0001E          MOVL    4(R0), (R6)                                 ; 2089
                50 00000000G    0C  9E 00022          MOVAB   DBG$REG_VALUES, R0                          ; 2094
                50              52  D1 00029          CMPL    ADDRESS, R0
                                03  1E 0002C          BGEQU   2$
                              0153  31 0002E 1$:       BRW     19$
                50 00000000G    00  9E 00031 2$:      MOVAB   DBG$REG_VALUES+68, R0                       ; 2095
                50              52  D1 00038          CMPL    ADDRESS, R0
                                F1  1E 0003B          BGEQU   1$
                53 00000000G    00  D0 0003D          MOVL    RST$START_ADDR, MODRSTPTR                   ; 2102
                                0D  12 00044          BNEQ    3$
                   00028053     8F  DD 00046          PUSHL   #163923                                     ; 2104
     00000000G  00              01  FB 0004C          CALLS   #1, LIB$SIGNAL
                50 00000000G    00  9E 00053 3$:      MOVAB   DBG$REG_VALUES, R0                          ; 2109
50              52              50  C3 0005A          SUBL3   R0, ADDRESS, R0
55              50              04  C7 0005E          DIVL3   #4, R0, REGNUM
                50 00000000G0045  DE 00062          MOVAL   DBG$REG_VALUES[REGNUM], R0                  ; 2110
57              52              50  C3 0006A          SUBL3   R0, ADDRESS, BYTE_OFFSET
                          08    BC  D4 0006E          CLRL    @P_SYMID                                    ; 2115
                          58    D4  D4 00071          CLRL    SYMBOL_FOUND                                ; 2116
                40        10    AC  E9 00073          BLBC    PRINT_FLAG, 5$                              ; 2121
                                7E  D4 00077          CLRL    -(SP)                                       ; 2124
                                5A  DD 00079          PUSHL   R10
                6B              02  FB 0007B          CALLS   #2, DBG$PRINT
                                52  DD 0007E          PUSHL   ADDRESS                                     ; 2125
           0000V CF             01  FB 00080          CALLS   #1, PRINT_REGNAME
                                66  D5 00085          TSTL    (R6)                                        ; 2126
                                14  13 00087          BEQL    4$
                          09    AA  9F 00089          PUSHAB  P.ADD
                6B              01  FB 0008C          CALLS   #1, DBG$PRINT
                                66  DD 0008F          PUSHL   (R6)
                          0B    AA  9F 00091          PUSHAB  P.ADE
                6B              02  FB 00094          CALLS   #2, DBG$PRINT
                          0F    AA  9F 00097          PUSHAB  P.ADF
                6B              01  FB 0009A          CALLS   #1, DBG$PRINT
                                7E  D4 0009D 4$:      CLRL    -(SP)                                       ; 2127
                          17    AA  9F 0009F          PUSHAB  P.ADG
                6B              02  FB 000A2          CALLS   #2, DBG$PRINT
        00000000G  00           00  FB 000A5          CALLS   #0, DBG$NEWLINE                             ; 2128
                                04  DD 000AC          PUSHL   #4                                          ; 2129
                                01  DD 000AE          PUSHL   #1
        00000000G  00           02  FB 000B0          CALLS   #2, DBG$PRINT_CONTROL
                                53  D5 000B7 5$:      TSTL    MODRSTPTR                                   ; 2135
                                03  12 000B9          BNEQ    6$
                              0082  31 000BB          BRW     15$
     0D 00000000G  00           01  E1 000BE 6$:      BBC     #1, DBG$GV_CONTROL+1, 7$                    ; 2136
                   000280E8     8F  DD 000C6          PUSHL   #164072
        00000000G  00           01  FB 000CC          CALLS   #1, LIB$SIGNAL
                62        28    A3  E9 000D3 7$:      BLBC    40(MODRSTPTR), 14$                          ; 2144
                54        08    A3  D0 000D7          MOVL    8(MODRSTPTR), RSTPTR                        ; 2151
                                5C  13 000DB 8$:      BEQL    14$                                         ; 2156
                                30  BB 000DD          PUSHR   #^M<R4,R5>                                  ; 2162
              0000V CF          02  FB 000DF          CALLS   #2, IS_SYMBOL_BOUND_TO_REG
                59              50  D0 000E4          MOVL    R0, VALSPEC
                                4A  13 000E7          BEQL    13$                                         ; 2168
03              69              02  00 ED 000E9      CMPZV   #0, #2, (VALSPEC), #3                       ; 2170
```

```
                                43  12 000EE          BNEQ    13$                                    ;
                35      10      AC  E9 000F0          BLBC    PRINT_FLAG, 11$                        ; 2173
                                54  DD 000F4          PUSHL   RSTPTR                                 ; 2176
        00000000G  00           01  FB 000F6          CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME          ;
                                57  D5 000FD          TSTL    BYTE_OFFSET                            ; 2177
                                09  13 000FF          BEQL    9$                                     ;
                                57  DD 00101          PUSHL   BYTE_OFFSET                            ; 2179
        00000000G  00           01  FB 00103          CALLS   #1, DBG$PRINT_OFFSET                   ;
                                66  D5 0010A 9$:      TSTL    (R6)                                   ; 2180
                                14  13 0010C          BEQL    10$                                    ;
                        1B      AA  9F 0010E          PUSHAB  P.ADH                                  ;
                   6B           01  FB 00111          CALLS   #1, DBG$PRINT                          ;
                                66  DD 00114          PUSHL   (R6)                                   ;
                        1D      AA  9F 00116          PUSHAB  P.ADI                                  ;
                   6B           02  FB 00119          CALLS   #2, DBG$PRINT                          ;
                        21      AA  9F 0011C          PUSHAB  P.ADJ                                  ;
                   6B           01  FB 0011F          CALLS   #1, DBG$PRINT                          ;
        00000000G  00           00  FB 00122 10$:     CALLS   #0, DBG$NEWLINE                        ; 2181
                   04           58  E8 00129 11$:     BLBS    SYMBOL_FOUND, 12$                      ; 2190
              08   BC           54  D0 0012C          MOVL    RSTPTR, @P_SYMID                       ; 2192
                   58           01  D0 00130 12$:     MOVL    #1, SYMBOL_FOUND                       ; 2193
                   54      08   A4  D0 00133 13$:     MOVL    8(RSTPTR), RSTPTR                      ; 2199
                                A2  11 00137          BRB     8$                                     ; 2156
                   53      10   A3  D0 00139 14$:     MOVL    16(MODRSTPTR), MODRSTPTR               ; 2207
                              FF77  31 0013D          BRW     5$                                     ; 2135
                   31      10   AC  E9 00140 15$:     BLBC    PRINT_FLAG, 17$                        ; 2214
                   2E           58  E8 00144          BLBS    SYMBOL_FOUND, 17$                      ; 2217
                                7E  D4 00147          CLRL    -(SP)                                  ; 2220
                        29      AA  9F 00149          PUSHAB  P.ADK                                  ;
                   6B           02  FB 0014C          CALLS   #2, DBG$PRINT                          ;
                                52  DD 0014F          PUSHL   ADDRESS                                ; 2221
            0000V  CF           01  FB 00151          CALLS   #1, PRINT_REGNAME                      ;
                                66  D5 00156          TSTL    (R6)                                   ; 2222
                                14  13 00158          BEQL    16$                                    ;
                        42      AA  9F 0015A          PUSHAB  P.ADL                                  ;
                   6B           01  FB 0015D          CALLS   #1, DBG$PRINT                          ;
                                66  DD 00160          PUSHL   (R6)                                   ;
                        44      AA  9F 00162          PUSHAB  P.ADM                                  ;
                   6B           02  FB 00165          CALLS   #2, DBG$PRINT                          ;
                        48      AA  9F 00168          PUSHAB  P.ADN                                  ;
                   6B           01  FB 0016B          CALLS   #1, DBG$PRINT                          ;
        00000000G  00           00  FB 0016E 16$:     CALLS   #0, DBG$NEWLINE                        ; 2223
                        08      BC  D5 00175 17$:     TSTL    @P_SYMID                               ; 2230
                                02  12 00178          BNEQ    18$                                    ;
                                57  D4 0017A          CLRL    BYTE_OFFSET                            ;
                   76         9647  7E 0017C 18$:     MOVAQ   @(R6)+[BYTE_OFFSET], -(R6)             ; 2231
                   50           01  D0 00180          MOVL    #1, R0                                 ; 2232
                                    04 00183          RET                                            ;
                                50  D4 00184 19$:     CLRL    R0                                     ; 2234
                                    04 00186          RET                                            ;
```

; Routine Size: 391 bytes,   Routine Base: DBG$CODE + 0CF8

```
;  2117          2235  1 GLOBAL ROUTINE DBG$SYMID_TO_PRIMARY (SYMID, OFFSET) =
;  2118          2236  1 !
;  2119          2237  1 ! FUNCTION
;  2120          2238  1 !       This routine takes a SYMID and an offset
;  2121          2239  1 !       and builds a Primary Descriptor for the object.
;  2122          2240  1 !       The routine must first do symbol table lookups to determine
;  2123          2241  1 !       the TYPEID, the KIND, and the FCODE.
;  2124          2242  1 !       It then can build a Primary root node and call DBG$BUILD_PRIMARY_SUBNODE
;  2125          2243  1 !       to create the Primary sub-node.
;  2126          2244  1 !
;  2127          2245  1 !       Then, if the offset is not zero, the Primary must be
;  2128          2246  1 !       modified to include the offset information. For example, if
;  2129          2247  1 !       the Primary is an array, the subscripts can be filled in with
;  2130          2248  1 !       the appropriate values.
;  2131          2249  1 !
;  2132          2250  1 ! INPUTS
;  2133          2251  1 !       SYMID   - SYMID for the object
;  2134          2252  1 !       OFFSET  - offset from the object to the desired address
;  2135          2253  1 !
;  2136          2254  1 ! OUTPUTS
;  2137          2255  1 !       A Primary Descriptor is built out of temporary memory and a
;  2138          2256  1 !       pointer to this descriptor and an offset to the primary
;  2139          2257  1 !       are returned.
;  2140          2258  1 !
;  2141          2259  2     BEGIN
;  2142          2260  2
;  2143          2261  2     MAP
;  2144          2262  2         OFFSET: REF VECTOR[0];          ! Offset value
;  2145          2263  2
;  2146          2264  2     LOCAL
;  2147          2265  2         PRIMPTR: REF DBG$PRIMARY;       ! Pointer to a Primary Descriptor
;  2148          2266  2
;  2149          2267  2
;  2150          2268  2
;  2151          2269  2     ! SYMID better not be zero.
;  2152          2270  2     !
;  2153          2271  2     IF .SYMID EQL 0
;  2154          2272  2     THEN
;  2155          2273  2         $DBG_ERROR ('DBGSYMBLZ\DBG$SYMID_TO_PRIMARY zero symid');
;  2156          2274  2
;  2157          2275  2
;  2158          2276  2     ! Allocate space for the Primary Root node and fill in some of the header
;  2159          2277  2     ! fields.
;  2160          2278  2     !
;  2161          2279  2     PRIMPTR = DBG$GET_TEMPMEM (DBG$K_PRIMARY_SIZE);
;  2162          2280  2     PRIMPTR[DBG$B_DHDR_LANG] = .DBG$GB_LANGUAGE;
;  2163          2281  2     PRIMPTR[DBG$B_DHDR_TYPE] = DBG$K_PRIMARY_DESC;
;  2164          2282  2     PRIMPTR[DBG$W_DHDR_LENGTH] = DBG$K_PRIMARY_SIZE+%UPVAL;
;  2165          2283  2     PRIMPTR[DBG$L_DHDR_SYMID0] = .SYMID;
;  2166          2284  2     PRIMPTR[DBG$L_PRIM_FLINK] = PRIMPTR[DBG$A_PRIM_FLINK];
;  2167          2285  2     PRIMPTR[DBG$L_PRIM_BLINK] = PRIMPTR[DBG$A_PRIM_FLINK];
;  2168          2286  2
;  2169          2287  2
;  2170          2288  2     ! Build the rest Primary subnode(s) for given SYMID.
;  2171          2289  2     !
;  2172          2290  2     RETURN BUILD_PRIMARY_SUBNODE(.PRIMPTR, .SYMID, .OFFSET);
;  2173          2291  1     END;
```

```
                                                        .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

24 47 42 44 5C 5A 4C 42 4D 59 53 47 42 44 29  0034E P.ADO:  .ASCII  \)DBGSYMBLZ\<92>\DBG$SYMID_TO_PRIMARY ze\
52 41 4D 49 52 50 5F 4F 54 5F 44 49 4D 59 53  0035D
                                  65 7A 20 59 0036C
                        64 69 6D 79 73 20 6F 72 00370        .ASCII  \ro symid\

                                                        .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                0004 00000      .ENTRY  DBG$SYMID_TO_PRIMARY, Save R2                   ; 2235
                                52        04    AC   D0 00002  MOVL    SYMID, R2                                       ; 2271
                                                15   12 00006  BNEQ    1$
                                   00000000'    EF   9F 00008  PUSHAB  P.ADO                                           ; 2273
                                                01   DD 0000E  PUSHL   #1
                                   00028362     8F   DD 00010  PUSHL   #164706
                        00000000G   00          03   FB 00016  CALLS   #3, LIB$SIGNAL
                                                09   DD 0001D  1$:     PUSHL   #9                                       ; 2279
                        00000000G   00          01   FB 0001F  CALLS   #1, DBG$GET_TEMPMEM
                              03    A0 00000000G  00   90 00026  MOVB    DBG$GB_LANGUAGE, 3(PRIMPTR)                     ; 2280
                              02    A0        79  8F   90 0002E  MOVB    #121, 2(PRIMPTR)                                ; 2281
                                    60          24   B0 00033  MOVW    #36, (PRIMPTR)                                  ; 2282
                              0C    A0          52   D0 00036  MOVL    R2, 12(PRIMPTR)                                 ; 2283
                              14    A0        14    A0   9E 0003A  MOVAB   20(PRIMPTR), 20(PRIMPTR)                        ; 2284
                              18    A0        14    A0   9E 0003F  MOVAB   20(PRIMPTR), 24(PRIMPTR)                        ; 2285
                                              08    AC   DD 00044  PUSHL   OFFSET                                         ; 2290
                                                    05   BB 00047  PUSHR   #^M<R0,R2>
                                  0000V     CF          03   FB 00049  CALLS   #3, BUILD_PRIMARY_SUBNODE
                                                        04   0004E  RET                                                   ; 2291

; Routine Size:  79 bytes,    Routine Base:  DBG$CODE + 0E7F
```

```
;  2175          2292  1 GLOBAL ROUTINE DBG$NEW_SYMBOLIZE (ADDR, P_SYMID, P_BIT_OFFSET) =
;  2176          2293  1 !
;  2177          2294  1 ! FUNCTION:
;  2178          2295  1 !       This routine accepts a address descriptor, and attempts to symbolize
;  2179          2296  1 !       it as a symbol name plus offset.
;  2180          2297  1 !       It always returns the best possible symbolization; if the address can
;  2181          2298  1 !       be symbolized by more than one symbol name with the same offset, then
;  2182          2299  1 !       the first is chosen to be the best.
;  2183          2300  1 !
;  2184          2301  1 ! INPUTS:
;  2185          2302  1 !       ADDR            - The address of an address descriptor (byte and bit offset).
;  2186          2303  1 !
;  2187          2304  1 !       P_SYMID         - The address of a longword location where the "symbol identi-
;  2188          2305  1 !                         fier" should be returned.  The "symbol identifier" is a value
;  2189          2306  1 !                         which uniquely identifies the returned symbol.  This value is
;  2190          2307  1 !                         not directly understood outside the symbol table access rou-
;  2191          2308  1 !                         tines, but can be passed to various other symbol table access
;  2192          2309  1 !                         routines to extract information about the symbol.
;  2193          2310  1 !
;  2194          2311  1 !       P_BIT_OFFSET    - The address of a longword location where the bit offset from
;  2195          2312  1 !                         the SYMID symbol should be returned.
;  2196          2313  1 !
;  2197          2314  1 ! OUTPUTS:
;  2198          2315  1 !       SYMID   - A symbol identifier which uniquely identifies the symbol
;  2199          2316  1 !                 which best symbolizes ADDR is returned to SYMID.  This symbol
;  2200          2317  1 !                 identifier can then be passed to any symbol table access rou-
;  2201          2318  1 !                 tine which accepts a SYMID parameter.  If no suitable symbol
;  2202          2319  1 !                 can be found, a zero is returned to SYMID.
;  2203          2320  1 !
;  2204          2321  1 !       OFFSET  - The bit offset of ADDR relative to the SYMID symbol is
;  2205          2322  1 !                 returned to OFFSET.  If (SYMID) is zero, this                    ;
;  2206          2323  1 !                 offset is simply the original address descriptor.
;  2207          2324  1 !
;  2208          2325  1 !       The routine returns true if symbolization was possible; otherwise it     ;
;  2209          2326  1 !       returns false.
;  2210          2327  1 !
;  2211          2328  1
;  2212          2329  2     BEGIN
;  2213          2330  2
;  2214          2331  2     BIND
;  2215          2332  2         SYMID  = .P_SYMID:  REF RST$ENTRY,
;  2216          2333  2         BIT_OFFSET = .P_BIT_OFFSET;
;  2217          2334  2
;  2218          2335  2     MAP
;  2219          2336  2         ADDR: REF DBG$ADDRESS_DESC;     ! Pointer to address descriptor
;  2220          2337  2
;  2221          2338  2     LOCAL
;  2222          2339  2         BYTE_OFFSET,
;  2223          2340  2         SATPTR: REF SAT$ENTRY;
;  2224          2341  2
;  2225          2342  2
;  2226          2343  2     ! See if the address is a register address.
;  2227          2344  2     !
;  2228          2345  2     IF DBG$SYMBOLIZE_REG (.ADDR, SYMID, BIT_OFFSET, FALSE)
;  2229          2346  2     THEN
;  2230          2347  2         RETURN TRUE;
;  2231          2348  2
```

```
;  2232          2349  2
;  2233          2350  2      ! See if the address is a static address.
;  2234          2351  2      !
;  2235          2352  2      SATPTR = DBG$SEARCH_PROG_SAT (.SAT$START_ADDR,
;  2236          2353  2                                   .ADDR[DBG$L_ADDRESS_BYTE_ADDR],
;  2237          2354  2                                   BYTE_OFFSET);
;  2238          2355  2      IF .SATPTR NEQ 0
;  2239          2356  2      THEN
;  2240          2357  3          BEGIN
;  2241          2358  3          SYMID = .SATPTR[SAT$L_RSTPTR];
;  2242          2359  3
;  2243          2360  3          ! If the address is a code address, then print the symbol
;  2244          2361  3          ! name and corresponding line number.  If there is no line
;  2245          2362  3          ! number, then just print the routine name and offset.
;  2246          2363  3          !
;  2247          2364  3          IF (.SYMID[RST$B_KIND] EQL RST$K_ROUTINE) OR
;  2248          2365  3             (.SYMID[RST$B_KIND] EQL RST$K_BLOCK) OR
;  2249          2366  3             (.SYMID[RST$B_KIND] EQL RST$K_LABEL) OR
;  2250          2367  4             (.SYMID[RST$B_KIND] EQL RST$K_ENTRY)
;  2251          2368  3          THEN
;  2252          2369  4              BEGIN
;  2253          2370  4              LOCAL
;  2254          2371  4                  ADDRESS,
;  2255          2372  4                  LINE_NO,                    ! Line no. corresponding to code address.
;  2256          2373  4                  STMT_NO,                    ! statement no.
;  2257          2374  4                  START_PC,                   ! Beginning pc address for line.
;  2258          2375  4                  END_PC,                     ! Dummy.
;  2259          2376  4                  MOD_SYMID : REF RST$ENTRY,  ! Dummy.
;  2260          2377  4                  TMP_OFFSET,                 ! Temporay offset
;  2261          2378  4                  TMP_SYMID : REF RST$ENTRY;  ! Temporay symid for %line
;  2262          2379  4
;  2263          2380  4
;  2264          2381  4                  ! Lookup the line number; if found, then print the symbol name
;  2265          2382  4                  ! and line number.
;  2266          2383  4                  !
;  2267          2384  4                  MOD_SYMID = .SYMID;
;  2268          2385  4                  WHILE .MOD_SYMID[RST$B_KIND] NEQ RST$K_MODULE DO
;  2269          2386  4                      MOD_SYMID = .MOD_SYMID[RST$L_UPSCOPEPTR];
;  2270          2387  4                  ADDRESS = .ADDR[DBG$L_ADDRESS_BYTE_ADDR];
;  2271          2388  5                  IF (DBG$PC_TO_LINE_LOOKUP (.ADDRESS, LINE_NO, STMT_NO,
;  2272          2389  5                                             START_PC, END_PC, MOD_SYMID))
;  2273          2390  5                  AND ((.LINE_NO NEQ 0) OR (.STMT_NO NEQ 0))
;  2274          2391  4                  THEN
;  2275          2392  5                      IF (.BYTE_OFFSET NEQ 0) OR (.SYMID[RST$B_KIND] EQL RST$K_BLOCK)
;  2276          2393  4                      THEN
;  2277          2394  5                          BEGIN
;  2278          2395  5                          SYMID = DBG$STA_LINE_NUM_RST(.SYMID, .LINE_NO, .STMT_NO,
;  2279          2396  5                                                       .START_PC, .END_PC);
;  2280          2397  5                          BYTE_OFFSET = .ADDRESS - .START_PC;
;  2281          2398  4                          END;
;  2282          2399  3              END;
;  2283          2400  3          BIT_OFFSET = .ADDR[DBG$L_ADDRESS_BIT_OFFSET] + (8 * .BYTE_OFFSET);
;  2284          2401  3          RETURN TRUE;
;  2285          2402  2          END;
;  2286          2403  2
;  2287          2404  2
;  2288          2405  2      ! See if the address is a global symbol.
```

