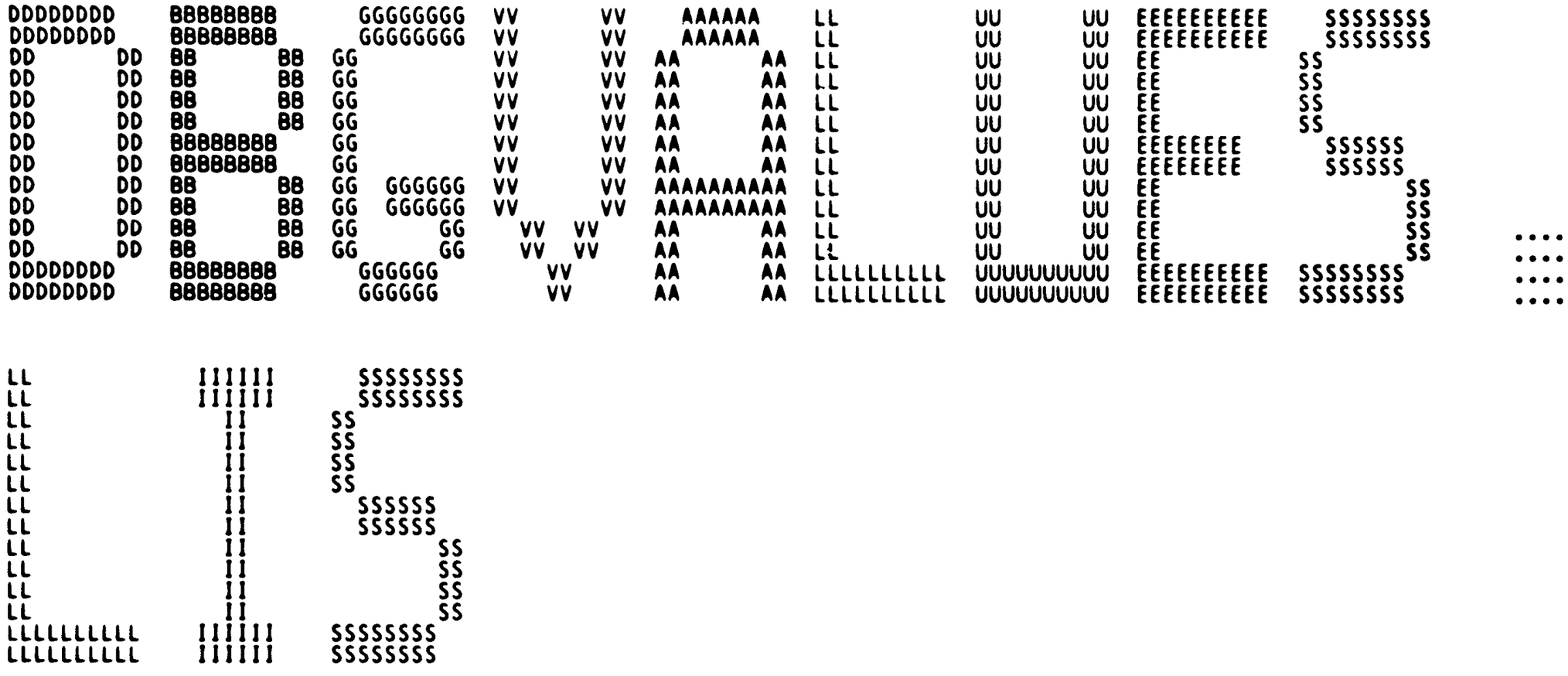
```
DDDDDDDDDDD     EEEEEEEEEEEEEEE  BBBBBBBBBBB      UUU         UUU     GGGGGGGGGGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB     UUU         UUU     GGGGGGGGGGGG
DDDDDDDDDDDD    EEEEEEEEEEEEEEE  BBBBBBBBBBBB     UUU         UUU     GGGGGGGGGGGG
DDD         DDD EEE              BBB         BBB  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
```


DDDDDDDD BBBBBBBB GGGGGGGG VV VV AAAAAA LL UU UU EEEEEEEEEE SSSSSSSS
DDDDDDDD BBBBBBBB GGGGGGGG VV VV AAAAAA LL UU UU EEEEEEEEEE SSSSSSSS
DD DD BB BB GG VV VV AA AA LL UU UU EE SS
DD DD BB BB GG VV VV AA AA LL UU UU EE SS
DD DD BB BB GG VV VV AA AA LL UU UU EE SS
DD DD BBBBBBBB GG VV VV AA AA LL UU UU EEEEEEEE SSSSSS
DD DD BBBBBBBB GG VV VV AA AA LL UU UU EEEEEEEE SSSSSS
DD DD BB BB GG GGGGGG VV VV AAAAAAAAAA LL UU UU EE SS
DD DD BB BB GG GGGGGG VV VV AAAAAAAAAA LL UU UU EE SS
DD DD BB BB GG GG VV VV AA AA LL UU UU EE SS
DD DD BB BB GG GG VV VV AA AA LL UU UU EE SS
DDDDDDDD BBBBBBBB GGGGGG VV AA AA LLLLLLLLLL UUUUUUUUUU EEEEEEEEEE SSSSSSSS
DDDDDDDD BBBBBBBB GGGGGG VV AA AA LLLLLLLLLL UUUUUUUUUU EEEEEEEEEE SSSSSSSS
LL IIIIII SSSSSSSS
LL IIIIII SSSSSSSS
LL II SS
LL II SS
LL II SS
LL II SS
LL II SSSSSS
LL II SSSSSS
LL II SS
LL II SS
LL II SS
LL II SS
LLLLLLLLLL IIIIII SSSSSSSS
LLLLLLLLLL IIIIII SSSSSSSS

```
;     1          0001  0 MODULE  DBGVALUES(IDENT = 'V04-000') =
;     2          0002  1 BEGIN
;     3          0003  1 !
;     4          0004  1 !
;     5          0005  1 !*****************************************************************************
;     6          0006  1 !*                                                                           *
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;    23          0023  1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                  *
;    24          0024  1 !*                                                                           *
;    25          0025  1 !*                                                                           *
;    26          0026  1 !*****************************************************************************
;    27          0027  1 !
;    28          0028  1 !
;    29          0029  1 !++
;    30          0030  1 !
;    31          0031  1 !  FACILITY:     VAX-11 DEBUG
;    32          0032  1 !
;    33          0033  1 !  ABSTRACT:
;    34          0034  1 !
;    35          0035  1 !        Language-Independent Value Descriptor support routines
;    36          0036  1 !
;    37          0037  1 !  ENVIRONMENT:  VAX/VMS user mode
;    38          0038  1 !
;    39          0039  1 !  AUTHOR:       J. Francis,     CREATION DATE: 19-Apr-1982
;    40          0040  1 !
;    41          0041  1 !  MODIFIED BY:
;    42          0042  1 !
;    43          0043  1 !        001     WC3     21-Jun-83
;    44          0044  1 !                Add support for /PACKED and /DATE_TIME
;    45          0045  1 !
;    46          0046  1 !        002     WC3     15-Jul-83
;    47          0047  1 !                Fix /DATE_TIME to use DBG$CVT_DX_DX
;    48          0048  1 !
;    49          0049  1 !        003     WC3     15-Sep-83
;    50          0050  1 !                Update DBG$GL_CURRENT_PRIMARY for self-referential records
;    51          0051  1 !
;    52          0052  1 !        004     WC3     22-Sep-83
;    53          0053  1 !                Check for variant records that have been optomized away
;    54          0054  1 !                but the DST is still around.
;    55          0055  1 !--
```

```
;    57          0056  1 !
;    58          0057  1 ! Table of Contents
;    59          0058  1 !
;    60          0059  1 FORWARD ROUTINE
;    61          0060  1 ! Global Routines :
;    62          0061  1     dbg$data_length,
;    63          0062  1     dbg$make_skeleton_desc,
;    64          0063  1     dbg$make_integer_desc,
;    65          0064  1     dbg$fill_in_vms_desc,                       ! fill in vms descriptor
;    66          0065  1     dbg$make_val_desc,                          ! Create  value  descriptor
;    67          0066  1     dbg$make_vms_desc,                          ! Create VAX/VMS descriptor
;    68          0067  1     dbg$prim_to_val,                            ! Get value of a primary
;    69          0068  1     dbg$print_aggregate          : NOVALUE,     ! Print aggregate value
;    70          0069  1     dbg$print_value              : NOVALUE,     ! Print value from DEBUG descriptor
;    71          0070  1     dbg$print_value_as_integer   : NOVALUE,     ! Print integer in given radix
;    72          0071  1     dbg$print_vms_value          : NOVALUE;     ! Print value from VMS descriptor
```

```
;    74          0072  1 !
;    75          0073  1 ! INCLUDE FILES
;    76          0074  1 !
;    77          0075  1 REQUIRE 'SRC$:DBGPROLOG';
;    78          0209  1 !
;    79          0210  1 !
;    80          0211  1 ! EXTERNALS
;    81          0212  1 !
;    82          0213  1 EXTERNAL
;    83          0214  1     dbg$gl_current_primary,                 ! Ponter to the primary being processed
;    84          0215  1     dbg$gb_radix        : VECTOR[3, BYTE],  ! Radix settings
;    85          0216  1     dbg$gb_language     : BYTE,             ! Current language
;    86          0217  1     dbg$gv_control      : dbg$control_flags,! DEBUG status information
;    87          0218  1     dbg$gl_call_context,                    ! Context for 'Bound' values
;    88          0219  1     dbg$gl_convert_token,                   ! "Integerize" operator token
;    89          0220  1     dbg$gl_dflttyp,                         ! Default type from "SET TYPE"
;    90          0221  1     dbg$gw_dfltleng     : WORD,             ! Length of default data-type
;    91          0222  1     dbg$gl_sign_flag;                       ! Print '+' before the signed
;    92          0223  1                                             !       variable.
;    93          0224  1
;    94          0225  1 EXTERNAL ROUTINE
;    95          0226  1     dbg$build_primary_subnode   : NOVALUE,  ! Add sub-node to primary
;    96          0227  1     dbg$collect                 : NOVALUE,  ! Sanitize character vectors
;    97          0228  1     dbg$cvt_dx_dx               : NOVALUE,  ! Convert data-types by descriptor
;    98          0229  1     dbg$enum_pos,                           ! Convert value->pos for enum type
;    99          0230  1     dbg$enum_succ,                          ! Find successor of enum type
;   100          0231  1     dbg$enum_val,                           ! Convert pos->value for enum type
;   101          0232  1     dbg$get_tempmem,                        ! Storage space allocator
;   102          0233  1     dbg$is_lt_entry,                        ! Check for CALL entry-mask address
;   103          0234  1     dbg$ins_decode,                         ! Print an instruction
;   104          0235  1     dbg$language_format,                    ! Language override output
;   105          0236  1     dbg$newline                 : NOVALUE,  ! Print buffer contents
;   106          0237  1     dbg$nget_radix,                         ! Obtain radix
;   107          0238  1     dbg$print                   : NOVALUE,  ! Print under FAO format
;   108          0239  1     dbg$print_control           : NOVALUE,  ! Control print format
;   109          0240  1     dbg$print_identifier,                   ! Print name of data item
;   110          0241  1     dbg$print_set_value         : NOVALUE,  ! Print value of set
;   111          0242  1     dbg$print_symbol_name       : NOVALUE,  ! Print name from a SYMID
;   112          0243  1     dbg$push_tempmem,                       ! Mark current position
;   113          0244  1     dbg$pop_tempmem             : NOVALUE,  ! Release marked storage
;   114          0245  1     dbg$save_val                : NOVALUE,  ! Save value for %CURVAL
;   115          0246  1     dbg$sta_setcontext          : NOVALUE,  ! Establish RST context
;   116          0247  1     dbg$sta_sympathname         : NOVALUE,  ! Get fully-qualified data name
;   117          0248  1     dbg$sta_symkind             : NOVALUE,  ! Get  kind   of data item
;   118          0249  1     dbg$sta_symname             : NOVALUE,  ! Get  name   of data item
;   119          0250  1     dbg$sta_symsize             : NOVALUE,  ! Get length  of data item
;   120          0251  1     dbg$sta_symtype             : NOVALUE,  ! Get  type   of data item
;   121          0252  1     dbg$sta_symvalue            : NOVALUE,  ! Get address of data item
;   122          0253  1     dbg$sta_typefcode,                      ! Get  FCODE  of data item
;   123          0254  1     dbg$sta_typ_atomic          : NOVALUE,  ! Get symbol table information
;   124          0255  1     dbg$sta_typ_descr           : NOVALUE,  ! Get symbol table information
;   125          0256  1     dbg$sta_typ_enum            : NOVALUE,  ! Get symbol table information
;   126          0257  1     dbg$sta_typ_record          : NOVALUE,  ! Get symbol table information
;   127          0258  1     dbg$sta_typ_subrng          : NOVALUE,  ! Get symbol table information
;   128          0259  1     dbg$sta_typ_typedptr        : NOVALUE,  ! Get symbol table information
;   129          0260  1     dbg$sta_variant_value,                  ! Check value of Variant Tag
;   130          0261  1     dbg$sta_variant_select,                 ! Get variant entry (by tag)
```

```
;  131          0262  1      for$cvt_d_tg,                       ! Conversion routine
;  132          0263  1      for$cvt_g_tg,                       ! Conversion routine
;  133          0264  1      for$cvt_h_tg;                       ! Conversion routine
;  134          0265  1
;  135          0266  1  OWN
;  136          0267  1      signed_dtype        : BITVECTOR[dbg$k_maximum_dtype+1] PRESET(
;  137          0268  1          [dsc$k_dtype_f  ] = 1,
;  138          0269  1          [dsc$k_dtype_d  ] = 1,
;  139          0270  1          [dsc$k_dtype_g  ] = 1,
;  140          0271  1          [dsc$k_dtype_h  ] = 1,
;  141          0272  1          [dsc$k_dtype_b  ] = 1,
;  142          0273  1          [dsc$k_dtype_w  ] = 1,
;  143          0274  1          [dsc$k_dtype_l  ] = 1,
;  144          0275  1          [dsc$k_dtype_q  ] = 1,
;  145          0276  1          [dsc$k_dtype_o  ] = 1,
;  146          0277  1          [dsc$k_dtype_p  ] = 1,
;  147          0278  1          [dsc$k_dtype_nz ] = 1,
;  148          0279  1          [dsc$k_dtype_nl ] = 1,
;  149          0280  1          [dsc$k_dtype_nlo] = 1,
;  150          0281  1          [dsc$k_dtype_nr ] = 1,
;  151          0282  1          [dsc$k_dtype_nro] = 1,
;  152          0283  1          [dsc$k_dtype_sv ] = 1,
;  153          0284  1          [dsc$k_dtype_svu] = 1);
;  154          0285  1
;  155          0286  1
;  156          0287  1  BIND
;  157          0288  1      Format_AC = UPLIT BYTE(%ASCIC '!AC'),
;  158          0289  1      Format_AD = UPLIT BYTE(%ASCIC '!AD');
```

```
;  160     0290  1 GLOBAL ROUTINE DBG$DATA_LENGTH (vms_desc : REF dbg$stg_desc) =
;  161     0291  1 !
;  162     0292  1 ! FUNCTION
;  163     0293  1 !       Given a VMS descriptor, this routine returns the length in
;  164     0294  1 !       bits of the object described by the descriptor.
;  165     0295  1 !
;  166     0296  1 !       Note - for array descriptors, this routine returns the length
;  167     0297  1 !       in bits of an element of the array. Do not change it to
;  168     0298  1 !       return the length of the entire array - things will break.
;  169     0299  1 !
;  170     0300  2     BEGIN
;  171     0301  2     LOCAL length;
;  172     0302  2
;  173     0303  2     ! Obtain the length from the descriptor. We do not yet know whether
;  174     0304  2     ! this length is in bits, nibbles, or bytes.
;  175     0305  2     !
;  176     0306  2     length = .vms_desc[dsc$w_length];
;  177     0307  2
;  178     0308  2     ! Decide whether the length is in bits, nibbles, or bytes, based
;  179     0309  2     ! on the dtype.
;  180     0310  2     !
;  181     0311  2     IF .vms_desc[dsc$b_dtype] EQL dst k_bool
;  182     0312  2     THEN
;  183     0313  2         length = .length * 1
;  184     0314  2
;  185     0315  2     ELSE CASE .vms_desc[dsc$b_dtype] FROM dbg$k_minimum_dtype TO dbg$k_maximum_dtype OF
;  186     0316  2         SET
;  187     0317  2         [dsc$k_dtype_f  ,dsc$k_dtype_f  ,dsc$k_dtype_d  ,dsc$k_dtype_dc ,
;  188     0318  2          dsc$k_dtype_g  ,dsc$k_dtype_g  ,dsc$k_dtype_h  ,dsc$k_dtype_hc ,
;  189     0319  2          dsc$k_dtype_b  ,dsc$k_dtype_b  ,dsc$k_dtype_w  ,dsc$k_dtype_wu ,
;  190     0320  2          dsc$k_dtype_l  ,dsc$k_dtype_l  ,dsc$k_dtype_q  ,dsc$k_dtype_qu ,
;  191     0321  2          dsc$k_dtype_o  ,dsc$k_dtype_ou ,dsc$k_dtype_t,  dsc$k_dtype_z  ,
;  192     0322  2          dsc$k_dtype_nl ,dsc$k_dtype_nlo,dsc$k_dtype_nr ,dsc$k_dtype_nro,
;  193     0323  2          dsc$k_dtype_nu ,dsc$k_dtype_nz ,dsc$k_dtype_zi ,dsc$k_dtype_zem,
;  194     0324  2          dsc$k_dtype_dsc,dsc$k_dtype_bpv,dsc$k_dtype_blv,dsc$k_dtype_adt]:      ! M002
;  195     0325  2
;  196     0326  2                                  length = .length * %BPUNIT;
;  197     0327  2
;  198     0328  2         [dsc$k_dtype_vt] :       length = (.length + 2) * %BPUNIT;
;  199     0329  2
;  200     0330  2         [dsc$k_dtype_p] :    length = (.length/2 + 1) * %BPUNIT;
;  201     0331  2
;  202     0332  2         [dsc$k_dtype_tf,dsc$k_dtype_vu,dsc$k_dtype_svu] :       0;
;  203     0333  2
;  204     0334  2         [dsc$k_dtype_v ,dsc$k_dtype_sv] :   IF (.length EQL 0) AND
;  205     0335  2                                  (.vms_desc[dsc$b_class] EQL dsc$k_class_z) THEN
;  206     0336  2                                  length = .vms_desc[dsc$l_pos];
;  207     0337  2
;  208     0338  3         [dsc$k_dtype_ac] :       length = (1 +
;  209     0339  2                                  .(.vms_desc[dsc$a_pointer])<0,8,0>) * %BPUNIT;
;  210     0340  2
;  211     0341  3         [dsc$k_dtype_az] :       BEGIN
;  212     0342  3                                  BIND chrvec = vms_desc[dsc$a_pointer] : REF VECTOR [,BYTE];
;  213     0343  3                                  LOCAL index;
;  214     0344  3                                  index = 0;
;  215     0345  3                                  WHILE .index LEQ 2046 DO
;  216     0346  4                                    BEGIN
```

```
;  217     0347  4                          IF .chrvec[.index] EQL 0 THEN EXITLOOP;
;  218     0348  4                          index = .index + 1;
;  219     0349  3                          END;
;  220     0350  3                      length = (.index+1) * %BPUNIT;
;  221     0351  2                      END;
;  222     0352  2
;  223     0353  2          [INRANGE,OUTRANGE] :    length = .length * %BPUNIT;
;  224     0354  2          TES;
;  225     0355  2
;  226     0356  2      RETURN .length;
;  227     0357  1      END;                        ! End of 'dbg$data_length'


                                                .TITLE  DBGVALUES
                                                .IDENT  \V04-000\

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

                                43  41  21  03  00000 P.AAA:  .ASCII  <3>\!AC\                    ;
                                44  41  21  03  00004 P.AAB:  .ASCII  <3>\!AD\                    ;

                                                .PSECT  DBG$OWN,NOEXE,  PIC,2

                                1C  3F  0F  C0  00000 SIGNED_DTYPE:
                                                .BYTE   -64, 15, 63, 28                         ;
                                    00  00004           .BYTE   0                               ;
                                    06  00005           .BYTE   6                               ;

                                        FORMAT_AC=          P.AAA
                                        FORMAT_AD=          P.AAB
                                                .EXTRN  DBG$GL_CURRENT_PRIMARY
                                                .EXTRN  DBG$GB_RADIX, DBG$GB_LANGUAGE
                                                .EXTRN  DBG$GV_CONTROL, DBG$GL_CALL_CONTEXT
                                                .EXTRN  DBG$GL_CONVERT_TOKEN
                                                .EXTRN  DBG$GL_DFLTTYP, DBG$GW_DFLTLENG
                                                .EXTRN  DBG$GL_SIGN_FLAG
                                                .EXTRN  DBG$BUILD_PRIMARY_SUBNODE
                                                .EXTRN  DBG$COLLECT, DBG$CVT_DX_DX
                                                .EXTRN  DBG$ENUM_POS, DBG$ENUM_SUCC
                                                .EXTRN  DBG$ENUM_VAL, DBG$GET_TEMPMEM
                                                .EXTRN  DBG$IS_IT_ENTRY
                                                .EXTRN  DBG$INS_DECODE, DBG$LANGUAGE_FORMAT
                                                .EXTRN  DBG$NEWLINE, DBG$NGET_RADIX
                                                .EXTRN  DBG$PRINT, DBG$PRINT_CONTROL
                                                .EXTRN  DBG$PRINT_IDENTIFIER
                                                .EXTRN  DBG$PRINT_SET_VALUE
                                                .EXTRN  DBG$PRINT_SYMBOL_NAME
                                                .EXTRN  DBG$PUSH_TEMPMEM
                                                .EXTRN  DBG$POP_TEMPMEM
                                                .EXTRN  DBG$SAVE_VAL, DBG$STA_SETCONTEXT
                                                .EXTRN  DBG$STA_SYMPATHNAME
                                                .EXTRN  DBG$STA_SYMKIND
                                                .EXTRN  DBG$STA_SYMNAME
                                                .EXTRN  DBG$STA_SYMSIZE
                                                .EXTRN  DBG$STA_SYMTYPE
                                                .EXTRN  DBG$STA_SYMVALUE
                                                .EXTRN  DBG$STA_TYPEFCODE
```

```
                                                                  .EXTRN  DBG$STA_TYP_ATOMIC
                                                                  .EXTRN  DBG$STA_TYP_DESCR
                                                                  .EXTRN  DBG$STA_TYP_ENUM
                                                                  .EXTRN  DBG$STA_TYP_RECORD
                                                                  .EXTRN  DBG$STA_TYP_SUBRNG
                                                                  .EXTRN  DBG$STA_TYP_TYPEDPTR
                                                                  .EXTRN  DBG$STA_VARIANT_VALUE
                                                                  .EXTRN  DBG$STA_VARIANT_SELECT
                                                                  .EXTRN  FOR$CVT_D_TG, FOR$CVT_G_TG
                                                                  .EXTRN  FOR$CVT_H_TG

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

                                             0004 00000          .ENTRY  DBG$DATA_LENGTH, Save R2                 ; 0290
                          52        04   AC   D0 00002          MOVL    VMS_DESC, R2                             ; 0306
                          51             62   3C 00006          MOVZWL  (R2), LENGTH
                   9E     8F        02   A2   91 00009          CMPB    2(R2), #158                              ; 0311
                                         7D   13 0000E          BEQL    6$
              2B          00        02   A2   8F 00010          CASEB   2(R2), #0, #43                           ; 0315
  0058        0058        006B          0058     00015 1$:      .WORD   2$-1$,-                                  ;
  0058        0058        0058          0058     0001D                  5$-1$,-                                  ;
  0058        0058        0058          0058     00025                  2$-1$,-                                  ;
  0058        0058        0058          0058     0002D                  2$-1$,-                                  ;
  0058        0058        0058          0058     00035                  2$-1$,-                                  ;
  0058        0058        0065          0058     0003D                  2$-1$,-                                  ;
  0058        0058        0058          0058     00045                  2$-1$,-                                  ;
  0058        0058        0058          0058     0004D                  2$-1$,-                                  ;
  0058        009C        0058          0058     00055                  2$-1$,-                                  ;
  0080        007A        005D          0058     0005D                  2$-1$,-                                  ;
  0058        009C        006B          009C     00065                  2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          4$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          11$-1$,-                                 ;
                                                                          2$-1$,-                                  ;
                                                                          2$-1$,-                                  ;
                                                                          3$-1$,-                                  ;
```

```
                                                                                7$-1$,-
                                                                                8$-1$,-
                                                                                11$-1$,-
                                                                                5$-1$,-
                                                                                11$-1$,-
                                                                                2$-1$
                        51              08  C4 0006D 2$:    MULL2   #8, LENGTH                      ; 0326
                                        3F  11 00070         BRB     11$
                        51              08  C4 00072 3$:    MULL2   #8, LENGTH                      ; 0328
                        51              10  C0 00075         ADDL2   #16, LENGTH
                                        37  11 00078         BRB     11$
                50      51              02  C7 0007A 4$:    DIVL3   #2, LENGTH, R0                  ; 0330
                                        2A  11 0007E         BRB     10$
                                        51  D5 00080 5$:    TSTL    LENGTH                          ; 0334
                                        2D  12 00082         BNEQ    11$
                                03      A2  95 00084         TSTB    3(R2)                           ; 0335
                                        28  12 00087         BNEQ    11$
                        51      08      A2  D0 00089         MOVL    8(R2), LENGTH                   ; 0336
                                        22  11 0008D 6$:    BRB     11$                             ; 0334
                        50      04      B2  9A 0008F 7$:    MOVZBL  @4(R2), R0                      ; 0339
                                        15  11 00093         BRB     10$
                                        50  D4 00095 8$:    CLRL    INDEX                           ; 0344
                000007FE        8F      50  D1 00097 9$:    CMPL    INDEX, #2046                    ; 0345
                                        0A  14 0009E         BGTR    10$
                                04 B240 95  00A0             TSTB    @4(R2)[INDEX]                   ; 0347
                                        04  13 00A4         BEQL    10$
                                        50  D6 00A6         INCL    INDEX                           ; 0348
                                        ED  11 00A8         BRB     9$                              ; 0345
                51              50      03  78 00AA 10$:    ASHL    #3, INDEX, LENGTH               ; 0350
                                51      08  C0 00AE         ADDL2   #8, LENGTH
                                50      51  D0 00B1 11$:    MOVL    LENGTH, R0                      ; 0356
                                            04 00B4         RET                                     ; 0357

; Routine Size:  181 bytes,    Routine Base:  DBG$CODE + 0000
```

```
;  229          0358  1 GLOBAL ROUTINE DBG$MAKE_SKELETON_DESC(desc_type,data_length) =
;  230          0359  2     BEGIN
;  231          0360  2     BUILTIN ACTUALCOUNT;
;  232          0361  2     LOCAL
;  233          0362  2         desc_length,
;  234          0363  2         result_desc     : REF BLOCK [,LONG] FIELD(dbg$dhdr_fields);
;  235          0364  2
;  236          0365  2     SELECTONE .desc_type OF
;  237          0366  2         SET
;  238          0367  2         [dbg$k_v_value_desc]:   desc_length = %UPVAL*dbg$k_valdesc_base_size + 16;
;  239          0368  2
;  240          0369  3         [dbg$k_value_desc]:     BEGIN
;  241          0370  3                                 desc_length = %UPVAL*dbg$k_valdesc_base_size + 16;
;  242          0371  3                                 IF actualcount() GTR 1 THEN
;  243          0372  3                                   IF .data_length GTR 16 THEN
;  244          0373  3                                     desc_length = .data_length + %UPVAL*dbg$k_valdesc_base_size;
;  245          0374  2                                 END;
;  246          0375  2
;  247          0376  3         [dbg$k_primary_desc]:   BEGIN
;  248          0377  3                                 desc_length = 20;
;  249          0378  3                                 IF actualcount() GTR 1 THEN
;  250          0379  3                                     desc_length = .desc_length + .data_length;
;  251          0380  2                                 END;
;  252          0381  2
;  253          0382  2         [OTHERWISE]:            SIGNAL();
;  254          0383  2         TES;
;  255          0384  2
;  256          0385  2     result_desc = dbg$get_tempmem((.desc_length + (%UPVAL-1)) / %UPVAL);
;  257          0386  2     result_desc[dbg$b_dhdr_lang]   = %X'FF';
;  258          0387  2     result_desc[dbg$b_dhdr_type]   = .desc_type;
;  259          0388  2     result_desc[dbg$w_dhdr_length] = .desc_length;
;  260          0389  2     RETURN .result_desc;
;  261          0390  2
;  262          0391  1     END;                            ! End of 'dbg$make_skeleton_desc'


                                                000C 00000          .ENTRY  DBG$MAKE_SKELETON_DESC, Save R2,R3          ; 0358
                        53        04        AC  D0 00002          MOVL    DESC_TYPE, R3                               ; 0365
                00000083  8F                53  D1 00006          CMPL    R3, #131                                    ; 0367
                                            05  12 0000D          BNEQ    1$                                          ;
                        52                  30  D0 0000F          MOVL    #48, DESC_LENGTH                            ;
                                            3C  11 00012          BRB     4$                                          ;
                0000007A  8F                53  D1 00014 1$:      CMPL    R3, #122                                    ; 0369
                                            15  12 0001B          BNEQ    2$                                          ;
                        52                  30  D0 0001D          MOVL    #48, DESC_LENGTH                            ; 0370
                        01                  6C  91 00020          CMPB    (AP), #1                                    ; 0371
                                            2B  1B 00023          BLEQU   4$                                          ;
                        10        08        AC  D1 00025          CMPL    DATA_LENGTH, #16                            ; 0372
                                            25  15 00029          BLEQ    4$                                          ;
                52          08    AC        20  C1 0002B          ADDL3   #32, DATA_LENGTH, DESC_LENGTH               ; 0373
                                            1E  11 00030          BRB     4$                                          ; 0365
                00000079  8F                53  D1 00032 2$:      CMPL    R3, #121                                    ; 0376
                                            0E  12 00039          BNEQ    3$                                          ;
                        52                  14  D0 0003B          MOVL    #20, DESC_LENGTH                            ; 0377
```

```
                        01              6C  91 0003E           CMPB    (AP), #1                                ; 0378
                                        0D  1B 00041           BLEQU   4$                                      ;
                        52      08      AC  C0 00043           ADDL2   DATA_LENGTH, DESC_LENGTH                ; 0379
                                        07  11 00047           BRB     4$                                      ; 0365
                00000000G   00          00  FB 00049 3$:       CALLS   #0, LIB$SIGNAL                          ; 0382
                        50      03      A2  9E 00050 4$:       MOVAB   3(R2), R0                               ; 0385
                7E      50              04  C7 00054           DIVL3   #4, R0, -(SP)                           ;
                00000000G   00          01  FB 00058           CALLS   #1, DBG$GET_TEMPMEM                     ;
                      03    A0          01  8E 0005F           MNEGB   #1, 3(RESULT_DESC)                      ; 0386
                      02    A0          53  90 00063           MOVB    R3, 2(RESULT_DESC)                      ; 0387
                        60              52  B0 00067           MOVW    DESC_LENGTH, (RESULT_DESC)              ; 0388
                                            04 0006A           RET                                             ; 0391

; Routine Size:  107 bytes,    Routine Base:  DBG$CODE + 00B5
```

```
;  264          0392  1 GLOBAL ROUTINE DBG$MAKE_INTEGER_DESC(VALUE) =
;  265          0393  1 !
;  266          0394  1 ! ROUTINE DESCRIPTION
;  267          0395  1 !       Given an integer value, this routine builds a value descriptor
;  268          0396  1 !       for that integer.
;  269          0397  1 !
;  270          0398  1 ! INPUTS
;  271          0399  1 !       VALUE   - The integer value
;  272          0400  1 !
;  273          0401  1 ! OUTPUTS
;  274          0402  1 !       A pointer to the constructed value descriptor is returned.
;  275          0403  1 !       The descriptor is built out of temporary memory.
;  276          0404  1 !
;  277          0405  2     BEGIN
;  278          0406  2     LOCAL
;  279          0407  2         TEMP_DESC: REF DBG$VALDESC;
;  280          0408  2
;  281          0409  2     TEMP_DESC = DBG$MAKE_SKELETON_DESC(DBG$K_VALUE_DESC);
;  282          0410  2     TEMP_DESC[DBG$B_DHDR_KIND] = RST$K_DATA;
;  283          0411  2     TEMP_DESC[DBG$B_DHDR_FCODE] = RST$K_TYPE_ATOMIC;
;  284          0412  2     TEMP_DESC[DBG$B_VALUE_CLASS] = DSC$K_CLASS_S;
;  285          0413  2     TEMP_DESC[DBG$B_VALUE_DTYPE] = DSC$K_DTYPE_L;
;  286          0414  2     TEMP_DESC[DBG$W_VALUE_LENGTH] = 4;
;  287          0415  2     TEMP_DESC[DBG$L_VALUE_POINTER] = TEMP_DESC[DBG$A_VALUE_ADDRESS];
;  288          0416  2     TEMP_DESC[DBG$L_VALUE_VALUE0] = .VALUE;
;  289          0417  2     RETURN .TEMP_DESC;
;  290          0418  1     END;

                                                0000 00000 .ENTRY  DBG$MAKE_INTEGER_DESC, Save nothing  ; 0392
                    7E       7A    8F   9A 00002 MOVZBL  #122, -(SP)                                  ; 0409
                88  AF             01   FB 00006 CALLS   #1, DBG$MAKE_SKELETON_DESC                  ;
                06  A0       0602 8F   B0 0000A MOVW    #1538, 6(TEMP_DESC)                         ; 0411
                14  A0 01080004 8F   D0 00010 MOVL    #17301508, 20(TEMP_DESC)                    ; 0414
                18  A0       20   A0   9E 00018 MOVAB   32(TEMP_DESC), 24(TEMP_DESC)                ; 0415
                20  A0       04   AC   D0 0001D MOVL    VALUE, 32(TEMP_DESC)                        ; 0416
                                        04 00022 RET                                                ; 0418

; Routine Size:  35 bytes,    Routine Base:  DBG$CODE + 0120
```

```
;  292     0419  1 GLOBAL ROUTINE DBG$MAKE_VAL_DESC (desc_ptr,target_type) =
;  293     0420  1 !
;  294     0421  1 ! ROUTINE DESCRIPTION
;  295     0422  1 !       Given a VMS descriptor, this routine builds either a Value Descriptor
;  296     0423  1 !       or a Volatile Value Descriptor around the VMS descriptor.
;  297     0424  1 !       In the case where a Value Descriptor is constructed, we need to
;  298     0425  1 !       extract the value represented by the VMS descriptor, and put
;  299     0426  1 !       this value inside the Value Descriptor. So, for descriptors
;  300     0427  1 !       representing bitfields, this routine is where the actual extraction
;  301     0428  1 !       of the bits takes place.
;  302     0429  1 !
;  303     0430  1 ! INPUTS
;  304     0431  1 !       DESC_PTR        - Points to a Vax-standard VMS descriptor
;  305     0432  1 !       TARGET_TYPE     - A constant which can be one of:
;  306     0433  1 !                         DBG$K_VALUE_DESC   or   DBG$K_V_VALUE_DESC
;  307     0434  1 ! OUTPUTS
;  308     0435  1 !       A Value Descriptor or a Volatile Value Descriptor is constructed
;  309     0436  1 !       out of temporary memory. A pointer to this descriptor is returned.
;  310     0437  1 !
;  311     0438  2     BEGIN
;  312     0439  2     LOCAL
;  313     0440  2         vms_desc        : dbg$stg_desc,
;  314     0441  2         bits,bytes,
;  315     0442  2         result_desc     : REF dbg$valdesc;
;  316     0443  2
;  317     0444  2     !+
;  318     0445  2     ! The first thing we do is to 'de-reference' data items of type
;  319     0446  2     ! descriptor which is what we get for arrays of dynamic strings.
;  320     0447  2     !-
;  321     0448  2     ch$move(12,.desc_ptr,vms_desc);
;  322     0449  2     IF .target_type EQL dbg$k_value_desc THEN
;  323     0450  2       WHILE .vms_desc[dsc$b_dtype] EQL dsc$k_dtype_dsc DO                ;
;  324     0451  3         BEGIN
;  325     0452  3         BUILTIN PROBER;
;  326     0453  3         LOCAL addr;
;  327     0454  3         addr = .vms_desc[dsc$a_pointer];
;  328     0455  3         IF NOT PROBER(%REF(0),%REF(8),.addr) THEN SIGNAL(dbg$_noaccessr,1,.addr);
;  329     0456  3         ch$move(8,.addr,vms_desc);
;  330     0457  3         CASE .vms_desc[dsc$b_class] FROM dsc$k_class_z TO dsc$k_class_ubs
;  331     0458  3          OF SET
;  332     0459  3             [dsc$k_class_s,dsc$k_class_d,dsc$k_class_vs] :
;  333     0460  4                 BEGIN
;  334     0461  4                 IF  .vms_desc[dsc$b_class] EQL dsc$k_class_d
;  335     0462  4                 THEN vms_desc[dsc$b_class]  =  dsc$k_class_s;
;  336     0463  4                 IF  .vms_desc[dsc$b_dtype] EQL dsc$k_dtype_vt
;  337     0464  4                 THEN vms_desc[dsc$b_class]  =  dsc$k_class_vs;
;  338     0465  4                 IF  .vms_desc[dsc$b_class] EQL dsc$k_class_vs
;  339     0466  4                 AND .vms_desc[dsc$b_dtype] EQL dsc$k_dtype_t
;  340     0467  4                 THEN vms_desc[dsc$b_dtype]  =  dsc$k_dtype_vt;
;  341     0468  4                 vms_desc[dsc$l_pos] = 0;
;  342     0469  3                 END;
;  343     0470  3
;  344     0471  3             [dsc$k_class_sd,dsc$k_class_ubs] :
;  345     0472  4                 BEGIN
;  346     0473  4                 IF NOT PROBER(%REF(0),%REF(4),.addr+8) THEN SIGNAL(dbg$_noaccessr,1,.addr+8);
;  347     0474  4                 vms_desc[dsc$l_pos] = .(.addr+8)<0,32,0>;
;  348     0475  3                 END;
```

```
;  349     0476  3
;  350     0477  3              [INRANGE,OUTRANGE] :        SIGNAL(dbg$_illtype);
;  351     0478  3              TES;
;  352     0479  2          END;
;  353     0480  2      !+
;  354     0481  2      ! Obtain the length in bits and the length in bytes of the data
;  355     0482  2      ! represented by the VMS descriptor.
;  356     0483  2      !-
;  357     0484  2      bits  = dbg$data_length(vms_desc);
;  358     0485  2      bytes = (.bits + (%BPUNIT-1)) / %BPUNIT;
;  359     0486  2
;  360     0487  2      !+
;  361     0488  2      ! Allocate either enough space for a Volatile Value Descriptor,
;  362     0489  2      ! or enough space for a Value Descriptor which contains the value.
;  363     0490  2      !-
;  364     0491  3      IF (.target_type EQL dbg$k_v_value_desc) OR (.bytes GTR 512)
;  365     0492  2      THEN
;  366     0493  2          result_desc = dbg$make_skeleton_desc(dbg$k_v_value_desc)
;  367     0494  2      ELSE
;  368     0495  2          result_desc = dbg$make_skeleton_desc(dbg$k_value_desc,.bytes);
;  369     0496  2
;  370     0497  2      !+
;  371     0498  2      ! Copy the VMS descriptor into the Value Descriptor. Also fill in
;  372     0499  2      ! the kind and fcode fields.
;  373     0500  2      !-
;  374     0501  2      ch$move(12,vms_desc,result_desc[dbg$a_value_vmsdesc]);
;  375     0502  2      result_desc[dbg$b_dhdr_kind]   = rst$k_data;
;  376     0503  2      result_desc[dbg$b_dhdr_fcode]  = rst$k_type_descr;
;  377     0504  2
;  378     0505  2      !+
;  379     0506  2      ! If the target type is a value descriptor then we want to extract
;  380     0507  2      ! the value represented by the VMS descriptor and
;  381     0508  2      ! right-align the result in the value descriptor.
;  382     0509  2      !-
;  383     0510  2      IF .result_desc[dbg$b_dhdr_type] EQL dbg$k_value_desc THEN
;  384     0511  3          BEGIN
;  385     0512  3          BUILTIN PROBER;
;  386     0513  3          LOCAL addr,pos;
;  387     0514  3          result_desc[dbg$l_value_pointer] = result_desc[dbg$a_value_address];
;  388     0515  3              !+
;  389     0516  3              ! Compute the byte address by adding (bit_offset/8).
;  390     0517  3              ! Then set the bit offset to (bit_offset mod 8).
;  391     0518  3              !-
;  392     0519  3              IF .vms_desc[dsc$b_class] EQL dsc$k_class_ubs
;  393     0520  3              THEN
;  394     0521  4                  BEGIN
;  395     0522  4                  pos   = .(vms_desc[dsc$l_pos])<0,3,0>;
;  396     0523  4                  addr = .vms_desc[dsc$a_pointer] + .(vms_desc[dsc$l_pos])<3,29,1>;
;  397     0524  4                  END
;  398     0525  3              ELSE
;  399     0526  4                  BEGIN
;  400     0527  4                  pos = 0;
;  401     0528  4                  addr = .vms_desc[dsc$a_pointer];
;  402     0529  3                  END;
;  403     0530  3              !+
;  404     0531  3              ! Check for read access.
;  405     0532  3              !-
```

```
;  406          0533  3          bytes = (.pos + .bits + 7)/8;
;  407          0534  3          IF .bytes NEQ 0
;  408          0535  3          THEN
;  409          0536  3              IF NOT PROBER(%REF(0),bytes,.addr)
;  410          0537  3              THEN
;  411          0538  3                  SIGNAL(dbg$_noaccessr,1,.addr);
;  412          0539  3          !+
;  413          0540  3          ! Don't support bit extractions bigger than 32 bits for now.
;  414          0541  3          ! This restriction may be relaxed at a later time.
;  415          0542  3          !-
;  416          0543  3          IF .bits LEQU 32
;  417          0544  3          THEN
;  418          0545  4              BEGIN
;  419          0546  4              !+
;  420          0547  4              ! Decide whether to do a signed or an unsigned extraction based on
;  421          0548  4              ! the dtype.
;  422          0549  4              !-
;  423          0550  4              SELECTONE .vms_desc[dsc$b_dtype] OF
;  424          0551  4                  SET
;  425          0552  4                  [dsc$k_dtype_sv,dsc$k_dtype_svu,dsc$k_dtype_b,dsc$k_dtype_w] :
;  426          0553  4                      .result_desc[dbg$l_value_pointer] = .(.addr)<.pos,.bits,1>;
;  427          0554  4                  [OTHERWISE] :
;  428          0555  4                      .result_desc[dbg$l_value_pointer] = .(.addr)<.pos,.bits,0>;
;  429          0556  4                  TES;
;  430          0557  4              !+
;  431          0558  4              ! Since we have performed the bit extraction, the bit offset is
;  432          0559  4              ! now zero. Zero the POS field to reflect this.
;  433          0560  4              !-
;  434          0561  4              IF .result_desc[dbg$b_value_class] EQL dsc$k_class_ubs
;  435          0562  4                THEN result_desc[dbg$l_value_pos] = 0;
;  436          0563  4              END
;  437          0564  3          ELSE
;  438          0565  4              BEGIN
;  439          0566  4              !+
;  440          0567  4              ! The value is longer than 32 bits.
;  441          0568  4              !-
;  442          0569  4
;  443          0570  4              IF .pos EQL 0
;  444          0571  4              THEN
;  445          0572  4                !+
;  446          0573  4                ! Copy the bytes.
;  447          0574  4                !-
;  448          0575  4                ch$move(.bytes,.addr,.result_desc[dbg$l_value_pointer])
;  449          0576  4
;  450          0577  4              ELSE
;  451          0578  5                BEGIN
;  452          0579  5                !+
;  453          0580  5                ! We used to disallow this.
;  454          0581  5                ! SIGNAL(dbg$_unimplent);
;  455          0582  5                !-
;  456          0583  5                INCR i FROM 0 TO (.bits-1)/32 DO
;  457          0584  5                  (4*.i + .result_desc[dbg$l_value_pointer]) =
;  458          0585  5                      .(4*.i + .addr)<.pos,32,0>;
;  459          0586  5
;  460          0587  5                !+
;  461          0588  5                ! Since we have performed the bit extraction, the bit offset is
;  462          0589  5                ! now zero. Zero the POS field to reflect this.
```

```
;  463        0590  5                   !-
;  464        0591  5                   IF .result_desc[dbg$b_value_class] EQL dsc$k_class_ubs
;  465        0592  5                     THEN result_desc[dbg$l_value_pos] = 0;
;  466        0593  4                   END;
;  467        0594  3                 END;
;  468        0595  2             END;
;  469        0596  2
;  470        0597  2       !+
;  471        0598  2       ! We are all done. Return a pointer to the newly constructed  alue
;  472        0599  2       ! Descriptor.
;  473        0600  2       !-
;  474        0601  2       RETURN .r  ult_desc;
;  475        0602  1       END;                  ! end of routine dbg$make_val_desc



                                   0FFC 00000        .ENTRY  DBG$MAKE_VAL_DESC, Save R2,R3,R4,R5,R6,R7,-  ; 0419
                                                             R8,R9,R10,R11                                 ;
                        5E           0C  C2 00002        SUBL2   #12, SP                                   ;
          6E       04   BC           0C  28 00005        MOVC3   #12, @DESC_PTR, VMS_DESC                  ; 0448
             0000007A   8F     08    AC  D1 0000A        CMPL    TARGET_TYPE, #122                         ; 0449
                                     04  12 00012        BNEQ    2$                                        ;
                        18     02    AE  91 00014 1$:    CMPB    VMS_DESC+2, #24                           ; 0450
                                     03  13 00018 2$:    BEQL    3$                                        ;
                                   0098  31 0001A        BRW     14$                                       ;
                        56     04    AE  D0 0001D 3$:    MOVL    VMS_DESC+4, ADDR                          ; 0454
          66            08           00  0C 00021        PROBER  #0, #8, (ADDR)                            ; 0455
                                     11  12 00025        BNEQ    4$                                        ;
                                     56  DD 00027        PUSHL   ADDR                                      ;
                                     01  DD 00029        PUSHL   #1                                        ;
                          00028228   8F  DD 0002B        PUSHL   #164392                                   ;
             00000000G  00           03  FB 00031        CALLS   #3, LIB$SIGNAL                            ;
          6E            66           08  28 00038 4$:    MOVC3   #8, (ADDR), VMS_DESC                      ; 0456
          0D            00     03    AE  8F 0003C        CASEB   VMS_DESC+3, #0, #13                       ; 0457
   001C            002B        002B    001C   00041 5$:  .WORD   6$-5$,-                                   ;
   001C            001C        001C    001C   00049              8$-5$,-                                   ;
   002B            001C        0054    001C   00051              8$-5$,-                                   ;
                               0054    001C   00059              6$-5$,-                                   ;
                                                                 6$-5$,-                                   ;
                                                                 6$-5$,-                                   ;
                                                                 6$-5$,-                                   ;
                                                                 6$-5$,-                                   ;
                                                                 6$-5$,-                                   ;
                                                                 12$-5$,-                                  ;
                                                                 6$-5$,-                                   ;
                                                                 8$-5$,-                                   ;
                                                                 6$-5$,-                                   ;
                                                                 12$-5$                                    ;
                          000287D8   8F  DD 0005D 6$:    PUSHL   #165848                                   ; 0477
             00000000G  00           01  FB 00063        CALLS   #1, LIB$SIGNA                             ;
                                     A8  11 0006A 7$:    BRB     1$                                        ;
                        02     03    AE  91 0006C 8$:    CMPB    VMS_DESC+3, #2                            ; 0461
                                     04  12 00070        BNE?    9$                                        ;
                03      AE           01  90 00072        MOVB    #1, VMS_DESC+3                            ; 0462
                        25     02    AE  91 00076 9$:    CMPB    VMS_DESC+2, #37                           ; 0463
```

```
                                  04  12 0007A        BNEQ     10$                                       ;
             03    AE             0B  90 0007C        MOVB     #11, VMS_DESC+3                           ; 0464
                   0B      03     AE  91 00080 10$:   CMPB     VMS_DESC+3, #11                           ; 0465
                                  0A  12 00084        BNEQ     11$                                       ;
                   0E      02     AE  91 00086        CMPB     VMS_DESC+2, #14                           ; 0466
                                  04  12 0008A        BNEQ     11$                                       ;
             02    AE             25  90 0008C        MOVB     #37, VMS_DESC+2                           ; 0467
                           08     AE  D4 00090 11$:   CLRL     VMS_DESC+8                                ; 0468
                                  D5  11 00093        BRB      7$                                        ; 0457
       08    A6            04     00  0C 00095 12$:   PROBER   #0, #4, 8(ADDR)                           ; 0473
                                  12  12 0009A        BNEQ     13$                                       ;
                           08     A6  9F 0009C        PUSHAB   8(ADDR)                                   ;
                                  01  DD 0009F        PUSHL    #1                                        ;
                        00028228  8F  DD 000A1        PUSHL    #164392                                   ;
      00000000G    00             03  FB 000A7        CALLS    #3, LIB$SIGNAL                            ;
             08    AE      08     A6  D0 000AE 13$:   MOVL     8(ADDR), VMS_DESC+8                       ; 0474
                                  B5  11 000B3        BRB      7$                                        ; 0450
                                  5E  DD 000B5 14$:   PUSHL    SP                                        ; 0484
           FE01    CF             01  FB 000B7        CALLS    #1, DBG$DATA_LENGTH                       ;
                   5A             50  D0 000BC        MOVL     R0, BITS                                  ;
                   50      07     AA  9E 000BF        MOVAB    7(R10), R0                                ; 0485
       5B          50             08  C7 000C3        DIVL3    #8, R0, BYTES                             ;
      00000083     8F      08     AC  D1 000C7        CMPL     TARGET_TYPE, #131                         ; 0491
                                  09  13 000CF        BEQL     15$                                       ;
      00000200     8F             5B  D1 000D1        CMPL     BYTES, #512                               ;
                                  0B  15 000D8        BLEQ     16$                                       ;
                   7E      83     8F  9A 000DA 15$:   MOVZBL   #131, -(SP)                               ; 0493
           FE8F    CF             01  FB 000DE        CALLS    #', DBG$MAKE_SKELETON_DESC                ;
                                  0B  11 000E3        BRB      17$                                       ;
                                  5B  DD 000E5 16$:   PUSHL    BYTES                                     ; 0495
                   7E      7A     8F  9A 000E7        MOVZBL   #122, -(SP)                               ;
           FE82    CF             02  FB 000EB        CALLS    #2, DBG$MAKE_SKELETON_DESC                ;
                   57             50  D0 000F0 17$:   MOVL     R0, RESULT_DESC                           ;
       14    A7    6E             0C  28 000F3        MOVC3    #12, VMS_DESC, 20(RESULT_DESC)            ; 0501
             06    A7    0603     8F  B0 000F8        MOVW     #1539, 6(RESULT_DESC)                     ; 0503
             7A    8F      02     A7  91 000FE        CMPB     2(RESULT_DESC), #122                      ; 0510
                                  7E  12 00103        BNEQ     25$                                       ;
                   56      18     A7  9E 00105        MOVAB    24(RESULT_DESC), R6                       ; 0514
                   66      20     A7  9E 00109        MOVAB    32(R7), (R6)                              ;
                   0D      03     AE  91 0010D        CMPB     VMS_DESC+3, #13                           ; 0519
                                  12  12 00111        BNEQ     18$                                       ;
 58    08    AE            03     00  EF 00113        EXTZV    #0, #3, VMS_DESC+8, POS                   ; 0522
             59    08      FD     8F  78 00119        ASHL     #-3, VMS_DESC+8, ADDR                     ; 0523
                   AE             AE  C0 0011F        ADDL2    VMS_DESC+4, ADDR                          ;
                   59      04
                                  06  11 00123        BRB      19$                                       ; 0519
                                  58  D4 00125 18$:   CLRL     POS                                       ; 0527
                   59      04     AE  D0 00127        MOVL     VMS_DESC+4, ADDR                          ; 0528
                   50      07   AA48  9E 0012B 19$:   MOVAB    7(BITS)[POS], R0                          ; 0533
       5B          50             08  C7 00130        DIVL3    #8, R0, BYTES                             ;
                                  17  13 00134        BEQL     20$                                       ; 0534
       69                  5B     00  0C 00136        PROBER   #0, BYTES, (ADDR)                         ; 0536
                                  11  12 0013A        BNEQ     20$                                       ;
                                  59  DD 0013C        PUSHL    ADDR                                      ; 0538
                                  01  DD 0013E        PUSHL    #1                                        ;
                        00028228  8F  DD 00140        PUSHL    #164392                                   ;
      00000000G    00             03  FB 00146        CALLS    #3, LIB$SIGNAL                            ;
                   20             5A  D1 0014D 20$:   CMPL     BITS, #32                                 ; 0543
```

```
                                          28  1A 00150          BGTRU   24$                              ;
                        50        02      AE  9A 00152          MOVZBL  VMS_DESC+2, R0                   ; 0550
                        06                50  91 00156          CMPB    R0, #6                           ; 0552
                                          05  1F 00159          BLSSU   21$                              ;
                        07                50  91 0015B          CMPB    R0, #7                           ;
                                          0A  1B 0015E          BLEQU   22$                              ;
                        29                50  91 00160 21$:     CMPB    R0, #41                          ;
                                          0D  1F 00163          BLSSU   23$                              ;
                        2A                50  91 00165          CMPB    R0, #42                          ;
                                          08  1A 00168          BGTRU   23$                              ;
 00   B6          69    5A                58  EE 0016A 22$:     EXTV    POS, BITS, (ADDR), @0(R6)        ; 0553
                                          2D  11 00170          BRB     29$                              ;
 00   B6          69    5A                58  EF 00172 23$:     EXTZV   POS, BITS, (ADDR), @0(R6)        ; 0555
                                          25  11 00178          BRB     29$                              ; 0561
                                          58  D5 0017A 24$:     TSTL    POS                              ; 0570
                                          07  12 0017C          BNEQ    26$                              ;
            00    B6    69                5B  28 0017E          MOVC3   BYTES, (ADDR), @0(R6)            ; 0575
                                          23  11 00183 25$:     BRB     30$                              ;
                        50        FF      AA  9E 00185 26$:     MOVAB   -1(R10), R0                      ; 0583
                        50                20  C6 00189          DIVL2   #32, R0                          ;
                        51                01  CE 0018C          MNEGL   #1, I                            ;
                                          0A  11 0018F          BRB     28$                              ;
                                        6941  DF 00191 27$:     PUSHAL  (ADDR)[I]                        ; 0585
 00 B641          9E    20                58  EF 00194          EXTZV   POS, #32, @(SP)+, @0(R6)[I]      ;
                  F2    51                50  F3 0019B 28$:     AOBLEQ  R0, I, 27$                       ; 0584
                        0D        17      A7  91 0019F 29$:     CMPB    23(RESULT_DESC), #13             ; 0591
                                          03  12 001A3          BNEQ    30$                              ;
                                  1C      A7  D4 001A5          CLRL    28(RESULT_DESC)                  ; 0592
                        50                57  D0 001A8 30$:     MOVL    RESULT_DESC, R0                  ; 0601
                                              04 001AB          RET                                      ; 0602

; Routine Size:  428 bytes,    Routine Base:  DBG$CODE + 0143
```

```
;  477     0603  1 GLOBAL ROUTINE DBG$FILL_IN_VMS_DESC(fcode,typeid,symid,
;  478     0604  1                                       vms_desc,bit_length,bit_offset) =
;  479     0605  1 !