```
;  2289          2406  2      !
;  2290          2407  2      IF DBG$SEARCH_GLOBAL (.ADDR, SYMID, BIT_OFFSET, FALSE)
;  2291          2408  2      THEN
;  2292          2409  2          RETURN TRUE;
;  2293          2410  2
;  2294          2411  2
;  2295          2412  2      ! See if the address is on the call stack.
;  2296          2413  2      !
;  2297          2414  2      IF DBG$SEARCH_VAX_CALL_STACK (.ADDR, SYMID, BIT_OFFSET, FALSE)
;  2298          2415  2      THEN
;  2299          2416  2          RETURN TRUE;
;  2300          2417  2
;  2301          2418  2
;  2302          2419  2      ! The address was not found, and symbolization was thus impossible.
;  2303          2420  2      !
;  2304          2421  2      SYMID = 0;
;  2305          2422  2      BIT_OFFSET = .ADDR;
;  2306          2423  2      RETURN FALSE;
;  2307          2424  1      END;


                                00FC 00000          .ENTRY  DBG$NEW_SYMBOLIZE, Save R2,R3,R4,R5,R6,R7    ; 2292
                             5E   18  C2 00002      SUBL2   #24, SP                                      ;
                             55   08  AC  D0 00005  MOVL    P_SYMID, R5                                  ; 2332
                             57   0C  AC  D0 00009  MOVL    P_BIT_OFFSET, R7                             ; 2333
                                  7E  D4 0000D      CLRL    -(SP)                                        ; 2345
                            00A0  8F  BB 0000F      PUSHR   #^M<R5,R7>                                   ;
                             52   04  AC  D0 00013  MOVL    ADDR, R2                                     ;
                                  52  DD 00017      PUSHL   R2                                           ;
                        FE0C CF       04  FB 00019  CALLS   #4, DBG$SYMBOLIZE_REG                        ;
                             03       50  E9 0001E  BLBC    R0, 1$                                       ;
                                 00BE  31  00021  BRW     10$                                          ;
                                   5E  DD 00024  1$:     PUSHL   SP                                     ; 2352
                                   62  DD 00026          PUSHL   (R2)                                   ; 2353
                          00000000G    00  DD 00028      PUSHL   SAT$START_ADDR                         ; 2352
                        F2CD CF        03  FB 0002E      CALLS   #3, DBG$SEARCH_PROG_SAT                ;
                                   50  D5 00033  TSTL    SATPTR                                       ; 2355
                                   03  12 00035  BNEQ    2$                                           ;
                                 008C  31  00037  BRW     9$                                           ;
                             65   0C  A0  D0 0003A  2$:    MOVL    12(SATPTR), (R5)                     ; 2358
                             53       65  D0 0003E  MOVL    (R5), R3                                     ; 2364
                             54   14  A3  9A 00041  MOVZBL  20(R3), R4                                  ;
                             02       54  91 00045  CMPB    R4, #2                                       ;
                                      0F  13 00048  BEQL    3$                                           ;
                             03       54  91 0004A  CMPB    R4, #3                                       ; 2365
                                      0A  13 0004D  BEQL    3$                                           ;
                             04       54  91 0004F  CMPB    R4, #4                                       ; 2366
                                      05  13 00052  BEQL    3$                                           ;
                             08       54  91 00054  CMPB    R4, #8                                       ; 2367
                                      63  12 00057  BNEQ    8$                                           ;
                          04 AE       53  D0 00059  3$:     MOVL    R3, MOD_SYMID                        ; 2384
                             50   04  AE  D0 0005D  4$:     MOVL    MOD_SYMID, R0                        ; 2385
                             01   14  A0  91 00061  CMPB    20(R0), #1                                   ;
                                      07  13 00065  BEQL    5$                                           ;
```

```
                04   AE      10   A0  DD 00067          MOVL    16(R0), MOD_SYMID                       ; 2386
                                  EF  11 0006C          BRB     4$
                     56           62  D0 0006E 5$:      MOVL    (R2), ADDRESS                           ; 2387
                           04     AE  9F 00071          PUSHAB  MOD_SYMID                               ; 2388
                           0C     AE  9F 00074          PUSHAB  END_PC
                           14     AE  9F 00077          PUSHAB  START_PC
                           1C     AE  9F 0007A          PUSHAB  STMT_NO
                           24     AE  9F 0007D          PUSHAB  LINE_NO
                                  56  DD 00080          PUSHL   ADDRESS
          00000000G        00         06  FB 00082      CALLS   #6, DBG$PC_TO_LINE_LOOKUP
                           30         50  E9 00089      BLBC    R0, 8$
                           14     AE  D5 0008C          TSTL    LINE_NO                                 ; 2390
                                  05  12 0008F          BNEQ    6$
                           10     AE  D5 00091          TSTL    STMT_NO
                                  26  13 00094          BEQL    8$
                                  6E  D5 00096 6$:      TSTL    BYTE_OFFSET                             ; 2392
                                  05  12 00098          BNEQ    7$
                     03           54  91 0009A          CMPB    R4, #3
                                  1D  12 0009D          BNEQ    8$
                           08     AE  DD 0009F 7$:      PUSHL   END_PC                                  ; 2396
                           10     AE  DD 000A2          PUSHL   START_PC
                           18     AE  DD 000A5          PUSHL   STMT_NO                                 ; 2395
                           20     AE  DD 000A8          PUSHL   LINE_NO
                                  53  DD 000AB          PUSHL   R3
          00000000G        00         05  FB 000AD      CALLS   #5, DBG$STA_LINE_NUM_RST
                           65         50  D0 000B4      MOVL    R0, (R5)
          6E               56   0C    AE  C3 000B7      SUBL3   START_PC, ADDRESS, BYTE_OFFSET          ; 2397
                           50         6E  D0 000BC 8$:      MOVL    BYTE_OFFSET, R0                     ; 2400
                           67     04 B240  7E 000BF      MOVAQ   @4(R2)[R0], (R7)
                                  1C  11 000C4          BRB     10$                                     ; 2401
                                  7E  D4 000C6 9$:      CLRL    -(SP)                                   ; 2407
                                00A4  8F  BB 000C8      PUSHR   #^M<R2,R5,R7>
                     F38E   CF         04  FB 000CC      CALLS   #4, DBG$SEARCH_GLOBAL
                           0E         50  E8 000D1      BLBS    R0, 10$
                                  7E  D4 000D4          CLRL    -(SP)                                   ; 2414
                                00A4  8F  BB 000D6      PUSHR   #^M<R2,R5,R7>
                     F7A6   CF         04  FB 000DA      CALLS   #4, DBG$SEARCH_VAX_CALL_STACK
                           04         50  E9 000DF      BLBC    R0, 11$
                           50         01  D0 000E2 10$:      MOVL    #1, R0                              ; 2416
                                         04 000E5          RET
                                  65  D4 000E6 11$:      CLRL    (R5)                                    ; 2421
                           67         52  D0 000E8      MOVL    R2, (R7)                                ; 2422
                                  50  D4 000EB          CLRL    R0                                      ; 2423
                                         04 000ED          RET                                         ; 2424

; Routine Size:  238 bytes,    Routine Base:  DBG$CODE + 0ECE
```

```
;  2309          2425  1 GLOBAL ROUTINE DBG$PC_TO_SYMID(PC, RSTPTR) =
;  2310          2426  1 !
;  2311          2427  1 ! FUNCITON
;  2312          2428  1 !       This routine goes through the Module SAT table and/or Global symbol
;  2313          2429  1 !       chain to locate RST for the best match for a address.  If the 3rd
;  2314          2430  1 !       parameter is present, that means if the above
;  2315          2431  1 !       search failed, this routine goes on searching global symbol chain.
;  2316          2432  1 !       If the 3rd parameter is not present, that means to search Module SAT
;  2317          2433  1 !       only.
;  2318          2434  1 !
;  2319          2435  1 ! INPUTS
;  2320          2436  1 !
;  2321          2437  1 !       ADDRESS - The address for which a match is desired.
;  2322          2438  1 !
;  2323          2439  1 !       RSTPTR  - A pointer to RST entry.
;  2324          2440  1 !
;  2325          2441  1 !       3rd Parameter - optional.
;  2326          2442  1 !
;  2327          2443  1 ! OUTPUTS
;  2328          2444  1 !
;  2329          2445  1 !       TRUE    - If a match is found.
;  2330          2446  1 !       FALSE   - otherwise.
;  2331          2447  1 !
;  2332          2448  1
;  2333          2449  2     BEGIN
;  2334          2450  2
;  2335          2451  2     BUILTIN
;  2336          2452  2         ACTUALCOUNT;
;  2337          2453  2
;  2338          2454  2     LOCAL
;  2339          2455  2         ADDR: DBG$ADDRESS_DESC,          ! Address Descriptor
;  2340          2456  2         OFFSET,                          ! Bit offset
;  2341          2457  2         SATPTR: REF SAT$ENTRY;
;  2342          2458  2
;  2343          2459  2     SATPTR = DBG$SEARCH_PROG_SAT (.SAT$START_ADDR, .PC, OFFSET);
;  2344          2460  2     IF .SATPTR NEQ 0
;  2345          2461  2     THEN
;  2346          2462  3         BEGIN
;  2347          2463  3         .RSTPTR = .SATPTR[SAT$L_RSTPTR];
;  2348          2464  3         RETURN TRUE;
;  2349          2465  2         END;
;  2350          2466  2     IF ACTUALCOUNT() EQL 2 THEN RETURN FALSE;
;  2351          2467  2     ADDR[DBG$L_ADDRESS_BYTE_ADDR] = .PC;
;  2352          2468  2     ADDR[DBG$L_ADDRESS_BIT_OFFSET] = 0;
;  2353          2469  2     RETURN DBG$SEARCH_GLOBAL(ADDR, .RSTPTR, OFFSET);
;  2354          2470  1     END;


                                  0000 00000          .ENTRY  DBG$PC_TO_SYMID, Save nothing                   ; 2425
                        5E        0C   C2 00002          SUBL2   #12, SP                                         ;
                                  5E   DD 00005          PUSHL   SP                                              ; 2459
                              04  AC   DD 00007          PUSHL   PC                                              ;
                   00000000G      00   DD 0000A          PUSHL   SAT$START_ADDR                                  ;
               F1FD   CF          03   FB 00010          CALLS   #3, DBG$SEARCH_PROG_SAT                         ;
```

```
                         50  D5 00015          TSTL    SATPTR                                  ; 2460
                         09  13 00017          BEQL    1$                                      ;
              08   BC    0C  A0 00019          MOVL    12(SATPTR), @RSTPTR                     ; 2463
                   50        01 DO 0001E       MOVL    #1, R0                                  ; 2464
                             04 00021          RET                                             ;
                   02        6C 91 00022 1$:   CMPB    (AP), #2                                ; 2466
                             16 13 00025       BEQL    2$                                      ;
              04   AE    04  AC DO 00027       MOVL    PC, ADDR                                ; 2467
                   08    AE  D4 0002C          CLRL    ADDR+4                                  ; 2468
                         5E  DD 0002F          PUSHL   SP                                      ; 2469
                   08    AC  DD 00031          PUSHL   RSTPTR                                  ;
                   0C    AE  9F 00034          PUSHAB  ADDR                                    ;
              F335 CF        03 FB 00037       CALLS   #3, DBG$SEARCH_GLOBAL                   ;
                             04 0003C          RET                                             ;
                         50  D4 0003D 2$:      CLRL    R0                                      ; 2470
                             04 0003F          RET                                             ;

; Routine Size:  64 bytes,    Routine Base:  DBG$CODE + 0FBC
```

```
;  2356          2471  1 ROUTINE FIND_ROUTINE (PCVAL, PRINT_FLAG) =
;  2357          2472  1 !
;  2358          2473  1 ! FUNCTION
;  2359          2474  1 !       This routine looks through the SAT to find the most nested routine
;  2360          2475  1 !       containing the PC value passed to the routine.
;  2361          2476  1 !
;  2362          2477  1 ! INPUTS
;  2363          2478  1 !       PCVAL               - The PC.
;  2364          2479  1 !
;  2365          2480  1 ! OUTPUTS
;  2366          2481  1 !       If successful, and the module is set, the routine returns the routine
;  2367          2482  1 !       RST pointer.
;  2368          2483  1 !       If successful, and the module is not set, the routine returns the
;  2369          2484  1 !       module RST pointer.
;  2370          2485  1 !
;  2371          2486  1 !       If unsuccessful, the routine return 0.
;  2372          2487  1 !
;  2373          2488  1
;  2374          2489  2     BEGIN
;  2375          2490  2
;  2376          2491  2     LOCAL
;  2377          2492  2         MODRSTPTR:      REF RST$ENTRY,  ! Ptr to module's RST entry.
;  2378          2493  2         RSTPTR:         REF RST$ENTRY,  ! Ptr to symbol's RST entry.
;  2379          2494  2         BYTE_OFFSET,                    ! Byte offset.
;  2380          2495  2         PROG_SATPTR:    REF SAT$ENTRY;  ! Ptr to program level SAT entry.
;  2381          2496  2
;  2382          2497  2
;  2383          2498  2     ! Initialize program level SAT pointer.
;  2384          2499  2     !
;  2385          2500  2     PROG_SATPTR = .SAT$START_ADDR;
;  2386          2501  2
;  2387          2502  2
;  2388          2503  2     ! Search through the program level SAT.
;  2389          2504  2     !
;  2390          2505  2     WHILE .PROG_SATPTR NEQ 0 DO
;  2391          2506  3         BEGIN
;  2392          2507  3
;  2393          2508  3
;  2394          2509  3         ! If current SAT entry is past the address we are looking for, then
;  2395          2510  3         ! exitloop.  (SAT is sorted on start address.)
;  2396          2511  3         !
;  2397          2512  3         IF .PROG_SATPTR[SAT$L_START] GTRA .PCVAL
;  2398          2513  3         THEN
;  2399          2514  3             EXITLOOP;
;  2400          2515  3
;  2401          2516  3
;  2402          2517  3         IF (.PROG_SATPTR[SAT$L_START] LEQA .PCVAL) AND
;  2403          2518  4            (.PROG_SATPTR[SAT$L_END]   GEQA .PCVAL)
;  2404          2519  3         THEN
;  2405          2520  4             BEGIN
;  2406          2521  4
;  2407          2522  4
;  2408          2523  4             ! Search the module level SAT looking for a routine whose address
;  2409          2524  4             ! range includes .PCVAL.  (The most nested routine is returned.)
;  2410          2525  4             !
;  2411          2526  4             SEARCH_MODULE_SAT (.PROG_SATPTR, .PCVAL, MODRSTPTR, RSTPTR,
;  2412          2527  4                                BYTE_OFFSET, .PRINT_FLAG);
```

```
;  2413          2528  4
;  2414          2529  4
;  2415          2530  4          ! If the module is not set, can only return at most the module
;  2416          2531  4          ! RST pointer.
;  2417          2532  4          !
;  2418          2533  4          IF NOT .MODRSTPTR[RST$V_MODSET]
;  2419          2534  4          THEN
;  2420          2535  4              RETURN .MODRSTPTR;
;  2421          2536  4
;  2422          2537  4
;  2423          2538  4          ! If the module was set, make sure RSTPTR is not zero.
;  2424          2539  4          !
;  2425          2540  4          IF .RSTPTR EQL 0 THEN RETURN .RSTPTR;
;  2426          2541  4
;  2427          2542  4
;  2428          2543  4          ! If the module was set, then find out if the RST entry is a
;  2429          2544  4          ! routine (the pcval could have more closely symbolized to a
;  2430          2545  4          ! label or block within the routine).
;  2431          2546  4          !
;  2432          2547  4          WHILE .RSTPTR[RST$B_KIND] NEQ RST$K_MODULE DO
;  2433          2548  5              BEGIN
;  2434          2549  5              IF .RSTPTR[RST$B_KIND] EQL RST$K_ROUTINE
;  2435          2550  5              THEN
;  2436          2551  5                  RETURN .RSTPTR;
;  2437          2552  5              RSTPTR = .RSTPTR[RST$L_UPSCOPEPTR];
;  2438          2553  4              END;
;  2439          2554  4
;  2440          2555  4          RETURN .MODRSTPTR;
;  2441          2556  3          END;
;  2442          2557  3
;  2443          2558  3
;  2444          2559  3              ! Nothing found yet.  Get next SAT entry.
;  2445          2560  3              !
;  2446          2561  3              PROG_SATPTR = .PROG_SATPTR[SAT$L_FLINK];
;  2447          2562  2              END;
;  2448          2563  2
;  2449          2564  2
;  2450          2565  2      ! We did not find a routine containing the PC.
;  2451          2566  2      !
;  2452          2567  2      RETURN 0;
;  2453          2568  1      END;


                                0004 00000 FIND_ROUTINE:
                                           .WORD   Save R2                                  ;  2471
                5E                  0C  C2 00002           SUBL2   #12, SP                  ;
                52 00000000G        00  D0 00005           MOVL    SAT$START_ADDR, PROG_SATPTR ;  2500
                                    56  13 0000C 1$:       BEQL    5$                       ;  2505
          04    AC            04    A2  D1 0000E           CMPL    4(PROG_SATPTR), PCVAL    ;  2512
                                    4F  1A 00013           BGTRU   5$                       ;
          04    AC            08    A2  D1 00015           CMPL    8(PROG_SATPTR), PCVAL    ;  2518
                                    43  1F 0001A           BLSSU   4$                       ;
                                08  AC  DD 0001C           PUSHL   PRINT_FLAG               ;  2527
                                04  AE  9F 0001F           PUSHAB  BYTE_OFFSET              ;  2526
```

```
                        0C   AE  9F 00022          PUSHAB  RSTPTR                                    ;
                        14   AE  9F 00025          PUSHAB  MODRSTPTR                                 ;
                        04   AC  DD 00028          PUSHL   PCVAL                                     ;
                             52  DD 0002B          PUSHL   PROG_SATPTR                               ;
              0000V     CF        06 FB 0002D      CALLS   #6, SEARCH_MODULE_SAT                     ;
                        51   08   AE D0 00032      MOVL    MODRSTPTR, R1                             ; 2533
                        21   28   A1 E9 00036      BLBC    40(R1), 3$                                ;
                             04   AE D5 0003A      TSTL    RSTPTR                                    ; 2540
                             05   12 0003D         BNEQ    2$                                        ;
                        50   04   AE D0 0003F      MOVL    RSTPTR, R0                                ;
                             04   04 00043         RET                                               ;
                        50   04   AE D0 00044 2$:  MOVL    RSTPTR, R0                                ; 2547
                        01   14   A0 91 00048      CMPB    20(R0), #1                                ;
                             0D   13 0004C         BEQL    3$                                        ;
                        02   14   A0 91 0004E      CMPB    20(R0), #2                                ; 2549
                             12   13 00052         BEQL    6$                                        ;
                   04   AE   10   A0 D0 00054      MOVL    16(R0), RSTPTR                            ; 2552
                             E9   11 00059         BRB     2$                                        ; 2547
                        50        51 D0 0005B 3$:  MOVL    R1, R0                                    ; 2555
                             04   04 0005E         RET                                               ;
                        52        62 D0 0005F 4$:  MOVL    (PROG_SATPTR), PROG_SATPTR                ; 2561
                             A8   11 00062         BRB     1$                                        ; 2505
                             50   D4 00064 5$:     CLRL    R0                                        ; 2567
                                  04 00066 6$:     RET                                               ; 2568