;  480     0606  1 ! ROUTINE DESCRIPTION
;  481     0607  1 !
;  482     0608  2     BEGIN
;  483     0609  2     MAP
;  484     0610  2         symid           : REF rst$entry,
;  485     0611  2         vms_desc        : REF dbg$stg_desc,
;  486     0612  2         bit_length      : REF VECTOR [1,LONG],
;  487     0613  2         bit_offset      : REF VECTOR [1,LONG];
;  488     0614  2
;  489     0615  2     CASE .fcode FROM rst$k_type_minimum TO rst$k_type_maximum OF
;  490     0616  2         SET
;  491     0617  2         [rst$k_type_atomic] :
;  492     0618  3             BEGIN
;  493     0619  3             LOCAL typecode;
;  494     0620  3             !+
;  495     0621  3             ! Atomic data types - the routine dbg$sta_typ_atomic can be
;  496     0622  3             ! used to obtain the dtype and length in bits. Class is set
;  497     0623  3             ! to S or VS here; it may later be changed to UBS if there
;  498     0624  3             ! is a bit offset present.
;  499     0625  3             !-
;  500     0626  3             dbg$sta_typ_atomic(.typeid,typecode,bit_length[0]);
;  501     0627  3             IF .typecode EQL dst$k_bool THEN
;  502     0628  4                 BEGIN
;  503     0629  4                 vms_desc[dsc$b_class]  = dsc$k_class_s;
;  504     0630  4                 vms_desc[dsc$b_dtype]  = dsc$k_dtype_tf;
;  505     0631  4                 vms_desc[dsc$w_length] = .bit_length[0];
;  506     0632  4                 END
;  507     0633  3             ELSE
;  508     0634  4                 BEGIN
;  509     0635  4                 vms_desc[dsc$b_dtype]  = .typecode;
;  510     0636  4                 IF .typecode EQL dsc$k_dtype_vt
;  511     0637  4                 THEN
;  512     0638  4                     vms_desc[dsc$b_class] = dsc$k_class_vs
;  513     0639  4                 ELSE
;  514     0640  4                     vms_desc[dsc$b_class] = dsc$k_class_s;
;  515     0641  4                 !+
;  516     0642  4                 ! Length is in bits for the five data types below, and
;  517     0643  4                 ! bytes for all others.
;  518     0644  4                 !-
;  519     0645  4                 vms_desc[dsc$w_length] = .bit_length[0]/
;  520     0646  5                     (IF .typecode EQL dsc$k_dtype_v
;  521     0647  5                      OR .typecode EQL dsc$k_dtype_vu
;  522     0648  5                      OR .typecode EQL dsc$k_dtype_sv
;  523     0649  5                      OR .typecode EQL dsc$k_dtype_svu
;  524     0650  5                      OR .typecode EQL dsc$k_dtype_tf
;  525     0651  5                        THEN 1
;  526     0652  4                        ELSE %BPUNIT);
;  527     0653  3                 END;
;  528     0654  2             END;
;  529     0655  2
;  530     0656  2
;  531     0657  2         [rst$k_type_pict] :
;  532     0658  3             BEGIN
;  533     0659  3             !+
```

```
;  534     0660  3          ! "Pictured" data item. This is really an item of data-type
;  535     0661  3          ! dsc$k_dtype_t, but we need to retain extra information in
;  536     0662  3          ! case we want to deposit a numeric value into this item.
;  537     0663  3          !-
;  538     0664  3          dbg$sta_symsize (.typeid,bit_length[0]);
;  539     0665  3          vms_desc[dsc$b_class]  = dsc$k_class_s;
;  540     0666  3          vms_desc[dsc$b_dtype]  = dsc$k_dtype_t;
;  541     0667  3          vms_desc[dsc$w_length] = .bit_length[0]/%BPUNIT;
;  542     0668  2          END;
;  543     0669  2
;  544     0670  2
;  545     0671  2      [rst$k_type_record,rst$k_type_ptr,rst$k_type_tptr,
;  546     0672  2       rst$k_type_enum,rst$k_type_set,rst$k_type_subrng,
;  547     0673  2       rst$k_type_file, rst$k_type_rfa]:
;  548     0674  2          !+
;  549     0675  2          ! Non-atomic (i.e., non-VAX standard) data types. For these,
;  550     0676  2          ! we do not attempt to fill in the VMS descriptor. We just
;  551     0677  2          ! fill in the bit_length.
;  552     0678  2          !-
;  553     0679  2          dbg$sta_symsize(.typeid,bit_length[0]);
;  554     0680  2
;  555     0681  2
;  556     0682  2      ! For variants, there is nothing to fill in.
;  557     0683  2      !
;  558     0684  2      [rst$k_type_variant]:
;  559     0685  2          0;
;  560     0686  2
;  561     0687  2      [rst$k_type_descr] :
;  562     0688  3          BEGIN
;  563     0689  3          !+
;  564     0690  3          ! Types described by descriptors. We use the routine dbg$sta_typ_descr
;  565     0691  3          ! to obtain the class, dtype, and length information.
;  566     0692  3          !-
;  567     0693  3          LOCAL dst_desc : REF dbg$stg_desc;
;  568     0694  3          dbg$sta_typ_descr(.typeid,dst_desc);
;  569     0695  3
;  570     0696  3          ! If we got a symid passed in to this routine,
;  571     0697  3          ! try calling SYMVALUE to get a
;  572     0698  3          ! descriptor. If we get one, then use this
;  573     0699  3          ! descriptor instead of the one we got back from STA_TYP_DESCR.
;  574     0700  3          !
;  575     0701  3          ! Note - normally, these 2 descriptors will be the same.
;  576     0702  3          ! However, for dynamic arrays in PASCAL, the runtime descriptor
;  577     0703  3          ! (which we get back when we call SYMVALUE with the symid) is
;  578     0704  3          ! correct, but the compile-time descriptor (which is part of
;  579     0705  3          ! the typespec) is wrong. This code is a workaround for this
;  580     0706  3          ! problem in the PASCAL DST. The same workaround appears
;  581     0707  3          ! in DBGPARSER for array descriptors.
;  582     0708  3          !
;  583     0709  3          IF .SYMID NEQ 0
;  584     0710  3          THEN
;  585     0711  4              BEGIN
;  586     0712  4              LOCAL
;  587     0713  4                  DESC: VECTOR[3],
;  588     0714  4                  RSTPTR: REF RST$ENTRY,
;  589     0715  4                  VALUE_KIND;
;  590     0716  4              RSTPTR = .SYMID;
```

```
;  591          0717  4              WHILE .RSTPTR[RST$B_KIND] NEQ RST$K_MODULE DO
;  592          0718  4                  RSTPTR = .RSTPTR[RST$L_UPSCOPEPTR];
;  593          0719  4              IF .RSTPTR[RST$B_LANGUAGE] EQL DBG$K_PASCAL
;  594          0720  4              THEN
;  595          0721  5                  BEGIN
;  596          0722  5                  DBG$STA_SETCONTEXT(.SYMID);
;  597          0723  5                  DBG$STA_SYMVALUE(.SYMID, DESC, VALUE_KIND);
;  598          0724  5                  IF .VALUE_KIND EQL DBG$K_VAL_DESCR
;  599          0725  5                  THEN
;  600          0726  5                      DST_DESC = .DESC[0];
;  601          0727  4                  END;
;  602          0728  3              END;
;  603          0729  3
;  604          0730  3          vms_desc[dsc$b_class]  = .dst_desc[dsc$b_class];
;  605          0731  3          vms_desc[dsc$b_dtype]  = .dst_desc[dsc$b_dtype];
;  606          0732  3          vms_desc[dsc$w_length] = .dst_desc[dsc$w_length];
;  607          0733  3
;  608          0734  3          !+
;  609          0735  3          ! Fix things up so that dtype VT always corresponds to class VS.
;  610          0736  3          ! (This seems to be necessary for PL/I varying strings).
;  611          0737  3          !-
;  612          0738  3          IF .vms_desc[dsc$b_dtype] EQL dsc$k_dtype_vt
;  613          0739  3          THEN
;  614          0740  3            vms_desc[dsc$b_class] = dsc$k_class_vs;
;  615          0741  3
;  616          0742  3          SELECTONE .vms_desc[dsc$b_class] OF
;  617          0743  3              SET
;  618          0744  3              [dsc$k_class_s,dsc$k_class_d,dsc$k_class_vs] : 0;
;  619          0745  3
;  620          0746  3              [dsc$k_class_sd] :
;  621          0747  4                  BEGIN
;  622          0748  4                  vms_desc[dsc$b_digits] = .dst_desc[dsc$b_digits];
;  623          0749  4                  vms_desc[dsc$b_scale]  = .dst_desc[dsc$b_scale];
;  624          0750  4                  vms_desc[dsc$v_fl_binscale] = .dst_desc[dsc$v_fl_binscale];
;  625          0751  4
;  626          0752  4                  !+
;  627          0753  4                  !*** Workaround for a problem in the PL/I DST.
;  628          0754  4                  !*** The scale they are giving us is the negative
;  629          0755  4                  !*** of what we expect.
;  630          0756  4                  !-
;  631          0757  4                  IF .symid NEQ 0
;  632          0758  4                  THEN
;  633          0759  5                      BEGIN
;  634          0760  5                      WHILE .symid[rst$b_kind] NEQ rst$k_module DO
;  635          0761  5                          symid = .symid[rst$l_upscopeptr];
;  636          0762  5                      IF (.symid[rst$b_language] EQL dbg$k_pli) AND
;  637          0763  5                          .symid[rst$v_oldpliflag]
;  638          0764  5                      THEN
;  639          0765  5                          vms_desc[dsc$b_scale] = - .dst_desc[dsc$b_scale];
;  640          0766  4                      END;
;  641          0767  3                  END;
;  642          0768  3
;  643          0769  3              [dsc$k_class_ubs] :
;  644          0770  3                  SELECTONE .dst_desc[dsc$b_dtype] OF
;  645          0771  3                      SET
;  646          0772  3                      [dsc$k_dtype_syu,dsc$k_dtype_vu,dsc$k_dtype_tf]:
;  647          0773  3                          bit_offset[0] = .bit_offset[0] + .dst_desc[dsc$l_pos];
```

```
;  648          0774  3                    [dsc$k_dtype_ubs]:
;  649          0775  3                        BEGIN
;  650          0776  4                        bit_offset[0] = .bit_offset[0] + .(.dst_desc+8)<0,16,1>;
;  651          0777  4                        IF .(.dst_desc+10)<0,1,0>
;  652          0778  4                            THEN vms_desc[dsc$b_dtype] = dsc$k_dtype_svu
;  653          0779  4                            ELSE vms_desc[dsc$b_dtype] = dsc$k_dtype_vu;
;  654          0780  4                        END;
;  655          0781  3
;  656          0782  3                    [OTHERWISE]:
;  657          0783  3                        0;
;  658          0784  3                    TES;
;  659          0785  3
;  660          0786  3
;  661          0787  3                [OTHERWISE] :
;  662          0788  3                    SIGNAL(dbg$_unimplent);
;  663          0789  3                TES;
;  664          0790  3
;  665          0791  3            IF .vms_desc[dsc$b_dtype] EQL dsc$k_dtype_bpv
;  666          0792  3            THEN
;  667          0793  4                BEGIN
;  668          0794  4                vms_desc[dsc$b_class]  = dsc$k_class_z;
;  669          0795  4                vms_desc[dsc$b_dtype]  = dsc$k_dtype_zem;
;  670          0796  4                vms_desc[dsc$w_length] = 2;
;  671          0797  4                dbg$gl_call_context = .dst_desc[dsc$a_frame];
;  672          0798  4                END
;  673          0799  3            ELSE IF .vms_desc[dsc$b_dtype] EQL dsc$k_dtype_blv
;  674          0800  3            THEN
;  675          0801  4                BEGIN
;  676          0802  4                vms_desc[dsc$b_class]  = dsc$k_class_z;
;  677          0803  4                vms_desc[dsc$b_dtype]  = dsc$k_dtype_zi;
;  678          0804  4                vms_desc[dsc$w_length] =
;  679          0805  5                    (dbg$ins_decode(.vms_desc[dsc$a_pointer],false,false) -
;  680          0806  4                                    .vms_desc[dsc$a_pointer]);
;  681          0807  4                dbg$gl_call_context = .dst_desc[dsc$a_frame];
;  682          0808  3                END;
;  683          0809  3
;  684          0810  3                bit_length[0] = dbg$data_length(.vms_desc);
;  685          0811  2                END;
;  686          0812  2
;  687          0813  2            ! Self relative labels in PL/I (i.e., arrays of labels).
;  688          0814  2            ! The value of one of these is equal to the contents of the
;  689          0815  2            ! memory location plus its own address. In other words, the
;  690          0816  2            ! values actually stored in the label array are offsets to
;  691          0817  2            ! the actual place to branch to.
;  692          0818  2            !
;  693          0819  2            [rst$k_type_self_rel_lab]:
;  694          0820  3                BEGIN
;  695          0821  3                vms_desc[dsc$b_class] = dsc$k_class_z;
;  696          0822  3                vms_desc[dsc$b_dtype] = dsc$k_dtype_zi;
;  697          0823  3                vms_desc[dsc$a_pointer] = .vms_desc[dsc$a_pointer] +
;  698          0824  3                    .(.vms_desc[dsc$a_pointer]);
;  699          0825  3                vms_desc[dsc$w_length] =
;  700          0826  4                        (dbg$ins_decode(.vms_desc[dsc$a_pointer],false,false) -
;  701          0827  3                                        .vms_desc[dsc$a_pointer]);
;  702          0828  3                bit_length[0] = .vms_desc[dsc$w_length] * 8;
;  703          0829  2                END;
;  704          0830  2
```

```
;  705          0831  2          ! We do not handle any other fcodes.
;  706          0832  2          !
;  707          0833  2          [INRANGE,OUTRANGE] :
;  708          0834  2              SIGNAL(dbg$_unimplent);
;  709          0835  2          TES;
;  710          0836  2
;  711          0837  2      RETURN sts$k_success;
;  712          0838  1      END;                            ! End of routine 'dbg$fill_in_vms_desc'


                                                03FC 00000          .ENTRY  DBG$FILL_IN_VMS_DESC, Save R2,R3,R4,R5,R6,- ; 0603
                                                                            R7,R8,R9
                                      59 00000000G   00   9E 00002          MOVAB   LIB$SIGNAL, R9
                                      58 00000000G   00   9E 00009          MOVAB   DBG$INS_DECODE, R8
                                      57 00000000G   00   9E 00010          MOVAB   DBG$STA_SYMSIZE, R7
                                      5E             18   C2 00017          SUBL2   #24, SP
                                15    01        04   AC   CF 0001A          CASEL   FCODE, #1, #21                      ; 0615
                00C6          00D2          0037          002C     0001F 1$:  .WORD   2$-1$,-
                00C6          00C6          00C6          00A9     00027      3$-1$,-
                002C          002C          002C          00C6     0002F      14$-1$,-
                00C6          00C6          002C          002C     00037      12$-1$,-
                00C6          0234          002C          002C     0003F      11$-1$,-
                                            002C          0212     00047      12$-1$,-
                                                                              12$-1$,-
                                                                              12$-1$,-
                                                                              12$-1$,-
                                                                              2$-1$,-
                                                                              12$-1$,-
                                                                              2$-1$,-
                                                                              2$-1$,-
                                                                              2$-1$,-
                                                                              2$-1$,-
                                                                              12$-1$,-
                                                                              12$-1$,-
                                                                              2$-1$,-
                                                                              2$-1$,-
                                                                              33$-1$,-
                                                                              12$-1$,-
                                                                              32$-1$,-
                                                                              2$-1$
                          00028800    8F   DD 0004B 2$:       PUSHL   #165888                              ; 0834
                      69              01   FB 00051           CALLS   #1, LIB$SIGNAL
                                      70   11 00054           BRB     10$
                                14    AC   DD 00056 3$:       PUSHL   BIT_LENGTH                          ; 0626
                                04    AE   9F 00059           PUSHAB  TYPECODE
                                08    AC   DD 0005C           PUSHL   TYPEID
                00000000G     00              03   FB 0005F           CALLS   #3, DBG$STA_TYP_ATOMIC
                              50        10    AC   D0 00066           MOVL    VMS_DESC, R0                    ; 0629
                              51        10    AC   D0 0006A           MOVL    VMS_DESC, R1                    ; 0630
                              52              6E   D0 0006E           MOVL    TYPECODE, R2                    ; 0627
                0000009E      8F              52   D1 00071           CMPL    R2, #158
                                              0F   12 00078           BNEQ    4$
                          03    A0              01   90 0007A           MOVB    #1, 3(R0)                       ; 0629
                          02    A1              28   90 0007E           MOVB    #40, 2(R1)                      ; 0630
                          10    BC        14    BC   B0 00082           MOVW    @BIT_LENGTH, @VMS_DESC          ; 0631
```

```
                                  65  11 00087        BRB     13$                              ; 0627
             02    A1             52  90 00089  4$:   MOVB    R2, 2(R1)                        ; 0635
                   25             52  D1 0008D        CMPL    R2, #37                          ; 0636
                                  06  12 00090        BNEQ    5$
             03    A0             0B  90 00092        MOVB    #11, 3(R0)                       ; 0638
                                  04  11 00096        BRB     6$
             03    A0             01  90 00098  5$:   MOVB    #1, 3(R0)                        ; 0640
                   01             52  D1 0009C  6$:   CMPL    R2, #1                           ; 0646
                                  14  13 0009F        BEQL    7$
                   22             52  D1 000A1        CMPL    R2, #34                          ; 0647
                                  0F  13 000A4        BEQL    7$
                   29             52  D1 000A6        CMPL    R2, #41                          ; 0648
                                  0A  13 000A9        BEQL    7$
                   2A             52  D1 000AB        CMPL    R2, #42                          ; 0649
                                  05  13 000AE        BEQL    7$
                   28             52  D1 000B0        CMPL    R2, #40                          ; 0650
                                  05  12 000B3        BNEQ    8$
                   50             01  D0 000B5  7$:   MOVL    #1, R0                           ; 0646
                                  03  11 000B8        BRB     9$
                   50             08  D0 000BA  8$:   MOVL    #8, R0
   51        14    BC             50  C7 000BD  9$:   DIVL3   R0, @BIT_LENGTH, R1
             10    BC             51  B0 000C2        MOVW    R1, @VMS_DESC
                                  26  11 000C6 10$:   BRB     13$                              ; 0615
                           14     AC  DD 000C8 11$:   PUSHL   BIT_LENGTH                       ; 0664
                           08     AC  DD 000CB        PUSHL   TYPEID
                   67             02  FB 000CE        CALLS   #2, DBG$STA_SYMSIZE
                   50      10     AC  D0 000D1        MOVL    VMS_DESC, R0                     ; 0665
             02    A0    010E     8F  B0 000D5        MOVW    #270, 2(R0)                      ; 0666
   51        14    BC             08  C7 000DB        DIVL3   #8, @BIT_LENGTH, R1              ; 0667
                   60             51  B0 000E0        MOVW    R1, (R0)
                                  09  11 000E3        BRB     13$                              ; 0615
                           14     AC  DD 000E5 12$:   PUSHL   BIT_LENGTH                       ; 0679
                           08     AC  DD 000E8        PUSHL   TYPEID
                   67             02  FB 000EB        CALLS   #2, DBG$STA_SYMSIZE
                                0162  31 000EE 13$:   BRW     33$
                           04     AE  9F 000F1 14$:   PUSHAB  DST_DESC                         ; 0694
                           08     AC  DD 000F4        PUSHL   TYPEID
       00000000G   00             02  FB 000F7        CALLS   #2, DBG$STA_TYP_DESCR
                   52      0C     AC  D0 000FE        MOVL    SYMID, R2                        ; 0709
                                  56  D4 00102        CLRL    R6
                                  52  D5 00104        TSTL    R2
                                  3A  13 00106        BEQL    17$
                                  56  D6 00108        INCL    R6
                   50             52  D0 0010A        MOVL    R2, RSTPTR                       ; 0716
                   01      14     A0  91 0010D 15$:   CMPB    20(RSTPTR), #1                   ; 0717
                                  06  13 00111        BEQL    16$
                   50      10     A0  D0 00113        MOVL    16(RSTPTR), RSTPTR               ; 0718
                                  F4  11 00117        BRB     15$
                   06      29     A0  91 00119 16$:   CMPB    41(RSTPTR), #6                   ; 0719
                                  23  12 0011D        BNEQ    17$
                                  52  DD 0011F        PUSHL   R2                               ; 0722
       00000000G   00             01  FB 00121        CALLS   #1, DBG$STA_SETCONTEXT
                           08     AE  9F 00128        PUSHAB  VALUE_KIND                       ; 0723
                           10     AE  9F 0012B        PUSHAB  DESC
                                  52  DD 0012E        PUSHL   R2
       00000000G   00             03  FB 00130        CALLS   #3, DBG$STA_SYMVALUE
                   03      08     AE  D1 00137        CMPL    VALUE_KIND, #3                   ; 0724
```

```
                                   05  12 0013B         BNEQ    17$
                04  AE       0C    AE  D0 0013D         MOVL    DESC, DST_DESC                        ; 0726
                    52       10    AC  D0 00142  17$:   MOVL    VMS_DESC, R2                          ; 0730
                    54       03    A2  9E 00146         MOVAB   3(R2), R4
                    53       04    AE  D0 0014A         MOVL    DST_DESC, R3
                    64       03    A3  90 0014E         MOVB    3(R3), (R4)
                    55       02    A2  9E 00152         MOVAB   2(R2), R5                             ; 0731
                    50       02    A3  9A 00156         MOVZBL  2(R3), R0
                    65             50  90 0015A         MOVB    R0, (R5)
                    62             63  B0 0015D         MOVW    (R3), (R2)                            ; 0732
                    25             65  91 00160         CMPB    (R5), #37                             ; 0738
                                   03  12 00163         BNEQ    18$
                    64             0B  90 00165         MOVB    #11, (R4)                             ; 0740
                                   64  95 00168  18$:   TSTB    (R4)                                  ; 0744
                                   05  13 0016A         BEQL    19$
                    02             64  91 0016C         CMPB    (R4), #2
                                   7A  1B 0016F         BLEQU   26$
                    0B             64  91 00171  19$:   CMPB    (R4), #11
                                   75  13 00174         BEQL    26$
                    09             64  91 00176         CMPB    (R4), #9                              ; 0746
                                   3B  12 00179         BNEQ    22$
                08  A2       08    A3  B0 0017B         MOVW    8(R3), 8(R2)                          ; 0749
     50       0A    A3  01     03  EF 00180         EXTZV   #3, #1, 10(R3), R0                    ; 0750
0A   A2             01  03     50  F0 00186         INSV    R0, #3, #1, 10(R2)
                    67             56  E9 0018C         BLBC    R6, 28$                               ; 0757
                    50       0C    AC  D0 0018F  20$:   MOVL    SYMID, R0                             ; 0760
                    01       14    A0  91 00193         CMPB    20(R0), #1
                                   07  13 00197         BEQL    21$
                0C  AC       10    A0  D0 00199         MOVL    16(R0), SYMID                         ; 0761
                                   EF  11 0019E         BRB     20$
                    50       0C    AC  D0 001A0  21$:   MOVL    SYMID, R0                             ; 0762
                    05       29    A0  91 001A4         CMPB    41(R0), #5
                                   4C  12 001A8         BNEQ    28$
          47    28  A0             05  E1 001AA         BBC     #5, 40(R0), 28$                       ; 0763
                08  A2       08    A3  8E 001AF         MNEGB   8(R3), 8(R2)                          ; 0765
                                   40  11 001B4         BRB     28$                                   ; 0742
                    0D             64  91 001B6  22$:   CMPB    (R4), #13                             ; 0769
                                   32  12 001B9         BNEQ    27$
                    22             50  91 001BB         CMPB    R0, #34                               ; 0772
                                   0A  13 001BE         BEQL    23$
                    28             50  91 001C0         CMPB    R0, #40
                                   05  13 001C3         BEQL    23$
                    2A             50  91 001C5         CMPB    R0, #42
                                   07  12 001C8         BNEQ    24$
                18  BC       08    A3  C0 001CA  23$:   ADDL2   8(R3), @BIT_OFFSET                    ; 0773
                                   25  11 001CF         BRB     28$
                A1  8F             50  91 001D1  24$:   CMPB    R0, #161                              ; 0775
                                   1F  12 001D5         BNEQ    28$
                    50       08    A3  32 001D7         CVTWL   8(R3), R0                             ; 0777
                18  BC             50  C0 001DB         ADDL2   R0, @BIT_OFFSET
                    05       0A    A3  E9 001DF         BLBC    10(R3), 25$                           ; 0778
                    65             2A  90 001E3         MOVB    #42, (R5)                             ; 0779
                                   0E  11 001E6         BRB     28$
                    65             22  90 001E8  25$:   MOVB    #34, (R5)                             ; 0780
                                   09  11 001EB  26$:   BRB     28$                                   ; 0770
                       00028800    8F  DD 001ED  27$:   PUSHL   #165888                               ; 0788
                    69             01  FB 001F3         CALLS   #1, LIB$SIGNAL
```

```
                        20              65  91 001F6 28$:   CMPB    (R5), #32                       ; 0791
                                        0A  12 001F9        BNEQ    29$                             ;
                                        64  94 001FB        CLRB    (R4)                            ; 0794
                        65              17  90 001FD        MOVB    #23, (R5)                       ; 0795
                        62              02  B0 00200        MOVW    #2, (R2)                        ; 0796
                                        17  11 00203        BRB     30$                             ; 0797
                        21              65  91 00205 29$:   CMPB    (R5), #33                       ; 0799
                                        1A  12 00208        BNEQ    31$                             ;
                                        64  94 0020A        CLRB    (R4)                            ; 0802
                        65              16  90 0020C        MOVB    #22, (R5)                       ; 0803
                                        7E  7C 0020F        CLRQ    -(SP)                           ; 0805
                                04      A2  DD 00211        PUSHL   4(R2)                           ;
                        68              03  FB 00214        CALLS   #3, DBG$INS_DECODE              ;
                    62                  50  04 A2  A3 00217 SUBW3   4(R2), R0, (R2)                ; 0806
                00000000G               00  08 A3  D0 0021C 30$:   MOVL    8(R3), DBG$GL_CALL_CONTEXT  ; 0807
                                        52  DD 00224 31$:   PUSHL   R2                              ; 0810
                    FAE6                CF      01  FB 00226        CALLS   #1, DBG$DATA_LENGTH     ;
                      14                BC      50  D0 0022B        MOVL    R0, @BIT_LENGTH         ;
                                        22  11 0022F        BRB     33$                             ; 0615
                        52          10  AC  D0 00231 32$:   MOVL    VMS_DESC, R2                    ; 0821
                      02                A2      16  B0 00235        MOVW    #22, 2(R2)              ; 0822
                      04                A2  04  B2  C0 00239        ADDL2   @4(R2), 4(R2)           ; 0824
                                        7E  7C 0023E        CLRQ    -(SP)                           ; 0826
                                04      A2  DD 00240        PUSHL   4(R2)                           ;
                        68              03  FB 00243        CALLS   #3, DBG$INS_DECODE              ;
                    62                  50  04 A2  A3 00246        SUBW3   4(R2), R0, (R2)         ; 0827
                                        50  62  3C 0024B        MOVZWL  (R2), R0                    ; 0828
                14  BC                  50  03  78 0024E        ASHL    #3, R0, @BIT_LENGTH         ;
                                        50  01  D0 00253 33$:   MOVL    #1, R0                      ; 0837
                                            04 00256        RET                                     ; 0838

; Routine Size:  599 bytes,    Routine Base:  DBG$CODE + 02EF
```

```
;  714     0839  1 GLOBAL ROUTINE DBG$MAKE_VMS_DESC (prm_desc,vms_desc) =
;  715     0840  1 !
;  716     0841  1 ! FUNCTIONAL DESCRIPTION:
;  717     0842  1 !
;  718     0843  1 !       This routine constructs a VAX/VMS descriptor that points to the
;  719     0844  1 !       value of a symbol (described by a primary symbol descriptor).
;  720     0845  1 !       It first materializes the address by resolving all array and/or
;  721     0846  1 !       record component references, and then determines the length and
;  722     0847  1 !       data type.  Finally it checks for sub references, and if one is
;  723     0848  1 !       present updates the length and address fields accordingly.
;  724     0849  1 !
;  725     0850  1 ! FORMAL PARAMETERS:
;  726     0851  1 !
;  727     0852  1 !       prm_desc        - A longword containing the address of a primary descriptor
;  728     0853  1 !
;  729     0854  1 !       vms_desc        - A longword containing the address of a block of at least
;  730     0855  1 !                         12 bytes where a VAX/VMS descriptor will be constructed.
;  731     0856  1 !
```

```
;  733     0857  1 !dbg$make_vms_desc (prm_desc,vms_desc)
;  734     0858  2     BEGIN
;  735     0859  2     MAP
;  736     0860  2         prm_desc        : REF dbg$primary,
;  737     0861  2         vms_desc        : REF dbg$stg_desc;
;  738     0862  2
;  739     0863  2     LOCAL
;  740     0864  2         adr_kind,
;  741     0865  2         adr_ptrs        : VECTOR [3,LONG],
;  742     0866  2         addr_offset,
;  743     0867  2         bit_offset,
;  744     0868  2         bit_length,
;  745     0869  2         result_desc     : BLOCK [12,BYTE],
;  746     0870  2         data_subnode    : REF dbg$prim_node,
;  747     0871  2         prim_subnode    : REF dbg$prim_node,
;  748     0872  2         typeid: REF rst$entry,
;  749     0873  2         s_value;
;  750     0874  2
;  751     0875  2     BUILTIN
;  752     0876  2         PROBER;
;  753     0877  2
;  754     0878  2     dbg$gl_current_primary = .prm_desc;                                 ! A003
;  755     0879  2
;  756     0880  2     ! It is illegal to call DBG$MAKE_VMS_DESC with a type.
;  757     0881  2     !
;  758     0882  2     IF .prm_desc[dbg$b_dhdr_kind] EQL rst$k_type
;  759     0883  2     THEN
;  760     0884  3         BEGIN
;  761     0885  3         LOCAL
;  762     0886  3             name;
;  763     0887  3         IF .prm_desc[dbg$l_dhdr_symid0] NEQ 0
;  764     0888  3         THEN
;  765     0889  4             BEGIN
;  766     0890  4             dbg$sta_symname(.prm_desc[dbg$l_dhdr_symid0], name);
;  767     0891  4             SIGNAL (dbg$_novaltyp, 1, .name);
;  768     0892  4             END
;  769     0893  3         ELSE
;  770     0894  3             SIGNAL (dbg$_novalue);
;  771     0895  2         END;
;  772     0896  2
;  773     0897  2     !+
;  774     0898  2     ! The first thing we do is to set the symbol table access context to
;  775     0899  2     ! the correct stack frame (in case of values whose address is given by
;  776     0900  2     ! an offset from an address in a register such as FP or AP), and clear
;  777     0901  2     ! the initial byte and bit addresses and descriptor fields.
;  778     0902  2     !-
;  779     0903  2     dbg$sta_setcontext(.prm_desc[dbg$l_dhdr_symid0]);
;  780     0904  2     bit_offset = bit_length = 0;
;  781     0905  2     ch$fill(0,12,result_desc);
```

```
;  783          0906  2      ! Loop for all except the last sub-node in the primary descriptor,
;  784          0907  2      ! building up the address of the element within the structure.
;  785          0908  2      ! This address is represented by a byte address, stored in the
;  786          0909  2      ! dsc$a_pointer field of result_desc, and a bit offset, stored
;  787          0910  2      ! (for now) in the local variable bit_offset.
;  788          0911  2      !
;  789          0912  2      ! N.B.  This MUST be done 'top-down' to deal with POINTER data-types.
;  790          0913  2      !-
;  791          0914  2      prim_subnode = .prm_desc[dbg$l_prim_flink];
;  792          0915  2      data_subnode = .prm_desc[dbg$l_prim_blink];
;  793          0916  2      WHILE .prim_subnode NEQA .data_subnode DO
;  794          0917  3          BEGIN
;  795          0918  3          result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + .prim_subnode[dbg$l_pnode_reloc];
;  796          0919  3          !+
;  797          0920  3          ! Get the address of this element by calling dbg$sta_symvalue.
;  798          0921  3          ! This should return either the address of a data item (offset
;  799          0922  3          ! from the start of the record, if this is a record component)
;  800          0923  3          ! or the address of a descriptor. Anything else is an error.
;  801          0924  3          !-
;  802          0925  3          IF (.prim_subnode[dbg$l_pnode_symid] NEQ 0) AND
;  803          0926  3          NOT .prim_subnode[dbg$v_pnode_ignore]
;  804          0927  3          THEN
;  805          0928  4              BEGIN
;  806          0929  4              dbg$sta_symvalue(.prim_subnode[dbg$l_pnode_symid],adr_ptrs,adr_kind);
;  807          0930  4              SELECTONE .adr_kind OF
;  808          0931  4                  SET
;  809          0932  4                  [dbg$k_val_addr]:
;  810          0933  5                      BEGIN
;  811          0934  5                      result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + .adr_ptrs[0];
;  812          0935  5                      bit_offset = .bit_offset + .adr_ptrs[1];
;  813          0936  4                      END;
;  814          0937  4                  [dbg$k_val_descr]:
;  815          0938  5                      BEGIN
;  816          0939  5                      BIND adr_desc = adr_ptrs[0] : REF dbg$stg_desc;
;  817          0940  5                      result_desc[dsc$a_pointer]  = .result_desc[dsc$a_pointer] + .adr_desc[dsc$a_pointer];
;  818          0941  4                      END;
;  819          0942  4                  [dbg$k_val_unalloc]:
;  820          0943  5                      BEGIN
;  821          0944  5                      LOCAL name;
;  822          0945  5                      dbg$sta_symname(.prim_subnode[dbg$l_pnode_symid],name);
;  823          0946  5                      SIGNAL(dbg$_unallocated, 1, .name);
;  824          0947  4                      END;
;  825          0948  4                  [OTHERWISE]:
;  826          0949  4                      SIGNAL(dbg$_novalue);
;  827          0950  4                  TES;
;  828          0951  3          END;
```

```
;  830     0952  3          SELECTONE .prim_subnode[dbg$b_pnode_fcode] OF
;  831     0953  3              SET
;  832     0954  3              [rst$k_type_array]:
;  833     0955  4                  BEGIN
;  834     0956  4                  !+
;  835     0957  4                  ! If this is an array (of records or pointers, presumably),
;  836     0958  4                  ! get the address of an individual element of the array.
;  837     0959  4                  !-
;  838     0960  4                  BIND pnsub = prim_subnode[dbg$a_pnarr_svector] : dbg$prim_node_subs;
;  839     0961  4                  addr_offset = .prim_subnode[dbg$l_pnarr_offset];
;  840     0962  4
;  841     0963  4                  ! Loop through the dimensions of the array.
;  842     0964  4                  !
;  843     0965  4                  DECR index FROM .prim_subnode[dbg$b_pnarr_dimcnt]-1 TO 0 DO
;  844     0966  5                    BEGIN
;  845     0967  5                    s_value = .pnsub[.index,dbg$l_pnsub_svalue];
;  846     0968  5                    typeid = .pnsub[.index,dbg$l_pnsub_typeid];
;  847     0969  5
;  848     0970  5                    ! If the array is indexed by an enumeration type,
;  849     0971  5                    ! then index by the position and not by
;  850     0972  5                    ! the value. This cases arises only in ADA for
;  851     0973  5                    ! enumerated types with representation specs.
;  852     0974  5                    !
;  853     0975  5                    IF (.dbg$gb_language EQL dbg$k_ada) AND
;  854     0976  6                       (.typeid NEQ 0)
;  855     0977  5                    THEN
;  856     0978  6                      IF (.typeid[rst$b_fcode] EQL rst$k_type_enum)
;  857     0979  5                      THEN
;  858     0980  5                        s_value = dbg$enum_pos(.typeid,.s_value);
;  859     0981  5
;  860     0982  5                    addr_offset = .addr_offset + (.s_value*.pnsub[.index,dbg$l_pnsub_stride]);
;  861     0983  4                    END;
;  862     0984  4
;  863     0985  4                  IF .prim_subnode[dbg$v_pnarr_bitref]
;  864     0986  4                    THEN bit_offset = .bit_offset + .addr_offset
;  865     0987  4                    ELSE result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + .addr_offset;
;  866     0988  3                  END;
;  867     0989  3
;  868     0990  3              [rst$k_type_ptr,rst$k_type_tptr]:
;  869     0991  4                  BEGIN
;  870     0992  4                  BUILTIN PROBER;
;  871     0993  4                  LOCAL addr;
;  872     0994  4                  !+
;  873     0995  4                  ! Check for read access before trying to fetch a value.
;  874     0996  4                  !-
;  875     0997  4                  addr = .result_desc[dsc$a_pointer] + .bit_offset<3,29,1>;
;  876     0998  4                  IF NOT PROBER(%REF(0),%REF(5),.addr)
;  877     0999  4                    THEN SIGNAL(dbg$_noaccessr,1,.addr);
;  878     1000  4                  !+
;  879     1001  4                  ! If this is a POINTER, fetch a longword value
;  880     1002  4                  !-
;  881     1003  4                  result_desc[dsc$a_pointer] = .(.addr)<.bit_offset,32,0>;
;  882     1004  4                  bit_offset = 0;
;  883     1005  3                  END;
;  884     1006  3
;  885     1007  3              [rst$k_type_record]:
;  886     1008  3                  0;
```

```
;  887          1009  3
;  888          1010  3          [rst$k_type_variant]:
;  889          1011  3              IF NOT .prim_subnode[dbg$v_pnvar_valid] THEN
;  890          1012  4                  BEGIN
;  891          1013  4                  LOCAL tag_value,tag_size,tag_name : REF VECTOR[,BYTE];
;  892          1014  4                  prim_subnode[dbg$v_pnvar_valid] = true;
;  893          1015  4                  IF .prim_subnode[dbg$l_pnvar_tagid] NEQ 0 THEN
;  894          1016  5                      BEGIN
;  895          1017  5                      BUILTIN PROBER;                                                         ! A0
;  896          1018  5                      dbg$sta_symname(.prim_subnode[dbg$l_pnvar_tagid],tag_name)
;  897          1019  5                      dbg$sta_symsize(.prim_subnode[dbg$l_pnvar_tagid],tag_size),
;  898          1020  5                      IF (.tag_size NEQ 0) AND (.tag_name[0] NEQ 0) THEN
;  899          1021  6                          BEGIN
;  900          1022  6                          dbg$sta_symvalue(.prim_subnode[dbg$l_pnvar_tagid],adr_ptrs,adr_kind);
;  901          1023  6                          adr_ptrs[0] = .adr_ptrs[0] + .result_desc[dsc$a_pointer];
;  902          1024  6                          adr_ptrs[1] = .adr_ptrs[1] + .bit_offset;
;  903          1025  6
;  904          1026  6                          !++
;  905          1027  6                          ! Check that the address is accessable
;  906          1028  6                          !--
;  907          1029  6                          IF NOT PROBER( %REF(0), %REF(4), .adr_ptrs[0] )                 ! A0
;  908          1030  6                          THEN                                                            ! A0
;  909          1031  6                              SIGNAL(dbg$_noaccessr,1,.adr_ptrs[0]);                      ! A0
;  910          1032  6
;  911          1033  6                          tag_value = .(.adr_ptrs[0])<.adr_ptrs[1],.tag_size,0>;
;  912          1034  6                          IF NOT dbg$sta_variant_value(.tag_value,.prim_subnode[dbg$l_pnvar_dstptr])
;  913          1035  6                            THEN SIGNAL(dbg$_badtagval,2,.tag_value,tag_name[0]);
;  914          1036  5                          END;
;  915          1037  4                      END;
;  916          1038  3                  END;
;  917          1039  3
;  918          1040  3          [rst$k_type_file]:
;  919          1041  4              BEGIN
;  920          1042  4              BUILTIN PROBER;
;  921          1043  4              LOCAL addr: REF BITVECTOR[];
;  922          1044  4              !+
;  923          1045  4              ! For file types what we have in the vms descriptor is a
;  924          1046  4              ! pointer to a PASCAL file descriptor. Bit 16 in the
;  925          1047  4              ! second longword of this descriptor is a "valid" bit which
;  926          1048  4              ! basically says whether the file is open. If bit 16 is set
;  927          1049  4              ! then the first longword of the descriptor is a pointer
;  928          1050  4              ! to a buffer from which we can read the next item
;  929          1051  4              ! in the file.
;  930          1052  4              !-
;  931          1053  4              !+
;  932          1054  4              ! Note in the calculations below, bit_offset will normally
;  933          1055  4              ! be zero. It might conceivably be non-zero in obscure cases,
;  934          1056  4              ! such as a file variable which is an element of a packed
;  935          1057  4              ! record.
;  936          1058  4              !-
;  937          1059  4              !+
;  938          1060  4              ! Check for read access.
;  939          1061  4              !-
;  940          1062  4              addr = .result_desc[dsc$a_pointer] + .bit_offset<3,29,1>;
;  941          1063  4              bit_offset = .bit_offset<0,3,0>;
;  942          1064  4              IF NOT PROBER(%REF(0),%REF(8),.addr) THEN SIGNAL(dbg$_illfilptr);
;  943          1065  4              !+
```

```
;  944          1066  4                ! Check "valid" bit.
;  945          1067  4                !-
;  946          1068  4                IF NOT .addr[48+.bit_offset] THEN SIGNAL(dbg$_illfilptr);
;  947          1069  4                !+
;  948          1070  4                ! Put the buffer address back into result_desc.
;  949          1071  4                !-
;  950          1072  4                result_desc[dsc$a_pointer] = .(.addr)<.bit_offset,32,0>;
;  951          1073  4                bit_offset = 0;
;  952          1074  3                END;
;  953          1075  3
;  954          1076  3            [OTHERWISE]:
;  955          1077  3                SIGNAL(dbg$_illtype);
;  956          1078  3
;  957          1079  3            TES;
;  958          1080  2        prim_subnode = .prim_subnode[dbg$l_pnode_flink];
;  959          1081  1        END;
```

```
;  961          1082  2     !+
;  962          1083  2     ! We now have resolved all earlier record component and array references,
;  963          1084  2     ! and have to determine the actual data item address. The first thing to
;  964          1085  2     ! do is to calculate the base address (much as we did above).
;  965          1086  2     !-
;  966          1087  2     IF (.data_subnode[dbg$l_pnode_symid] NEQ 0) AND
;  967          1088  2     NOT .data_subnode[dbg$v_pnode_ignore]
;  968          1089  2     THEN
;  969          1090  3         BEGIN
;  970          1091  3         dbg$sta_symvalue(.data_subnode[dbg$l_pnode_symid],adr_ptrs,adr_kind);
;  971          1092  3         SELECTONE .adr_kind OF
;  972          1093  3             SET
;  973          1094  4             [dbg$k_val_addr]:
;  974          1095  4                 BEGIN
;  975          1096  4                 result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + .adr_ptrs[0];
;  976          1097  4                 bit_offset = .bit_offset + .adr_ptrs[1];
;  977          1098  3                 END;
;  978          1099  3             [dbg$k_val_descr]:
;  979          1100  4                 BEGIN
;  980          1101  4                 BIND adr_desc = adr_ptrs[0]     : REF dbg$stg_desc;
;  981          1102  4                 result_desc[dsc$a_pointer]  = .result_desc[dsc$a_pointer] + .adr_desc[dsc$a_pointer];
;  982          1103  3                 END;
;  983          1104  3             [dbg$k_val_literal]:
;  984          1105  4                 BEGIN
;  985          1106  4                 result_desc[dsc$a_pointer] = .adr_ptrs[0];
;  986          1107  4                 bit_offset = .adr_ptrs[1];
;  987          1108  3                 END;
;  988          1109  3             [dbg$k_val_unalloc]:
;  989          1110  4                 BEGIN
;  990          1111  4                 LOCAL name;
;  991          1112  4                 dbg$sta_symname(.data_subnode[dbg$l_pnode_symid],name);
;  992          1113  4                 SIGNAL(dbg$_unallocated, 1, .name);
;  993          1114  3                 END;
;  994          1115  3             [OTHERWISE]:
;  995          1116  3                 SIGNAL(dbg$_novalue);
;  996          1117  3             TES;
;  997          1118  2         END;
```

```
;  999          1119  2      !+
; 1000          1120  2      ! Having determined the address of the data object, we now attempt to
; 1001          1121  2      ! fill in the rest of the fields in the VMS descriptor (class, dtype,
; 1002          1122  2      ! and length). We use the information that we have in the bottom subnode:
; 1003          1123  2      ! a kind, an fcode, and a typeid.
; 1004          1124  2      !-
; 1005          1125  2      CASE .data_subnode[dbg$b_pnode_kind] FROM rst$k_kind_minimum TO rst$k_kind_maximum OF
; 1006          1126  2          SET
; 1007          1127  2
; 1008          1128  2          [rst$k_routine,rst$k_block,rst$k_entry,rst$k_line,rst$k_label]:
; 1009          1129  3              BEGIN
; 1010          1130  3              !+
; 1011          1131  3              ! Special case for MACRO - since MACRO declares everything to
; 1012          1132  3              ! be a label, then we want to instead use the default type
; 1013          1133  3              ! that has been specified with a SET TYPE command.
; 1014          1134  3              !-
; 1015          1135  4              IF (.data_subnode[dbg$b_pnode_kind] EQL rst$k_label)
; 1016          1136  4              AND (.prm_desc[dbg$b_dhdr_lang] EQL dbg$k_macro)
; 1017          1137  4              AND (NOT .prm_desc[dbg$v_dhdr_override])
; 1018          1138  4              AND (.dbg$gl_dflttyp NEQ dsc$k_dtype_zi)     ! If instruction, the we
; 1019          1139  4                                                           ! already have correct type
; 1020          1140  4                                                           ! and length
; 1021          1141  3              THEN
; 1022          1142  4                  BEGIN
; 1023          1143  4                  result_desc[dsc$b_class] = dsc$k_class_z;
; 1024          1144  4                  result_desc[dsc$b_dtype]  = .dbg$gl_dflttyp;
; 1025          1145  4                  result_desc[dsc$w_length] = .dbg$gw_dfltleng; ! All default types
; 1026          1146  4                  bit_length = 8*.dbg$gw_dfltleng;             ! have length in bytes.
; 1027          1147  4                  END
; 1028          1148  4
; 1029          1149  3              ELSE
; 1030          1150  4                  BEGIN
; 1031          1151  4                  !+
; 1032          1152  4                  ! This must be a primary representing an instruction or an entry
; 1033          1153  4                  ! mask in the user program.
; 1034          1154  4                  !-
; 1035          1155  4                  IF .bit_offset NEQ 0 THEN SIGNAL(dbg$_unimplent);
; 1036          1156  4                  result_desc[dsc$b_class] = dsc$k_class_z;
; 1037          1157  4                  IF dbg$is_it_entry(.result_desc[dsc$a_pointer])
; 1038          1158  4                  THEN
; 1039          1159  5                      BEGIN
; 1040          1160  5                      result_desc[dsc$b_dtype] = dsc$k_dtype_zem;
; 1041          1161  5                      bit_length = 16;
; 1042          1162  5                      END
; 1043          1163  4                  ELSE
; 1044          1164  5                      BEGIN
; 1045          1165  5                      result_desc[dsc$b_dtype] = dsc$k_dtype_zi;
; 1046          1166  6                      bit_length = %BPUNIT*(dbg$ins_decode(.result_desc[dsc$a_pointer],false,false) -
; 1047          1167  5                                                          .result_desc[dsc$a_pointer]);
; 1048          1168  4                      END;
; 1049          1169  3                  END;
; 1050          1170  2              END;
; 1051          1171  2
; 1052          1172  2          [rst$k_data,rst$k_typcomp]:
; 1053          1173  3              BEGIN
; 1054          1174  3              !+
; 1055          1175  3              ! The Primary represents data in the user program. Note that
```

```
;1056     1176  3          ! record components come back with kind=typcomp (this is a quirk
;1057     1177  3          ! in the parsing that may eventually be fixed).
;1058     1178  3          !-
;1059     1179  3          IF .data_subnode[dbg$b_pnode_fcode] EQL rst$k_type_array
;1060     1180  3          THEN
;1061     1181  4              BEGIN
;1062     1182  4              BIND pnsub = data_subnode[dbg$a_pnarr_svector] : dbg$prim_node_subs;
;1063     1183  4              addr_offset = .data_subnode[dbg$l_pnarr_offset];
;1064     1184  4
;1065     1185  4              ! Loop through the dimensions of the array.
;1066     1186  4              !
;1067     1187  4              DECR index FROM .data_subnode[dbg$b_pnarr_dimcnt]-1 TO 0 DO
;1068     1188  5                BEGIN
;1069     1189  5                s_value = .pnsub[.index,dbg$l_pnsub_svalue];
;1070     1190  5                typeid = .pnsub[.index,dbg$l_pnsub_typeid];
;1071     1191  5
;1072     1192  5                ! If the array is indexed by an enumeration type,
;1073     1193  5                ! then index by the position and not by
;1074     1194  5                ! the value. This cases arises only in ADA for
;1075     1195  5                ! enumerated types with representation specs.
;1076     1196  5                !
;1077     1197  5                IF (.dbg$gb_language EQL dbg$k_ada) AND
;1078     1198  6                   (.typeid NEQ 0)
;1079     1199  5                THEN
;1080     1200  6                  IF (.typeid[rst$b_fcode] EQL rst$k_type_enum)
;1081     1201  5                  THEN
;1082     1202  5                    s_value = dbg$enum_pos(.typeid,.s_value);
;1083     1203  5
;1084     1204  5                addr_offset = .addr_offset + (.s_value*.pnsub[.index,dbg$l_pnsub_stride]);
;1085     1205  4                END;
;1086     1206  4
;1087     1207  4              IF .data_subnode[dbg$v_pnarr_bitref]
;1088     1208  4                THEN bit_offset = .bit_offset + .addr_offset
;1089     1209  4                ELSE result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + .addr_offset;
;1090     1210  4
;1091     1211  4              !+
;1092     1212  4              ! Figure out the class field. This class may get fixed up later -
;1093     1213  4              ! we want class=ubs to reflect the fact that there is a bit
;1094     1214  4              ! offset present. But for now, we just fill in class VS for
;1095     1215  4              ! dtype vt, class SD if digits or scale are present, and
;1096     1216  4              ! class s for all other dtypes.
;1097     1217  4              !-
;1098     1218  4              IF .data_subnode[dbg$b_pnarr_dtype] EQL dsc$k_dtype_vt
;1099     1219  4              THEN
;1100     1220  4                  result_desc[dsc$b_class]  = dsc$k_class_vs
;1101     1221  4              ELSE
;1102     1222  5                  BEGIN
;1103     1223  5                  IF (.data_subnode[dbg$b_pnarr_digits] NEQ 0) OR
;1104     1224  6                     (.data_subnode[dbg$b_pnarr_scale] NEQ 0)
;1105     1225  5                  THEN
;1106     1226  6                      BEGIN
;1107     1227  6                      result_desc[dsc$b_class]  = dsc$k_class_sd;
;1108     1228  6                      result_desc[dsc$b_digits] = .data_subnode[dbg$b_pnarr_digits];
;1109     1229  6                      result_desc[dsc$b_scale]  = .data_subnode[dbg$b_pnarr_scale];
;1110     1230  6                      END
;1111     1231  5                  ELSE
;1112     1232  5                      result_desc[dsc$b_class]  = dsc$k_class_s;
```

```
;  1113          1233  4                END;
;  1114          1234  4
;  1115          1235  4
;  1116          1236  4            ! Fill in dtype and length. For arrays, we have this information
;  1117          1237  4            ! in the array subnode.
;  1118          1238  4            !
;  1119          1239  4            result_desc[dsc$b_dtype]  = .data_subnode[dbg$b_pnarr_dtype];
;  1120          1240  4            result_desc[dsc$w_length] = .data_subnode[dbg$w_pnarr_length];
;  1121          1241  4            !+
;  1122          1242  4            ! Fix up boolean to use the new type code dsc$k_dtype_tf.
;  1123          1243  4            !-
;  1124          1244  4            IF .result_desc[dsc$b_dtype] EQL dst$k_bool
;  1125          1245  4            THEN
;  1126          1246  5                BEGIN
;  1127          1247  5                result_desc[dsc$b_class]  = dsc$k_class_s; ! This will get
;  1128          1248  5                                                          ! changed to UBS
;  1129          1249  5                                                          ! if there is a
;  1130          1250  5                                                          ! bit offset
;  1131          1251  5                result_desc[dsc$b_dtype]  = dsc$k_dtype_tf;
;  1132          1252  5                result_desc[dsc$w_length] = bit_length = 1;
;  1133          1253  5                END
;  1134          1254  4            ELSE
;  1135          1255  4                bit_length = dbg$data_length(result_desc);
;  1136          1256  4            END
;  1137          1257  3        ELSE
;  1138          1258  3            !+
;  1139          1259  3            ! For everything except arrays, we call a routine to fill
;  1140          1260  3            ! in the fields of the VMS descriptor, passing to this
;  1141          1261  3            ! routine all the information we have collected so far.
;  1142          1262  3            !-
;  1143          1263  3            dbg$fill_in_vms_desc(.data_subnode[dbg$b_pnode_fcode],
;  1144          1264  3                                 .data_subnode[dbg$l_pnode_typeid],
;  1145          1265  3                                 .prm_desc[dbg$l_dhdr_symid0],
;  1146          1266  3                                 result_desc,bit_length,bit_offset);
```

```
;  1148     1267  3            !+
;  1149     1268  3            ! Fix things up so class VS always has dtype VT. Class VS and
;  1150     1269  3            ! type T is the older way of expressing varying string data
;  1151     1270  3            ! type, so we fix it up to use the newer dtype VT.
;  1152     1271  3            !-
;  1153     1272  3            IF  .result_desc[dsc$b_class] EQL dsc$k_class_vs
;  1154     1273  3            AND .result_desc[dsc$b_dtype] EQL dsc$k_dtype_t
;  1155     1274  3              THEN result_desc[dsc$b_dtype] = dsc$k_dtype_vt;
;  1156     1275  2            END;
;  1157     1276  2
;  1158     1277  2        !+
;  1159     1278  2        ! We should not see other kinds.
;  1160     1279  2        !-
;  1161     1280  2        [INRANGE,OUTRANGE]:
;  1162     1281  2            SIGNAL(dbg$_unimplent);
;  1163     1282  2        TES;
;  1164     1283  2
;  1165     1284  2
;  1166     1285  2    ! Dereference descriptors of type DSC.
;  1167     1286  2    !