; Routine Size:  103 bytes,    Routine Base:  DBG$CODE + 0FFC
```

```
;  2455          2569  1 ROUTINE GET_ADDRESS_DESC (ADDRPTR, ADDRESS_DESC, MESSAGE_VECT) =
;  2456          2570  1 !
;  2457          2571  1 ! FUNCTION
;  2458          2572  1 !       This routine interprets an address representation (AED for level 2
;  2459          2573  1 !       support, Primary or Value Descriptor for level 3 support), and an
;  2460          2574  1 !       address descriptor is returned.
;  2461          2575  1 !
;  2462          2576  1 ! INPUTS
;  2463          2577  1 !       ADDRPTR         - The address representation.
;  2464          2578  1 !
;  2465          2579  1 !       ADDRESS_DESC    - The address descriptor.
;  2466          2580  1 !
;  2467          2581  1 !       MESSAGE_VECT    - The address of a longword to contain the address
;  2468          2582  1 !                         of a standard message argument vector.
;  2469          2583  1 !
;  2470          2584  1 ! OUTPUTS
;  2471          2585  1 !       If the ADDRPTR type is a permanent descriptor of AED, then the register
;  2472          2586  1 !       address is returned in the byte address field of the address descriptor.
;  2473          2587  1 !       The bit offset is set to 0.  Otherwise, a regular address descriptor is
;  2474          2588  1 !       constructed and returned.
;  2475          2589  1 !
;  2476          2590  1 !       On success, STS$K_SUCCESS is returned.
;  2477          2591  1 !
;  2478          2592  1 !       On failure, either the routine signals its way out, or returns a
;  2479          2593  1 !           message vector and STS$K_SEVERE.
;  2480          2594  1 !
;  2481          2595  1
;  2482          2596  2     BEGIN
;  2483          2597  2
;  2484          2598  2     MAP
;  2485          2599  2         ADDRPTR         : REF DBG$AED,          ! Ptr to Address Exp. Desc.
;  2486          2600  2         ADDRESS_DESC    : REF DBG$ADDRESS_DESC; ! Ptr to Address Desc.
;  2487          2601  2
;  2488          2602  2     LOCAL
;  2489          2603  2         TYPE;
;  2490          2604  2
;  2491          2605  2
;  2492          2606  2     ! See if we have a level 2 address expression descriptor.  If we do
;  2493          2607  2     ! check for the permanent symbol AED type.
;  2494          2608  2     !
;  2495          2609  2     IF .ADDRPTR[DBG$B_AED_SIGNATURE] EQL DBG$K_AED
;  2496          2610  2     THEN
;  2497          2611  3         BEGIN
;  2498          2612  3         IF .ADDRPTR[DBG$B_AED_TYPE] EQL DBG$K_PERM_DESC
;  2499          2613  3         THEN
;  2500          2614  4             BEGIN
;  2501          2615  4             LOCAL
;  2502          2616  4                 REGNUM,                         ! Register Number
;  2503          2617  4                 PERM_DESC: REF DBG$PERMSD;      ! Ptr to the permanent symbol desc.
;  2504          2618  4
;  2505          2619  4
;  2506          2620  4             ! We do, so initialize perm_desc to the AED value field,
;  2507          2621  4             ! which points to a permanent symbol descriptor.
;  2508          2622  4             !
;  2509          2623  4             PERM_DESC = .ADDRPTR[DBG$L_AED_VALUE];
;  2510          2624  4
;  2511          2625  4
```

```
;  2512          2626  4              ! Calculate the register number from the perm_desc ID field.
;  2513          2627  4              !
;  2514          2628  4              REGNUM = .PERM_DESC[DBG$B_PERMSD_ID] - DBG$K_R0;
;  2515          2629  4
;  2516          2630  4
;  2517          2631  4              ! Get the address of the register from DBG$REG_VALUES.
;  2518          2632  4              !
;  2519          2633  4              ADDRESS_DESC[DBG$L_ADDRESS_BYTE_ADDR] = DBG$REG_VALUES[.REGNUM];
;  2520          2634  4              ADDRESS_DESC[DBG$L_ADDRESS_BIT_OFFSET] = 0;
;  2521          2635  4              RETURN STS$K_SUCCESS;
;  2522          2636  3              END;
;  2523          2637  3
;  2524          2638  2          END;
;  2525          2639  2
;  2526          2640  2
;  2527          2641  2      ! Any other kinds call DBG$NGET_ADDRESS to get the addr. desc.
;  2528          2642  2      !
;  2529          2643  2      IF NOT DBG$NGET_ADDRESS (.ADDRPTR, .ADDRESS_DESC, TYPE, FALSE, .MESSAGE_VECT)
;  2530          2644  2      THEN
;  2531          2645  2          RETURN STS$K_SEVERE;
;  2532          2646  2
;  2533          2647  2      RETURN STS$K_SUCCESS;
;  2534          2648  1      END;


                                        0004 00000 GET_ADDRESS_DESC:
                                                   .WORD   Save R2                                          ;  2569
                              5E            04  C2 00002          SUBL2   #4, SP                           ;
                              52        04  AC  D0 00005          MOVL    ADDRPTR, R2                      ;  2609
                          84  8F        02  A2  91 00009          CMPB    2(R2), #132                      ;
                                            23  12 0000E          BNEQ    1$                               ;
                          7B  8F            62  91 00010          CMPB    (R2), #123                       ;  2612
                                            1D  12 00014          BNEQ    1$                               ;
                              50        04  A2  D0 00016          MOVL    4(R2), PERM_DESC                 ;  2623
                              51            60  9A 0001A          MOVZBL  (PERM_DESC), REGNUM              ;  2628
                              51      FF38  C1  9E 0001D          MOVAB   -200(R1), REGNUM                 ;
                              50        08  AC  D0 00022          MOVL    ADDRESS_DESC, R0                 ;  2633
                              60 00000000G 0041  DE 00026          MOVAL   DBG$REG_VALUES[REGNUM], (R0)     ;
                                        04  A0  D4 0002E          CLRL    4(R0)                            ;  2634
                                            1B  11 00031          BRB     2$                               ;  2635
                                        0C  AC  DD 00033 1$:      PUSHL   MESSAGE_VECT                     ;  2643
                                            7E  D4 00036          CLRL    -(SP)                            ;
                                        08  AE  9F 00038          PUSHAB  TYPE                             ;
                                        08  AC  DD 0003B          PUSHL   ADDRESS_DESC                     ;
                                            52  DD 0003E          PUSHL   R2                               ;
                      00000000G         00      FB 00040          CALLS   #5, DBG$NGET_ADDRESS             ;
                                        04      E8 00047          BLBS    R0, 2$                           ;
                                        50      D0 0004A          MOVL    #4, R0                           ;  2645
                                                04 0004D          RET                                      ;
                                        50      D0 0004E 2$:      MOVL    #1, R0                           ;  2647
                                                04 00051          RET                                      ;  2648

; Routine Size:  82 bytes,    Routine Base:  DBG$CODE + 1063
```

```
;  2536          2649  1 ROUTINE GSTADDRESS(RSTPTR) =
;  2537          2650  1 !
;  2538          2651  1 ! FUNCTION:
;  2539          2652  1 !       This routine get the address of GST from GST's RST entry.
;  2540          2653  1 !
;  2541          2654  1 ! INPUTS:
;  2542          2655  1 !       RSTPTR - Pointer to GST's RST entry.
;  2543          2656  1 !
;  2544          2657  1 ! OUTPUT:
;  2545          2658  1 !       The address of GST.
;  2546          2659  1 !
;  2547          2660  1
;  2548          2661  2     BEGIN
;  2549          2662  2
;  2550          2663  2     MAP
;  2551          2664  2         RSTPTR: REF RST$ENTRY;          ! Pointer to GST's RST entry
;  2552          2665  2
;  2553          2666  2     LOCAL
;  2554          2667  2         DSTPTR: REF DST$RECORD,         ! Pointer to DST record
;  2555          2668  2         GST_VALUE;                      ! Address of Global symbo
;  2556          2669  2
;  2557          2670  2
;  2558          2671  2         CASE .RSTPTR[RST$B_KIND] FROM RST$K_KIND_MINIMUM TO
;  2559          2672  2                                       RST$K_KIND_MAXIMUM OF
;  2560          2673  2             SET
;  2561          2674  2
;  2562          2675  2             [RST$K_ROUTINE]:
;  2563          2676  3                 BEGIN
;  2564          2677  3                 GST_VALUE = .RSTPTR[RST$L_STARTADDR];
;  2565          2678  2                 END;
;  2566          2679  2
;  2567          2680  2             [RST$K_DATA]:
;  2568          2681  3                 BEGIN
;  2569          2682  3                 DSTPTR = .RSTPTR[RST$L_DSTPTR];
;  2570          2683  3                 GST_VALUE = .DSTPTR[DST$L_VALUE];
;  2571          2684  2                 END;
;  2572          2685  2
;  2573          2686  2             [INRANGE, OUTRANGE]:
;  2574          2687  2                 $DBG_ERROR('DBGSYMBLZ\GSTADDRESS');
;  2575          2688  2
;  2576          2689  2             TES;
;  2577          2690  2
;  2578          2691  2         RETURN .GST_VALUE;
;  2579          2692  2
;  2580          2693  1     END;


                                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

41  54  53  47  5C  5A  4C  42  4D  59  53  47  42  44  14  00378 P.ADP:  .ASCII  <20>\DBGSYMBLZ\<92>\GSTADDRESS\                ;
                                    53  53  45  52  44  44  00387                                                               ;


                                                                .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0
```

```
                                                       0000 00000 GSTADDRESS:
                                                                       .WORD   Save nothing                    ; 2649
                                    50         04   AC   D0 00002             MOVL    RSTPTR, R0                      ; 2671
                      0D            00         14   A0   8F 00006             CASEB   20(R0), #0, #13
      001C            0033          001C       001C        0000B 1$:          .WORD   2$-1$,-
      001C            0039          001C       001C        00013                      2$-1$,-
      001C            001C          001C       001C        0001B                      3$-1$,-
                                    001C       001C        00023                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      4$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$,-
                                                                                      2$-1$
                          00000000'   EF   9F 00027 2$:           PUSHAB  P.ADP                           ; 2687
                                      01   DD 0002D               PUSHL   #1
                          00028362    8F   DD 0002F               PUSHL   #164706
              00000000G   00          03   FB 00035               CALLS   #3, LIB$SIGNAL
                                      0E   11 0003C               BRB     5$
                    51         18     A0   D0 0003E 3$:           MOVL    24(R0), GST_VALUE               ; 2677
                                      08   11 00042               BRB     5$                              ; 2671
                    50         0C     A0   D0 00044 4$:           MOVL    12(R0), DSTPTR                  ; 2682
                    51         03     A0   D0 00048               MOVL    3(DSTPTR), GST_VALUE            ; 2683
                    50                51   D0 0004C 5$:           MOVL    GST_VALUE, R0                   ; 2691
                                      04      0004F               RET                                     ; 2693
```

; Routine Size: 80 bytes, Routine Base: DBG$CODE + 10B5

; 2581 2694 1

```
;2583   2695  1 ROUTINE IS_SYMBOL_BOUND_TO_REG (SYMID, REGNUM) =
;2584   2696  1 !
;2585   2697  1 ! FUNCTION
;2586   2698  1 !       This function accepts a symid as input, and determines if the symbol
;2587   2699  1 !       associated with this symid is bound to the register regnum.
;2588   2700  1 !
;2589   2701  1 ! INPUTS
;2590   2702  1 !       SYMID   - Pointer to symbol's RST entry.
;2591   2703  1 !
;2592   2704  1 !       REGNUM  - The register number in question.
;2593   2705  1 !
;2594   2706  1 ! OUTPUTS
;2595   2707  1 !       The routine returns a DST value spec. if the symbol is bound to regnum
;2596   2708  1 !       in some way; otherwise, it returns false.
;2597   2709  1 !
;2598   2710  1
;2599   2711  2     BEGIN
;2600   2712  2
;2601   2713  2     MAP
;2602   2714  2         SYMID           : REF RST$ENTRY;                ! Ptr. to symbol's RST entry.
;2603   2715  2
;2604   2716  2     LOCAL
;2605   2717  2         VALSPEC         : REF DST$VAL_SPEC,             ! Ptr to DST record's
;2606   2718  2                                                         ! value spec.
;2607   2719  2         BLITRLR         : REF DST$BLI_TRAILER1,         ! Ptr to Bliss DST record
;2608   2720  2                                                         ! trailer.
;2609   2721  2         BLIVALSPEC      : BLOCK[8, BYTE]                ! Value spec buffer for
;2610   2722  2                           FIELD (DST$VS_HDR_FIELDS),    ! Bliss special cases DST.
;2611   2723  2         DSTPTR          : REF DST$RECORD;               ! Ptr. to DST record value spec.
;2612   2724  2
;2613   2725  2
;2614   2726  2     $ABORT_ON_CONTROL_Y;
;2615   2727  2
;2616   2728  2
;2617   2729  2     ! See if the entry is a data type.
;2618   2730  2     !
;2619   2731  2     IF (.SYMID[RST$B_KIND] EQL RST$K_DATA) OR
;2620   2732  3        (.SYMID[RST$B_KIND] EQL RST$K_TYPCOMP)
;2621   2733  2     THEN
;2622   2734  3         BEGIN
;2623   2735  3
;2624   2736  3
;2625   2737  3         ! It was, so get the corresponding DST entry.
;2626   2738  3         !
;2627   2739  3         DSTPTR = .SYMID[RST$L_DSTPTR];
;2628   2740  3
;2629   2741  3
;2630   2742  3         ! Now get the value spec.
;2631   2743  3         !
;2632   2744  3         CASE .DSTPTR[DST$B_TYPE] FROM 0 TO 255 OF
;2633   2745  3             SET
;2634   2746  3
;2635   2747  3
;2636   2748  3             ! Get the value spec for those DST records
;2637   2749  3             ! that can be represented by the standard
;2638   2750  3             ! format DST.
;2639   2751  3             !
```

```
;  2640          2752  3          [DSC$K_DTYPE_LOWEST TO DSC$K_DTYPE_HIGHEST,
;  2641          2753  3           DST$K_BOOL, DST$K_SEPTYP, DST$K_LBLORLIT,
;  2642          2754  3           DST$K_ENTRY, DST$R_RECBEG, DST$R_ENUMELT]:
;  2643          2755  4              BEGIN
;  2644          2756  4              VALSPEC = DSTPTR[DST$B_VFLAGS];
;  2645          2757  3              END;
;  2646          2758  3
;  2647          2759  3
;  2648          2760  3          ! Handle the Bliss Special Cases DST Record.
;  2649          2761  3          !
;  2650          2762  3          [DST$K_BLI]:
;  2651          2763  4              BEGIN
;  2652          2764  4              BLIVALSPEC[DST$B_VS_VFLAGS] = .DSTPTR[DST$B_BLI_VFLAGS];
;  2653          2765  4              BLITRLR = DSTPTR[DST$A_BLI_TRLR1] + .DSTPTR[DST$B_BLI_LNG];
;  2654          2766  4              BLIVALSPEC[DST$L_VS_VALUE] = .BLITRLR[DST$L_BLI_VALUE];
;  2655          2767  4              VALSPEC = BLIVALSPEC[DST$B_VS_VFLAGS];
;  2656          2768  3              END;
;  2657          2769  3
;  2658          2770  3
;  2659          2771  3          ! Other types of symbols cannot be bound to a
;  2660          2772  3          ! register, so ignore them.
;  2661          2773  3          !
;  2662          2774  3          [INRANGE]:
;  2663          2775  3              RETURN FALSE;
;  2664          2776  3
;  2665          2777  3          ! Anything else is an illegal DST type.
;  2666          2778  3          !
;  2667          2779  3          [OUTRANGE]:
;  2668          2780  3              SIGNAL (DBG$_INVDSTREC);
;  2669          2781  3
;  2670          2782  3          TES;
;  2671          2783  3
;  2672          2784  3
;  2673          2785  3          ! Loop through trailing value spec if present to get to actual
;  2674          2786  3          ! value spec.
;  2675          2787  3          !
;  2676          2788  3          WHILE .VALSPEC[DST$B_VS_VFLAGS] EQL DST$K_VFLAGS_TVS DO
;  2677          2789  3              VALSPEC = VALSPEC[DST$A_VS_TVS_BASE] + .VALSPEC[DST$L_VS_TVS_OFFSET];
;  2678          2790  3
;  2679          2791  3          SELECTONE TRUE OF
;  2680          2792  3              SET
;  2681          2793  3
;  2682          2794  3
;  2683          2795  3              ! Now, look at the VFLAGS field.
;  2684          2796  3              !
;  2685          2797  3              [.VALSPEC[DST$B_VS_VFLAGS] EQL DST$K_VFLAGS_NOVAL]:
;  2686          2798  3                  RETURN FALSE;
;  2687          2799  3
;  2688          2800  3
;  2689          2801  3              ! If valspec gives the offset to a descriptor, just return.
;  2690          2802  3              !
;  2691          2803  3              [.VALSPEC[DST$B_VS_VFLAGS] EQL DST$K_VFLAGS_DSC]:
;  2692          2804  3                  RETURN FALSE;
;  2693          2805  3
;  2694          2806  3
;  2695          2807  3              ! If valspec gives a bit offset, return.
;  2696          2808  3              !
```

```
;  2697          2809  3          [.VALSPEC[DST$B_VS_VFLAGS] EQL DST$K_VFLAGS_BITOFFS]:
;  2698          2810  3              RETURN FALSE;
;  2699          2811  3
;  2700          2812  3
;  2701          2813  3          ! If valspec is a value-spec-follows, is a complex address.
;  2702          2814  3          !
;  2703          2815  3          [.VALSPEC[DST$B_VS_VFLAGS] EQL DST$K_VS_FOLLOWS]:
;  2704          2816  3              RETURN FALSE;
;  2705          2817  3
;  2706          2818  3
;  2707          2819  3          ! Now look at the VALKIND field for VFLAG non-above.
;  2708          2820  3          !
;  2709          2821  3          [.VALSPEC[DST$V_VS_VALKIND] EQL DST$K_VALKIND_LITERAL]:
;  2710          2822  3              RETURN FALSE;
;  2711          2823  3
;  2712          2824  3
;  2713          2825  3          [.VALSPEC[DST$V_VS_VALKIND] EQL DST$K_VALKIND_DESC]:
;  2714          2826  3              RETURN FALSE;
;  2715          2827  3
;  2716          2828  3
;  2717          2829  3          ! If valkind is valkind_reg, then check and see if the value
;  2718          2830  3          ! field is equal to regnum.  If so, then return the valspec, as
;  2719          2831  3          ! the symbol is bound to this register.
;  2720          2832  3          !
;  2721          2833  3          [.VALSPEC[DST$V_VS_VALKIND] EQL DST$K_VALKIND_REG]:
;  2722          2834  4              BEGIN
;  2723          2835  4              IF .VALSPEC[DST$L_VS_VALUE] NEQ .REGNUM
;  2724          2836  4              THEN
;  2725          2837  4                  RETURN FALSE;
;  2726          2838  4
;  2727          2839  4              RETURN .VALSPEC;
;  2728          2840  3              END;
;  2729          2841  3
;  2730          2842  3
;  2731          2843  3          [.VALSPEC[DST$V_VS_VALKIND] EQL DST$K_VALKIND_ADDR]:
;  2732          2844  3
;  2733          2845  3
;  2734          2846  3              ! If there is a register displacement, check to see if the regnum
;  2735          2847  3              ! field is equal to regnum.  If so, return valspec.
;  2736          2848  3              !
;  2737          2849  4              BEGIN
;  2738          2850  4              IF .VALSPEC[DST$V_VS_DISP]
;  2739          2851  4              THEN
;  2740          2852  5                  BEGIN
;  2741          2853  5                  IF .VALSPEC[DST$V_VS_REGNUM] NEQ .REGNUM
;  2742          2854  5                  THEN
;  2743          2855  5                      RETURN FALSE;
;  2744          2856  5
;  2745          2857  5                  RETURN .VALSPEC;
;  2746          2858  4                  END;
;  2747          2859  3              END;
;  2748          2860  3
;  2749          2861  3          TES;
;  2750          2862  2      END;
;  2751          2863  2
;  2752          2864  2
;  2753          2865  2  ! Otherwise, just return false.
```

```
;  2754          2866  2     !
;  2755          2867  2     RETURN FALSE;
;  2756          2868  1     END;