;  1168     1287  2    IF .result_desc[dsc$b_dtype] EQL dsc$k_dtype_dsc
;  1169     1288  2    THEN
;  1170     1289  3        BEGIN
;  1171     1290  3        IF NOT PROBER(%REF(0),%REF(8),.result_desc[dsc$a_pointer])
;  1172     1291  3        THEN
;  1173     1292  3            SIGNAL(dbg$_noaccessr,1,.result_desc[dsc$a_pointer]);
;  1174     1293  3        ch$move(.result_desc[dsc$w_length],
;  1175     1294  3                .result_desc[dsc$a_pointer], result_desc);
;  1176     1295  2        END;
;  1177     1296  2
;  1178     1297  2
;  1179     1298  2    ! Dereference descriptors of type BPV or BLV.
;  1180     1299  2    !
;  1181     1300  2    IF (.result_desc[dsc$b_dtype] EQL dsc$k_dtype_blv) OR
;  1182     1301  3       (.result_desc[dsc$b_dtype] EQL dsc$k_dtype_bpv)
;  1183     1302  2    THEN
;  1184     1303  3        BEGIN
;  1185     1304  3        IF NOT PROBER(%REF(0),%REF(8),.result_desc[dsc$a_pointer])
;  1186     1305  3        THEN
;  1187     1306  3            SIGNAL(dbg$_noaccessr,1,.result_desc[dsc$a_pointer]);
;  1188     1307  3        result_desc[dsc$a_pointer] = ..result_desc[dsc$a_pointer];
;  1189     1308  3        IF .result_desc[dsc$b_dtype] EQL dsc$k_dtype_blv
;  1190     1309  3        THEN
;  1191     1310  3            result_desc[dsc$b_dtype] = dsc$k_dtype_zi;
;  1192     1311  3        IF .result_desc[dsc$b_dtype] EQL dsc$k_dtype_bpv
;  1193     1312  3        THEN
;  1194     1313  3            result_desc[dsc$b_dtype] = dsc$k_dtype_zem;
;  1195     1314  2        END;
;  1196     1315  2
;  1197     1316  2    result_desc[dsc$a_pointer] =
;  1198     1317  2            .result_desc[dsc$a_pointer] + .data_subnode[dbg$l_pnode_reloc];
;  1199     1318  2
```

```
;  1201          1319  2     IF .prm_desc[dbg$v_dhdr_subref] THEN
;  1202          1320  3         BEGIN
;  1203          1321  3         !+
;  1204          1322  3         ! If there was an offset in the Primary (either a bit offset or
;  1205          1323  3         ! a byte offset) then take care of that here.
;  1206          1324  3         !-
;  1207          1325  3         IF .prm_desc[dbg$v_dhdr_bitref]
;  1208          1326  3         THEN
;  1209          1327  4             BEGIN
;  1210          1328  4             bit_offset = .prm_desc[dbg$w_prim_offset] + .bit_offset;
;  1211          1329  4             bit_length = .prm_desc[dbg$w_prim_length];
;  1212          1330  4             result_desc[dsc$b_class]  = dsc$k_class_z;  ! These get fixed up
;  1213          1331  4             result_desc[dsc$b_dtype]  = dsc$k_dtype_z;  ! below.
;  1214          1332  4             result_desc[dsc$w_length] = 0;
;  1215          1333  4             IF (.bit_offset AND (%BPUNIT-1)) EQL 0 THEN
;  1216          1334  4               SELECTONE .bit_length OF
;  1217          1335  4                 SET
;  1218          1336  4
;  1219          1337  4                 [ 8]:
;  1220          1338  5                     result_desc[dsc$b_dtype] = (IF .prm_desc[dbg$v_dhdr_sgnext]
;  1221          1339  4                                                 THEN dsc$k_dtype_b ELSE dsc$k_dtype_bu);
;  1222          1340  4                 [16]:
;  1223          1341  5                     result_desc[dsc$b_dtype] = (IF .prm_desc[dbg$v_dhdr_sgnext]
;  1224          1342  4                                                 THEN dsc$k_dtype_w ELSE dsc$k_dtype_wu);
;  1225          1343  4                 [32]:
;  1226          1344  5                     result_desc[dsc$b_dtype] = (IF .prm_desc[dbg$v_dhdr_sgnext]
;  1227          1345  4                                                 THEN dsc$k_dtype_l ELSE dsc$k_dtype_lu);
;  1228          1346  4
;  1229          1347  4                 [OTHERWISE]:
;  1230          1348  4                     0;
;  1231          1349  4
;  1232          1350  4                 TES;
;  1233          1351  4             END
;  1234          1352  4
;  1235          1353  3         ELSE
;  1236          1354  4             BEGIN
;  1237          1355  4             IF .result_desc[dsc$b_dtype] EQL dsc$k_dtype_vt
;  1238          1356  4             THEN
;  1239          1357  5                 BEGIN
;  1240          1358  5                 result_desc[dsc$b_class]   = dsc$k_class_s;
;  1241          1359  5                 result_desc[dsc$b_dtype]   = dsc$k_dtype_t;
;  1242          1360  5                 result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + 2;
;  1243          1361  4                 END;
;  1244          1362  4             result_desc[dsc$a_pointer] = .prm_desc[dbg$w_prim_offset] + .result_desc[dsc$a_pointer];
;  1245          1363  4             bit_length = .prm_desc[dbg$w_prim_length] * %BPUNIT;
;  1246          1364  4
;  1247          1365  4             !+
;  1248          1366  4             ! For the string data types (which include ascii and also the
;  1249          1367  4             ! numeric string types NU, NL, NLO, NR, NRO, and NZ), fill
;  1250          1368  4             ! in the length of the result descriptor, but leave the class
;  1251          1369  4             ! and dtype unchanged. Note that the code below relies on the
;  1252          1370  4             ! fact that these dtype codes span the range from 14 (dsc$k_dtype_t)
;  1253          1371  4             ! to 20 (dsc$k_dtype_nz).
;  1254          1372  4             !-
;  1255          1373  4             IF (.result_desc[dsc$b_dtype] GEQ dsc$k_dtype_t) .AND
;  1256          1374  5                (.result_desc[dsc$b_dtype] LEQ dsc$k_dtype_nz)
;  1257          1375  4             THEN
```

```
;  1258          1376  4                 result_desc[dsc$w_length] = .prm_desc[dbg$w_prim_length]
;  1259          1377  4             ELSE
;  1260          1378  5                 BEGIN
;  1261          1379  5                 result_desc[dsc$b_class]  = dsc$k_class_z;      ! (0)
;  1262          1380  5                 result_desc[dsc$b_dtype]  = dsc$k_dtype_z;      ! (0)
;  1263          1381  5                 result_desc[dsc$w_length] = 0;
;  1264          1382  4                 END;
;  1265          1383  3             END;
;  1266          1384  2         END;
```

```
;  1268     1385  2      !+
;  1269     1386  2      ! At this point, if the bit_offset variable is not a multiple of 8 then
;  1270     1387  2      ! there really is a bit offset. Fix up the class field to be UBS in
;  1271     1388  2      ! this case.
;  1272     1389  2      !-
;  1273     1390  2      IF (.bit_offset AND (%BPUNIT-1)) NEQ 0 THEN
;  1274     1391  2          BEGIN
;  1275     1392  2          !+
;  1276     1393  2          ! We used to not support unaligned bit fields longer than 32 bits.
;  1277     1394  2          ! IF .bit_length GTRU 32 THEN SIGNAL(dbg$_unimplent);
;  1278     1395  2          !-
;  1279     1396  2          result_desc[dsc$b_class] = dsc$k_class_ubs;
;  1280     1397  2          IF .result_desc[dsc$b_dtype] EQL dsc$k_dtype_z
;  1281     1398  2            THEN result_desc[dsc$b_dtype] = dsc$k_dtype_vu;
;  1282     1399  2          !+
;  1283     1400  2          ! Bit length is in bits for these five data types, and in bytes
;  1284     1401  2          ! for all others.
;  1285     1402  2          !-
;  1286     1403  2          result_desc[dsc$w_length] = .bit_length /
;  1287     1404  4            (IF .result_desc[dsc$b_dtype] EQL dsc$k_dtype_vu
;  1288     1405  4             OR .result_desc[dsc$b_dtype] EQL dsc$k_dtype_v
;  1289     1406  4             OR .result_desc[dsc$b_dtype] EQL dsc$k_dtype_svu
;  1290     1407  4             OR .result_desc[dsc$b_dtype] EQL dsc$k_dtype_sv
;  1291     1408  4             OR .result_desc[dsc$b_dtype] EQL dsc$k_dtype_tf
;  1292     1409  3             THEN 1 ELSE 8);
;  1293     1410  2          result_desc[dsc$l_pos]   = .bit_offset;
;  1294     1411  2          END
;  1295     1412  2      ELSE
;  1296     1413  2          BEGIN
;  1297     1414  3          !+
;  1298     1415  3          ! If we get here then we have byte-aligned data.
;  1299     1416  3          ! Fix up the pointer field to point to the byte where the data
;  1300     1417  3          ! data actually begins.
;  1301     1418  3          !-
;  1302     1419  3          result_desc[dsc$a_pointer] = .result_desc[dsc$a_pointer] + (.bit_offset/%BPUNIT);
;  1303     1420  4          IF (.result_desc[dsc$b_class] EQL dsc$k_class_z)
;  1304     1421  3          THEN
;  1305     1422  4              BEGIN
;  1306     1423  5              IF ((.bit_length AND (%BPUNIT-1)) EQL 0)
;  1307     1424  4              THEN
;  1308     1425  4                  !+
;  1309     1426  4                  ! If the length of the data is exactly a multiple of 8 then
;  1310     1427  4                  ! leave the dtype Z and express the length in bytes.
;  1311     1428  4                  !-
;  1312     1429  4                  result_desc[dsc$w_length] = .bit_length/%BPUNIT
;  1313     1430  4              ELSE
;  1314     1431  5                  BEGIN
;  1315     1432  5                  !+
;  1316     1433  5                  ! If the length is not expressible in bytes then change the dtype
;  1317     1434  5                  ! to V and fill in the length field with a bit length.
;  1318     1435  5                  !-
;  1319     1436  5                  result_desc[dsc$b_dtype] = dsc$k_dtype_v;
;  1320     1437  5                  IF .bit_length LSSU %X'10000'
;  1321     1438  5                  THEN
;  1322     1439  6                      BEGIN
;  1323     1440  6                      result_desc[dsc$w_length] = .bit_length;
;  1324     1441  6                      result_desc[dsc$l_pos]    = 0;
```

```
;  1325     1442  6                END
;  1326     1443  5             ELSE
;  1327     1444  6                BEGIN
;  1328     1445  6                !+
;  1329     1446  6                ! Special handling for the case where the length does
;  1330     1447  6                ! not fit in the word field.
;  1331     1448  6                !-
;  1332     1449  6                result_desc[dsc$w_length] = 0;
;  1333     1450  6                result_desc[dsc$l_pos] = .bit_length;
;  1334     1451  5              END;
;  1335     1452  4           END;
;  1336     1453  3        END;
;  1337     1454  2     END;
;  1338     1455  2
;  1339     1456  2  ch$move(12,result_desc,.vms_desc);
;  1340     1457  2
;  1341     1458  2  RETURN sts$k_success;
;  1342     1459  2
;  1343     1460  1  END;                  ! End of routine dbg$make_vms_desc
```

```
                                 0FFC 00000        .ENTRY  DBG$MAKE_VMS_DESC, Save R2,R3,R4,R5,R6,R7,- ; 0839
                                                           R8,R9,R10,R11
                5B 00000000G     00   9E 00002    MOVAB   LIB$SIGNAL, R11
                5E               38   C2 00009    SUBL2   #56, SP
                57        04     AC   D0 0000C    MOVL    PRM_DESC, R7                                ; 0878
00000000G       00               57   D0 00010    MOVL    R7, DBG$GL_CURRENT_PRIMARY
                5A        04     A7   9E 00017    MOVAB   4(R7), R10                                  ; 0882
                07        03     AA   91 0001B    CMPB    3(R10), #7
                                 29   12 0001F    BNEQ    2$
                          0C     A7   D5 00021    TSTL    12(R7)                                      ; 0887
                                 1B   13 00024    BEQL    1$
                                 5E   DD 00026    PUSHL   SP                                          ; 0890
                          0C     A7   DD 00028    PUSHL   12(R7)
                00000000G  00         02   FB 0002B    CALLS   #2, DBG$STA_SYMNAME
                                      6E   DD 00032    PUSHL   NAME                                    ; 0891
                                      01   DD 00034    PUSHL   #1
                    00028168          8F   DD 00036    PUSHL   #164200
                          6B          03   FB 0003C    CALLS   #3, LIB$SIGNAL
                                      09   11 0003F    BRB     2$                                      ; 0887
                    000287F8          8F   DD 00041 1$: PUSHL   #165880                                ; 0894
                          6B          01   FB 00047    CALLS   #1, LIB$SIGNAL
                                   0C     A7   DD 0004A 2$: PUSHL   12(R7)                            ; 0903
                00000000G  00         01   FB 0004D    CALLS   #1, DBG$STA_SETCONTEXT
                                   18     AE   7C 00054    CLRQ    BIT_OFFSET                          ; 0904
                0C         00         6E   00   2C 00057    MOVC5   #0, (SP), #0, #12, RESULT_DESC      ; 0905
                                   20     AE        0005C
                                   53     14   A7   D0 0005E    MOVL    20(R7), PRIM_SUBNODE            ; 0914
                                   56     18   A7   D0 00062    MOVL    24(R7), DATA_SUBNODE            ; 0915
                                   56          53   D1 00066 3$: CMPL    PRIM_SUBNODE, DATA_SUBNODE      ; 0916
                                               03   12 00069    BNEQ    4$
                                         01E5  31   00 0006B    BRW     25$
                              24   AE        14   A3   C0 0006E 4$: ADDL2   20(PRIM_SUBNODE), RESULT_DESC+4  ; 0918
                                   52        10   A3   D0 00073    MOVL    16(PRIM_SUBNODE), R2        ; 0925
```

```
                                63  13 00077          BEQL    8$
5E      0A      A3              05  E0 00079          BBS     #5, 10(PRIM_SUBNODE), 8$                    ;0926
                        10      AE  9F 0007E          PUSHAB  ADR_KIND                                    ;0929
                        30      AE  9F 00081          PUSHAB  ADR_PTRS
                                52  DD 00084          PUSHL   R2
    00000000G   00              03  FB 00086          CALLS   #3, DBG$STA_SYMVALUE
                50      10      AE  D0 0008D          MOVL    ADR_KIND, R0                                ;0930
                02              50  D1 00091          CMPL    R0, #2                                      ;0932
                                0C  12 00094          BNEQ    5$
        24      AE      2C      AE  C0 00096          ADDL2   ADR_PTRS, RESULT_DESC+4                     ;0934
        18      AE      30      AE  C0 0009B          ADDL2   ADR_PTRS+4, BIT_OFFSET                      ;0935
                                3A  11 000A0          BRB     8$                                          ;0930
                03              50  D1 000A2 5$:      CMPL    R0, #3                                      ;0937
                                0B  12 000A5          BNEQ    6$
                50      2C      AE  D0 000A7          MOVL    ADR_DESC, R0                                ;0940
        24      AE      04      A0  C0 000AB          ADDL2   4(R0), RESULT_DESC+4
                                2A  11 000B0          BRB     8$                                          ;0930
                04              50  D1 000B2 6$:      CMPL    R0, #4                                      ;0942
                                1C  12 000B5          BNEQ    7$
                        04      AE  9F 000B7          PUSHAB  NAME                                        ;0945
                                52  DD 000BA          PUSHL   R2
    00000000G   00              02  FB 000BC          CALLS   #2, DBG$STA_SYMNAME
                        04      AE  DD 000C3          PUSHL   NAME                                        ;0946
                                01  DD 000C6          PUSHL   #1
                00028170        8F  DD 000C8          PUSHL   #164208
                6B              03  FB 000CE          CALLS   #3, LIB$SIGNAL
                                09  11 000D1          BRB     8$                                          ;0930
                000287F8        8F  DD 000D3 7$:      PUSHL   #165880                                     ;0949
                6B              01  FB 000D9          CALLS   #1, LIB$SIGNAL
                50      09      A3  9A 000DC 8$:      MOVZBL  9(PRIM_SUBNODE), R0                         ;0952
                01              50  91 000E0          CMPB    R0, #1                                      ;0954
                                5D  12 000E3          BNEQ    14$
                58      20      A3  D0 000E5          MOVL    32(PRIM_SUBNODE), ADDR_OFFSET               ;0961
                52      1B      A3  9A 000E9          MOVZBL  27(PRIM_SUBNODE), INDEX                     ;0965
                                3E  11 000ED          BRB     11$
54              52              14  C5 000EF 9$:      MULL3   #20, INDEX, R4                              ;0967
                        28 A344 9F  9F 000F3          PUSHAB  40(PRIM_SUBNODE)[R4]
                59              9E  D0 000F7          MOVL    @(SP)+, S_VALUE
                        38 A344 9F  9F 000FA          PUSHAB  56(PRIM_SUBNODE)[R4]                        ;0968
                55              9E  D0 000FE          MOVL    @(SP)+, TYPEID
                09  00000000G  00  91 00101          CMPB    DBG$GB_LANGUAGE, #9                         ;0975
                                18  12 00108          BNEQ    10$
                                55  D5 0010A          TSTL    TYPEID                                      ;0976
                                14  13 0010C          BEQL    10$
                04      18      A5  91 0010E          CMPB    24(TYPEID), #4                              ;0978
                                0E  12 00112          BNEQ    10$
                        0220    8F  BB 00114          PUSHR   #^M<R5,R9>                                  ;0980
    00000000G   00              02  FB 00118          CALLS   #2, DBG$ENUM_POS
                59              50  D0 0011F          MOVL    R0, S_VALUE
                        2C A344 9F  9F 00122 10$:     PUSHAB  44(PRIM_SUBNODE)[R4]                        ;0982
50              59              9E  C5 00126          MULL3   @(SP)+, S_VALUE, R0
                58              50  C0 0012A          ADDL2   R0, ADDR_OFFSET
                BF              52  F4 0012D 11$:     SOBGEQ  INDEX, 9$                                   ;0965
06      0A      A3              02  E1 00130          BBC     #2, 10(PRIM_SUBNODE), 12$                   ;0985
        18      AE              58  C0 00135          ADDL2   ADDR_OFFSET, BIT_OFFSET                     ;0986
                                04  11 00139          BRB     13$
        24      AE              58  C0 0013B 12$:     ADDL2   ADDR_OFFSET, RESULT_DESC+4                  ;0987
```

```
                                        010B   31 0013F 13$:    BRW     24$                                             ; 0952
                         06               50   91 00142 14$:    CMPB    R0, #6                                          ; 0990
                                          05   13 00145         BEQL    15$                                             ;
                         10               50   91 00147         CMPB    R0, #16                                         ;
                                          20   12 0014A         BNEQ    17$                                             ;
              52     18  AE        FD     8F   78 0014C 15$:    ASHL    #-3, BIT_OFFSET, ADDR                           ; 0997
                         52        24     AE   C0 00152         ADDL2   RESULT_DESC+4, ADDR                             ;
              62         05               00   0C 00156         PROBER  #0, #5, (ADDR)                                  ; 0998
                                          0D   12 0015A         BNEQ    16$                                             ;
                                          52   DD 0015C         PUSHL   ADDR                                            ; 0999
                                          01   DD 0015E         PUSHL   #1                                              ;
                               00028228   8F   DD 00160         PUSHL   #164392                                         ;
                         6B               03   FB 00166         CALLS   #3, LIB$SIGNAL                                  ;
                                        00CC   31 00169 16$:    BRW     22$                                             ; 1003
                         07               50   91 0016C 17$:    CMPB    R0, #7                                          ; 1007
                                          CE   13 0016F         BEQL    13$                                             ;
                         13               50   91 00171         CMPB    R0, #19                                         ; 1010
                                          03   13 00174         BEQL    18$                                             ;
                                        0088   31 00176         BRW     20$                                             ;
              C1     0A  A3               04   E0 00179 18$:    BBS     #4, 10(PRIM_SUBNODE), 13$                       ; 1011
                     0A  A3               10   88 0017E         BISB2   #16, 10(PRIM_SUBNODE)                           ; 1014
                         52        1C     A3   D0 00182         MOVL    28(PRIM_SUBNODE), R2                            ; 1015
                                          B7   13 00186         BEQL    13$                                             ;
                                   08     AE   9F 00188         PUSHAB  TAG_NAME                                        ; 1018
                                          52   DD 0018B         PUSHL   R2                                              ;
               00000000G  00              02   FB 0018D         CALLS   #2, DBG$STA_SYMNAME                             ;
                                   0C     AE   9F 00194         PUSHAB  TAG_SIZE                                        ; 1019
                                          52   DD 00197         PUSHL   R2                                              ;
               00000000G  00              02   FB 00199         CALLS   #2, DBG$STA_SYMSIZE                             ;
                                   0C     AE   D5 001A0         TSTL    TAG_SIZE                                        ; 1020
                                          9A   13 001A3         BEQL    13$                                             ;
                                   08     BE   95 001A5         TSTB    @TAG_NAME                                       ;
                                          95   13 001A8         BEQL    13$                                             ;
                                   10     AE   9F 001AA         PUSHAB  ADR_KIND                                        ; 1022
                                   30     AE   9F 001AD         PUSHAB  ADR_PTRS                                        ;
                                          52   DD 001B0         PUSHL   R2                                              ;
               00000000G  00              03   FB 001B2         CALLS   #3, DBG$STA_SYMVALUE                            ;
                      2C  AE       24     AE   C0 001B9         ADDL2   RESULT_DESC+4, ADR_PTRS                         ; 1023
                      30  AE       18     AE   C0 001BE         ADDL2   BIT_OFFSET, ADR_PTRS+4                          ; 1024
         2C    BE        04               00   0C 001C3         PROBER  #0, #4, @ADR_PTRS                               ; 1029
                                          0E   12 001C8         BNEQ    19$                                             ;
                                   2C     AE   DD 001CA         PUSHL   ADR_PTRS                                        ; 1031
                                          01   DD 001CD         PUSHL   #1                                              ;
                               00028228   8F   DD 001CF         PUSHL   #164392                                         ;
                         6B               03   FB 001D5         CALLS   #3, LIB$SIGNAL                                  ;
    52   2C    BE    0C  AE        30     AE   EF 001D8 19$:    EXTZV   ADR_PTRS+4, TAG_SIZE, @ADR_PTRS, TAG_VALUE      ; 1033
                                   24     A3   DD 001E0         PUSHL   36(PRIM_SUBNODE)                                ; 1034
                                          52   DD 001E3         PUSHL   TAG_VALUE                                       ;
               00000000G  00              02   FB 001E5         CALLS   #2, DBG$STA_VARIANT_VALUE                       ;
                          5E              50   E8 001EC         BLBS    R0, 24$                                         ;
                                   08     AE   DD 001EF         PUSHL   TAG_NAME                                        ; 1035
                                          52   DD 001F2         PUSHL   TAG_VALUE                                       ;
                                          02   DD 001F4         PUSHL   #2                                              ;
                               0002871B   8F   DD 001F6         PUSHL   #165659                                         ;
                         6B               04   FB 001FC         CALLS   #4, LIB$SIGNAL                                  ;
                                          4C   11 001FF         BRB     24$                                             ; 1011
                         0F               50   91 00201 20$:    CMPB    R0, #15                                         ; 1040
```

```
                                        3E  12 00204        BNEQ    23$                                          ;
             52      18    AE      FD   8F  78 00206        ASHL    #-3, BIT_OFFSET, ADDR                        ; 1062
                           52      24   AE  C0 0020C        ADDL2   RESULT_DESC+4, ADDR                          ;
  18  AE      18    AE     03           00  EF 00210        EXTZV   #0, #3, BIT_OFFSET, BIT_OFFSET               ; 1063
             62            08           00  0C 00217        PROBER  #0, #8, (ADDR)                               ; 1064
                                        09  12 0021B        BNEQ    21$                                          ;
                           00028F40     8F  DD 0021D        PUSHL   #167744                                      ;
                           6B           01  FB 00223        CALLS   #1, LIB$SIGNAL                               ;
             50      18    AE           30  C1 00226 21$:   ADDL3   #48, BIT_OFFSET, R0                          ; 1068
             09            62           50  E0 0022B        BBS     R0, (ADDR), 22$                              ;
                           00028F40     8F  DD 0022F        PUSHL   #167744                                      ;
                           6B           01  FB 00235        CALLS   #1, LIB$SIGNAL                               ;
  24  AE     62            20      18   AE  EF 00238 22$:   EXTZV   BIT_OFFSET, #32, (ADDR), RESULT_DESC+4       ; 1072
                                   18   AE  D4 0023F        CLRL    BIT_OFFSET                                   ; 1073
                                        09  11 00242        BRB     24$                                          ; 0952
                           000287D8     8F  DD 00244 23$:   PUSHL   #165848                                      ; 1077
                           6B           01  FB 0024A        CALLS   #1, LIB$SIGNAL                               ;
                           53           63  D0 0024D 24$:   MOVL    (PRIM_SUBNODE), PRIM_SUBNODE                 ; 1080
                                      FE13  31 00250        BRW     3$                                           ; 0916
             52            10           A6  D0 00253 25$:   MOVL    16(DATA_SUBNODE), R2                         ; 1087
                                        74  13 00257        BEQL    30$                                          ;
             6F      0A    A6           05  E0 00259        BBS     #5, 10(DATA_SUBNODE), 30$                    ; 1088
                                   10   AE  9F 0025E        PUSHAB  ADR_KIND                                     ; 1091
                                   30   AE  9F 00261        PUSHAB  ADR_PTRS                                     ;
                                        52  DD 00264        PUSHL   R2                                           ;
                   00000000G  00        03  FB 00266        CALLS   #3, DBG$STA_SYMVALUE                         ;
                              50   10   AE  D0 0026D        MOVL    ADR_KIND, R0                                 ; 1092
                              02        50  D1 00271        CMPL    R0, #2                                       ; 1094
                                        0C  12 00274        BNEQ    26$                                          ;
                     24       AE   2C   AE  C0 00276        ADDL2   ADR_PTRS, RESULT_DESC+4                      ; 1096
                     18       AE   30   AE  C0 0027B        ADDL2   ADR_PTRS+4, BIT_OFFSET                       ; 1097
                                        4B  11 00280        BRB     30$                                          ; 1092
                              03        50  D1 00282 26$:   CMPL    R0, #3                                       ; 1099
                                        0B  12 00285        BNEQ    27$                                          ;
                     50            2C   AE  D0 00287        MOVL    ADR_DESC, R0                                 ; 1102
                     24       AE   04   A0  C0 0028B        ADDL2   4(R0), RESULT_DESC+4                         ;
                                        3B  11 00290        BRB     30$                                          ; 1092
                              01        50  D1 00292 27$:   CMPL    R0, #1                                       ; 1104
                                        0C  12 00295        BNEQ    28$                                          ;
                     24       AE   2C   AE  D0 00297        MOVL    ADR_PTRS, RESULT_DESC+4                      ; 1106
                     18       AE   30   AE  D0 0029C        MOVL    ADR_PTRS+4, BIT_OFFSET                       ; 1107
                                        2A  11 002A1        BRB     30$                                          ; 1092
                              04        50  D1 002A3 28$:   CMPL    R0, #4                                       ; 1109
                                        1C  12 002A6        BNEQ    29$                                          ;
                                   14   AE  9F 002A8        PUSHAB  NAME                                         ; 1112
                                        52  DD 002AB        PUSHL   R2                                           ;
                   00000000G  00        02  FB 002AD        CALLS   #2, DBG$STA_SYMNAME                          ;
                                   14   AE  DD 002B4        PUSHL   NAME                                         ; 1113
                                        01  DD 002B7        PUSHL   #1                                           ;
                           00028170     8F  DD 002B9        PUSHL   #164208                                      ;
                              6B        03  FB 002BF        CALLS   #3, LIB$SIGNAL                               ;
                                        09  11 002C2        BRB     30$                                          ; 1092
                           000287F8     8F  DD 002C4 29$:   PUSHL   #165880                                      ; 1116
                              6B        01  FB 002CA        CALLS   #1, LIB$SIGNAL                               ;
             0D               00   08   A6  8F 002CD 30$:   CASEB   8(DATA_SUBNODE), #0, #13                     ; 1125
   0027      0027           001C      001C     002D2 31$:   .WORD   32$-31$,-                                    ;
   001C      0098           0027      0027     002DA              32$-31$,-                                    ;
```

```
   001C      0098       001C       0027     002E2                 33$-31$,-               ;
                        001C       001C     002EA                 33$-31$,-               ;
                                                                  33$-31$,-               ;
                                                                  33$-31$,-               ;
                                                                  39$-31$,-               ;
                                                                  32$-31$,-               ;
                                                                  33$-31$,-               ;
                                                                  32$-31$,-               ;
                                                                  39$-31$,-               ;
                                                                  32$-31$,-               ;
                                                                  32$-31$,-               ;
                                                                  32$-31$                 ;
                         00028800     8F  DD 002EE 32$:  PUSHL    #165888                 ; 1281
                     6B               01  FB 002F4       CALLS    #1, LIB$SIGNAL          ;
                                      6E  11 002F7       BRB      38$                     ;
                                23    AE  94 002F9 33$:  CLRB     RESULT_DESC+3           ; 1143
                     04         08    A6  91 002FC       CMPB     8(DATA_SUBNODE), #4     ; 1135
                                      27  12 00300       BNEQ     34$                     ;
                                03    A7  95 00302       TSTB     3(R7)                   ; 1136
                                      22  12 00305       BNEQ     34$                     ;
                                      6A  95 00307       TSTB     (R10)                   ; 1137
                                      1E  19 00309       BLSS     34$                     ;
                     16 00000000G     00  D1 0030B       CMPL     DBG$GL_DFLTTYP, #22     ; 1138
                                      15  13 00312       BEQL     34$                     ;
              22     AE 00000000G     00  90 00314       MOVB     DBG$GL_DFLTTYP, RESULT_DESC+2  ; 1144
                     50 00000000G     00  3C 0031C       MOVZWL   DBG$GW_DFLTLENG, R0     ; 1145
              20     AE               50  B0 00323       MOVW     R0, RESULT_DESC         ;
                                      39  11 00327       BRB      37$                     ; 1146
                                18    AE  D5 00329 34$:  TSTL     BIT_OFFSET              ; 1155
                                      09  13 0032C       BEQL     35$                     ;
                         00028800     8F  DD 0032E       PUSHL    #165888                 ;
                     6B               01  FB 00334       CALLS    #1, LIB$SIGNAL          ;
                                24    AE  DD 00337 35$:  PUSHL    RESULT_DESC+4           ; 1157
           00000000G 00               01  FB 0033A       CALLS    #1, DBG$IS_IT_ENTRY     ;
                     0A               50  E9 00341       BLBC     R0, 36$                 ;
              22     AE               17  90 00344       MOVB     #23, RESULT_DESC+2      ; 1160
              1C     AE               10  D0 00348       MOVL     #16, BIT_LENGTH         ; 1161
                                      19  11 0034C       BRB      38$                     ; 1157
              22     AE               16  90 0034E 36$:  MOVB     #22, RESULT_DESC+2      ; 1165
                                      7E  7C 00352       CLRQ     -(SP)                   ; 1166
                                2C    AE  DD 00354       PUSHL    RESULT_DESC+4           ;
           00000000G 00               03  FB 00357       CALLS    #3, DBG$INS_DECODE      ;
                     50         24    AE  C2 0035E       SUBL2    RESULT_DESC+4, R0       ; 1167
   1C     AE         50               03  78 00362 37$:  ASHL     #3, R0, BIT_LENGTH      ; 1166
                              00DF        31 00367 38$:  BRW      53$                     ; 1125
                     01         09    A6  91 0036A 39$:  CMPB     9(DATA_SUBNODE), #1     ; 1179
                                      03  13 0036E       BEQL     40$                     ;
                              00AE        31 00370       BRW      51$                     ;
                     58         20    A6  D0 00373 40$:  MOVL     32(DATA_SUBNODE), ADDR_OFFSET  ; 1183
                     54         18    A6  9E 00377       MOVAB    24(DATA_SUBNODE), R4    ; 1187
                     52         03    A4  9A 0037B       MOVZBL   3(R4), INDEX            ;
                                      3E  11 0037F       BRB      43$                     ;
          53         52               14  C5 00381 41$:  MULL3    #20, INDEX, R3          ; 1189
                                28  A643  9F 00385       PUSHAB   40(DATA_SUBNODE)[R3]    ;
                     59               9E  D0 00389       MOVL     @(SP)+, S_VALUE         ;
                                38  A643  9F 0038C       PUSHAB   56(DATA_SUBNODE)[R3]    ; 1190
                     55               9E  D0 00390       MOVL     @(SP)+, TYPEID          ;
```

```
                        09 00000000G   00  91 00393          CMPB    DBG$GB_LANGUAGE, #9                     ; 1197
                                       18  12 0039A          BNEQ    42$
                                       55  D5 0039C          TSTL    TYPEID                                  ; 1198
                                       14  13 0039E          BEQL    42$
                        04        18   A5  91 003A0          CMPB    24(TYPEID), #4                          ; 1200
                                       0E  12 003A4          BNEQ    42$
                              0220     8F  BB 003A6          PUSHR   #^M<R5,R9>                              ; 1202
                   00000000G  00       02  FB 003AA          CALLS   #2, DBG$ENUM_POS
                        59             50  D0 003B1          MOVL    R0, S_VALUE
                              2C A643  9F  9F 003B4 42$:     PUSHAB  44(DATA_SUBNODE)[R3]                    ; 1204
                50            59       9E  C5 003B8          MULL3   @(SP)+, S_VALUE, R0
                              58       50  C0 003BC          ADDL2   R0, ADDR_OFFSET
                              BF       52  F4 003BF 43$:     SOBGEQ  INDEX, 4T$                              ; 1187
                06      0A    A6       02  E1 003C2          BBC     #2, 10(DATA_SUBNODE), 44$               ; 1207
                        18    AE       58  C0 003C7          ADDL2   ADDR_OFFSET, BIT_OFFSET                 ; 1208
                                       04  11 003CB          BRB     45$
                        24    AE       58  C0 003CD 44$:     ADDL2   ADDR_OFFSET, RESULT_DESC+4              ; 1209
                        25        02   A4  91 003D1 45$:     CMPB    2(R4), #37                              ; 1218
                                       06  12 003D5          BNEQ    46$
                        23    AE       0B  90 003D7          MOVB    #11, RESULT_DESC+3                      ; 1220
                                       17  11 003DB          BRB     49$
                              01       A4  95 003DD 46$:     TSTB    1(R4)                                   ; 1223
                                       04  12 003E0          BNEQ    47$
                                       64  95 003E2          TSTB    (R4)                                    ; 1224
                                       0A  13 003E4          BEQL    48$
                        23    AE       09  90 003E6 47$:     MOVB    #9, RESULT_DESC+3                       ; 1227
                        28    AE       64  B0 003EA          MOVW    (R4), RESULT_DESC+8                     ; 1229
                                       04  11 003EE          BRB     49$                                     ; 1223
                        23    AE       01  90 003F0 48$:     MOVB    #1, RESULT_DESC+3                       ; 1232
                        22    AE   02  A4  90 003F4 49$:     MOVB    2(R4), RESULT_DESC+2                    ; 1239
                        20    AE   1C  A6  B0 003F9          MOVW    28(DATA_SUBNODE), RESULT_DESC           ; 1240
                        9E    8F       22  AE 91 003FE          CMPB    RESULT_DESC+2, #^X8                     ; 1244
                                       0E  12 00403          BNEQ    50$
                        1C    AE           01  D0 00405          MOVL    #1, BIT_LENGTH                          ; 1252
                        20    AE 01280001  8F  D0 00409          MOVL    #19398657, RESULT_DESC
                                       26  11 00411          BRB     52$                                     ; 1244
                              20       AE  9F  00413 50$:     PUSHAB  RESULT_DESC                             ; 1255
                      F69F    CF       01  FB 00416          CALLS   #1, DBG$DATA_LENGTH
                        1C    AE       50  D0 0041B          MOVL    R0, BIT_LENGTH
                                       18  11 0041F          BRB     52$                                     ; 1179
                              18       AE  9F 00421 51$:     PUSHAB  BIT_OFFSET                              ; 1263
                              20       AE  9F 00424          PUSHAB  BIT_LENGTH
                              28       AE  9F 00427          PUSHAB  RESULT_DESC
                              0C       A7  DD 0042A          PUSHL   12(R7)                                  ; 1265
                              0C       A6  DD 0042D          PUSHL   12(DATA_SUBNODE)                        ; 1264
                                 7E    09  A6 9A 00430          MOVZBL  9(DATA_SUBNODE), -(SP)                  ; 1263
                      F970    CF       06  FB 00434          CALLS   #6, DBG$FILL_IN_VMS_DESC
                                 0B    23  AE 91 00439 52$:     CMPB    RESULT_DESC+3, #11                      ; 1272
                                       0A  12 0043D          BNEQ    53$
                                 0E    22  AE 91 0043F          CMPB    RESULT_DESC+2, #14                      ; 1273
                                       04  12 00443          BNEQ    53$
                        22    AE           25  90 00445          MOVB    #37, RESULT_DESC+2                      ; 1274
                                 18    22  AE 91 00449 53$:     CMPB    RESULT_DESC+2, #24                      ; 1287
                                       1C  12 0044D          BNEQ    55$
                24    BE                 08  00  0C 0044F          PROBER  #0, #8, @RESULT_DESC+4                  ; 1290
                                       0E  12 00454          BNEQ    54$
                              24       AE  DD 00456          PUSHL   RESULT_DESC+4                           ; 1292
```

```
                                01 DD 00459         PUSHL   #1                                              ;
                      00028228  8F DD 0045B         PUSHL   #164392                                         ;
                  6B            03 FB 00461         CALLS   #3, LIB$SIGNAL                                  ;
20  AE        24  BE        20  AE 28 00464 54$:    MOVC3   RESULT_DESC, @RESULT_DESC+4, RESULT_DESC        ; 1293
                  21        22  AE 91 0046B 55$:    CMPB    RESULT_DESC+2, #33                              ; 1300
                                06 13 0046F         BEQL    56$                                             ;
                  20        22  AE 91 00471         CMPB    RESULT_DESC+2, #32                              ; 1301
                                2E 12 00475         BNEQ    59$                                             ;
24  BE            08            00 0C 00477 56$:    PROBER  #0, #8, @RESULT_DESC+4                          ; 1304
                                0E 12 0047C         BNEQ    57$                                             ;
                            24  AE DD 0047E         PUSHL   RESULT_DESC+4                                   ; 1306
                                01 DD 00481         PUSHL   #1                                              ;
                      00028228  8F DD 00483         PUSHL   #164392                                         ;
                  6B            03 FB 00489         CALLS   #3, LIB$SIGNAL                                  ;
              24  AE        24  BE D0 0048C 57$:    MOVL    @RESULT_DESC+4, RESULT_DESC+4                   ; 1307
                  21        22  AE 91 00491         CMPB    RESULT_DESC+2, #33                              ; 1308
                                04 12 00495         BNEQ    58$                                             ;
              22  AE            16 90 00497         MOVB    #22, RESULT_DESC+2                              ; 1310
                  20        22  AE 91 0049B 58$:    CMPB    RESULT_DESC+2, #32                              ; 1311
                                04 12 0049F         BNEQ    59$                                             ;
              22  AE            17 90 004A1         MOVB    #23, RESULT_DESC+2                              ; 1313
              24  AE        14  A6 C0 004A5 59$:    ADDL2   20(DATA_SUBNODE), RESULT_DESC+4                 ; 1317
    59            6A            01 E1 004AA         BBC     #1, (R10), 66$                                  ; 1319
    57            6A            02 E1 004AE         BBC     #2, (R10), 67$                                  ; 1325
                  50        10  A7 32 004B2         CVTWL   16(R7), R0                                      ; 1328
              18  AE            50 C0 004B6         ADDL2   R0, BIT_OFFSET                                  ;
              1C  AE        12  A7 3C 004BA         MOVZWL  18(R7), BIT_LENGTH                              ; 1329
                            20  AE D4 004BF         CLRL    RESULT_DESC                                     ; 1332
                  07        18  AE 93 004C2         BITB    BIT_OFFSET, #7                                  ; 1333
                                78 12 004C6         BNEQ    70$                                             ;
                  50        1C  AE D0 004C8         MOVL    BIT_LENGTH, R0                                  ; 1334
                  08            50 D1 004CC         CMPL    R0, #8                                          ; 1337
                                0E 12 004CF         BNEQ    61$                                             ;
    05            6A            03 E1 004D1         BBC     #3, (R10), 60$                                  ; 1338
                  50            06 D0 004D5         MOVL    #6, R0                                          ;
                                29 11 004D8         BRB     65$                                             ;
                  50            02 D0 004DA 60$:    MOVL    #2, R0                                          ;
                                24 11 004DD         BRB     65$                                             ;
                  10            50 D1 004DF 61$:    CMPL    R0, #16                                         ; 1340
                                0E 12 004E2         BNEQ    63$                                             ;
    05            6A            03 E1 004E4         BBC     #3, (R10), 62$                                  ; 1341
                  50            07 D0 004E8         MOVL    #7, R0                                          ;
                                16 11 004EB         BRB     65$                                             ;
                  50            03 D0 004ED 62$:    MOVL    #3, R0                                          ;
                                11 11 004F0         BRB     65$                                             ;
                  20            50 D1 004F2 63$:    CMPL    R0, #32                                         ; 1343
                                49 12 004F5         BNEQ    70$                                             ;
    05            6A            03 E1 004F7         BBC     #3, (R10), 64$                                  ; 1344
                  50            08 D0 004FB         MOVL    #8, R0                                          ;
                                03 11 004FE         BRB     65$                                             ;
                  50            04 D0 00500 64$:    MOVL    #4, R0                                          ;
              22  AE            50 90 00503 65$:    MOVB    R0, RESULT_DESC+2                               ;
                                37 11 00507 66$:    BRB     70$                                             ;
                  25        22  AE 91 00509 67$:    CMPB    RESULT_DESC+2, #37                              ; 1355
                                0A 12 0050D         BNEQ    68$                                             ;
              22  AE      010E  8F B0 0050F         MOVW    #270, RESULT_DESC+2                             ; 1359
              24  AE            02 C0 00515         ADDL2   #2, RESULT_DESC+4                               ; 1360
```

```
                        50      10  A7  32 00519 68$:    CVTWL   16(R7), R0                      ; 1362
                    24  AE          50  C0 00520         ADDL2   R0, RESULT_DESC+4
                        50      12  A7  3C 00521         MOVZWL  18(R7), R0                      ; 1363
                1C  AE              50  03 78 00525       ASHL    #3, R0, BIT_LENGTH
                        0E      22  AE  91 00529         CMPB    RESULT_DESC+2, #14              ; 1373
                                    0D  1F 0052E         BLSSU   69$
                        14      22  AE  91 00530         CMPB    RESULT_DESC+2, #20              ; 1374
                                    07  1A 00534         BGTRU   69$
                    20  AE      12  A7  B0 00536         MOVW    18(R7), RESULT_DESC             ; 1376
                                    03  11 0053B         BRB     70$
                                20  AE  D4 0053D 69$:     CLRL    RESULT_DESC                     ; 1381
                        07      18  AE  93 00540 70$:     BITB    BIT_OFFSET, #7                  ; 1390
                                    42  13 00544         BEQL    75$
                    23  AE              0D  90 00546     MOVB    #13, RESULT_DESC+3              ; 1396
                                22  AE  95 0054A         TSTB    RESULT_DESC+2                   ; 1397
                                    04  12 0054D         BNEQ    71$
                    22  AE              22  90 0054F     MOVB    #34, RESULT_DESC+2              ; 1398
                        50      22  AE  9A 00553 71$:     MOVZBL  RESULT_DESC+2, R0               ; 1404
                        22              50  91 00557     CMPB    R0, #34
                                        14  13 0055A     BEQL    72$
                        01              50  91 0055C     CMPB    R0, #1                          ; 1405
                                        0F  13 0055F     BEQL    72$
                        2A              50  91 00561     CMPB    R0, #42                         ; 1406
                                        0A  13 00564     BEQL    72$
                        29              50  91 00566     CMPB    R0, #41                         ; 1407
                                        05  13 00569     BEQL    72$
                        28              50  91 0056B     CMPB    R0, #40                         ; 1408
                                        05  12 0056E     BNEQ    73$
                        50              01  D0 00570 72$:     MOVL    #1, R0                      ; 1404
                                        03  11 00573     BRB     74$
                        50              08  D0 00575 73$:     MOVL    #8, R0
            51          1C  AE          50  C7 00578 74$:     DIVL3   R0, BIT_LENGTH, R1
                        20  AE          51  B0 0057D         MOVW    R1, RESULT_DESC
                        28  AE      18  AE  D0 00581         MOVL    BIT_OFFSET, RESULT_DESC+8       ; 1410
                                        3E  11 00586         BRB     78$                             ; 1390
            50          18  AE          08  C7 00588 75$:     DIVL3   #8, BIT_OFFSET, R0          ; 1419
                        24  AE          50  C0 0058D         ADDL2   R0, RESULT_DESC+4
                                    23  AE  95 00591         TSTB    RESULT_DESC+3                   ; 1420
                                        30  12 00594         BNEQ    78$
                        50      1C  AE  D0 00596             MOVL    BIT_LENGTH, R0              ; 1423
                        07              50  93 0059A         BITB    R0, #7
                                        0A  12 0059D         BNEQ    76$
            51          50              08  C7 0059F         DIVL3   #8, R0, R1                  ; 1429
                    20  AE              51  B0 005A3         MOVW    R1, RESULT_DESC
                                        1D  11 005A7         BRB     78$
                    22  AE              01  90 005A9 76$:     MOVB    #1, RESULT_DESC+2           ; 1436
                00010000    8F          50  D1 005AD         CMPL    R0, #65536                  ; 1437
                                        09  1E 005B4         BGEQU   77$
                    20  AE              50  B0 005B6         MOVW    R0, RESULT_DESC             ; 1440
                                    28  AE  D4 005BA         CLRL    RESULT_DESC+8               ; 1441
                                        07  11 005BD         BRB     78$                         ; 1437
                                20  AE  B4 005BF 77$:     CLRW    RESULT_DESC                 ; 1449
                    28  AE              50  D0 005C2         MOVL    R0, RESULT_DESC+8           ; 1450
    08      BC      20  AE              0C  28 005C6 78$:     MOVC3   #12, RESULT_DESC, @VMS_DESC ; 1456
                        50              01  D0 005CC         MOVL    #1, R0                      ; 1458
                                            04 005CF         RET                                 ; 1460
```

; Routine Size: 1488 bytes,   Routine Base: DBG$CODE + 0546

```
;1345     1461  1 GLOBAL ROUTINE DBG$PRIM_TO_VAL (prm_desc,target_type,val_desc) =
;1346     1462  1 !++
;1347     1463  1 ! FUNCTIONAL DESCRIPTION:
;1348     1464  1 !
;1349     1465  1 !       Translates language independent descriptors to language independent
;1350     1466  1 !       value descriptors.  Normally the input descriptor will be a primary
;1351     1467  1 !       descriptor (a symbolic address reference),  but it is also possible
;1352     1468  1 !       to call this routine passing it a 'volatile value descriptor' (used
;1353     1469  1 !       for absolute addressing) or a normal value descriptor (indirection).
;1354     1470  1 !       This routine should be able to use the symbol table access routines
;1355     1471  1 !       and the information contained within the primary descriptor to make
;1356     1472  1 !       a descriptor representing a 'value  materialization' for the object
;1357     1473  1 !       described by the input descriptor.
;1358     1474  1 !
;1359     1475  1 !       Note that this routine must be able to use life-time, invocation, and
;1360     1476  1 !       generation information to produce an accurate value descriptor of the
;1361     1477  1 !       input object, or to decide when the value of an object cannot be
;1362     1478  1 !       materialized (such as when the user's PC is not within the scope of
;1363     1479  1 !       a dynamic variable).
;1364     1480  1 !
;1365     1481  1 !       Value descriptors produced by this routine must be marked (within the
;1366     1482  1 !       type field of the language independent header block) as to whether
;1367     1483  1 !       they are non-volatile (dbg$k_value_desc) or volatile (dbg$k_v_value_desc).
;1368     1484  1 !       Volatile value descriptors will NOT be stored to represent '\', 'last value'.
;1369     1485  1 !
;1370     1486  1 !       Since value descriptors may be used as target descriptors ( as input to
;1371     1487  1 !       dbg$ncob_type_conv ), some provision must be made for incorporating
;1372     1488  1 !       a value pointer field within the value descriptor. This type of value
;1373     1489  1 !       descriptor is loosely defined as a volatile type.
;1374     1490  1 !
;1375     1491  1 ! FORMAL PARAMETERS:
;1376     1492  1 !
;1377     1493  1 !       prm_desc        - A longword containing the address of a primary descriptor
;1378     1494  1 !
;1379     1495  1 !       target_type     - A longword containing the type of value descriptor
;1380     1496  1 !                         (dbg$k_value_desc or dbg$k_v_value_desc).
;1381     1497  1 !
;1382     1498  1 !       val_desc        - The address of a longword to contain the address of the
;1383     1499  1 !                         resulting value descriptor
;1384     1500  1 !
```

```
;  1386     1501  1 ;  IMPLICIT INPUTS:
;  1387     1502  1 ;
;  1388     1503  1 ;        NONE
;  1389     1504  1 ;
;  1390     1505  1 ;  IMPLICIT OUTPUTS:
;  1391     1506  1 ;
;  1392     1507  1 ;        In case of a success return, the resulting value descriptor must be
;  1393     1508  1 ;        constructed from dynamic storage and returned.
;  1394     1509  1 ;
;  1395     1510  1 ;  ROUTINE VALUE:
;  1396     1511  1 ;
;  1397     1512  1 ;        An unsigned integer longword completion code
;  1398     1513  1 ;
;  1399     1514  1 ;  COMPLETION CODES:
;  1400     1515  1 ;
;  1401     1516  1 ;        STS$K_SUCCESS (1) - Success. Value descriptor constructed and returned.
;  1402     1517  1 ;
;  1403     1518  1 ;        STS$K_ERROR   (2) - Failure. Data-type is not known to DEBUG kernel.
;  1404     1519  1 ;
;  1405     1520  1 ;  SIDE EFFECTS:
;  1406     1521  1 ;
;  1407     1522  1 ;        In case of a severe error, this routine will SIGNAL the error.
;  1408     1523  1 ;
;  1409     1524  1 ;--
```

```
; 1411          1525  1 !DBG$PRIM_TO_VAL(prm_desc,val_desc,target_type)
; 1412          1526  2     BEGIN
; 1413          1527  2     !
; 1414          1528  2     ! Describe formal parameters that are structures
; 1415          1529  2     !
; 1416          1530  2     MAP
; 1417          1531  2         prm_desc        : REF dbg$primary;
; 1418          1532  2     !
; 1419          1533  2     !
; 1420          1534  2     ! Declare routine-level local variables
; 1421          1535  2     !
; 1422          1536  2     LOCAL
; 1423          1537  2         result_desc     : REF dbg$valdesc,
; 1424          1538  2         data_desc       : BLOCK [dbg$k_valdesc_base_size+1,LONG]
; 1425          1539  2                           FIELD(dbg$dhdr_fields,dbg$value_fields);
; 1426          1540  2
; 1427          1541  2     BIND vms_desc = data_desc[dbg$a_value_vmsdesc] : dbg$stg_desc;
; 1428          1542  2
; 1429          1543  2     dbg$gl_current_primary = .prm_desc;                                    ! A003
; 1430          1544  2
; 1431          1545  2     ! It is illegal to call DBG$PRIM_TO_VAL with a type.
; 1432          1546  2     !
; 1433          1547  2     IF .prm_desc[dbg$b_dhdr_kind] EQL rst$k_type
; 1434          1548  2     THEN
; 1435          1549  3         BEGIN
; 1436          1550  3         LOCAL
; 1437          1551  3             name;
; 1438          1552  3         IF .prm_desc[dbg$l_dhdr_symid0] NEQ 0
; 1439          1553  3         THEN
; 1440          1554  4             BEGIN
; 1441          1555  4             dbg$sta_symname(.prm_desc[dbg$l_dhdr_symid0], name);
; 1442          1556  4             SIGNAL (dbg$_novaltyp, 1, .name);
; 1443          1557  4             END
; 1444          1558  3         ELSE
; 1445          1559  3             SIGNAL (dbg$_novalue);
; 1446          1560  2         END;
; 1447          1561  2
; 1448          1562  2     !+
; 1449          1563  2     ! First construct a VAX/VMS descriptor that for the desired value
; 1450          1564  2     !-
; 1451          1565  2     IF .prm_desc[dbg$l_dhdr_symid0] NEQ 0 THEN dbg$sta_setcontext(.prm_desc[dbg$l_dhdr_symid0]);
; 1452          1566  2     dbg$collect(.prm_desc);
; 1453          1567  2
; 1454          1568  2     SELECTONE .prm_desc[dbg$b_dhdr_type] OF
; 1455          1569  2         SET
; 1456          1570  2         [dbg$k_primary_desc]:
; 1457          1571  2             IF NOT dbg$make_vms_desc(.prm_desc,vms_desc) THEN RETURN sts$k_error;
; 1458          1572  2         [dbg$k_v_value_desc]:
; 1459          1573  2             ch$move(12,prm_desc[dbg$a_value_vmsdesc],vms_desc);
; 1460          1574  2         [dbg$k_value_desc]:
; 1461          1575  3             BEGIN
; 1462          1576  3             ch$fill(0,(dbg$k_valdesc_base_size+1)*%UPVAL,data_desc);
; 1463          1577  3             data_desc[dbg$b_dhdr_lang]   = .prm_desc[dbg$b_dhdr_lang];
; 1464          1578  3             data_desc[dbg$b_dhdr_type]   = .prm_desc[dbg$b_dhdr_type];
; 1465          1579  3             data_desc[dbg$l_dhdr_symid0] = .prm_desc[dbg$l_dhdr_symid0];
; 1466          1580  3             data_desc[dbg$w_dhdr_length] = dbg$k_valdesc_base_size*%UPVAL;
; 1467          1581  3             data_desc[dbg$b_dhdr_kind]   = rst$k_data;
```

```
;  1468          1582  3              data_desc[dbg$b_dhdr_fcode]  = rst$k_type_descr;
;  1469          1583  3
;  1470          1584  3              !+
;  1471          1585  3              ! Passing a pointer value into DBG$PRIM_TO_VAL results in a
;  1472          1586  3              ! value which is obtained by dereferencing the pointer.