                                                000C 00000 IS_SYMBOL_BOUND_TO_REG:
                                                           .WORD   Save R2,R3                                  ;  2695
                                     53 00000000G   00  9E 00002          MOVAB   LIB$SIGNAL, R3
                                     5E             08  C2 00009          SUBL2   #8, SP
                                  09 00000000G      00  E1 0000C          BBC     #1, DBG$GV_CONTROL+1, 1$    ;  2723
                                        000280E8    8F  DD 00014          PUSHL   #164072
                                     63             01  FB 0001A          CALLS   #1, LIB$SIGNAL
                                     50       04    AC  D0 0001D 1$:      MOVL    SYMID, R0                   ;  2731
                                     06       14    A0  91 00021          CMPB    20(R0), #6
                                                    09  13 00025          BEQL    2$
                                     0A       14    A0  91 00027          CMPB    20(R0), #10                 ;  2732
                                                    03  13 0002B          BEQL    2$
                                                0285 31 0002D          BRW     10$
                                     52       0C    A0  D0 00030 2$:      MOVL    12(R0), DSTPTR              ;  2739
                                 FF   8F      00    01  A2  8F 00034      CASEB   1(DSTPTR), #0, #255         ;  2744
                            020B        020B        020B        0211        0003A 3$:      .WORD   5$-3$,-
                            020B        020B        020B        020B        00042          4$-3$,-
                            020B        020B        020B        020B        0004A          4$-3$,-
                            020B        020B        020B        020B        00052          4$-3$,-
                            020B        020B        020B        020B        0005A          4$-3$,-
                            020B        020B        020B        020B        00062          4$-3$,-
                            020B        020B        020B        020B        0006A          4$-3$,-
                            020B        020B        020B        020B        00072          4$-3$,-
                            020B        020B        020B        020B        0007A          4$-3$,-
                            027B        020B        020B        020B        00082          4$-3$,-
                            027B        027B        027B        027B        0008A          4$-3$,-
                            027B        027B        027B        027B        00092          4$-3$,-
                            027B        027B        027B        027B        0009A          4$-3$,-
                            027B        027B        027B        027B        000A2          4$-3$,-
                            027B        027B        027B        027B        000AA          4$-3$,-
                            027B        027B        027B        027B        000B2          4$-3$,-
                            027B        027B        027B        027B        000BA          4$-3$,-
                            027B        027B        027B        027B        000C2          4$-3$,-
                            027B        027B        027B        027B        000CA          4$-3$,-     5
                            027B        027B        027B        027B        000D2          4$-3$,-     2
                            027B        027B        027B        027B        000DA          4$-3$,-
                            027B        027B        027B        027B        000E2          4$-3$,-
                            027B        027B        027B        027B        000EA          4$-3$,-     5
                            027B        027B        027B        027B        000F2          4$-3$,-     2
                            027B        027B        027B        027B        000FA          4$-3$,-
                            027B        027B        027B        027B        00102          4$-3$,-
                            027B        027B        027B        027B        0010A          4$-3$,-
                            027B        027B        027B        027B        00112          4$-3$,-
                            027B        027B        027B        027B        0011A          4$-3$,-
                            027B        027B        027B        027B        00122          4$-3$,-
                            027B        027B        027B        027B        0012A          4$-3$,-
                            027B        027B        027B        027B        00132          4$-3$,-
                            027B        027B        027B        027B        0013A          4$-3$,-
                            027B        027B        027B        027B        00142          4$-3$,-
```

```
027B    027B    027B    027B    0014A        4$-3$,-          ;
027B    027B    027B    027B    00152        4$-3$,-          ;
027B    027B    027B    027B    0015A        4$-3$,-          ;
027B    027B    027B    027B    00162        4$-3$,-          ;
027B    027B    027B    027B    0016A        10$-3$,-         ;
027B    020B    027B    027B    00172        10$-3$,-         ;
020B    027B    027B    027B    0017A        10$-3$,-         ;
027B    027B    027B    020B    00182        10$-3$,-         ;
020B    027B    027B    027B    0018A        10$-3$,-         ;
027B    027B    027B    027B    00192        10$-3$,-         ;
027B    027B    027B    027B    0019A        10$-3$,-         ;
027B    027B    020B    027B    001A2        10$-3$,-         ;
027B    020B    027B    027B    001AA        10$-3$,-         ;
027B    027B    027B    027B    001B2        10$-3$,-         ;
027B    027B    027B    027B    001BA        10$-3$,-         ;
027B    027B    027B    027B    001C2        10$-3$,-         ;
027B    027B    027B    027B    001CA        10$-3$,-         ;
027B    027B    027B    027B    001D2        10$-3$,-         ;
027B    027B    027B    027B    001DA        10$-3$,-         ;
027B    027B    027B    027B    001E2        10$-3$,-         ;
027B    027B    027B    027B    001EA        10$-3$,-         ;
027B    027B    027B    027B    001F2        10$-3$,-         ;
027B    027B    027B    027B    001FA        10$-3$,-         ;
027B    027B    027B    027B    00202        10$-3$,-         ;
027B    027B    027B    027B    0020A        10$-3$,-         ;
027B    027B    027B    027B    00212        10$-3$,-         ;
027B    027B    027B    027B    0021A        10$-3$,-         ;
027B    027B    027B    027B    00222        10$-3$,-         ;
027B    027B    027B    027B    0022A        10$-3$,-         ;
027B    027B    027B    027B    00232        10$-3$,-         ;
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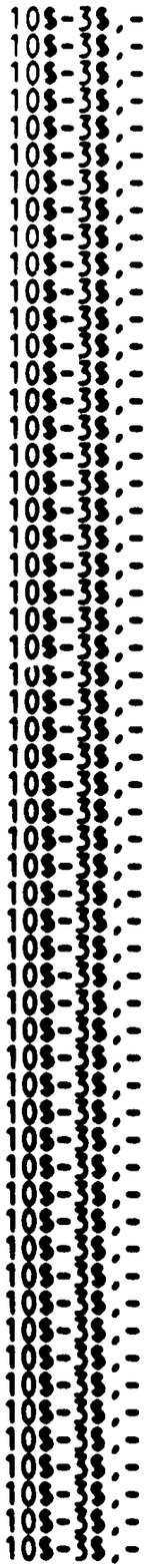

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                                                        10$-3$                            ;
    0002832A   8F  DD 0023A          PUSHL   #164650                                      ; 2780
63             01  FB 00240          CALLS   #1, LIB$SIGNAL                               ;
               1A  11 00243          BRB     6$                                           ;
50      02     A2  9E 00245 4$:      MOVAB   2(R2), VALSPEC                               ; 2756
               14  11 00249          BRB     6$                                           ; 2744
6E      04     A2  90 0024B 5$:      MOVB    4(DSTPTR), BLIVALSPEC                        ; 2764
```

```
                                51      02   A2  9A 0024F          MOVZBL  2(DSTPTR), R1                           ;2765
                                51      03 A142  9E 00253          MOVAB   3(R1)[DSTPTR], BLITRLR                  ;
                             01    AE          61  D0 00258          MOVL    (BLITRLR), BLIVALSPEC+1                 ;2766
                                50          6E  9E 0025C          MOVAB   BLIVALSPEC, VALSPEC                     ;2767
                             FB    8F          60  91 0025F 6$:      CMPB    (VALSPEC), #251                         ;2788
                                           0B  12 00263          BNEQ    7$                                      ;
                      51                   50   01  A0  C1 00265          ADDL3   1(VALSPEC), VALSPEC, R1         ;2789
                                           50   05  A1  9E 0026A          MOVAB   5(R1), VALSPEC                  ;
                                           EF  11 0026E          BRB     6$                                      ;
                             80    8F          60  91 00270 7$:      CMPB    (VALSPEC), #128                         ;2797
                                           3F  13 00274          BEQL    10$                                     ;
                             FA    8F          60  91 00276          CMPB    (VALSPEC), #250                         ;2803
                                           39  13 0027A          BEQL    10$                                     ;
                             FF    8F          60  91 0027C          CMPB    (VALSPEC), #255                         ;2809
                                           33  13 00280          BEQL    10$                                     ;
                             FD    8F          60  91 00282          CMPB    (VALSPEC), #253                         ;2815
                                           2D  13 00286          BEQL    10$                                     ;
                                03         60  93 00288          BITB    (VALSPEC), #3                           ;2821
                                           28  13 0028B          BEQL    10$                                     ;
          02            60          02         00  ED 0028D          CMPZV   #0, #2, (VALSPEC), #2                   ;2825
                                           21  13 00292          BEQL    10$                                     ;
          03            60          02         00  ED 00294          CMPZV   #0, #2, (VALSPEC), #3                   ;2833
                                           07  12 00299          BNEQ    8$                                      ;
                             08    AC    01   A0  D1 0029B          CMPL    1(VALSPEC), REGNUM                      ;2835
                                           11  11 002A0          BRB     9$                                      ;
          01            60          02         00  ED 002A2 8$:      CMPZV   #0, #2, (VALSPEC), #1                   ;2843
                                           0C  12 002A7          BNEQ    10$                                     ;
                        08          60         03  E1 002A9          BBC     #3, (VALSPEC), 10$                      ;2850
       08   AC          60          04         04  ED 002AD          CMPZV   #4, #4, (VALSPEC), REGNUM               ;2853
                                           02  13 002B3 9$:      BEQL    11$                                     ;
                                           50  D4 002B5 10$:     CLRL    R0                                      ;2868
                                           04 002B7 11$:     RET                                                 ;

; Routine Size:  696 bytes,    Routine Base:  DBG$CODE + 1105
```

```
;  2758          2869  1 ROUTINE IS_SYMBOL_PSECT(RSTPTR) =
;  2759          2870  1 !
;  2760          2871  1 ! FUNCTION
;  2761          2872  1 !       This routine determines whether a given symbol is a PSECT or not.
;  2762          2873  1 !       It accepts as input a SYMID (the given symbol's RST pointer), and it
;  2763          2874  1 !       returns TRUE if that SYMID is the SYMID of a PSECT; it returns FALSE
;  2764          2875  1 !       otherwise.  PSECTs are represented by Label RST Entries whose DST
;  2765          2876  1 !       pointer points to a PSECT DST Record.
;  2766          2877  1 !
;  2767          2878  1 !       PSECT names are less desirable symbolizations of addresses than any
;  2768          2879  1 !       other kind of label.
;  2769          2880  1 !
;  2770          2881  1 ! INPUTS
;  2771          2882  1 !       RSTPTR  - A pointer to the RST entry of the symbol whose identity as
;  2772          2883  1 !                 a PSECT is to be established.
;  2773          2884  1 !
;  2774          2885  1 ! OUTPUTS
;  2775          2886  1 !       The routine returns TRUE if the RSTPTR symbol is a PSECT.  It returns
;  2776          2887  1 !                 FALSE otherwise.
;  2777          2888  1 !
;  2778          2889  1
;  2779          2890  2     BEGIN
;  2780          2891  2
;  2781          2892  2     MAP
;  2782          2893  2         RSTPTR: REF RST$ENTRY;          ! Pointer to symbol's RST entry
;  2783          2894  2
;  2784          2895  2     LOCAL
;  2785          2896  2         DSTPTR: REF DST$RECORD;         ! Pointer to symbol's DST record
;  2786          2897  2
;  2787          2898  2
;  2788          2899  2
;  2789          2900  2     ! If this is a Label RST Entry, see if its DST pointer points to a PSECT
;  2790          2901  2     ! DST record.  If so, return TRUE.
;  2791          2902  2     !
;  2792          2903  2     IF .RSTPTR[RST$B_KIND] EQL RST$K_LABEL
;  2793          2904  2     THEN
;  2794          2905  3         BEGIN
;  2795          2906  3         DSTPTR = .RSTPTR[RST$L_DSTPTR];
;  2796          2907  3         IF .DSTPTR[DST$B_TYPE] EQL DST$K_PSECT THEN RETURN TRUE;
;  2797          2908  2         END;
;  2798          2909  2
;  2799          2910  2
;  2800          2911  2     ! It is not a PSECT--return FALSE.
;  2801          2912  2     !
;  2802          2913  2     RETURN FALSE;
;  2803          2914  2
;  2804          2915  1     END;


                              0000 00000 IS_SYMBOL_PSECT:
                                                 .WORD   Save nothing                    ; 2869
                   50    04   AC  D0 00002          MOVL    RSTPTR, R0                 ; 2903
                   04    14   A0  91 00006          CMPB    20(R0), #4                 :
                              0F  12 0000A          BNEQ    1$                         :
```

```
                    50      0C    A0  D0 0000C          MOVL    12(R0), DSTPTR                  ; 2906
                BB  8F      01    A0  91 00010          CMPB    1(DSTPTR), #184                 ; 2907
                                  04  12 00015          BNEQ    1$                              ;
                    50            01  D0 00017          MOVL    #1, R0                          ;
                                      04 0001A          RET                                     ;
                                  50  D4 0001B 1$:      CLRL    R0                              ; 2913
                                      04 0001D          RET                                     ; 2915

; Routine Size:  30 bytes,    Routine Base:  DBG$CODE + 13BD

; 2805          2916  1
```

```
;  2807          2917  1 ROUTINE PRINT_REGNAME (ADDRESS):  NOVALUE =
;  2808          2918  1 !
;  2809          2919  1 ! FUNCTION
;  2810          2920  1 !       This routine accepts an address in register address area and gets a
;  2811          2921  1 !       register descriptor by calling DBG$STA_ADDRESS_TO_REGDESCR.  Then
;  2812          2922  1 !       converts register descriptor into a counted ASCII name.
;  2813          2923  1 !
;  2814          2924  1 !
;  2815          2925  1 ! INPUTS
;  2816          2926  1 !       ADDRESS - The input address which is a register address.
;  2817          2927  1 !
;  2818          2928  1 ! OUTPUTS
;  2819          2929  1 !       None.
;  2820          2930  1 !
;  2821          2931  1
;  2822          2932  2     BEGIN
;  2823          2933  2
;  2824          2934  2     LOCAL
;  2825          2935  2         NAMEPTR: REF VECTOR[,BYTE],     ! Pointer to register name
;  2826          2936  2         REGDESCR: DBG$REGDESCR;         ! Register Descriptor
;  2827          2937  2
;  2828          2938  2
;  2829          2939  2     REGDESCR = DBG$STA_ADDRESS_TO_REGDESCR(.ADDRESS);
;  2830          2940  2     NAMEPTR = DBG$STA_REGISTER_NAME(.REGDESCR);
;  2831          2941  2     DBG$PRINT(UPLIT BYTE(%ASCIC '!AC'), .NAMEPTR);
;  2832          2942  2     RETURN 0;
;  2833          2943  1     END;

                                                .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0
                                43  41  21  03  0038D P.ADQ:  .ASCII  <3>\!AC\                                 ;

                                                .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                    0000 00000 PRINT_REGNAME:
                                                .WORD   Save nothing                                        ; 2917
                                04  AC  DD 00002          PUSHL   ADDRESS                                    ; 2939
00000000G  00                       01  FB 00005          CALLS   #1, DBG$STA_ADDRESS_TO_REGDESCR            ;
                                    50  DD 0000C          PUSHL   REGDESCR                                   ; 2940
00000000G  00                       01  FB 0000E          CALLS   #1, DBG$STA_REGISTER_NAME                  ;
                                    50  DD 00015          PUSHL   NAMEPTR                                    ; 2941
                    00000000'   EF  9F 00017          PUSHAB  P.ADQ                                      ;
00000000G  00                       02  FB 0001D          CALLS   #2, DBG$PRINT                              ;
                                        04 00024          RET                                                ; 2943

; Routine Size:  37 bytes,    Routine Base:  DBG$CODE + 13DB
```

```
;  2835          2944  1 ROUTINE SEARCH_MODULE_SAT (PROG_SATPTR, ADDRESS, P_MODRSTPTR, P_RSTPTR,
;  2836          2945  1                           P_BYTE_OFFSET, PRINT_FLAG):  NOVALUE =
;  2837          2946  1 !
;  2838          2947  1 ! FUNCTION
;  2839          2948  1 !       This routine searches a set module's SAT to determine what static
;  2840          2949  1 !       symbol most immediately precedes the given address.  The routine
;  2841          2950  1 !       returns the module RST pointer, the symbol RST pointer, and the byte
;  2842          2951  1 !       offset.
;  2843          2952  1 !
;  2844          2953  1 ! INPUTS
;  2845          2954  1 !       ADDRESS         - The 32 bit address we want to symbolize.
;  2846          2955  1 !
;  2847          2956  1 !       PROG_SATPTR     - The pointer into the program level SAT.
;  2848          2957  1 !
;  2849          2958  1 !       PRINT_FLAG      - Flag to indicate the symbol to be outputed, in
;  2850          2959  1 !                         here we print the symbols were not picked up
;  2851          2960  1 !                         by this routine which all has the same address.
;  2852          2961  1 !
;  2853          2962  1 ! OUTPUTS
;  2854          2963  1 !       P_MODRSTPTR     - The module RST entry for the symbol if one is found.
;  2855          2964  1 !
;  2856          2965  1 !       P_RSTPTR        - The RST entry for the symbol if a symbolization is
;  2857          2966  1 !                         possible.
;  2858          2967  1 !
;  2859          2968  1 !       P_BYTE_OFFSET   - The byte offset.
;  2860          2969  1 !
;  2861          2970  1
;  2862          2971  2     BEGIN
;  2863          2972  2
;  2864          2973  2     BIND
;  2865          2974  2         BYTE_OFFSET = .P_BYTE_OFFSET,               ! Byte offset.
;  2866          2975  2         RSTPTR      = .P_RSTPTR     : REF RST$ENTRY, ! The symbol's RST pointer.
;  2867          2976  2         MODRSTPTR   = .P_MODRSTPTR : REF RST$ENTRY; ! The module RST pointer.
;  2868          2977  2
;  2869          2978  2     MAP
;  2870          2979  2         PROG_SATPTR     : REF SAT$ENTRY;     ! The program's SAT pointer.
;  2871          2980  2
;  2872          2981  2     LOCAL
;  2873          2982  2         BEST_SAT        : REF SAT$ENTRY,
;  2874          2983  2         NAME            : REF VECTOR[,BYTE], ! Pointer to ASCIC string
;  2875          2984  2         NEXT_SATPTR     : REF SAT$ENTRY,     ! The next SAT ptr in the chain.
;  2876          2985  2         SATPTR          : REF SAT$ENTRY,     ! The module's SAT pointer.
;  2877          2986  2         SATRST          : REF RST$ENTRY,     ! Pointer RST entry in SAT
;  2878          2987  2         TMPSAT          : REF SAT$ENTRY;     ! Temp. SAT.
;  2879          2988  2
;  2880          2989  2
;  2881          2990  2     ! Initialize module RST pointer, as this is used to indicate the success
;  2882          2991  2     ! of this routine.
;  2883          2992  2     !
;  2884          2993  2     $ABORT_ON_CONTROL_Y;
;  2885          2994  2     MODRSTPTR = 0;
;  2886          2995  2     RSTPTR = 0;
;  2887          2996  2
;  2888          2997  2
;  2889          2998  2     MODRSTPTR = .PROG_SATPTR[SAT$L_RSTPTR];
;  2890          2999  2     OWN_MODULE_BEGIN = .PROG_SATPTR[SAT$L_START];
;  2891          3000  2     OWN_MODULE_END = .PROG_SATPTR[SAT$L_END];
```

```
;  2892          3001  2     IF NOT .MODRSTPTR[RST$V_MODSET] THEN RETURN 0;
;  2893          3002  2
;  2894          3003  2
;  2895          3004  2     ! If the module is set, search through the module's SAT looking for
;  2896          3005  2     ! a symbol whose address matches the input.
;  2897          3006  2     !
;  2898          3007  2     SATPTR = .MODRSTPTR[RST$L_SAT_PTR];
;  2899          3008  2     IF .SATPTR[SAT$L_START] GTRA .ADDRESS THEN RETURN 0;
;  2900          3009  2
;  2901          3010  2
;  2902          3011  2     ! Determine the address range.
;  2903          3012  2     !
;  2904          3013  2     BEST_SAT = 0;
;  2905          3014  2     TMPSAT = 0;
;  2906          3015  2     NEXT_SATPTR = .SATPTR[SAT$L_FLINK];
;  2907          3016  2     WHILE .NEXT_SATPTR NEQ 0 DO
;  2908          3017  3         BEGIN
;  2909          3018  3         $ABORT_ON_CONTROL_Y;
;  2910          3019  3         IF .SATPTR[SAT$L_END] GEQA .ADDRESS
;  2911          3020  3         THEN
;  2912          3021  4             BEGIN
;  2913          3022  4             IF NOT IS_SYMBOL_PSECT(.SATPTR[SAT$L_RSTPTR])
;  2914          3023  4             THEN
;  2915          3024  5                 BEGIN
;  2916          3025  5                 IF .TMPSAT NEQ 0 AND
;  2917          3026  5                     .ADDRESS LEQ .TMPSAT[SAT$L_END]
;  2918          3027  5                 THEN
;  2919          3028  6                     BEGIN
;  2920          3029  6                     BEST_SAT = .TMPSAT;
;  2921          3030  6                     TMPSAT = 0;
;  2922          3031  6
;  2923          3032  6
;  2924          3033  6                 ! If the print_flag is set, output the symbol we did not
;  2925          3034  6                 ! choose.
;  2926          3035  6                 !
;  2927          3036  6                 IF .PRINT_FLAG
;  2928          3037  6                 THEN
;  2929          3038  7                     BEGIN
;  2930          3039  7
;  2931          3040  7
;  2932          3041  7                     ! Build the ASCII string for the symbol.
;  2933          3042  7                     !
;  2934          3043  7                     DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;  2935          3044  7                     DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  2936          3045  7                     DBG$NEWLINE();
;  2937          3046  7                     DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  2938          3047  7                     DBG$PRINT_SYMBOL_PATHNAME(.SATPTR[SAT$L_RSTPTR]);
;  2939          3048  7                     BYTE_OFFSET = .ADDRESS - .SATPTR[SAT$L_START];
;  2940          3049  7                     IF .BYTE_OFFSET NEQ 0
;  2941          3050  7                     THEN
;  2942          3051  7                         DBG$PRINT_OFFSET (.BYTE_OFFSET);
;  2943          3052  7                     DBG$NEWLINE();
;  2944          3053  7                     DBG$PRINT_CONTROL (DBG$K_PRT_RESET);
;  2945          3054  6                     END;
;  2946          3055  6                 END
;  2947          3056  6
;  2948          3057  5             ELSE
```