;  1473          1587  3              !-
;  1474          1588  3              IF .prm_desc[dbg$b_dhdr_fcode] EQL rst$k_type_tptr
;  1475          1589  3              THEN
;  1476          1590  4                  BEGIN
;  1477          1591  4                  LOCAL bit_length,bit_offset;
;  1478          1592  4                  dbg$sta_typ_typedptr(.prm_desc[dbg$l_dhdr_typeid],data_desc[dbg$l_dhdr_typeid]);
;  1479          1593  4                  data_desc[dbg$b_dhdr_fcode] = dbg$sta_typefcode(data_desc[dbg$l_dhdr_typeid]);
;  1480          1594  4                  IF .data_desc[dbg$b_dhdr_fcode] EQL rst$k_type_array THEN RETURN 0;
;  1481          1595  4                  bit_length = 0;
;  1482          1596  4                  bit_offset = 0;
;  1483          1597  4                  vms_desc[dsc$b_class]  = 0;
;  1484          1598  4                  vms_desc[dsc$b_dtype]  = 0;
;  1485          1599  4                  vms_desc[dsc$w_length] = 0;
;  1486          1600  4                  vms_desc[dsc$a_pointer] = .(.prm_desc[dbg$l_value_pointer]);
;  1487          1601  4                  dbg$fill_in_vms_desc(.data_desc[dbg$b_dhdr_fcode],
;  1488          1602  4                                       .data_desc[dbg$l_dhdr_typeid],
;  1489          1603  4                                       .prm_desc[dbg$l_dhdr_symid0],
;  1490          1604  4                                       vms_desc,bit_length,bit_offset);
;  1491          1605  3                  END;
;  1492          1606  2              END;
;  1493          1607  2          [OTHERWISE]:
;  1494          1608  2              SIGNAL(dbg$_illtype);
;  1495          1609  2          TES;
;  1496          1610  2
;  1497          1611  2      result_desc = dbg$make_val_desc(vms_desc,.target_type);
;  1498          1612  2
;  1499          1613  2      result_desc[dbg$b_dhdr_lang]   = .prm_desc[dbg$b_dhdr_lang];
;  1500          1614  2      result_desc[dbg$b_dhdr_kind]   = .prm_desc[dbg$b_dhdr_kind];
;  1501          1615  2      result_desc[dbg$b_dhdr_fcode]  = .prm_desc[dbg$b_dhdr_fcode];
;  1502          1616  2      result_desc[dbg$l_dhdr_typeid] = .prm_desc[dbg$l_dhdr_typeid];
;  1503          1617  2      result_desc[dbg$l_dhdr_symid0] = .prm_desc[dbg$l_dhdr_symid0];
;  1504          1618  2      result_desc[dbg$v_dhdr_override] = .prm_desc[dbg$v_dhdr_override];
;  1505          1619  2
;  1506          1620  2
;  1507          1621  2      !+
;  1508          1622  2      ! Special case in COBOL.  Treat the cobol record as text string.
;  1509          1623  2      !-
;  1510          1624  2      IF .result_desc[dbg$b_dhdr_fcode] EQL rst$k_type_record
;  1511          1625  2      THEN
;  1512          1626  3          BEGIN
;  1513          1627  3          LOCAL tmp_symid: REF rst$entry;
;  1514          1628  3
;  1515          1629  3          tmp_symid = .result_desc[dbg$l_dhdr_symid0];
;  1516          1630  3          WHILE .tmp_symid[rst$b_kind] NEQ rst$k_module DO
;  1517          1631  3              tmp_symid = .tmp_symid[rst$l_upscopeptr];
;  1518          1632  3          IF .tmp_symid[rst$b_language] EQL dbg$k_cobol
;  1519          1633  3          THEN
;  1520          1634  4              BEGIN
;  1521          1635  4              result_desc[dbg$b_dhdr_fcode] = rst$k_type_descr;
;  1522          1636  4              result_desc[dbg$b_value_class] = dsc$k_class_s;
;  1523          1637  4              result_desc[dbg$b_value_dtype] = dsc$k_dtype_t;
;  1524          1638  3              END;
```

```
;  1525     1639  2          END;
;  1526     1640  2
;  1527     1641  2      !+
;  1528     1642  2      ! Special case for subrange - if we are turning a subrange primary into
;  1529     1643  2      ! a value descriptor, then change the type to reflect the parent type.
;  1530     1644  2      ! This is because, in all operations, a subrange is treated the same
;  1531     1645  2      ! as its parent type. This thus simplifies the operator tables.
;  1532     1646  2      !-
;  1533     1647  2      IF .target_type EQL dbg$k_value_desc THEN
;  1534     1648  2        WHILE .result_desc[dbg$b_dhdr_fcode] EQL rst$k_type_subrng DO
;  1535     1649  3          BEGIN
;  1536     1650  3          LOCAL parent,fcode,typeid,bit_length,bit_offset,dummy;
;  1537     1651  3          dbg$sta_typ_subrng(.result_desc[dbg$l_dhdr_typeid],parent,dummy,dummy,bit_length);
;  1538     1652  3          bit_offset = 0;
;  1539     1653  3          dbg$sta_symtype(.parent,fcode,typeid);
;  1540     1654  3          result_desc[dbg$b_dhdr_fcode]  = .fcode;
;  1541     1655  3          result_desc[dbg$l_dhdr_typeid] = .typeid;
;  1542     1656  3          result_desc[dbg$b_value_class]  = 0;
;  1543     1657  3          result_desc[dbg$b_value_dtype]  = 0;
;  1544     1658  3          result_desc[dbg$w_value_length] = 0;
;  1545     1659  3          dbg$fill_in_vms_desc(.fcode,.typeid,.prm_desc[dbg$l_dhdr_symid0],
;  1546     1660  3                               result_desc[dbg$a_value_vmsdesc],bit_length,bit_offset);
;  1547     1661  3          END;
;  1548     1662  2
;  1549     1663  2      .val_desc = .result_desc;
;  1550     1664  2      RETURN sts$k_success;
;  1551     1665  2
;  1552     1666  1      END;                                    ! End of dbg$prim_to_val


                                    01FC 00000          .ENTRY  DBG$PRIM_TO_VAL, Save R2,R3,R4,R5,R6,R7,R8 ; 1461
                58 00000000G   00    9E 00002          MOVAB   LIB$SIGNAL, R8
                5E         B8  AE    9E 00009          MOVAB   -72(SP), SP
                56         04  AC    D0 0000D          MOVL    PRM_DESC, R6                                ; 1543
00000000G       00             56    D0 00011          MOVL    R6, DBG$GL_CURRENT_PRIMARY
                57         04  A6    9E 00018          MOVAB   4(R6), R7                                   ; 1547
                07         03  A7    91 0001C          CMPB    3(R7), #7
                                29    12 00020          BNEQ    2$
                           0C  A6    D5 00022          TSTL    12(R6)                                      ; 1552
                                1B    13 00025          BEQL    1$
                                5E    DD 00027          PUSHL   SP                                          ; 1555
                           0C  A6    DD 00029          PUSHL   12(R6)
00000000G       00                  02    FB 0002C          CALLS   #2, DBG$STA_SYMNAME
                                6E    DD 00033          PUSHL   NAME                                        ; 1556
                                01    DD 00035          PUSHL   #1
                    00028168    8F    DD 00037          PUSHL   #164200
                68                  03    FB 0003D          CALLS   #3, LIB$SIGNAL
                                09    11 00040          BRB     2$                                          ; 1552
                    000287F8    8F    DD 00042 1$:      PUSHL   #165880                                     ; 1559
                68                  01    FB 00048          CALLS   #1, LIB$SIGNAL
                           0C  A6    D5 0004B 2$:      TSTL    12(R6)                                      ; 1565
                                0A    13 0004E          BEQL    3$
                           0C  A6    DD 00050          PUSHL   12(R6)
00000000G       00                  01    FB 00053          CALLS   #1, DBG$STA_SETCONTEXT
```

```
                                                    56  DD 0005A 3$:    PUSHL   R6                                      ; 1566
                                00000000G   00          01  FB 0005C        CALLS   #1, DBG$COLLECT
                                      79    8F      02    A6  91 00063        CMPB    2(R6), #121                             ; 1570
                                                    11    12 00068        BNEQ    4$
                                                    38    AE  9F 0006A        PUSHAB  VMS_DESC                                ; 1571
                                                    56    DD 0006D        PUSHL   R6
                                    F9BC    CF              02  FB 0006F        CALLS   #2, DBG$MAKE_VMS_DESC
                                            11              50  E8 00074        BLBS    R0, 5$
                                            50              02  D0 00077        MOVL    #2, R0
                                                            04  0007A        RET
                                      83    8F      02    A6  91 0007B 4$:    CMPB    2(R6), #131                             ; 1572
                                                    08    12 00080        BNEQ    6$
                            38  AE        14    A6          0C  28 00082        MOVC3   #12, 20(R6), VMS_DESC                   ; 1573
                                                    7A    11 00088 5$:    BRB     9$
                                      7A    8F      02    A6  91 0008A 6$:    CMPB    2(R6), #122                             ; 1574
                                                    6A    12 0008F        BNEQ    8$
                        24          00              6E          00  2C 00091        MOVC5   #0, (SP), #0, #36, DATA_DESC            ; 1576
                                                        24  AE      00096
                                      26    AE      02    A6  B0 00098        MOVW    2(R6), DATA_DESC+2                      ; 1578
                                      30    AE      0C    A6  D0 0009D        MOVL    12(R6), DATA_DESC+12                    ; 1579
                                      24    AE              20  B0 000A2        MOVW    #32, DATA_DESC                          ; 1580
                                      2A    AE    0603    8F  B0 000A6        MOVW    #1539, DATA_DESC+6                      ; 1582
                                            06      02    A7  91 000AC        CMPB    2(R7), #6                               ; 1588
                                                    52    12 000B0        BNEQ    9$
                                                    2C    AE  9F 000B2        PUSHAB  DATA_DESC+8                             ; 1592
                                                    08    A6  DD 000B5        PUSHL   8(R6)
                                00000000G   00          02  FB 000B8        CALLS   #2, DBG$STA_TYP_TYPEDPTR
                                                    2C    AE  9F 000BF        PUSHAB  DATA_DESC+8                             ; 1593
                                00000000G   00          01  FB 000C2        CALLS   #1, DBG$STA_TYPEFCODE
                                      2A    AE              50  90 000C9        MOVB    R0, DATA_DESC+6
                                            01      2A    AE  91 000CD        CMPB    DATA_DESC+6, #1                         ; 1594
                                                    03    12 000D1        BNEQ    7$
                                                00E6    31 000D3        BRW     15$
                                                04    AE  7C 000D6 7$:    CLRQ    BIT_OFFSET                              ; 1596
                                                38    AE  D4 000D9        CLRL    VMS_DESC                                ; 1599
                                      3C    AE      18    B6  D0 000DC        MOVL    @24(R6), VMS_DESC+4                     ; 1600
                                                04    AE  9F 000E1        PUSHAB  BIT_OFFSET                              ; 1601
                                                0C    AE  9F 000E4        PUSHAB  BIT_LENGTH
                                                40    AE  9F 000E7        PUSHAB  VMS_DESC
                                                0C    A6  DD 000EA        PUSHL   12(R6)                                  ; 1603
                                                3C    AE  DD 000ED        PUSHL   DATA_DESC+8                             ; 1602
                                            7E      3E    AE  9A 000F0        MOVZBL  DATA_DESC+6, -(SP)                      ; 1601
                                    F6E0    CF              06  FB 000F4        CALLS   #6, DBG$FILL_IN_VMS_DESC
                                                            09  11 000F9        BRB     9$                                      ; 1568
                                                000287D8    8F  DD 000FB 8$:    PUSHL   #165848                                 ; 1608
                                            68              01  FB 00101        CALLS   #1, LIB$SIGNAL
                                                    08    AC  DD 00104 9$:    PUSHL   TARGET_TYPE                             ; 1611
                                                    3C    AE  9F 00107        PUSHAB  VMS_DESC
                                    F51E    CF              02  FB 0010A        CALLS   #2, DBG$MAKE_VAL_DESC
                                            52              50  D0 0010F        MOVL    R0, RESULT_DESC
                                      03    A2      03    A6  90 00112        MOVB    3(R6), 3(RESULT_DESC)                   ; 1613
                                            53      04    A2  9E 00117        MOVAB   4(RESULT_DESC), R3                      ; 1614
                                      02    A3      02    A7  B0 0011B        MOVW    2(R7), 2(R3)                            ; 1615
                                      08    A2      08    A6  7D 00120        MOVQ    8(R6), 8(RESULT_DESC)                   ; 1616
                50          67                      01          07  EF 00125        EXTZV   #7, #1, (R7), R0                        ; 1618
                63          01                      07          50  F0 0012A        INSV    R0, #7, #1, (R3)
                                                    07    02    A3  91 0012F        CMPB    2(R3), #7                               ; 1624
```

```
                          20  12 00133          BNEQ    12$                                                     ;
                    50    0C  A2  D0 00135          MOVL    12(RESULT_DESC), TMP_SYMID                              ; 1629
                    01    14  A0  91 00139 10$:     CMPB    20(TMP_SYMID), #1                                       ; 1630
                          06  13 0013D          BEQL    11$                                                     ;
                    50    10  A0  D0 0013F          MOVL    16(TMP_SYMID), TMP_SYMID                                ; 1631
                          F4  11 00143          BRB     10$                                                     ;
                    03    29  A0  91 00145 11$:     CMPB    41(TMP_SYMID), #3                                       ; 1632
                          0A  12 00149          BNEQ    12$                                                     ;
                02  A3        03  90 0014B          MOVB    #3, 2(R3)                                               ; 1635
                16  A2  010E  8F  B0 0014F          MOVW    #270, 22(RESULT_DESC)                                   ; 1637
          0000007A  8F  08    AC  D1 00155 12$:     CMPL    TARGET_TYPE, #122                                       ; 1647
                          55  12 0015D          BNEQ    14$                                                     ;
                    09    02  A3  91 0015F 13$:     CMPB    2(R3), #9                                               ; 1648
                          4F  12 00163          BNEQ    14$                                                     ;
                          20  AE  9F 00165          PUSHAB  BIT_LENGTH                                              ; 1651
                          10  AE  9F 00168          PUSHAB  DUMMY                                                   ;
                          14  AE  9F 0016B          PUSHAB  DUMMY                                                   ;
                          1C  AE  9F 0016E          PUSHAB  PARENT                                                  ;
                          08  A2  DD 00171          PUSHL   8(RESULT_DESC)                                          ;
          00000000G       00      FB 00174          CALLS   #5, DBG$STA_TYP_SUBRNG                                  ;
                          1C  AE  D4 0017B          CLRL    BIT_OFFSET                                              ; 1652
                          14  AE  9F 0017E          PUSHAB  TYPEID                                                  ; 1653
                          1C  AE  9F 00181          PUSHAB  FCODE                                                   ;
                          18  AE  DD 00184          PUSHL   PARENT                                                  ;
          00000000G       00      FB 00187          CALLS   #3, DBG$STA_SYMTYPE                                     ;
                02  A3        18  AE  90 0018E          MOVB    FCODE, 2(R3)                                            ; 1654
                08  A2        14  AE  D0 00193          MOVL    TYPEID, 8(RESULT_DESC)                                  ; 1655
                          14  A2  D4 00198          CLRL    20(RESULT_DESC)                                         ; 1658
                          1C  AE  9F 0019B          PUSHAB  BIT_OFFSET                                              ; 1660
                          24  AE  9F 0019E          PUSHAB  BIT_LENGTH                                              ;
                          14  A2  9F 001A1          PUSHAB  20(RESULT_DESC)                                         ;
                          0C  A6  DD 001A4          PUSHL   12(R6)                                                  ;
                          24  AE  DD 001A7          PUSHL   TYPEID                                                  ;
                          2C  AE  DD 001AA          PUSHL   FCODE                                                   ;
              F627        CF      06  FB 001AD          CALLS   #6, DBG$FILL_IN_VMS_DESC                                ;
                          AB  11 001B2          BRB     13$                                                     ; 1648
                0C    BC        52  D0 001B4 14$:     MOVL    RESULT_DESC, @VAL_DESC                                  ; 1663
                      50        01  D0 001B8          MOVL    #1, R0                                                  ; 1664
                                    04 001BB          RET                                                             ;
                                50  D4 001BC 15$:     CLRL    R0                                                      ; 1666
                                    04 001BE          RET                                                             ;

; Routine Size:  447 bytes,    Routine Base:  DBG$CODE + 0B16
```

```
; 1554     1667  1 GLOBAL ROUTINE DBG$PRINT_AGGREGATE(prm_desc,radix) : NOVALUE =
; 1555     1668  2     BEGIN
; 1556     1669  2     MAP prm_desc        : REF dbg$primary;
; 1557     1670  2     BUILTIN REMQUE;
; 1558     1671  2     LOCAL
; 1559     1672  2         subnode         : REF dbg$prim_node,
; 1560     1673  2         val_desc        : REF dbg$valdesc,
; 1561     1674  2         symid,kind,fcode,typeid,dummy,mark_one,mark_two;
; 1562     1675  2
; 1563     1676  2     dbg$gl_current_primary = .prm_desc;                                    ! A003
; 1564     1677  2
; 1565     1678  2     dbg$newline();
; 1566     1679  2     dbg$print_control(dbg$k_prtset_rlmargin,+4);        ! Indent by +4
; 1567     1680  2     subnode = .prm_desc[dbg$l_prim_blink];
; 1568     1681  2     subnode[dbg$v_pnode_eval] = true;
; 1569     1682  2     SELECTONE .subnode[dbg$b_pnode_fcode] OF
; 1570     1683  2         SET
; 1571     1684  2         [rst$k_type_array]:
; 1572     1685  3             BEGIN
; 1573     1686  3             LABEL cell;
; 1574     1687  3             LOCAL s_vector      : REF dbg$prim_node_subs;
; 1575     1688  3
; 1576     1689  3             s_vector = subnode[dbg$a_pnarr_svector];
; 1577     1690  3
; 1578     1691  3             ! Check for the array being empty (i.e., if any of the
; 1579     1692  3             ! dimensions has zero or negative length). If this is the
; 1580     1693  3             ! case, indicate that this is an empty array,
; 1581     1694  3             ! and then clean up and return.
; 1582     1695  3             !
; 1583     1696  3             INCR i FROM 0 to .subnode[dbg$b_pnarr_dimcnt]-1 DO
; 1584     1697  4                 BEGIN
; 1585     1698  4                 IF .s_vector[.i,dbg$l_pnsub_lbound] GTR
; 1586     1699  4                    .s_vector[.i,dbg$l_pnsub_ubound]
; 1587     1700  4                 THEN
; 1588     1701  5                     BEGIN
; 1589     1702  5                     dbg$print(UPLIT (%ASCIC '[empty array]'));
; 1590     1703  5                     dbg$newline();
; 1591     1704  5                     subnode[dbg$v_pnode_eval] = false;
; 1592     1705  5                     dbg$print_control(dbg$k_prtset_rlmargin,-4);
; 1593     1706  5                     RETURN;
; 1594     1707  4                     END;
; 1595     1708  3                 END;
; 1596     1709  3
; 1597     1710  3             mark_one = dbg$push_tempmem();
; 1598     1711  3             dbg$sta_symtype(.subnode[dbg$l_pnarr_celltype],fcode,typeid);
; 1599     1712  3             dbg$build_primary_subnode(.prm_desc,rst$k_data,0,,fcode,,typeid,0);
; 1600     1713  3             dbg$collect(.prm_desc);
; 1601     1714  3             WHILE NOT .dbg$gv_control[dbg$v_control_stop] DO
; 1602     1715  4 cell:            BEGIN
; 1603     1716  4                 mark_two = dbg$push_tempmem();
; 1604     1717  4                 dbg$print_identifier(.prm_desc,0);
; 1605     1718  4                 IF .prm_desc[dbg$v_dhdr_aggr]
; 1606     1719  4                   THEN dbg$print_aggregate(.prm_desc,,radix)
; 1607     1720  4                   ELSE
; 1608     1721  5                     BEGIN
; 1609     1722  5                     dbg$print(UPLIT BYTE(%ASCIC ':AD!_'),1,UPLIT BYTE(':'));
; 1610     1723  5
```

```
;  1611          1724  5                ! If you examine a label array in PLI then you see the
;  1612          1725  5                ! instructions at the labels. Instructions must always
;  1613          1726  5                ! be represented as volatile value descriptors (since
;  1614          1727  5                ! if you copy the bits, then the operands may change).
;  1615          1728  5                !
;  1616          1729  5                IF .fcode EQL rst$k_type_self_rel_lab
;  1617          1730  5                THEN
;  1618          1731  5                    dbg$prim_to_val(.prm_desc,dbg$k_v_value_desc,val_desc)
;  1619          1732  5                ELSE
;  1620          1733  5                    dbg$prim_to_val(.prm_desc,dbg$k_value_desc,val_desc);
;  1621          1734  5                dbg$print_value(.val_desc,.radix, .dbg$gl_sign_flag);
;  1622          1735  5                dbg$newline();
;  1623          1736  4                END;
;  1624          1737  4            dbg$pop_tempmem(.mark_two);
;  1625          1738  4            INCR dimension FROM 1 TO .subnode[dbg$b_pnarr_dimcnt] DO
;  1626          1739  5                BEGIN
;  1627          1740  5                LOCAL s,typeid: REF rst$entry;
;  1628          1741  6                s = (IF .subnode[dbg$v_pnarr_column]
;  1629          1742  6                    THEN .dimension - 1
;  1630          1743  5                    ELSE .subnode[dbg$b_pnarr_dimcnt] - .dimension);
;  1631          1744  5
;  1632          1745  5                typeid  = .s_vector[.s,dbg$l_pnsub_typeid];
;  1633          1746  6                IF  .s_vector[.s,dbg$l_pnsub_svalue] GEQ (
;  1634          1747  6                    IF (.dbg$gb_language EQL dbg$k_ada) AND
;  1635          1748  7                       (.typeid NEQ 0)
;  1636          1749  6                    THEN
;  1637          1750  7                        IF (.typeid[rst$b_fcode] EQL rst$k_type_enum)
;  1638          1751  6                        THEN
;  1639          1752  6                            dbg$enum_val(.typeid, .s_vector[.s,dbg$l_pnsub_ubound])
;  1640          1753  6                        ELSE
;  1641          1754  6                            .s_vector[.s,dbg$l_pnsub_ubound]
;  1642          1755  6                    ELSE
;  1643          1756  6                        .s_vector[.s,dbg$l_pnsub_ubound])
;  1644          1757  5                THEN
;  1645          1758  6                    BEGIN
;  1646          1759  6
;  1647          1760  6                    ! For arrays indexed by enumeration types in ADA, the lower bound field gives
;  1648          1761  6                    ! the position, which we need to translate into a value.
;  1649          1762  6                    !
;  1650          1763  6                    typeid  = .s_vector[.s,dbg$l_pnsub_typeid];
;  1651          1764  6                    IF (.dbg$gb_language EQL dbg$k_ada) AND
;  1652          1765  7                       (.typeid NEQ 0)
;  1653          1766  6                    THEN
;  1654          1767  7                        IF (.typeid[rst$b_fcode] EQL rst$k_type_enum)
;  1655          1768  6                        THEN
;  1656          1769  6                            s_vector[.s,dbg$l_pnsub_svalue] = dbg$enum_val(.typeid, .s_vector[.s,dbg$l_p
;  1657          1770  6                        ELSE
;  1658          1771  6                            s_vector[.s,dbg$l_pnsub_svalue]  =  .s_vector[.s,dbg$l_pnsub_lbound]
;  1659          1772  6                    ELSE
;  1660          1773  6                        s_vector[.s,dbg$l_pnsub_svalue]  =  .s_vector[.s,dbg$l_pnsub_lbound];
;  1661          1774  6                    END
;  1662          1775  5                ELSE
;  1663          1776  6                    BEGIN
;  1664          1777  6                    LOCAL
;  1665          1778  6                        s_value;
;  1666          1779  6
;  1667          1780  6                    ! For arrays indexed by enumeration types in ADA, we need to use ENUM_SUCC to get
```

```
;  1668          1781  6                    ! the successor subscript. In all other cases, we can just add one.
;  1669          1782  6                    !