```
;  2949     3058  5                    BEST_SAT = .SATPTR;
;  2950     3059  4                END;
;  2951     3060  3            END;
;  2952     3061  3
;  2953     3062  3        IF .NEXT_SATPTR[SAT$L_START] GTRA .ADDRESS
;  2954     3063  3        THEN
;  2955     3064  3            EXITLOOP;
;  2956     3065  3
;  2957     3066  3
;  2958     3067  3        ! In bliss, BIND user_meaningful_name = PLIT (....), in this case
;  2959     3068  3        ! user_meaningful_name == P.AAA.  So the choise should not be P.AAA.
;  2960     3069  3        ! Here is the code to check for this kind of cases.  Print both
;  2961     3070  3        ! name, the best symbolization one will be printed from the caller.
;  2962     3071  3        !
;  2963     3072  3        IF (.SATPTR[SAT$L_START] EQL .NEXT_SATPTR[SAT$L_START]) AND
;  2964     3073  4           (.SATPTR[SAT$L_END] EQL .NEXT_SATPTR[SAT$L_END])
;  2965     3074  3        THEN
;  2966     3075  4            BEGIN
;  2967     3076  4            SATRST = .SATPTR[SAT$L_RSTPTR];
;  2968     3077  4            NAME = DBG$GET_DST_NAME(.SATRST[RST$L_DSTPTR]);
;  2969     3078  4            IF .NAME[0] NEQ 0
;  2970     3079  4            THEN
;  2971     3080  5                BEGIN
;  2972     3081  6                IF NOT (.NAME[1] EQL %C'P' AND .NAME[2] EQL %C'.')
;  2973     3082  5                THEN
;  2974     3083  5                    TMPSAT = .SATPTR
;  2975     3084  5
;  2976     3085  5
;  2977     3086  5                    ! Print P.AAA, which we did not choose.
;  2978     3087  5                    !
;  2979     3088  5                ELSE
;  2980     3089  6                    BEGIN
;  2981     3090  6                    IF .PRINT_FLAG
;  2982     3091  6                    THEN
;  2983     3092  7                        BEGIN
;  2984     3093  7
;  2985     3094  7
;  2986     3095  7                        ! Build the ASCII string for the symbol.
;  2987     3096  7                        !
;  2988     3097  7                        DBG$PRINT (UPLIT BYTE (%ASCIC 'address !XL'), .ADDRESS);
;  2989     3098  7                        DBG$PRINT (UPLIT BYTE (%ASCIC ': '));
;  2990     3099  7                        DBG$NEWLINE();
;  2991     3100  7                        DBG$PRINT_CONTROL (DBG$K_PRTSET_LMARGIN, TAB);
;  2992     3101  7                        DBG$PRINT_SYMBOL_PATHNAME(.SATPTR[SAT$L_RSTPTR]);
;  2993     3102  7                        BYTE_OFFSET = .SATPTR[SAT$L_START];
;  2994     3103  7                        IF .BYTE_OFFSET NEQ 0
;  2995     3104  7                        THEN
;  2996     3105  7                            DBG$PRINT_OFFSET (.BYTE_OFFSET);
;  2997     3106  7                        DBG$NEWLINE();
;  2998     3107  7                        DBG$PRINT_CONTROL (DBG$K_PRT_RESET);
;  2999     3108  6                        END;
;  3000     3109  6
;  3001     3110  5                    END;
;  3002     3111  5
;  3003     3112  4                END;
;  3004     3113  4
;  3005     3114  3        END;
```

```
;3006        3115  3
;3007        3116  3          SATPTR = .NEXT_SATPTR;
;3008        3117  3          NEXT_SATPTR = .SATPTR[SAT$L_FLINK];
;3009        3118  2          END;
;3010        3119  2
;3011        3120  2
;3012        3121  2      ! Check for special cases.
;3013        3122  2      !
;3014        3123  2      IF .NEXT_SATPTR EQL 0
;3015        3124  2      THEN
;3016        3125  3          BEGIN
;3017        3126  3          IF (.ADDRESS GEQA .SATPTR[SAT$L_START]) AND
;3018        3127  4             (.ADDRESS LEQA .SATPTR[SAT$L_END])
;3019        3128  3          THEN
;3020        3129  4              BEGIN
;3021        3130  4              IF .TMPSAT NEQ 0 AND
;3022        3131  4                 .ADDRESS LEQ .TMPSAT[SAT$L_END]
;3023        3132  4              THEN
;3024        3133  4                  BEST_SAT = .TMPSAT
;3025        3134  4              ELSE
;3026        3135  4                  BEST_SAT = .SATPTR;
;3027        3136  3              END;
;3028        3137  2          END;
;3029        3138  2
;3030        3139  2      IF .BEST_SAT EQL 0 THEN BEST_SAT = .SATPTR;
;3031        3140  2                                                                                ;
;3032        3141  2
;3033        3142  2      ! We have found the best sat, get the symbol's RST pointer and determine
;3034        3143  2      ! the maximum byte offset.                                                 ;
;3035        3144  2      !
;3036        3145  2      RSTPTR = .BEST_SAT[SAT$L_RSTPTR];
;3037        3146  2      BYTE_OFFSET = .ADDRESS - .BEST_SAT[SAT$L_START];
;3038        3147  2      CASE .RSTPTR[RST$B_KIND] FROM RST$K_KIND_MINIMUM
;3039        3148  2                               TO   RST$K_KIND_MAXIMUM OF
;3040        3149  2          SET
;3041        3150  2          [RST$K_ROUTINE, RST$K_BLOCK, RST$K_LABEL, RST$K_ENTRY]:
;3042        3151  3              BEGIN
;3043        3152  3
;3044        3153  3
;3045        3154  3              ! See if the address is a label address.  It much match the
;3046        3155  3              ! the label address exactly, or else we find the containing
;3047        3156  3              ! entity and print that plus line number as the better
;3048        3157  3              ! symbolization.
;3049        3158  3              !
;3050        3159  3              IF .RSTPTR[RST$B_KIND] EQL RST$K_LABEL OR
;3051        3160  3                 .RSTPTR[RST$B_KIND] EQL RST$K_ENTRY
;3052        3161  3              THEN
;3053        3162  3                  IF .BYTE_OFFSET NEQ 0
;3054        3163  3                  THEN
;3055        3164  4                      BEGIN
;3056        3165  4                      LOCAL
;3057        3166  4                          RSTPTR_TMP;
;3058        3167  4
;3059        3168  4                      RSTPTR_TMP = .RSTPTR;
;3060        3169  4                      WHILE .RSTPTR[RST$B_KIND] NEQ RST$K_MODULE DO
;3061        3170  5                          BEGIN
;3062        3171  5                          RSTPTR = .RSTPTR[RST$L_UPSCOPEPTR];
```

```
;  3063          3172  5                    IF .RSTPTR[RST$B_KIND] EQL RST$K_ROUTINE
;  3064          3173  5                    THEN
;  3065          3174  5                        EXITLOOP;
;  3066          3175  4                    END;
;  3067          3176  4
;  3068          3177  4                IF .RSTPTR[RST$B_KIND] EQL RST$K_MODULE
;  3069          3178  4                THEN
;  3070          3179  4                    IF .RSTPTR[RST$B_LANGUAGE] EQL DBG$K_MACRO
;  3071          3180  4                    THEN
;  3072          3181  5                        BEGIN
;  3073          3182  5                        RSTPTR = .RSTPTR_TMP;
;  3074          3183  5                        END
;  3075          3184  4                    ELSE
;  3076          3185  4                        $DBG_ERROR ('DBGSYMBLZ\SEARCH_MODULE_SAT:  routine not found');
;  3077          3186  3                END;
;  3078          3187  2            END;
;  3079          3188  2
;  3080          3189  2        [RST$K_DATA]:
;  3081          3190  3            BEGIN
;  3082          3191  3            0;
;  3083          3192  2            END;
;  3084          3193  2
;  3085          3194  2        [INRANGE, OUTRANGE]:
;  3086          3195  2            $DBG_ERROR ('DBGSYMBLZ\SEARCH_MODULE_SAT:  invalid RST kind');
;  3087          3196  2        TES;
;  3088          3197  2
;  3089          3198  2
;  3090          3199  2    ! If the address was found in the module, MODRSTPTR contains that module's
;  3091          3200  2    ! RST pointer.  Otherwise, it contains 0.
;  3092          3201  2    !
;  3093          3202  2    RETURN 0;
;  3094          3203  1    END;


                                                    .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

                    4C  58  21  20  73  73  65  72  64  64  61  0B  00391 P.ADR:   .ASCII  <11>\address !XL\                                  ;
                                                    20  3A  02  0039D P.ADS:   .ASCII  <2>\: \                                          ;
                    4C  58  21  20  73  73  65  72  64  64  61  0B  003A0 P.ADT:   .ASCII  <11>\address !XL\                                  ;
                                                    20  3A  02  003AC P.ADU:   .ASCII  <2>\: \                                          ;
52  41  45  53  5C  5A  4C  42  4D  59  53  47  42  44  2F  003AF P.ADV:   .ASCII  \/DBGSYMBLZ\<92>\SEARCH_MODULE_SAT:  rou\             ;
20  3A  54  41  53  5F  45  4C  55  44  4F  4D  5F  48  43  003BE
                                                    75  6F  72  20  003CD
    64  6E  75  6F  66  20  74  6F  6E  20  65  6E  69  74  003D1         .ASCII  \tine not found\                                        ;
52  41  45  53  5C  5A  4C  42  4D  59  53  47  42  44  2E  003DF P.ADW:   .ASCII  \.DBGSYMBLZ\<92>\SEARCH_MODULE_SAT:  inv\             ;
20  3A  54  41  53  5F  45  4C  55  44  4F  4D  5F  48  43  003EE
                                                    76  6E  69  20  003FD
        64  6E  69  6B  20  54  53  52  20  64  69  6C  61  00401         .ASCII  \alid RST kind\                                         ;


                                                    .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                00FFC 00000 SEARCH_MODULE_SAT:
                                                            .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9,R10,R11            ; 2944
                                    5B 00000000'  EF  9E 00002  MOVAB   P.ADR, R11                                  ;
```

```
                    56        14    AC  D0 00009          MOVL    P_BYTE_OFFSET, R6                       ; 2974
                    5A        10    AC  D0 0000D          MOVL    P_RSTPTR, R10                           ; 2975
OD 00000000G        00              01  E1 00011          BBC     #7, DBG$GV_CONTROL+1, 1$                ; 2987
                          000280E8  8F  DD 00019          PUSHL   #164072
   00000000G        00              01  FB 0001F          CALLS   #1, LIB$SIGNAL
                             0C     BC  D4 00026 1$:       CLRL    @P_MODRSTPTR                            ; 2994
                             6A     D4 00029              CLRL    (R10)                                   ; 2995
                    50        04    AC  D0 0002B          MOVL    PROG_SATPTR, R0                         ; 2998
                 0C BC        0C    A0  D0 0002F          MOVL    12(R0), @P_MODRSTPTR
   00000000'     EF           04    A0  7D 00034          MOVQ    4(R0), OWN_MODULE_BEGIN                 ; 2999
                    50        0C    BC  D0 0003C          MOVL    @P_MODRSTPTR, R0                        ; 3001
                    01        28    A0  E8 00040          BLBS    40(R0), 2$
                                    04  00044             RET
                    52        18    A0  D0 00045 2$:       MOVL    24(R0), SATPTR                          ; 3007
                    57        08    AC  D0 00049          MOVL    ADDRESS, R7                             ; 3008
                    57        04    A2  D1 0004D          CMPL    4(SATPTR), R7
                                    01  1B 00051          BLEQU   3$
                                    04  00053             RET
                                    54  7C 00054 3$:       CLRQ    TMPSAT                                  ; 3014
                    53              62  D0 00056 4$:       MOVL    (SATPTR), NEXT_SATPTR                   ; 3015
                                    03  12 00059          BNEQ    5$                                      ; 3016
                                  0128  31 0005B          BRW     16$
OD 00000000G        00              01  E1 0005E 5$:       BBC     #1, DBG$GV_CONTROL+1, 6$                ; 3017
                          000280E8  8F  DD 00066          PUSHL   #164072
   00000000G        00              01  FB 0006C          CALLS   #1, LIB$SIGNAL
                    57        08    A2  D1 00073 6$:       CMPL    8(SATPTR), R7                           ; 3019
                                    74  1F 00077          BLSSU   9$
                             0C     A2  DD 00079          PUSHL   12(SATPTR)                              ; 3022
                FF3C        CF          01  FB 0007C          CALLS   #1, IS_SYMBOL_PSECT
                    69              50  E8 00081          BLBS    R0, 9$
                                    54  D5 00084          TSTL    TMPSAT                                  ; 3025
                                    62  13 00086          BEQL    8$
                       08           A4  57  D1 00088          CMPL    R7, 8(TMPSAT)                           ; 3026
                                    5C  14 0008C          BGTR    8$
                    55              54  D0 0008E          MOVL    TMPSAT, BEST_SAT                        ; 3029
                                    54  D4 00091          CLRL    TMPSAT                                  ; 3030
                    56        18    AC  E9 00093          BLBC    PRINT_FLAG, 9$                          ; 3036
                                    57  DD 00097          PUSHL   R7                                      ; 3043
                                    5B  DD 00099          PUSHL   R11
   00000000G        00              02  FB 0009B          CALLS   #2, DBG$PRINT
                             0C     AB  9F 000A2          PUSHAB  P.ADS                                   ; 3044
   00000000G        00              01  FB 000A5          CALLS   #1, DBG$PRINT
   00000000G        00              00  FB 000AC          CALLS   #0, DBG$NEWLINE                         ; 3045
                                    04  DD 000B3          PUSHL   #4                                      ; 3046
                                    01  DD 000B5          PUSHL   #1
   00000000G        00              02  FB 000B7          CALLS   #2, DBG$PRINT_CONTROL
                             0C     A2  DD 000BE          PUSHL   12(SATPTR)                              ; 3047
   00000000G        00              01  FB 000C1          CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME
66                  57        04    A2  C3 000C8          SUBL3   4(SATPTR), R7, (R6)                     ; 3048
                                    09  13 000CD          BEQL    7$                                      ; 3049
                                    66  DD 000CF          PUSHL   (R6)                                    ; 3051
   00000000G        00              01  FB 000D1          CALLS   #1, DBG$PRINT_OFFSET
   00000000G        00              00  FB 000D8 7$:       CALLS   #0, DBG$NEWLINE                         ; 3052
                                    05  DD 000DF          PUSHL   #5                                      ; 3053
   00000000G        00              01  FB 000E1          CALLS   #1, DBG$PRINT_CONTROL
                                    03  11 000E8          BRB     9$                                      ; 3025
                    55              52  D0 000EA 8$:       MOVL    SATPTR, BEST_SAT                        ; 3058
```

```
                57      04   A3  D1 000ED 9$:     CMPL    4(NEXT_SATPTR), R7                      ; 3062
                              03  1B 000F1        BLEQU   10$
                            0090  31 000F3        BRW     16$
            04  A3      04   A2  D1 000F6 10$:    CMPL    4(SATPTR), 4(NEXT_SATPTR)               ; 3072
                              2C  12 000FB        BNEQ    12$
            08  A3      08   A2  D1 000FD        CMPL    8(SATPTR), 8(NEXT_SATPTR)               ; 3073
                              7C  12 00102        BNEQ    15$
                59      0C   A2  D0 00104        MOVL    12(SATPTR), SATRST                      ; 3076
                        0C   A9  DD 00108        PUSHL   12(SATRST)                              ; 3077
00000000G       00           01  FB 0010B        CALLS   #1, DBG$GET_DST_NAME
                58           50  D0 00112        MOVL    R0, NAME
                             68  95 00115        TSTB    (NAME)                                  ; 3078
                             67  13 00117        BEQL    15$
            50  8F      01   A8  91 00119        CMPB    1(NAME), #80                            ; 3081
                             06  12 0011E        BNEQ    11$
                2E      02   A8  91 00120        CMPB    2(NAME), #46
                             05  13 00124        BEQL    13$
                54           52  D0 00126 11$:    MOVL    SATPTR, TMPSAT                          ; 3083
                             55  11 00129 12$:    BRB     15$
                51      18   AC  E9 0012B 13$:    BLBC    PRIN_FLAG, 15$                          ; 3090
                             57  DD 0012F        PUSHL   R7                                      ; 3097
                        0F   AB  9F 00131        PUSHAB  P.ADT
00000000G       00           02  FB 00134        CALLS   #2, DBG$PRINT
                        1B   AB  9F 0013B        PUSHAB  P.ADU                                   ; 3098
00000000G       00           01  FB 0013E        CALLS   #1, DBG$PRINT
00000000G       00           00  FB 00145        CALLS   #0, DBG$NEWLINE                         ; 3099
                             04  DD 0014C        PUSHL   #4                                      ; 3100
                             01  DD 0014E        PUSHL   #1
00000000G       00           02  FB 00150        CALLS   #2, DBG$PRINT_CONTROL
                        0C   A2  DD 00157        PUSHL   12(SATPTR)                              ; 3101
00000000G       00           01  FB 0015A        CALLS   #1, DBG$PRINT_SYMBOL_PATHNAME
                66      04   A2  D0 00161        MOVL    4(SATPTR), (R6)                         ; 3102
                             09  13 00165        BEQL    14$                                     ; 3103
                             66  DD 00167        PUSHL   (R6)                                    ; 3105
00000000G       00           01  FB 00169        CALLS   #1, DBG$PRINT_OFFSET
00000000G       00           00  FB 00170 14$:    CALLS   #0, DBG$NEWLINE                         ; 3106
                             05  DD 00177        PUSHL   #5                                      ; 3107
00000000G       00           01  FB 00179        CALLS   #1, DBG$PRINT_CONTROL
                52           53  D0 00180 15$:    MOVL    NEXT_SATPTR, SATPTR                     ; 3116
                          FED0   31  00183        BRW     4$                                      ; 3117
                             53  D5 00186 16$:    TSTL    NEXT_SATPTR                             ; 3123
                             1E  12 00188        BNEQ    18$
            04  A2           57  D1 0018A        CMPL    R7, 4(SATPTR)                           ; 3126
                             18  1F 0018E        BLSSU   18$
            08  A2           57  D1 00190        CMPL    R7, 8(SATPTR)                           ; 3127
                             12  1A 00194        BGTRU   18$
                             54  D5 00196        TSTL    TMPSAT                                  ; 3130
                             0B  13 00198        BEQL    17$
            08  A4           57  D1 0019A        CMPL    R7, 8(TMPSAT)                           ; 3131
                             05  14 0019E        BGTR    17$
                55           54  D0 001A0        MOVL    TMPSAT, BEST_SAT                        ; 3133
                             03  11 001A3        BRB     18$
                55           52  D0 001A5 17$:    MOVL    SATPTR, BEST_SAT                        ; 3135
                             55  D5 001A8 18$:    TSTL    BEST_SAT                                ; 3139
                             03  12 001AA        BNEQ    19$
                55           52  D0 001AC        MOVL    SATPTR, BEST_SAT
                6A      0C   A5  D0 001AF 19$:    MOVL    12(BEST_SAT), (R10)                     ; 3145
```

```
                66      57      04      A5  C3 001B3           SUBL3   4(BEST_SAT), R7, (R6)                   ; 3146
                        52          6A  D0 001B8               MOVL    (R10), R2                               ; 3147
                0D      00      14  A2  8F 001BB               CASEB   20(R2), #0, #13
              0021    0021    001C        001C    001C0 20$:    .WORD   21$-20$,-
              001C    006E    001C        0021    001C8                 21$-20$,-
              001C    001C    001C        0021    001D0                 22$-20$,-
                              001C        001C    001D8                 22$-20$,-
                                                                        22$-20$,-
                                                                        21$-20$,-
                                                                        28$-20$,-
                                                                        21$-20$,-
                                                                        22$-20$,-
                                                                        21$-20$,-
                                                                        21$-20$,-
                                                                        21$-20$,-
                                                                        21$-20$,-
                                                                        21$-20$
                        4E      AB  9F 001DC 21$:          PUSHAB  P.ADW                                   ; 3195
                        3E      11 001DF                   BRB     27$
                04      14      A2  91 001E1 22$:          CMPB    20(R2), #4                              ; 3159
                        06      13 001E5                   BEQL    23$
                08      14      A2  91 001E7               CMPB    20(R2), #8                              ; 3160
                        41      12 001EB                   BNEQ    28$
                        66      D5 001ED 23$:              TSTL    (R6)                                    ; 3162
                        3D      13 001EF                   BEQL    28$
                51              52  D0 001F1              MOVL    R2, RSTPTR_TMP                          ; 3168
                50              6A  D0 001F4 24$:          MOVL    (R10), R0                               ; 3169
                01      14      A0  91 001F7               CMPB    20(R0), #1
                        0D      13 001FB                   BEQL    25$
                6A      10      A0  D0 001FD               MOVL    16(R0), (R10)                           ; 3171
                50              6A  D0 00201               MOVL    (R10), R0                               ; 3172
                02      14      A0  91 00204               CMPB    20(R0), #2
                        EA      12 00208                   BNEQ    24$
                50              6A  D0 0020A 25$:          MOVL    (R10), R0                               ; 3177
                01      14      A0  91 0020D               CMPB    20(R0), #1
                        1B      12 00211                   BNEQ    28$
                        29      A0  95 00213               TSTB    41(R0)                                  ; 3179
                        04      12 00216                   BNEQ    26$
                6A              51  D0 00218               MOVL    RSTPTR_TMP, (R10)                       ; 3182
                                04 0021B                   RET                                             ; 3179
                        1E      AB  9F 0021C 26$:          PUSHAB  P.ADV                                   ; 3185
                        01      DD 0021F 27$:              PUSHL   #1
                00028362        8F  DD 00221               PUSHL   #164706
      00000000G 00                  03  FB 00227           CALLS   #3, LIB$SIGNAL
                                    04 0022E 28$:          RET                                             ; 3203

; Routine Size:  559 bytes,    Routine Base:  DBG$CODE + 1400

; 3095          3204  1
```

```
;3097     3205  1 ROUTINE BUILD_PRIMARY_SUBNODE(PRIMPTR, SYMID, BIT_OFFSET) =
;3098     3206  1 !
;3099     3207  1 ! FUNCTION
;3100     3208  1 !       This routine is a recursive routine to be called to build the
;3101     3209  1 !       Primary subnode.  For Array or Record type, we need to do
;3102     3210  1 !       more work to symbolize down to record component or array element
;3103     3211  1 !       level.  For other type, return the primary from this routine.
;3104     3212  1 !
;3105     3213  1 ! INPUTS
;3106     3214  1 !       PRIMPTR - Pointer to Primary.
;3107     3215  1 !
;3108     3216  1 !       SYMID   - Pointer to SYMID.
;3109     3217  1 !
;3110     3218  1 !       BIT_OFFSET - Bit offset to the given object.
;3111     3219  1 !
;3112     3220  1 ! OUTPUTS
;3113     3221  1 !       Return value is the pointer to Primary.  And Bit offsets to the
;3114     3222  1 !       primary is passed back to the caller. (BIT_OFFSET updated accordingly).
;3115     3223  1 !
;3116     3224  1
;3117     3225  2     BEGIN
;3118     3226  2
;3119     3227  2     MAP
;3120     3228  2         BIT_OFFSET: REF VECTOR[,LONG],  ! Bit offset to Primary
;3121     3229  2         PRIMPTR: REF DBG$PRIMARY,       ! Pointer to Primary
;3122     3230  2         SYMID: REF RST$ENTRY;           ! Pointer to Symid
;3123     3231  2
;3124     3232  2     LOCAL
;3125     3233  2         FCODE,                          ! Fcode of the symid to be build
;3126     3234  2         KIND,                           ! Kind of this symid to be build
;3127     3235  2         TYPEID: REF RST$ENTRY;          ! Pointer to TYPEID for the SYMID
;3128     3236  2
;3129     3237  2     DBG$GL_CURRENT_PRIMARY = .PRIMPTR;  ! Update the current primary
;3130     3238  2
;3131     3239  2     FCODE = 0;
;3132     3240  2     TYPEID = 0;
;3133     3241  2     DBG$STA_SYMKIND (.SYMID, KIND);
;3134     3242  2
;3135     3243  2
;3136     3244  2     ! Check to see if this is a data item, if it is get more inforamtion.
;3137     3245  2     !
;3138     3246  2     IF .KIND EQL RST$K_DATA OR
;3139     3247  2        .KIND EQL RST$K_TYPCOMP OR
;3140     3248  2        .KIND EQL RST$K_TYPE
;3141     3249  2     THEN
;3142     3250  2         DBG$STA_SYMTYPE(.SYMID, FCODE, TYPEID);
;3143     3251  2
;3144     3252  2
;3145     3253  2     ! Call DBG$BUILD_PRIMARY_SUBNODE to build a subnode and fill in all of
;3146     3254  2     ! the subnode information.
;3147     3255  2     !
;3148     3256  2     IF .KIND EQL RST$K_TYPE
;3149     3257  2     THEN
;3150     3258  3         BEGIN
;3151     3259  3         KIND = RST$K_DATA;
;3152     3260  3         SYMID = 0;
;3153     3261  2         END;
```

```
;  3154          3262  2
;  3155          3263  2      DBG$BUILD_PRIMARY_SUBNODE(.PRIMPTR, .KIND, .SYMID, .FCODE, .TYPEID, 0);
;  3156          3264  2
;  3157          3265  2
;  3158          3266  2      ! Do more work for array and record component --  Symbolize down to
;  3159          3267  2      ! the components + offset.  For example, Array+15 --> Array(3)+3.
;  3160          3268  2      !
;  3161          3269  2      CASE .FCODE FROM RST$K_TYPE_MINIMUM TO RST$K_TYPE_MAXIMUM OF
;  3162          3270  2          SET
;  3163          3271  2          [RST$K_TYPE_ARRAY]:
;  3164          3272  2              IF .DBG$GL_ARRSUB_FLAG
;  3165          3273  2              THEN
;  3166          3274  2                  PRIMPTR = SYMBOLIZE_ARRAY_ELEMENT(.PRIMPTR, .BIT_OFFSET)
;  3167          3275  2              ELSE
;  3168          3276  2                  PRIMPTR[DBG$V_DHDR_AGGR] = FALSE;
;  3169          3277  2
;  3170          3278  2          [RST$K_TYPE_RECORD]:
;  3171          3279  2              IF .DBG$GL_RECCMP_FLAG
;  3172          3280  2              THEN
;  3173          3281  2                  PRIMPTR = SYMBOLIZE_RECORD_COMPONENT(.PRIMPTR, .BIT_OFFSET)
;  3174          3282  2              ELSE
;  3175          3283  2                  PRIMPTR[DBG$V_DHDR_AGGR] = FALSE;
;  3176          3284  2
;  3177          3285  2          [INRANGE, OUTRANGE]:
;  3178          3286  2              0;
;  3179          3287  2
;  3180          3288  2          TES;
;  3181          3289  2
;  3182          3290  2      RETURN .PRIMPTR;
;  3183          3291  1      END;


                                        0004 00000 BUILD_PRIMARY_SUBNODE:
                                                   .WORD   Save R2                                 ;  3205
                              5E                0C  C2 00002          SUBL2   #12, SP                          ;
                              52                04  AC  D0 00005          MOVL    PRIMPTR, R2                      ;  3237
                00000000G     00                    52  D0 00009          MOVL    R2, DBG$GL_CURRENT_PRIMARY       ;
                                                04  AE  7C 00010          CLRQ    TYPEID                           ;  3240
                                                    5E  DD 00013          PUSHL   SP                               ;  3241
                                                08  AC  DD 00015          PUSHL   SYMID                            ;
                00000000G     00                    02  FB 00018          CALLS   #2, DBG$STA_SYMKIND              ;
                                                06  6E  D1 0001F          CMPL    KIND, #6                         ;  3246
                                                    0A  13 00022          BEQL    1$                               ;
                                                0A  6E  D1 00024          CMPL    KIND, #10                        ;  3247
                                                    05  13 00027          BEQL    1$                               ;
                                                07  6E  D1 00029          CMPL    KIND, #7                         ;  3248
                                                    10  12 0002C          BNEQ    2$                               ;
                                                04  AE  9F 0002E 1$:      PUSHAB  TYPEID                           ;  3250
                                                0C  AE  9F 00031          PUSHAB  FCODE                            ;
                                                08  AC  DD 00034          PUSHL   SYMID                            ;
                00000000G     00                    03  FB 00037          CALLS   #3, DBG$STA_SYMTYPE              ;
                                                07  6E  D1 0003E 2$:      CMPL    KIND, #7                         ;  3256
                                                    06  12 00041          BNEQ    3$                               ;
                                                6E  06  D0 00043          MOVL    #6, KIND                         ;  3259
```

```
                                                08 AC  D4 00046          CLRL    SYMID                                          ; 3260
                                                   7E  D4 00049 3$:      CLRL    -(SP)                                          ; 3263
                                                08 AE  DD 0004B          PUSHL   TYPEID                                         ;
                                                10 AE  DD 0004E          PUSHL   FCODE                                          ;
                                                08 AC  DD 00051          PUSHL   SYMID                                          ;
                                                10 AE  DD 00054          PUSHL   KIND                                           ;
                                                   52  DD 00057          PUSHL   R2                                             ;
                                 00000000G      00     06  FB 00059          CALLS   #6, DBG$BUILD_PRIMARY_SUBNODE              ;
                                        15              01  CF 00060          CASEL   FCODE, #1, #2?                             ; 3269
                                 005C           005C        002E     00065 4$:      .WORD   5$-4$,-
                                 005C           0041        005C     0006D          .WORD   9$-4$,-
                                 005C           005C        005C     00075          .WORD   9$-4$,-
                                 005C           005C        005C     0007D          .WORD   9$-4$,-
                                 005C           005C        005C     00085          .WORD   9$-4$,-
                                                005C        005C     0008D          .WORD   9$-4$,-
                                                                                    .WORD   6$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$
                                                                                    .WORD   9$-4$,-
                                                                                    .WORD   9$-4$
                                                                                    .WORD   9$
                                                   2E  11 00091          BRB     9$                                             ;
                                        23 00000000G   00  E9 00093 5$:      BLBC    DBG$GL_ARRSUB_FLAG, 8$                     ; 3272
                                                   0C  AC  DD 0009A          PUSHL   BIT_OFFSET                                 ; 3274
                                                   52  DD 0009D          PUSHL   R2                                         ;
                                 0000V             CF  02  FB 0009F          CALLS   #2, SYMBOLIZE_ARRAY_ELEMENT                ;
                                                   11  11 000A4          BRB     7$                                         ;
                                        10 00000000G   00  E9 000A6 6$:      BLBC    DBG$GL_RECCMP_FLAG, 8$                     ; 3279
                                                   0C  AC  DD 000AD          PUSHL   BIT_OFFSET                                 ; 3281
                                                   52  DD 000B0          PUSHL   R2                                         ;
                                 0000V             CF  02  FB 000B2          CALLS   #2, SYMBOLIZE_RECORD_COMPONENT             ;
                                   04              AC  50  D0 000B7 7$:      MOVL    R0, PRIMPTR                                ;
                                                   04  11 000BB          BRB     9$                                         ;
                                   04              A2  01  8A 000BD 8$:      BICB2   #1, 4(R2)                                  ; 3283
                                                   50      04  AC  D0 000C1 9$:      MOVL    PRIMPTR, R0                        ; 3290
                                                               04  000C5          RET                                        ; 3291

; Routine Size:  198 bytes,    Routine Base:  DBG$CODE + 162F

; 3184          3292  1
```

```
;  3186     3293  1 ROUTINE GET_RECORD_COMPONENT(PRIMPTR, COMPTR, BIT_OFFSET, SYMID, OFFSET, IDX) =
;  3187     3294  1 !
;  3188     3295  1 ! FUNCTION
;  3189     3296  1 !       This routine calculates the record component offsets to the record
;  3190     3297  1 !       address and then compares the value with the offset to the primary
;  3191     3298  1 !       we got so far.  If the value we just calculated is better than the
;  3192     3299  1 !       one we got so far, choice this one instead.  This routine is
;  3193     3300  1 !       recursive in a sense that if one of the record component is a
;  3194     3301  1 !       variant, we need to get a list of the variant components.  Then
;  3195     3302  1 !       figure out the offsets for each variant and choose the better
;  3196     3303  1 !       variant for the given record component.
;  3197     3304  1 !
;  3198     3305  1 ! INPUTS
;  3199     3306  1 !       PRIMPTR - Pointer to Primary descriptor.
;  3200     3307  1 !
;  3201     3308  1 !       COMPTR  - Pointer to the record component or variant component.
;  3202     3309  1 !
;  3203     3310  1 !       BIT_OFFSET - Offset value to the Primary.
;  3204     3311  1 !
;  3205     3312  1 !       SYMID   - The symid we choose for the record component, or variant.
;  3206     3313  1 !
;  3207     3314  1 !       OFFSET  - Offset value of the component.
;  3208     3315  1 !
;  3209     3316  1 !       IDX     - Ith component index.
;  3210     3317  1 !
;  3211     3318  1 ! OUTPUTS
;  3212     3319  1 !       Return value is the pointer to the primary.
;  3213     3320  1 !       Note: The primary returned from this routine may not be in a stable
;  3214     3321  1 !       state. (The infomation in the root node may not be updated properly).
;  3215     3322  1 !       When next time around to build primary subnode, it will be updated
;  3216     3323  1 !       properly.
;  3217     3324  1 !
;  3218     3325  1
;  3219     3326  2     BEGIN
;  3220     3327  2
;  3221     3328  2     MAP
;  3222     3329  2         BIT_OFFSET: REF VECTOR[,LONG],   ! Desired offset value to Begin of
;  3223     3330  2                                         !      the Record
;  3224     3331  2         COMPTR: REF RST$ENTRY,           ! Pointer to component RST
;  3225     3332  2         OFFSET: REF VECTOR[,LONG],       ! Offset Value to Begin of the Record
;  3226     3333  2                                         !      for SYMID
;  3227     3334  2         PRIMPTR: REF DBG$PRIMARY,        ! Pointer to Primary Root Node
;  3228     3335  2         SYMID: REF VECTOR[,LONG];        ! Pointer to desired RST
;  3229     3336  2
;  3230     3337  2     BUILTIN
;  3231     3338  2         REMQUE;
;  3232     3339  2
;  3233     3340  2     LOCAL
;  3234     3341  2         COMPVECPTR: REF VECTOR[,LONG],   ! Pointer to a list of variants
;  3235     3342  2         DUMMY,                           ! Dummy as it is
;  3236     3343  2         KIND,                            ! Data kind
;  3237     3344  2         SUBNODE: REF DBG$PRIM_NODE,      ! Last primary subnode
;  3238     3345  2         TAGID,                           ! Variant Tag variable
;  3239     3346  2         TAG_NAME: REF VECTOR[,BYTE],     ! Variant Tag name
;  3240     3347  2         TAG_VAL,                         ! Tag value
;  3241     3348  2         TMP_OFFSET,                      ! Temporary offset
;  3242     3349  2         TMP_SYMID,                       ! Temporary symid
```

```
;  3243          3350  2          VAL_DESC: REF DBG$VALDESC,      ! Tag Value descriptor
;  3244          3351  2          VALKIND,                        ! Data value kind
;  3245          3352  2          VALPTR: VECTOR[3, LONG],        ! Data value
;  3246          3353  2          VARIANT: REF RST$VAR_ENTRY;     ! Variant
;  3247          3354  2
;  3248          3355  2
;  3249          3356  2
;  3250          3357  2      DBG$GL_CURRENT_PRIMARY = .PRIMPTR;  ! Update the current primary
;  3251          3358  2
;  3252          3359  2      ! Set the context for the given RST entry.
;  3253          3360  2      !
;  3254          3361  2      DBG$STA_SETCONTEXT(.COMPTR);
;  3255          3362  2      DBG$STA_SYMKIND(.COMPTR, KIND);
;  3256          3363  2
;  3257          3364  2
;  3258          3365  2      ! Check to see if this is a variant.
;  3259          3366  2      !
;  3260          3367  2      IF .KIND EQL RST$K_VARIANT
;  3261          3368  2      THEN
;  3262          3369  3          BEGIN
;  3263          3370  3          VARIANT = 0;
;  3264          3371  3
;  3265          3372  3
;  3266          3373  3          ! Check to see if this variant has a tag variable.  Also check to
;  3267          3374  3          ! see if the tag variable has a name.
;  3268          3375  3          !
;  3269          3376  3          IF (TAGID = .COMPTR[RST$L_VARTAGPTR]) NEQ 0
;  3270          3377  3          THEN
;  3271          3378  4              BEGIN
;  3272          3379  4              DBG$STA_SYMNAME(.TAGID, TAG_NAME);
;  3273          3380  4              IF .TAG_NAME[0] NEQ 0
;  3274          3381  4              THEN
;  3275          3382  5                  BEGIN
;  3276          3383  5
;  3277          3384  5
;  3278          3385  5                  ! Build a subnode for the tag variable.
;  3279          3386  5                  !
;  3280          3387  5                  PRIMPTR = BUILD_PRIMARY_SUBNODE(.PRIMPTR, .TAGID, .BIT_OFFSET);
;  3281          3388  5
;  3282          3389  5
;  3283          3390  5                  ! Get the value for the tag variable.
;  3284          3391  5                  !
;  3285          3392  5                  DBG$PRIM_TO_VAL(.PRIMPTR, DBG$K_VALUE_DESC, VAL_DESC);
;  3286          3393  5                  TAG_VAL = .VAL_DESC[DBG$L_VALUE_VALUE0];
;  3287          3394  5
;  3288          3395  5
;  3289          3396  5                  ! Call variant select routine to select the variant components
;  3290          3397  5                  ! given tag value and the pointer to the variant.
;  3291          3398  5                  !
;  3292          3399  5                  VARIANT = DBG$STA_VARIANT_SELECT(.TAG_VAL, .COMPTR);
;  3293          3400  5
;  3294          3401  5
;  3295          3402  5                  ! We have no use for the tag variable, take it off from the
;  3296          3403  5                  ! subnode.
;  3297          3404  5                  !
;  3298          3405  5                  REMQUE(.PRIMPTR[DBG$L_PRIM_BLINK], DUMMY);
;  3299          3406  4              END;
```

```
;  3300          3407  4
;  3301          3408  3            END;
;  3302          3409  3
;  3303          3410  3
;  3304          3411  3        ! We have got variant components.
;  3305          3412  3        !
;  3306          3413  3        IF .VARIANT NEQ 0
;  3307          3414  3        THEN
;  3308          3415  4            BEGIN
;  3309          3416  4
;  3310          3417  4
;  3311          3418  4            ! Build subnode for this variant, fill in information.
;  3312          3419  4            ! Note: Remember to take this node away, if this is not what we
;  3313          3420  4            ! want.
;  3314          3421  4            !
;  3315          3422  4            DBG$BUILD_PRIMARY_SUBNODE(.PRIMPTR, RST$K_VARIANT, 0,
;  3316          3423  4                RST$K_TYPE_VARIANT, 0, 0);
;  3317          3424  4            SUBNODE = .PRIMPTR[DBG$L_PRIM_BLINK];
;  3318          3425  4            SUBNODE[DBG$L_PNVAR_TAGID] = .TAGID;
;  3319          3426  4            SUBNODE[DBG$W_PNVAR_INDEX] = 1;
;  3320          3427  4            SUBNODE[DBG$V_PNVAR_VALID] = TRUE;
;  3321          3428  4            SUBNODE[DBG$W_PNVAR_NCOMPS] = .VARIANT[RST$L_VAR_COMPCNT];
;  3322          3429  4            SUBNODE[DBG$L_PNVAR_COMPLST] = VARIANT[RST$A_VAR_COMPLST];
;  3323          3430  4            SUBNODE[DBG$L_PNVAR_DSTPTR] = .VARIANT[RST$L_VAR_DSTPTR];
;  3324          3431  4
;  3325          3432  4
;  3326          3433  4            ! Calculate the offsets of the variant components.  Call
;  3327          3434  4            ! GET_RECORD_COMPONENT to get the better variant component.
;  3328          3435  4            !
;  3329          3436  4            COMPVECPTR = VARIANT[RST$A_VAR_COMPLST];
;  3330          3437  4            TMP_SYMID = .SYMID[0];
;  3331          3438  4            TMP_OFFSET = .OFFSET[0];
;  3332          3439  4            INCR I FROM 0 TO .VARIANT[RST$L_VAR_COMPCNT] - 1 DO
;  3333          3440  5                BEGIN
;  3334          3441  5                PRIMPTR = GET_RECORD_COMPONENT(.PRIMPTR, .COMPVECPTR[.I],
;  3335          3442  5                                .BIT_OFFSET, TMP_SYMID, TMP_OFFSET, .I);
;  3336          3443  4                END;
;  3337          3444  4
;  3338          3445  4
;  3339          3446  4            ! If we did not find one, take the subnode off.
;  3340          3447  4            !
;  3341          3448  4            IF .TMP_SYMID EQL .SYMID[0] AND
;  3342          3449  4               .TMP_OFFSET EQL .OFFSET[0]
;  3343          3450  4            THEN
;  3344          3451  4                REMQUE(.PRIMPTR[DBG$L_PRIM_BLINK], DUMMY)
;  3345          3452  4
;  3346          3453  4
;  3347          3454  4            ! We got one variant component.
;  3348          3455  4            !
;  3349          3456  4            ELSE
;  3350          3457  5                BEGIN
;  3351          3458  5                SYMID[0] = .TMP_SYMID;
;  3352          3459  5                OFFSET[0] = .TMP_OFFSET;
;  3353          3460  5                SUBNODE[DBG$W_PNVAR_INDEX] = .IDX + 1;
;  3354          3461  4                END;
;  3355          3462  4
;  3356          3463  3            END;
```

```
;  3357     3464  3
;  3358     3465  3          END
;  3359     3466  3
;  3360     3467  3
;  3361     3468  3      ! This is the normal case, get the component offset value.
;  3362     3469  3      ! Select the smallest positive offset.
;  3363     3470  3      !
;  3364     3471  2      ELSE
;  3365     3472  3          BEGIN
;  3366     3473  3          DBG$STA_SYMVALUE(.COMPTR, VALPTR, VALKIND);
;  3367     3474  3          IF .VALKIND EQL DBG$K_VAL_ADDR
;  3368     3475  3          THEN
;  3369     3476  4              BEGIN
;  3370     3477  4              LOCAL
;  3371     3478  4                  VAL_OFFSET;
;  3372     3479  4
;  3373     3480  4              VAL_OFFSET = .VALPTR[0] * 8 + .VALPTR[1];
;  3374     3481  4              IF .VAL_OFFSET LEQ .BIT_OFFSET[0]
;  3375     3482  4              THEN
;  3376     3483  5                  BEGIN
;  3377     3484  6                  IF (.BIT_OFFSET[0] - .VAL_OFFSET) LEQ (.BIT_OFFSET[0] - .OFFSET[0])
;  3378     3485  5                  THEN
;  3379     3486  6                      BEGIN
;  3380     3487  6                      SYMID[0] = .COMPTR;
;  3381     3488  6                      OFFSET[0] = .VAL_OFFSET;
;  3382     3489  6                      SUBNODE = .PRIMPTR[DBG$L_PRIM_BLINK];
;  3383     3490  6                      SUBNODE[DBG$W_PNREC_INDEX] = .IDX + 1;
;  3384     3491  5                      END;
;  3385     3492  5
;  3386     3493  4                  END;
;  3387     3494  4
;  3388     3495  3              END;
;  3389     3496  3
;  3390     3497  2          END;                    ! End of ELSE clause for non-variant type of
;  3391     3498  2                                  !      record component.
;  3392     3499  2
;  3393     3500  2      RETURN .PRIMPTR;
;  3394     3501  1      END;


                                    007C 00000 GET_RECORD_COMPONENT:
                                               .WORD   Save R2,R3,R4,R5,R6                 ; 3293
                5E          24  C2 00002       SUBL2   #36, SP
                52      04  AC  7D 00005       MOVQ    PRIMPTR, R2                         ; 3357
00000000G       00          52  D0 00009       MOVL    R2, DBG$GL_CURRENT_PRIMARY
                            53  DD 00010       PUSHL   R3                                  ; 3361
00000000G       00          01  FB 00012       CALLS   #1, DBG$STA_SETCONTEXT
                        4008 8F  BB 00019       PUSHR   #^M<R3,SP>                          ; 3362
00000000G       00          02  FB 0001D       CALLS   #2, DBG$STA_SYMKIND
                0B          6E  D1 00024       CMPL    KIND, #11                           ; 3367
                            03  13 00027       BEQL    1$
                          00E1  31 00029       BRW     7$
                            54  D4 0002C 1$:    CLRL    VARIANT                             ; 3370
                55      10  A3  D0 0002E       MOVL    16(R3), TAGID                       ; 3376
```

```
                        4B  13 00032          BEQL    2$                                      ;
                    04  AE  9F 00034          PUSHAB  TAG_NAME                                ; 3379
                        55  DD 00037          PUSHL   TAGID                                   ;
          00000000G     00  02 FB 00039          CALLS   #2, DBG$STA_SYMNAME                 ;
                    04  BE  95 00040          TSTB    @TAG_NAME                               ; 3380
                        3A  13 00043          BEQL    2$                                      ;
                    0C  AC  DD 00045          PUSHL   BIT_OFFSET                              ; 3387
                        24  BB 00048          PUSHR   #^M<R2,R5>                              ;
              FEEB      CF  03 FB 0004A          CALLS   #3, BUILD_PRIMARY_SUBNODE           ;
                04      AC  50 D0 0004F          MOVL    R0, PRIMPTR                         ;
                    08  AE  9F 00053          PUSHAB  VAL_DESC                                ; 3392
                        7E  7A 8F 9A 00056          MOVZBL  #122, -(SP)                     ;
                        52  04 AC D0 0005A          MOVL    PRIMPTR, R2                     ;
                        52  DD 0005E          PUSHL   R2                                      ;
          00000000G     00  03 FB 00060          CALLS   #3, DBG$PRIM_TO_VAL                 ;
                        50  08 AE D0 00067          MOVL    VAL_DESC, R0                    ; 3393
                        50  20 A0 D0 0006B          MOVL    32(R0), TAG_VAL                 ;
                        09  BB 0006F          PUSHR   #^M<R0,R3>                              ; 3399
          00000000G     00  02 FB 00071          CALLS   #2, DBG$STA_VARIANT_SELECT          ;
                        54  50 D0 00078          MOVL    R0, VARIANT                         ;
                        56  18 B2 0F 0007B          REMQUE  @24(R2), DUMMY                  ; 3405
                            54 D5 0007F 2$:      TSTL    VARIANT                             ; 3413
                            7C 13 00081          BEQL    5$                                  ;
                            7E 7C 00083          CLRQ    -(SP)                               ; 3422
                            13 DD 00085          PUSHL   #19                                 ;
                        7E  0B 7D 00087          MOVQ    #11, -(SP)                          ;
                        52  04 AC D0 0008A          MOVL    PRIMPTR, R2                     ;
                        52  DD 0008E          PUSHL   R2                                      ;
          00000000G     00  06 FB 00090          CALLS   #6, DBG$BUILD_PRIMARY_SUBNODE       ;
                        52  18 A2 D0 00097          MOVL    24(R2), SUBNODE                 ; 3424
                    1C  A2  55 D0 0009B          MOVL    TAGID, 28(SUBNODE)                  ; 3425
                    18  A2  01 B0 0009F          MOVW    #1, 24(SUBNODE)                     ; 3426
                    0A  A2  10 88 000A3          BISB2   #16, 10(SUBNODE)                    ; 3427
                    1A  A2      04 A4 B0 000A7          MOVW    4(VARIANT), 26(SUBNODE)     ; 3428
                        50  08 A4 9E 000AC          MOVAB   8(R4), R0                       ; 3429
                    20  A2      50 D0 000B0          MOVL    R0, 32(SUBNODE)                 ;
                    24  A2      64 D0 000B4          MOVL    (VARIANT), 36(SUBNODE)          ; 3430
                        55      50 D0 000B8          MOVL    R0, COMPVECPTR                  ; 3436
                    10  AE      10 BC D0 000BB          MOVL    @SYMID, TMP_SYMID           ; 3437
                    0C  AE      14 BC D0 000C0          MOVL    @OFFSET, TMP_OFFSET         ; 3438
                        53          01 CE 000C5          MNEGL   #1, I                       ; 3441
                                    1A 11 000C8          BRB     4$                          ;
                                    53 DD 000CA 3$:      PUSHL   I                           ; 3442
                                10  AE 9F 000CC          PUSHAB  TMP_OFFSET                  ; 3441
                                18  AE 9F 000CF          PUSHAB  TMP_SYMID                   ;
                                0C  AC DD 000D2          PUSHL   BIT_OFFSET                  ; 3442
                                  6543 DD 000D5          PUSHL   (COMPVECPTR)[I]             ; 3441
                                04  AC DD 000D8          PUSHL   PRIMPTR                     ;
                    FF20        CF  06 FB 000DB          CALLS   #6, GET_RECORD_COMPONENT    ;
                      04        AC  50 D0 000E0          MOVL    R0, PRIMPTR                 ;
                E1          53      04 A4 F2 000E4 4$:   AOBLSS  4(VARIANT), I, 3$          ; 3439
                      10    BC      10 AE D1 000E9          CMPL    TMP_SYMID, @SYMID       ; 3448
                                    11 12 000EE          BNEQ    6$                          ;
                      14    BC      0C AE D1 000F0          CMPL    TMP_OFFSET, @OFFSET     ; 3449
                                    0A 12 000F5          BNEQ    6$                          ;
                            50  04 AC D0 000F7          MOVL    PRIMPTR, R0                 ; 3451
                            56  18 B0 0F 000FB          REMQUE  @24(R0), DUMMY              ;
```

```
                                                52  11 000FF 5$:    BRB     9$                                      ;
                                        10  BC      10  AE  D0 00101 6$:    MOVL    TMP_SYMID, @SYMID                       ; 3458
                                        14  BC      0C  AE  D0 00106        MOVL    TMP_OFFSET, @OFFSET                     ; 3459
                                                    40  11 0010B        BRB     8$                                      ; 3460
                                                14  AE  9F 0010D 7$:    PUSHAB  VALKIND                                 ; 3473
                                                1C  AE  9F 00110        PUSHAB  VALPTR                                  ;
                                                    53  DD 00113        PUSHL   R3                                      ;
                                    00000000G   00      03  FB 00115   CALLS   #3, DBG$STA_SYMVALUE                    ;
                                                02  14  AE  D1 0011C   CMPL    VALKIND, #2                             ; 3474
                                                    31  12 00120       BNEQ    9$                                      ;
                                                50  18  AE  D0 00122   MOVL    VALPTR, R0                              ; 3480
                                                51  1C BE40 7E 00126   MOVAQ   @VALPTR+4[R0], VAL_OFFSET               ;
                                        0C  BC          51  D1 0012B    CMPL    VAL_OFFSET, @BIT_OFFSET                 ; 3481
                                                    22  14 0012F       BGTR    9$                                      ;
                                54      0C  BC          51  C3 00131    SUBL3   VAL_OFFSET, @BIT_OFFSET, R4             ; 3484
                                50      0C  BC  14      BC  C3 00136    SUBL3   @OFFSET, @BIT_OFFSET, R0                ;
                                                50  54  D1 0013C       CMPL    R4, R0                                  ;
                                                    12  14 0013F       BGTR    9$                                      ;
                                        10  BC          53  D0 00141    MOVL    R3, @SYMID                              ; 3487
                                        14  BC          51  D0 00145    MOVL    VAL_OFFSET, @OFFSET                     ; 3488
                                                52  18  A2  D0 00149    MOVL    24(R2), SUBNODE                         ; 3489
                            18  A2          18  AC          01  A1 0014D 8$:    ADDW3   #1, IDX, 24(SUBNODE)            ; 3490
                                                50  04  AC  D0 00153 9$:    MOVL    PRIMPTR, R0                             ; 3500
                                                        04 00157        RET                                             ; 3501

; Routine Size:  344 bytes,    Routine Base:  DBG$CODE + 16F5

; 3395          3502  1
```

```
;  3397          3503  1 ROUTINE SYMBOLIZE_ARRAY_ELEMENT(PRIMPTR, BIT_OFFSET) =
;  3398          3504  1 !
;  3399          3505  1 ! FUNCTION
;  3400          3506  1 !       This routine figures out the array element from offset value to
;  3401          3507  1 !       the start of the array.  And build primary subnode for the
;  3402          3508  1 !       array element.
;  3403          3509  1 !
;  3404          3510  1 ! INPUTS
;  3405          3511  1 !       PRIMPTR - Pointer to Primary descriptor.
;  3406          3512  1 !
;  3407          3513  1 !       BIT_OFFSET - Array element offset value in bits to the start of
;  3408          3514  1 !               the array.
;  3409          3515  1 !
;  3410          3516  1 ! OUTPUTS
;  3411          3517  1 !       Return value is the pointer to the primary descriptor for the
;  3412          3518  1 !       array element.  BIT_OFFSET is the offset value in bits to
;  3413          3519  1 !       the primary.
;  3414          3520  1 !
;  3415          3521  1
;  3416          3522  2     BEGIN
;  3417          3523  2
;  3418          3524  2     MAP
;  3419          3525  2         BIT_OFFSET: REF VECTOR[,LONG],  ! Array cell Bit offset to array
;  3420          3526  2         PRIMPTR: REF DBG$PRIMARY;       ! Primary descriptor for the object
;  3421          3527  2
;  3422          3528  2     LOCAL
;  3423          3529  2         ARRAY_SUBNODE: REF DBG$PRIM_NODE,! Pointer to Array subnode
;  3424          3530  2         ARRAY_SUBVEC: REF DBG$PRIM_NODE_SUBS,! Pointer to array subscript in'o
;  3425          3531  2         BOUND_FLAG,                     ! flag to indicate the bound is exceeded
;  3426          3532  2         OFFSET,                         ! Offset value
;  3427          3533  2         STRIDE;                         ! Stride along each dimension in bits
;  3428          3534  2
;  3429          3535  2
;  3430          3536  2     ARRAY_SUBNODE = .PRIMPTR[DBG$L_PRIM_BLINK];
;  3431          3537  2     IF .ARRAY_SUBNODE[DBG$B_PNODE_FCODE] NEQ RST$K_TYPE_ARRAY
;  3432          3538  2     THEN
;  3433          3539  2         $DBG_ERROR('DBGSYMBLZ\SYMBOLIZE_ARRAY_ELEMENT');
;  3434          3540  2
;  3435          3541  2
;  3436          3542  2     ! We treat the start of the array is the first array element.
;  3437          3543  2     !
;  3438          3544  2     IF .BIT_OFFSET[0] EQL 0
;  3439          3545  2     THEN
;  3440          3546  3         BEGIN
;  3441          3547  3         ARRAY_SUBNODE[DBG$V_PNODE_EVAL] = TRUE;
;  3442          3548  3         RETURN BUILD_PRIMARY_SUBNODE(.PRIMPTR, .ARRAY_SUBNODE[DBG$L_PNARR_CELLTYPE],
;  3443          3549  3             .BIT_OFFSET);
;  3444          3550  2         END;
;  3445          3551  2
;  3446          3552  2
;  3447          3553  2     ! Divide the offset by largest stride and then adjusted by the lower bound,
;  3448          3554  2     ! this is the subscript we want.
;  3449          3555  2     !
;  3450          3556  2     OFFSET = .BIT_OFFSET[0];
;  3451          3557  2     ARRAY_SUBVEC = ARRAY_SUBNODE[DBG$A_PNARR_SVECTOR];
;  3452          3558  2     BOUND_FLAG = FALSE;
;  3453          3559  2     IF .ARRAY_SUBNODE[DBG$V_PNARR_COLUMN]
```

```
;  3454          3560  2     THEN
;  3455          3561  3         BEGIN
;  3456          3562  3         DECR I FROM .ARRAY_SUBNODE[DBG$B_PNARR_DIMCNT] - 1 TO 0 DO
;  3457          3563  4             BEGIN
;  3458          3564  4             IF .ARRAY_SUBNODE[DBG$V_PNARR_BITREF]
;  3459          3565  4             THEN
;  3460          3566  4                 STRIDE = .ARRAY_SUBVEC[.I, DBG$L_PNSUB_STRIDE]
;  3461          3567  4
;  3462          3568  4             ELSE
;  3463          3569  4                 STRIDE = .ARRAY_SUBVEC[.I, DBG$L_PNSUB_STRIDE] * 8;
;  3464          3570  4
;  3465          3571  4             ARRAY_SUBVEC[.I, DBG$L_PNSUB_SVALUE] =
;  3466          3572  4                 .OFFSET / .STRIDE + .ARRAY_SUBVEC[.I, DBG$L_PNSUB_LBOUND];
;  3467          3573  4
;  3468          3574  4             IF .ARRAY_SUBVEC[.I, DBG$L_PNSUB_SVALUE] GTR
;  3469          3575  4                 .ARRAY_SUBVEC[.I, DBG$L_PNSUB_UBOUND]
;  3470          3576  4             THEN
;  3471          3577  4                 BOUND_FLAG = TRUE;
;  3472          3578  4
;  3473          3579  4             OFFSET = .OFFSET MOD .STRIDE;
;  3474          3580  3             END;
;  3475          3581  3
;  3476          3582  3         END
;  3477          3583  3
;  3478          3584  2     ELSE
;  3479          3585  3         BEGIN
;  3480          3586  3         INCR I FROM 0 TO .ARRAY_SUBNODE[DBG$B_PNARR_DIMCNT] - 1 DO
;  3481          3587  4             BEGIN
;  3482          3588  4             IF .ARRAY_SUBNODE[DBG$V_PNARR_BITREF]
;  3483          3589  4             THEN
;  3484          3590  4                 STRIDE = .ARRAY_SUBVEC[.I, DBG$L_PNSUB_STRIDE]
;  3485          3591  4
;  3486          3592  4             ELSE
;  3487          3593  4                 STRIDE = .ARRAY_SUBVEC[.I, DBG$L_PNSUB_STRIDE] * 8;
;  3488          3594  4
;  3489          3595  4             ARRAY_SUBVEC[.I, DBG$L_PNSUB_SVALUE] =
;  3490          3596  4                 .OFFSET / .STRIDE + .ARRAY_SUBVEC[.I, DBG$L_PNSUB_LBOUND];
;  3491          3597  4
;  3492          3598  4             IF .ARRAY_SUBVEC[.I, DBG$L_PNSUB_SVALUE] GTR
;  3493          3599  4                 .ARRAY_SUBVEC[.I, DBG$L_PNSUB_UBOUND]
;  3494          3600  4             THEN
;  3495          3601  4                 BOUND_FLAG = TRUE;
;  3496          3602  4
;  3497          3603  4             OFFSET = .OFFSET MOD .STRIDE;
;  3498          3604  3             END;
;  3499          3605  3
;  3500          3606  2         END;
;  3501          3607  2
;  3502          3608  2
;  3503          3609  2     ! Make sure the subscripts calculated from above are not exceed the bounds.
;  3504          3610  2     !
;  3505          3611  2     OFFSET = 0;
;  3506          3612  2     INCR I FROM 0 TO .ARRAY_SUBNODE[DBG$B_PNARR_DIMCNT] - 1 DO
;  3507          3613  3         BEGIN
;  3508          3614  3         IF .BOUND_FLAG
;  3509          3615  3         THEN
;  3510          3616  3             ARRAY_SUBVEC[.I, DBG$L_PNSUB_SVALUE] =
```

```
;  3511     3617  3                  .ARRAY_SUBVEC[.I, DBG$L_PNSUB_UBOUND];
;  3512     3618  3
;  3513     3619  3              IF .ARRAY_SUBNODE[DBG$V_PNARR_BITREF]
;  3514     3620  3              THEN
;  3515     3621  3                  STRIDE = .ARRAY_SUBVEC[.I, DBG$L_PNSUB_STRIDE]
;  3516     3622  3
;  3517     3623  3              ELSE
;  3518     3624  3                  STRIDE = .ARRAY_SUBVEC[.I, DBG$L_PNSUB_STRIDE] * 8;
;  3519     3625  3
;  3520     3626  3              OFFSET = .OFFSET + .ARRAY_SUBVEC[.I, DBG$L_PNSUB_SVALUE] * .STRIDE;
;  3521     3627  2              END;
;  3522     3628  2
;  3523     3629  2
;  3524     3630  2          ! Adjust the offset.  Based on A(0,0,...).
;  3525     3631  2          !
;  3526     3632  2          IF .ARRAY_SUBNODE[DBG$V_PNARR_BITREF]
;  3527     3633  2          THEN
;  3528     3634  3              BIT_OFFSET[0] = .BIT_OFFSET[0] + (-1 * .ARRAY_SUBNODE[DBG$L_PNARR_OFFSET])
;  3529     3635  3
;  3530     3636  2          ELSE
;  3531     3637  2              BIT_OFFSET[0] = .BIT_OFFSET[0] + (-8 * .ARRAY_SUBNODE[DBG$L_PNARR_OFFSET]);
;  3532     3638  2
;  3533     3639  2
;  3534     3640  2          BIT_OFFSET[0] = .BIT_OFFSET[0] - .OFFSET;
;  3535     3641  2          ARRAY_SUBNODE[DBG$V_PNODE_EVAL] = TRUE;
;  3536     3642  2          ARRAY_SUBNODE[DBG$B_PNARR_SUBCNT] = .ARRAY_SUBNODE[DBG$B_PNARR_DIMCNT];
;  3537     3643  2          RETURN BUILD_PRIMARY_SUBNODE(.PRIMPTR, .ARRAY_SUBNODE[DBG$L_PNARR_CELLTYPE],
;  3538     3644  2              .BIT_OFFSET);
;  3539     3645  2
;  3540     3646  1          END;


                                                    .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

42 4D 59 53 5C 5A 4C 42 4D 59 53 47 42 44 21  0040E P.ADX:   .ASCII  \!DBGSYMBLZ\<92>\SYMBOLIZE_ARRAY_ELEMENT\
45 4C 45 5F 59 41 52 52 41 5F 45 5A 49 4C 4F  0041D
                              54 4E 45 4D     0042C


                                                    .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                          0FFC 00000 SYMBOLIZE_ARRAY_ELEMENT:
                                                     .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9,R10,R11          ;  3503
                                    5A       04   AC  D0 00002          MOVL    PRIMPTR, R10              ;  3536
                                    52       18   AA  D0 00006          MOVL    24(R10), ARRAY_SUBNODE
                                    57       08   A2  9E 0000A          MOVAB   8(ARRAY_SUBNODE), R7      ;  3537
                                    01       01   A7  91 0000E          CMPB    1(R7), #1
                                                  15  13 00012          BEQL    1$
                                        00000000'    EF  9F 00014          PUSHAB  P.ADX                     ;  3539
                                                  01  DD 0001A          PUSHL   #1
                                        00028362     8F  DD 00010          PUSHL   #164706
                                00000000G   00        03  FB 00022          CALLS   #3, LIB$SIGNAL
                                    55       08   AC  D0 00029 1$:       MOVL    BIT_OFFSET, R5            ;  3544
                                                  65  D5 0002D          TSTL    (R5)
                                                  07  12 0002F          BNEQ    2$
```

```
                        02  A7          01  88 00031          BISB2   #1, 2(R7)                                   ; 3547
                                   010E  31 00035          BRW     22$                                         ; 3549
                            53       65  D0 00038 2$:       MOVL    (R5), OFFSE                                 ; 3556
                            50   28  A2  9E 0003B          MOVAB   40(R2), ARRAY_SUBVEC                        ; 3557
                                     5B  D4 0003F          CLRL    BOUND_FLAG                                  ; 3558
                        52          67  11 00041          BBC     #17, (R7), 8$                               ; 3559
                            58   1B  A2  9A 00045          MOVZBL  27(ARRAY_SUBNODE), R8                       ; 3562
                                     58  D7 00049          DECL    R8
                            51   01  A8  9E 0004B          MOVAB   1(R8), I
                                     41  11 0004F          BRB     7$
                        54          51  14  C5 00051 3$:    MULL3   #20, I, R4                                  ; 3566
                        09          67  12  E1 00055          BBC     #18, (R7), 4$                               ; 3564
                                04  A440  9F 00059          PUSHAB  4(R4)[ARRAY_SUBVEC]                         ; 3566
                            56          9E  D0 0005D          MOVL    @(SP)+, STRIDE
                                        08  11 00060          BRB     5$
                                04  A440  9F 00062 4$:       PUSHAB  4(R4)[ARRAY_SUBVEC]                         ; 3569
                        56          9E  03  78 00066          ASHL    #3, @(SP)+, STRIDE
                        59          53  56  C7 0006A 5$:       DIVL3   STRIDE, OFFSET, R9                          ; 3572
                                    6440  9F 0006E          PUSHAB  (R4)[ARRAY_SUBVEC]
                                08  A440  9F 00071          PUSHAB  8(R4)[ARRAY_SUBVEC]
                        9E          59  9E  C1 00075          ADDL3   @(SP)+, R9, @(SP)+
                                0C  A440  9F 00079          PUSHAB  12(R4)[ARRAY_SUBVEC]                        ; 3575
                                    6440  9F 0007D          PUSHAB  (R4)[ARRAY_SUBVEC]
                            9E          9E  D1 00080          CMPL    @(SP)+, @(SP)+
                                        03  15 00083          BLEQ    6$
                            5B          01  D0 00085          MOVL    #1, BOUND_FLAG                              ; 3577
                7E      00  53          01  7A 00088 6$:       EMUL    #1, OFFSET, #0, -(SP)                       ; 3579
                53      53  8E          56  7B 0008D          EDIV    STRIDE, (SP)+, OFFSET, OFFSET
                            BC          51  F4 00092 7$:       SOBGEQ  I, 3$                                       ; 3562
                                        50  11 00095          BRB     14$                                         ; 3559
                            58   1B  A2  9A 00097 8$:       MOVZBL  27(ARRAY_SUBNODE), R8                       ; 3586
                                     58  D7 0009B          DECL    R8
                            51          01  CE 0009D          MNEGL   #1, I
                                        41  11 000A0          BRB     13$
                        54          51  14  C5 000A2 9$:       MULL3   #20, I, R4                                  ; 3590
                        09          67  12  E1 000A6          BBC     #18, (R7), 10$                              ; 3588
                                04  A440  9F 000AA          PUSHAB  4(R4)[ARRAY_SUBVEC]                         ; 3590
                            56          9E  D0 000AE          MOVL    @(SP)+, STRIDE
                                        08  11 000B1          BRB     11$
                                04  A440  9F 000B3 10$:      PUSHAB  4(R4)[ARRAY_SUBVEC]                         ; 3593
                        56          9E  03  78 000B7          ASHL    #3, @(SP)+, STRIDE
                        59          53  56  C7 000BB 11$:      DIVL3   STRIDE, OFFSET, R9                          ; 3596
                                    6440  9F 000BF          PUSHAB  (R4)[ARRAY_SUBVEC]
                                08  A440  9F 000C2          PUSHAB  8(R4)[ARRAY_SUBVEC]
                        9E          59  9E  C1 000C6          ADDL3   @(SP)+, R9, @(SP)+
                                0C  A440  9F 000CA          PUSHAB  12(R4)[ARRAY_SUBVEC]                        ; 3599
                                    6440  9F 000CE          PUSHAB  (R4)[ARRAY_SUBVEC]
                            9E          9E  D1 000D1          CMPL    @(SP)+, @(SP)+
                                        03  15 000D4          BLEQ    12$
                            5B          01  D0 000D6          MOVL    #1, BOUND_FLAG                              ; 3601
                7E      00  53          01  7A 000D9 12$:      EMUL    #1, OFFSET, #0, -(SP)                       ; 3603
                53      53  8E          56  7B 000DE          EDIV    STRIDE, (SP)+, OFFSET, OFFSET
                        BB  51          58  F3 000E3 13$:      AOBLEQ  R8, I, 9$                                   ; 3586
                                        53  D4 000E7 14$:      CLRL    OFFSET                                      ; 3611
                            59          01  CE 000E9          MNEGL   #1, I                                       ; 3614
                                        34  11 000EC          BRB     19$
                            0E          5B  E9 000EE 15$:      BLBC    BOUND_FLAG, 16$
```

```
                54              59              14  C5 000F1          MULL3   #20, I, R4                                  ; 3616
                                              6440  9F 000F5          PUSHAB  (R4)[ARRAY_SUBVEC]                          ; 3617
                                           0C A440  9F 000F8          PUSHAB  12(R4)[ARRAY_SUBVEC]
                                        9E          D0 000FC          MOVL    @(SP)+, @(SP)+
                54              59              14  C5 000FF 16$:     MULL3   #20, I, R4                                  ; 3621
                09              67              12  E1 00103          BBC     #18, (R7), 17$                              ; 3619
                                           04 A440  9F 00107          PUSHAB  4(R4)[ARRAY_SUBVEC]                         ; 3621
                                        56          D0 0010B          MOVL    @(SP)+, STRIDE
                                                    08 11 0010E       BRB     18$
                                           04 A440  9F 00110 17$:     PUSHAB  4(R4)[ARRAY_SUBVEC]                         ; 3624
                56              9E              03  78 00114          ASHL    #3, @(SP)+, STRIDE
                                              6440  9F 00118 18$:     PUSHAB  (R4)[ARRAY_SUBVEC]                          ; 3626
                54              9E              56  C5 0011B          MULL3   STRIDE, @(SP)+, R4
                                53              54  C0 0011F          ADDL2   R4, OFFSET
                C8              59              58  F3 00122 19$:     AOBLEQ  R8, I, 15$                                  ; 3612
                06              67              12  E1 00126          BBC     #18, (R7), 20$                              ; 3632
                                65          20  A2  C2 0012A          SUBL2   32(ARRAY_SUBNODE), (R5)                     ; 3634
                                                0A  11 0012E          BRB     21$
                                50          20  A2  D0 00130 20$:     MOVL    32(ARRAY_SUBNODE), R0                       ; 3637
                                50              08  C4 00134          MULL2   #8, R0
                                65              50  C2 00137          SUBL2   R0, (R5)
                                65              53  C2 0013A 21$:     SUBL2   OFFSET, (R5)                                ; 3640
                          02    A7              01  88 0013D          BISB2   #1, 2(R7)                                   ; 3641
                          1F    A2          1B  A2  90 00141          MOVB    27(ARRAY_SUBNODE), 31(ARRAY_SUBNODE)        ; 3642
                                55              DD 00146 22$:         PUSHL   R5                                          ; 3644
                                            24  A2  DD 00148          PUSHL   36(ARRAY_SUBNODE)                           ; 3643
                                5A              DD 0014B              PUSHL   R10
                        FC90    CF              03  FB 0014D          CALLS   #3, BUILD_PRIMARY_SUBNODE
                                                04 00152              RET                                                 ; 3646

; Routine Size:  339 bytes,    Routine Base:  DBG$CODE + 184D

; 3541          3647  1
```

```
;  3543          3648  1 ROUTINE SYMBOLIZE_RECORD_COMPONENT(PRIMPTR, BIT_OFFSET) =
;  3544          3649  1 !
;  3545          3650  1 ! FUNCTION
;  3546          3651  1 !       This routine gets a list of record components, call GET_RECORD_COMPONENT
;  3547          3652  1 !       to figure out THE component that is closest to the desired address.
;  3548          3653  1 !
;  3549          3654  1 ! INPUTS
;  3550          3655  1 !       PRIMPTR - Pointer to primary descriptor.
;  3551          3656  1 !
;  3552          3657  1 !       BIT_OFFSET - Offset value to the Primary.
;  3553          3658  1 !
;  3554          3659  1 ! OUTPUTS
;  3555          3660  1 !       Returned value is the Pointer to primary and updated offset value
;  3556          3661  1 !       to the Primary.
;  3557          3662  1 !
;  3558          3663  1
;  3559          3664  2     BEGIN
;  3560          3665  2
;  3561          3666  2     MAP
;  3562          3667  2         BIT_OFFSET: REF VECTOR[,LONG],  ! Offset to Primary
;  3563          3668  2         PRIMPTR: REF DBG$PRIMARY;       ! Pointer to Primary
;  3564          3669  2
;  3565          3670  2     LOCAL
;  3566          3671  2         BITSIZE,                        ! Bit size of the record (not used)
;  3567          3672  2         COMPVECPTR: REF VECTOR[,LONG],  ! Pointer to vector of component
;  3568          3673  2                                         !       SYMIDs for this record type
;  3569          3674  2         NCOMPS,                         ! Number of components for this record
;  3570          3675  2         OFFSET,                         ! Left over offsets to Primary
;  3571          3676  2         REC_SUBNODE: REF DBG$PRIM_NODE, ! Pointer to Primary Subnode
;  3572          3677  2         SYMID: REF RST$ENTRY;           ! Symid pointer
;  3573          3678  2
;  3574          3679  2
;  3575          3680  2     ! Get the last subnode we just built.  (This one must be a RST$K_TYPE_RECORD.
;  3576          3681  2     ! type).
;  3577          3682  2     !
;  3578          3683  2     REC_SUBNODE = .PRIMPTR[DBG$L_PRIM_BLINK];
;  3579          3684  2     IF .REC_SUBNODE[DBG$B_PNODE_FCODE] NEQ RST$K_TYPE_RECORD
;  3580          3685  2     THEN
;  3581          3686  2         $DBG_ERROR('DBGSYMBLZ\SYMBOLIZE_RECORD_COMPONENT');
;  3582          3687  2
;  3583          3688  2
;  3584          3689  2     ! Get a list of record components for this record..
;  3585          3690  2     !
;  3586          3691  2     DBG$STA_TYP_RECORD(.REC_SUBNODE[DBG$L_PNODE_TYPEID], NCOMPS, COMPVECPTR,
;  3587          3692  2         BITSIZE);
;  3588          3693  2
;  3589          3694  2
;  3590          3695  2     ! Find a SYMID from this list of record components has the closest
;  3591          3696  2     ! offset value to the given offset value.
;  3592          3697  2     !
;  3593          3698  2     SYMID = 0;
;  3594          3699  2     OFFSET = 0;
;  3595          3700  2     INCR I FROM 0 TO .NCOMPS - 1 DO
;  3596          3701  3         BEGIN
;  3597          3702  3         PRIMPTR = GET_RECORD_COMPONENT(.PRIMPTR, .COMPVECPTR[.I],
;  3598          3703  3                                 .BIT_OFFSET, SYMID, OFFSET, .I);
;  3599          3704  2         END;
```

```
;  3600          3705  2
;  3601          3706  2
;  3602          3707  2      ! We did not find a record component just returned the primary we got
;  3603          3708  2      ! so far.
;  3604          3709  2      !
;  3605          3710  2      IF .SYMID EQL 0 THEN RETURN .PRIMPTR;
;  3606          3711  2
;  3607          3712  2
;  3608          3713  2      ! We have found a better symbol, re-figure the offset value to the
;  3609          3714  2      ! record component.
;  3610          3715  2      !
;  3611          3716  2      BIT_OFFSET[0] = .BIT_OFFSET[0] - .OFFSET;
;  3612          3717  2
;  3613          3718  2
;  3614          3719  2      ! Building the Primary subnode for record component.
;  3615          3720  2      !
;  3616          3721  2      REC_SUBNODE[DBG$V_PNODE_EVAL] = TRUE;
;  3617          3722  2      RETURN BUILD_PRIMARY_SUBNODE(.PRIMPTR, .SYMID, .BIT_OFFSET);
;  3618          3723  1      END;


                                                        .PSECT  DBG$PLIT,NOWRT,  SHR,  PIC,0

42 4D 59 53 5C 5A 4C 42 4D 59 53 47 42 44 24  00430 P.ADY:  .ASCII  \$DBGSYMBLZ\<92>\SYMBOLIZE_RECORD_COMPON\   ;
4F 43 5F 44 52 4F 43 45 52 5F 45 5A 49 4C 4F  0043F                                                          ;
                                              4E 4F 50 4D  0044E                                             ;
                                                 54 4E 45  00452        .ASCII  \ENT\                        ;


                                                        .PSECT  DBG$CODE,NOWRT,  SHR,  PIC,0

                                                 000C 00000 SYMBOLIZE_RECORD_COMPONENT:
                                                            .WORD   Save R2,R3                          ;  3648
                                              5E            14   C2 00002          SUBL2   #20, SP       ;
                                              50       04   AC   D0 00005          MOVL    PRIMPTR, R0   ;  3683
                                              53       18   A0   D0 00009          MOVL    24(R0), REC_SUBNODE
                                              07       09   A3   91 0000D          CMPB    9(REC_SUBNODE), #7  ;  3684
                                                            15   13 00011          BEQL    1$            ;
                                                 00000000'  EF   9F 00013          PUSHAB  P.ADY         ;  3686
                                                            01   DD 00019          PUSHL   #1            ;
                                                 00028362   8F   DD 0001B          PUSHL   #164706       ;
                                00000000G     00            03   FB 00021          CALLS   #3, LIB$SIGNAL
                                                            5E   DD 00028 1$:      PUSHL   SP            ;  3691
                                                       08   AE   9F 0002A          PUSHAB  COMPVECPTR    ;
                                                       10   AE   9F 0002D          PUSHAB  NCOMPS        ;
                                                       0C   A3   DD 00030          PUSHL   12(REC_SUBNODE)
                                00000000G     00            04   FB 00033          CALLS   #4, DBG$STA_TYP_RECORD
                                                       0C   AE   7C 0003A          CLRQ    OFFSET        ;  3699
                                              52            01   CE 0003D          MNEGL   #1, I         ;  3702
                                                            1B   11 00040          BRB     3$            ;
                                                            52   DD 00042 2$:      PUSHL   I             ;  3703
                                                       10   AE   9F 00044          PUSHAB  OFFSET        ;  3702
                                                       18   AE   9F 00047          PUSHAB  SYMID         ;
                                                       08   AC   DD 0004A          PUSHL   BIT_OFFSET    ;  3703
                                                       14 BE42   DD 0004D          PUSHL   @COMPVECPTR[I]  ;  3702
```

```
                                    04   AC  DD 00051          PUSHL   PRIMPTR                                          ;
                              FCFC  CF       06  FB 00054          CALLS   #6, GET_RECORD_COMPONENT                    ;
                                04  AC       50  D0 00059          MOVL    R0, PRIMPTR                                 ;
                         E0         52   08  AE  F2 0005D 3$:      AOBLSS  NCOMPS, I, 2$                       ; 3700
                                         10  AE  D5 00062          TSTL    SYMID                               ; 3710
                                             05  12 00065          BNEQ    4$                                          ;
                                    50   04  AC  D0 00067          MOVL    PRIMPTR, R0                                 ;
                                             04 0006B              RET                                                 ;
                                08  BC   0C  AE  C2 0006C 4$:      SUBL2   OFFSET, @BIT_OFFSET                 ; 3716
                                0A  A3       01  88 00071          BISB2   #1, 10(REC_SUBNODE)                 ; 3721
                                         08  AC  DD 00075          PUSHL   BIT_OFFSET                          ; 3722
                                         14  AE  DD 00078          PUSHL   SYMID                                       ;
                                         04  AC  DD 0007B          PUSHL   PRIMPTR                                     ;
                              FC0C  CF       03  FB 0007E          CALLS   #3, BUILD_PRIMARY_SUBNODE                   ;
                                             04 00083              RET                                         ; 3723

; Routine Size:  132 bytes,    Routine Base:  DBG$CODE + 19A0

; 3619          3724  1
; 3620          3725  0 END ELUDOM


                                                                  .EXTRN  LIB$SIGNAL

;                               PSECT SUMMARY
;
;     Name                      Bytes                         Attributes

;  DBG$OWN                         8  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,  PIC,ALIGN(2)
;  DBG$PLIT                     1109  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(0)
;  DBG$CODE                     6692  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(0)


;                           Library Statistics
;
;                                    -------- Symbols --------      Pages       Processing
;     File                           Total    Loaded   Percent      Mapped      Time
;
;  _$255$DUA28:[SYSLIB]LIB.L32;1     18619        11         0        1000        00:01.8
;  _$255$DUA28:[DEBUG.OBJ]STRUCDEF.L32;1
;                                       32         0         0           7        00:00.2
;  _$255$DUA28:[DEBUG.OBJ]DBGLIB.L32;1
;                                     1545       222        14          97        00:02.1
;  _$255$DUA28:[DEBUG.OBJ]DSTRECRDS.L32;1
;                                      418       143        34          31        00:00.3
;  _$255$DUA28:[DEBUG.OBJ]DBGMSG.L32;1
;                                      386         9         2          22        00:00.3


;                               COMMAND QUALIFIERS
```

```
;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/LIS=LIS$:DBGSYMBLZ/OBJ=OBJ$:DBGSYMBLZ MSRC$:DBGSYMBLZ/UPDATE=(ENH$:DBGSYMBLZ)

; Size:         6692 code + 1117 data bytes
; Run Time:        01:45.9
; Elapsed Time:    01:57.0
; Lines/CPU Min:    2110
; Lexemes/CPU-Min: 13086
; Memory Used:  479 pages
; Compilation Complete
```

DBGSYMBOL
LIS

DBGSTO
LIS

DBGSYMBLZ
LIS