;  1670          1783  6                    s_value = .s_vector[.s,dbg$l_pnsub_svalue];
;  1671          1784  6                    typeid  = .s_vector[.s,dbg$l_pnsub_typeid];
;  1672          1785  6                    IF (.dbg$gb_language EQL dbg$k_ada) AND
;  1673          1786  7                       (.typeid NEQ 0)
;  1674          1787  6                    THEN
;  1675          1788  7                        IF (.typeid[rst$b_fcode] EQL rst$k_type_enum)
;  1676          1789  6                        THEN
;  1677          1790  6                            s_vector[.s,dbg$l_pnsub_svalue] = dbg$enum_succ(.typeid, .s_value)
;  1678          1791  6                        ELSE
;  1679          1792  6                            s_vector[.s,dbg$l_pnsub_svalue]  =  .s_vector[.s,dbg$l_pnsub_svalue] + 1
;  1680          1793  6                    ELSE
;  1681          1794  6                        s_vector[.s,dbg$l_pnsub_svalue]  =  .s_vector[.s,dbg$l_pnsub_svalue] + 1;
;  1682          1795  6                    LEAVE cell;
;  1683          1796  5                    END;
;  1684          1797  4                END;
;  1685          1798  4            EXITLOOP;
;  1686          1799  3            END;                        ! End of block 'cell'
;  1687          1800  3        REMQUE(.prm_desc[dbg$l_prim_blink],dummy);
;  1688          1801  3        dbg$pop_tempmem(.mark_one);
;  1689          1802  2        END;
```

```
; 1691        1803  2          [rst$k_type_record,rst$k_type_variant]:
; 1692        1804  3              BEGIN
; 1693        1805  3              LOCAL n_comps,s_vector : REF VECTOR [,LONG];
; 1694        1806  3              IF .subnode[dbg$b_pnode_fcode] EQL rst$k_type_record
; 1695        1807  3                THEN
; 1696        1808  3                  dbg$sta_typ_record(.subnode[dbg$l_pnode_typeid],n_comps,s_vector,dummy)
; 1697        1809  3                ELSE
; 1698        1810  4                  BEGIN
; 1699        1811  4                  n_comps  = .subnode[dbg$w_pnvar_ncomps];
; 1700        1812  4                  s_vector = .subnode[dbg$l_pnvar_complst];
; 1701        1813  3                  END;
; 1702        1814  3              INCR component FROM 0 TO .n_comps-1 DO
; 1703        1815  3                IF (symid = .s_vector[.component]) NEQ 0 THEN
; 1704        1816  4                  BEGIN
; 1705        1817  4                  IF .dbg$gv_control[dbg$v_control_stop] THEN EXITLOOP;
; 1706        1818  4                  IF .prm_desc[dbg$v_dhdr_tmpref] THEN
; 1707        1819  5                      BEGIN
; 1708        1820  5                      prm_desc[dbg$v_dhdr_tmpref] = false;
; 1709        1821  5                      prm_desc[dbg$v_dhdr_subref] = false;
; 1710        1822  5                      prm_desc[dbg$w_prim_offset] = 0;
; 1711        1823  5                      prm_desc[dbg$w_prim_length] = 0;
; 1712        1824  4                      END;
; 1713        1825  4                  mark_one = dbg$push_tempmem();
; 1714        1826  4                  dbg$sta_symkind(.symid,kind);
; 1715        1827  4                  IF .kind EQL rst$k_variant
; 1716        1828  4                    THEN
; 1717        1829  5                      BEGIN
; 1718        1830  5                      LOCAL
; 1719        1831  5                          tagid,tag_val,
; 1720        1832  5                          tag_name        : REF VECTOR[,BYTE],
; 1721        1833  5                          variant         : REF rst$var_entry;
; 1722        1834  5                      MAP symid           : REF rst$entry;
; 1723        1835  5
; 1724        1836  5                      variant = 0;
; 1725        1837  5                      IF (tagid = .symid[rst$l_vartagptr]) NEQ 0 THEN
; 1726        1838  6                          BEGIN
; 1727        1839  6                          dbg$sta_symname(.tagid,tag_name);
; 1728        1840  6                          IF .tag_name[0] NEQ 0 THEN
; 1729        1841  7                              BEGIN
; 1730        1842  7                              dbg$sta_symtype(.tagid,fcode,typeid);
; 1731        1843  7                              dbg$build_primary_subnode(.prm_desc,rst$k_data,.tagid,.fcode,.typeid,0);
; 1732        1844  7                              dbg$prim_to_val(.prm_desc,dbg$k_value_desc,val_desc);
; 1733        1845  7                              tag_val = .val_desc[dbg$l_value_value0];
; 1734        1846  7                              variant = dbg$sta_variant_select(.tag_val,.symid);
; 1735        1847  7                              REMQUE(.prm_desc[dbg$l_prim_blink],dummy);
; 1736        1848  6                              END;                                                                                    2
; 1737        1849  5                          END;                                                                                        4
; 1738        1850  5                      IF .variant EQL 0
; 1739        1851  5                        THEN
; 1740        1852  6                          BEGIN                                                                                       2
; 1741        1853  6                          dbg$print(UPLIT(%ASCIC '!AD'),52,UPLIT BYTE('[Variant Record omitted - null or illeg
; 1742        1854  6                          dbg$newline();
; 1743        1855  6                          END
; 1744        1856  5                        ELSE
; 1745        1857  6                          BEGIN                                                                                       3
; 1746        1858  6                          dbg$build_primary_subnode(.prm_desc,rst$k_variant,0,rst$k_type_variant,0,0);                3
; 1747        1859  6                          subnode = .prm_desc[dbg$l_prim_blink];
```

```
; 1748          1860  6                   subnode[dbg$l_pnvar_tagid]   = .tagid;
; 1749          1861  6                   subnode[dbg$w_pnvar_index]   = i;
; 1750          1862  6                   subnode[dbg$v_pnvar_valid]   = true;
; 1751          1863  6                   subnode[dbg$w_pnvar_ncomps]  = .variant[rst$l_var_compcnt];
; 1752          1864  6                   subnode[dbg$l_pnvar_complst] =  variant[rst$a_var_complst];
; 1753          1865  6                   subnode[dbg$l_pnvar_dstptr]  = .variant[rst$l_var_dstptr];
; 1754          1866  6                   dbg$print(UPLIT(%ASCIC '!AD'),30,UPLIT BYTE('Variant Record with Tag Value '));
; 1755          1867  6                   dbg$print_value(.val_desc,.radix, .dbg$gl_sign_flag);
; 1756          1868  6                   dbg$print_aggregate(.prm_desc,.radix);
; 1757          1869  6                   REMQUE(.prm_desc[dbg$l_prim_blink],dummy);
; 1758          1870  5                   END;
; 1759          1871  5               END
; 1760          1872  4           ELSE
; 1761          1873  5               BEGIN
; 1762          1874  5               dbg$sta_symtype(.symid,fcode,typeid);
; 1763          1875  5               dbg$build_primary_subnode(.prm_desc,.kind,.symid,.fcode,.typeid,0);
; 1764          1876  5               dbg$collect(.prm_desc);
; 1765          1877  5               IF .prm_desc[dbg$v_dhdr_aggr]
; 1766          1878  5                 THEN
; 1767          1879  6                   BEGIN
; 1768          1880  6                   dbg$print_identifier(.prm_desc,0);
; 1769          1881  6                   dbg$print_aggregate(.prm_desc,.radix);
; 1770          1882  6                   END
; 1771          1883  5                 ELSE
; 1772          1884  6                   BEGIN
; 1773          1885  6                   LOCAL name : REF VECTOR[,BYTE];
; 1774          1886  6                   dbg$sta_symname(.symid,name);
; 1775          1887  6                   IF .name[0] NEQ 0 THEN
; 1776          1888  7                       BEGIN
; 1777          1889  7                       dbg$print_identifier(.prm_desc,0);
; 1778          1890  7                       dbg$print(UPLIT BYTE(%ASCIC '!AD!_'),1,UPLIT BYTE(':'));
; 1779          1891  7                       dbg$prim_to_val(.prm_desc,dbg$k_value_desc,val_desc);
; 1780          1892  7                       dbg$print_value(.val_desc,.radix, .dbg$gl_sign_flag);
; 1781          1893  7                       dbg$newline();
; 1782          1894  6                       END;
; 1783          1895  5                   END;
; 1784          1896  5                REMQUE(.prm_desc[dbg$l_prim_blink],dummy);
; 1785          1897  4                END;
; 1786          1898  4            dbg$pop_tempmem(.mark_one);
; 1787          1899  3            END;
; 1788          1900  2        END;
; 1789          1901  2
; 1790          1902  2        [OTHERWISE]:
; 1791          1903  2            SIGNAL(dbg$_illtype);
; 1792          1904  2
; 1793          1905  2        TES;
; 1794          1906  2
; 1795          1907  2    subnode[dbg$v_pnode_eval]   = false;
; 1796          1908  2    prm_desc[dbg$v_dhdr_aggr]   = true;
; 1797          1909  2    prm_desc[dbg$b_dhdr_kind]   = .subnode[dbg$b_pnode_kind];
; 1798          1910  2    prm_desc[dbg$b_dhdr_fcode]  = .subnode[dbg$b_pnode_fcode];
; 1799          1911  2    prm_desc[dbg$l_dhdr_typeid] = .subnode[dbg$l_pnode_typeid];
; 1800          1912  2    dbg$print_control(dbg$k_prtset_rlmargin,-4);        ! Reset indentation
; 1801          1913  1    END;                                    ! End of dbg$print_aggregate
```

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

00 5D 79 61 72 72 61 20 79 74 70 6D 65 5B 0D 00008 P.AAC:  .ASCII  <13>\[empty array]\<0><0>                ;
                                                  00 00017                                                ;
                                        5F 21 44 41 21 05 00018 P.AAD:  .ASCII  <5>\!AD!_\                ;
                                                  3A 0001E P.AAE:  .ASCII  \:\                            ;
                                                     0001F         .BLKB   1                              ;
                                           44 41 21 03 00020 P.AAF:  .ASCII  <3>\!AD\                      ;
64 72 6F 63 65 52 20 74 6E 61 69 72 61 56 5B 00024 P.AAG:  .ASCII  \[Variant Record omitted - null or illega\ ;
6C 6C 75 6E 20 2D 20 64 65 74 74 69 6D 6F 20 00033                                                        ;
                 61 67 65 6C 6C 69 20 72 6F 20 00042                                                      ;
              5D 65 75 6C 61 56 20 67 61 54 20 6C 0004C         .ASCII  \l Tag Value]\                    ;
                                           44 41 21 03 00058 P.AAH:  .ASCII  <3>\!AD\                      ;
20 64 72 6F 63 65 52 20 74 6E 61 69 72 61 56 0005C P.AAI:  .ASCII  \Variant Record with Tag Value \        ;
20 65 75 6C 61 56 20 67 61 54 20 68 74 69 77 0006B                                                        ;
                                        5F 21 44 41 21 05 0007A P.AAJ:  .ASCII  <5>\!AD!_\                ;
                                                  3A 00080 P.AAK:  .ASCII  \:\                            ;


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

                                                     0FFC 00000         .ENTRY  DBG$PRINT_AGGREGATE, Save R2,R3,R4,R5,R6,- ; 1667
                                                                                R7,R8,R9,R10,R11                          ;
                                              5E          28  C2 00002         SUBL2   #40, SP                           ;
                                              58       04 AC  D0 00005         MOVL    PRM_DESC, R8                      ; 1676
                                00000000G     00          58  D0 00009         MOVL    R8, DBG$GL_CURRENT_PRIMARY        ;
                                00000000G     00          00  FB 00010         CALLS   #0, DBG$NEWLINE                   ; 1678
                                                          04  DD 00017         PUSHL   #4                                ; 1679
                                                          02  DD 00019         PUSHL   #2                                ;
                                00000000G     00          02  FB 0001B         CALLS   #2, DBG$PRINT_CONTROL             ;
                                              52    18    A8  D0 00022         MOVL    24(R8), SUBNODE                   ; 1680
                                     0A       A2          01  88 00026         BISB2   #1, 10(SUBNODE)                   ; 1681
                                              50    09    A2  9A 0002A         MOVZBL  9(SUBNODE), R0                    ; 1682
                                              01          50  91 0002E         CMPB    R0, #1                            ; 1684
                                                          03  13 00031         BEQL    1$                                ;
                                                       01C2  31 00033         BRW     23$                               ;
                                              53    28    A2  9E 00036 1$:     MOVAB   40(R2), S_VECTOR                  ; 1689
                                              55    1B    A2  9A 0003A         MOVZBL  27(SUBNODE), R5                   ; 1696
                                              54          01  CE 0003E         MNEGL   #1, I                             ; 1698
                                                          2C  11 00041         BRB     3$                                ;
50                                            54          14  C5 00043 2$:     MULL3   #20, I, R0                        ;
                                                    0C A043  9F 00047         PUSHAB  12(R0)[S_VECTOR]                  ; 1699
                                                    08 A043  9F 0004B         PUSHAB  8(R0)[S_VECTOR]                   ;
                                              9E          9E  D1 0004F         CMPL    @(SP)+, @(SP)+                    ;
                                                          1B  15 00052         BLEQ    3$                                ;
                                           00000000'      EF  9F 00054         PUSHAB  P.AAC                             ; 1702
                                00000000G     00          01  FB 0005A         CALLS   #1, DBG$PRINT                     ;
                                00000000G     00          00  FB 00061         CALLS   #0, DBG$NEWLINE                   ; 1703
                                     0A       A2          01  8A 00068         BICB2   #1, 10(SUBNODE)                   ; 1704
                                                       03C5  31 0006C         BRW     42$                               ; 1705
D0                                            54          55  F2 0006F 3$:     AOBLSS  R5, I, 2$                         ; 1696
                                00000000G     00          00  FB 00073         CALLS   #0, DBG$PUSH_TEMPMEM              ; 1710
                                              6E          50  D0 0007A         MOVL    R0, MARK_ONE                      ;
                                                    18    AE  9F 0007D         PUSHAB  TYPEID                            ; 1711
                                                    20    AE  9F 00080         PUSHAB  FCODE                             ;
                                                    24    A2  DD 00083         PUSHL   36(SUBNODE)                       ;
```

```
                00000000G  00              03  FB 00086          CALLS   #3, DBG$STA_SYMTYPE
                                            7E  D4 0008D          CLRL    -(SP)                                   ; 1712
                                      1C    AE  DD 0008F          PUSHL   TYPEID
                                      24    AE  DD 00092          PUSHL   FCODE
                                7E          06  7D 00095          MOVQ    #6, -(SP)
                                            58  DD 00098          PUSHL   R8
                00000000G  00               06  FB 0009A          CALLS   #6, DBG$BUILD_PRIMARY_SUBNODE
                                            58  DD 000A1          PUSHL   R8                                      ; 1713
                00000000G  00               01  FB 000A3          CALLS   #1, DBG$COLLECT
             03 00000000G  00               01  E1 000AA 4$:      BBC     #1, DBG$GV_CONTROL+1, 5$                ; 1714
                                          0132  31 000B2          BRW     21$
                00000000G  00               00  FB 000B5 5$:      CALLS   #0, DBG$PUSH_TEMPMEM                    ; 1716
                                5B          50  D0 000BC          MOVL    R0, MARK_TWO
                                            7E  D4 000BF          CLRL    -(SP)                                   ; 1717
                                            58  DD 000C1          PUSHL   R8
                00000000G  00               02  FB 000C3          CALLS   #2, DBG$PRINT_IDENTIFIER
                                0C    04    A8  E9 000CA          BLBC    4(R8), 6$                               ; 1718
                                      08    AC  DD 000CE          PUSHL   RADIX                                   ; 1719
                                            58  DD 000D1          PUSHL   R8
                    FF28        CF          02  FB 000D3          CALLS   #2, DBG$PRINT_AGGREGATE
                                            4A  11 000D8          BRB     9$
                                00000000'   EF  9F 000DA 6$:      PUSHAB  P.AAE                                   ; 1722
                                            01  DD 000E0          PUSHL   #1
                                00000000'   EF  9F 000E2          PUSHAB  P.AAD
                00000000G  00               03  FB 000E8          CALLS   #3, DBG$PRINT
                                15    1C    AE  D1 000EF          CMPL    FCODE, #21                              ; 1729
                                            09  12 000F3          BNEQ    7$
                                      24    AE  9F 000F5          PUSHAB  VAL_DESC                                ; 1731
                                7E    83    8F  9A 000F8          MOVZBL  #13T, -(SP)
                                            07  11 000FC          BRB     8$
                                      24    AE  9F 000FE 7$:      PUSHAB  VAL_DESC                                ; 1733
                                7E    7A    8F  9A 00101          MOVZBL  #122, -(SP)
                                            58  DD 00105 8$:      PUSHL   R8
                    FD35        CF          03  FB 00107          CALLS   #3, DBG$PRIM_TO_VAL
                                00000000G   00  DD 0010C          PUSHL   DBG$GL_SIGN_FLAG                        ; 1734
                                      08    AC  DD 00112          PUSHL   RADIX
                                      2C    AE  DD 00115          PUSHL   VAL_DESC
                        0000V   CF          03  FB 00118          CALLS   #3, DBG$PRINT_VALUE
                00000000G  00               00  FB 0011D          CALLS   #0, DBG$NEWLINE                         ; 1735
                                            5B  DD 00124 9$:      PUSHL   MARK_TWO                                ; 1737
                00000000G  00               01  FB 00126          CALLS   #1, DBG$POP_TEMPMEM
                                5A    1B    A2  9A 0012D          MOVZBL  27(SUBNODE), R10                        ; 1738
                                            54  D4 00131          CLRL    DIMENSION
                                            7C  11 00133          BRB     16$
          06          0A        A2          01  E1 00135 10$:     BBC     #1, 10(SUBNODE), 11$                    ; 1741
                                50    FF    A4  9E 0013A          MOVAB   -1(R4), S                               ; 1742
                                            04  11 0013E          BRB     12$
          50                    5A          54  C3 00140 11$:     SUBL3   DIMENSION, R10, S                       ; 1743
          56                    50          14  C5 00144 12$:     MULL3   #20, S, R6                              ; 1745
                                      10 A643   9F  00148          PUSHAB  16(R6)[S_VECTOR]
                                59          9E  D0 0014C          MOVL    @(SP)+, R9
                                55          59  D0 0014F          MOVL    R9, TYPEID
          57                    53          56  C1 00152          ADDL3   R6, S_VECTOR, R7                        ; 1746
                                50    0C A643   9E  00156          MOVAB   12(R6)[S_VECTOR], R0                    ; 1752
                                09 00000000G    00  91 0015B      CMPB    DBG$GB_LANGUAGE, #9                     ; 1747
                                            17  12 00162          BNEQ    13$
                                            55  D5 00164          TSTL    TYPEID                                  ; 1748
```

```
                                         13  13 00166           BEQL    13$                              ;
                         04         18   A5  91 00168           CMPB    24(TYPEID), #4                   ; 1750
                                         0D  12 0016C           BNEQ    13$                              ;
                                         60  DD 0016E           PUSHL   (R0)                             ; 1752
                                         55  DD 00170           PUSHL   TYPEID                           ;
            00000000G    00              02  FB 00172           CALLS   #2, DBG$ENUM_VAL                 ;
                                         03  11 00179           BRB     14$                              ;
                         50              60  D0 0017B 13$:      MOVL    (R0), R0                         ; 1756
                         50              67  D1 0017E 14$:      CMPL    (R7), R0                         ; 1746
                                         30  19 00181           BLSS    17$                              ;
                         55              59  D0 00183           MOVL    R9, TYPEID                       ; 1763
                         50         08 A643  9E 00186           MOVAB   8(R6)[S_VECTOR], R0              ; 1769
                         09 00000000G    00  91 0018B           CMPB    DBG$GB_LANGUAGE, #9              ; 1764
                                         1A  12 00192           BNEQ    15$                              ;
                                         55  D5 00194           TSTL    TYPEID                           ; 1765
                                         16  13 00196           BEQL    15$                              ;
                         04         18   A5  91 00198           CMPB    24(TYPEID), #4                   ; 1767
                                         10  12 0019C           BNEQ    15$                              ;
                                         60  DD 0019E           PUSHL   (R0)                             ; 1769
                                         55  DD 001A0           PUSHL   TYPEID                           ;
            00000000G    00              02  FB 001A2           CALLS   #2, DBG$ENUM_VAL                 ;
                         67              50  D0 001A9           MOVL    R0, (R7)                         ;
                                         33  11 001AC           BRB     20$                              ;
                         67              60  D0 001AE 15$:      MOVL    (R0), (R7)                       ; 1773
                                         2E  11 001B1 16$:      BRB     20$                              ; 1746
                         50              67  D0 001B3 17$:      MOVL    (R7), S_VALUE                    ; 1783
                         55              59  D0 001B6           MOVL    R9, TYPEID                       ; 1784
                         09 00000000G    00  91 001B9           CMPB    DBG$GB_LANGUAGE, #9              ; 1785
                                         1A  12 001C0           BNEQ    18$                              ;
                                         55  D5 001C2           TSTL    TYPEID                           ; 1786
                                         16  13 001C4           BEQL    18$                              ;
                         04         18   A5  91 001C6           CMPB    24(TYPEID), #4                   ; 1788
                                         10  12 001CA           BNEQ    18$                              ;
                                         50  DD 001CC           PUSHL   S_VALUE                          ; 1790
                                         55  DD 001CE           PUSHL   TYPEID                           ;
            00000000G    00              02  FB 001D0           CALLS   #2, DBG$ENUM_SUCC                ;
                         67              50  D0 001D7           MOVL    R0, (R7)                         ;
                                         02  11 001DA           BRB     19$                              ;
                                         67  D6 001DC 18$:      INCL    (R7)                             ; 1794
                                       FEC9  31 001DE 19$:      BRW     4$                               ; 1795
   FF4E             54   01              5A  F1 001E1 20$:      ACBL    R10, #1, DIMENSION, 10$          ; 1738
                    04   AE         18   B8  0F 001E7 21$:      REMQUE  @24(R8), DUMMY                   ; 1800
                                         6E  DD 001EC           PUSHL   MARK_ONE                         ; 1801
            00000000G    00              01  FB 001EE           CALLS   #1, DBG$POP_TEMPMEM              ;
                                       0221  31 001F5 22$:      BRW     41$                              ; 1682
                         07              50  91 001F8 23$:      CMPB    R0, #7                           ; 1803
                                         08  13 001FB           BEQL    24$                              ;
                         13              50  91 001FD           CMPB    R0, #19                          ;
                                         03  13 00200           BEQL    24$                              ;
                                       0207  31 00202           BRW     40$                              ;
                         07              50  91 00205 24$:      CMPB    R0, #7                           ; 1806
                                         15  12 00208           BNEQ    25$                              ;
                                    04   AE  9F 0020A           PUSHAB  DUMMY                            ; 1808
                                    0C   AE  9F 0020D           PUSHAB  S_VECTOR                         ;
                                    14   AE  9F 00210           PUSHAB  N_COMPS                          ;
                                    0C   A2  DD 00213           PUSHL   12(SUBNODE)                      ;
            00000000G    00              04  FB 00216           CALLS   #4, DBG$STA_TYP_RECORD           ;
```

```
                                    0A  11 0021D         BRB     26$                                         :
              0C   AE       1A      A2  3C 0021F  25$:   MOVZWL  26(SUBNODE), N_COMPS                        : 1811
              08   AE       20      A2  D0 00224         MOVL    32(SUBNODE), S_VECTOR                       : 1812
                   53       0C      AE  D0 00229  26$:   MOVL    N_COMPS, R3                                 : 1814
                   54               01  CE 0022D         MNEGL   #1, COMPONENT                               :
                                  01D0  31 00230  27$:   BRW     38$                                         :
                   57          08 BE44  D0 00233  28$:   MOVL    @S_VECTOR[COMPONENT], SYMID                 : 1815
                                    F6  13 00238         BEQL    27$                                         :
       B3 00000000G 00              01  E0 0023A         BBS     #1, DBG$GV_CONTROL+1, 22$                   : 1817
                   55       04      AC  D0 00242         MOVL    PRM_DESC, R5                                : 1818
                   09       05      A5  E9 00246         BLBC    5(R5), 29$                                  :
              04   A5     0102      8F  AA 0024A         BICW2   #258, 4(R5)                                 : 1820
                            10      A5  D4 00250         CLRL    16(R5)                                      : 1822
        00000000G  00               00  FB 00253  29$:   CALLS   #0, DBG$PUSH_TEMPMEM                        : 1825
                   6E               50  D0 0025A         MOVL    R0, MARK_ONE                                :
                            10      AE  9F 0025D         PUSHAB  KIND                                        : 1826
                                    57  DD 00260         PUSHL   SYMID                                       :
        00000000G  00               02  FB 00262         CALLS   #2, DBG$STA_SYMKIND                         :
                   0B       10      AE  D1 00269         CMPL    KIND, #11                                   : 1827
                                    03  13 0026D         BEQL    30$                                         :
                                  00E3  31 0026F         BRW     33$                                         :
                                    5A  D4 00272  30$:   CLRL    VARIANT                                     : 1836
                   56       10      A7  D0 00274         MOVL    16(SYMID), TAGID                            : 1837
                                    5E  13 00278         BEQL    31$                                         :
                            14      AE  9F 0027A         PUSHAB  TAG_NAME                                    : 1839
                                    56  DD 0027D         PUSHL   TAGID                                       :
        00000000G  00               02  FB 0027F         CALLS   #2, DBG$STA_SYMNAME                         :
                            14      BE  95 00286         TSTB    @TAG_NAME                                   : 1840
                                    4D  13 00289         BEQL    31$                                         :
                            18      AE  9F 0028B         PUSHAB  TYPEID                                      : 1842
                            20      AE  9F 0028E         PUSHAB  FCODE                                       :
                                    56  DD 00291         PUSHL   TAGID                                       :
        00000000G  00               03  FB 00293         CALLS   #3, DBG$STA_SYMTYPE                         :
                                    7E  D4 0029A         CLRL    -(SP)                                       : 1843
                            1C      AE  DD 0029C         PUSHL   TYPEID                                      :
                            24      AE  DD 0029F         PUSHL   FCODE                                       :
                                    56  DD 002A2         PUSHL   TAGID                                       :
                                    06  DD 002A4         PUSHL   #6                                          :
                                    55  DD 002A6         PUSHL   R5                                          :
        00000000G  00               06  FB 002A8         CALLS   #6, DBG$BUILD_PRIMARY_SUBNODE               :
                            24      AE  9F 002AF         PUSHAB  VAL_DESC                                    : 1844
                   7E       7A      8F  9A 002B2         MOVZBL  #122, -(SP)                                 :
                                    55  DD 002B6         PUSHL   R5                                          :
            FB84   CF               03  FB 002B8         CALLS   #3, DBG$PRIM_TO_VAL                         :
                   50       24      AE  D0 002BD         MOVL    VAL_DESC, R0                                : 1845
                   50       20      A0  D0 002C1         MOVL    32(R0), TAG_VAL                             :
                          0081      8F  BB 002C5         PUSHR   #^M<R0,R7>                                  : 1846
        00000000G  00               02  FB 002C9         CALLS   #2, DBG$STA_VARIANT_SELECT                  :
                   5A               50  D0 002D0         MOVL    R0, VARIANT                                 :
              04   AE       18      B5  0F 002D3         REMQUE  @24(R5), DUMMY                              : 1847
                                    5A  D5 002D8  31$:   TSTL    VARIANT                                     : 1850
                                    1F  12 002DA         BNEQ    32$                                         :
                     00000000'      EF  9F 002DC         PUSHAB  P.AAG                                       : 1853
                                    34  DD 002E2         PUSHL   #52                                         :
                     00000000'      EF  9F 002E4         PUSHAB  P.AAF                                       :
        00000000G  00               03  FB 002EA         CALLS   #3, DBG$PRINT                               :
        00000000G  00               00  FB 002F1         CALLS   #0, DBG$NEWLINE                             : 1854
```

```
                        00FF  31  002F8              BRW     37$                                     ; 1850
                           7E 7C  002FB 32$:         CLRQ    -(SP)                                   ; 1858
                           13 DD  002FD              PUSHL   #19
                     7E    0B 7D  002FF              MOVQ    #11, -(SP)
                     55    04 AC  00302              MOVL    PRM_DESC, R5
                           55 DD  00306              PUSHL   R5
00000000G            00       06 FB  00308           CALLS   #6, DBG$BUILD_PRIMARY_SUBNODE
                     52    18 A5  0030F              MOVL    24(R5), SUBNODE                         ; 1859
                  1C A2       56 D0  00313           MOVL    TAGID, 28(SUBNODE)                      ; 1860
                  18 A2       01 B0  00317           MOVW    #1, 24(SUBNODE)                         ; 1861
                  0A A2       10 88  0031B           BISB2   #16, 10(SUBNODE)                        ; 1862
                  1A A2    04 AA B0  0031F           MOVW    4(VARIANT), 26(SUBNODE)                 ; 1863
                  20 A2    08 AA 9E  00324           MOVAB   8(R10), 32(SUBNODE)                     ; 1864
                  24 A2       6A D0  00329           MOVL    (VARIANT), 36(SUBNODE)                  ; 1865
                        00000000'  EF 9F  0032D       PUSHAB  P.AAI                                   ; 1866
                           1E DD  00333               PUSHL   #30
                        00000000'  EF 9F  00335       PUSHAB  P.AAH
00000000G            00       03 FB  0033B           CALLS   #3, DBG$PRINT
                        00000000G  0C DD  00342       PUSHL   DBG$GL_SIGN_FLAG                        ; 1867
                           08 AC  DD  00348           PUSHL   RADIX
                           2C AE  DD  0034B           PUSHL   VAL_DESC
                     0000V CF       03 FB  0034E     CALLS   #3, DBG$PRINT_VALUE
                           3D 11  00353               BRB     34$                                     ; 1868
                           18 AE  9F  00355 33$:      PUSHAB  TYPEID                                  ; 1874
                           20 AE  9F  00358           PUSHAB  FCODE
                           57 DD  0035B               PUSHL   SYMID
00000000G            00       03 FB  0035D           CALLS   #3, DBG$STA_SYMTYPE
                           7E D4  00364               CLRL    -(SP)                                   ; 1875
                           1C AE  DD  00366           PUSHL   TYPEID
                           24 AE  DD  00369           PUSHL   FCODE
                           57 DD  0036C               PUSHL   SYMID
                           20 AE  DD  0036E           PUSHL   KIND
                           55 DD  00371               PUSHL   R5
00000000G            00       06 FB  00373           CALLS   #6, DBG$BUILD_PRIMARY_SUBNODE
                           55 DD  0037A               PUSHL   R5                                      ; 1876
00000000G            00       01 FB  0037C           CALLS   #1, DBG$COLLECT
                     17    04 A5  E9  00383           BLBC    4(R5), 35$                              ; 1877
                           7E D4  00387               CLRL    -(SP)                                   ; 1880
                           55 DD  00389               PUSHL   R5
00000000G            00       02 FB  0038B           CALLS   #2, DBG$PRINT_IDENTIFIER
                           08 AC  DD  00392 34$:      PUSHL   RADIX                                   ; 1881
                           55 DD  00395               PUSHL   R5
                     FC64  CF       02 FB  00397     CALLS   #2, DBG$PRINT_AGGREGATE
                           57 11  0039C               BRB     36$                                     ; 1877
                           20 AE  9F  0039E 35$:      PUSHAB  NAME                                    ; 1886
                           57 DD  003A1               PUSHL   SYMID
00000000G            00       02 FB  003A3           CALLS   #2, DBG$STA_SYMNAME
                           20 BE  95  003AA           TSTB    @NAME                                   ; 1887
                           46 13  003AD               BEQL    36$
                           7E D4  003AF               CLRL    -(SP)                                   ; 1889
                           55 DD  003B1               PUSHL   R5
00000000G            00       02 FB  003B3           CALLS   #2, DBG$PRINT_IDENTIFIER
                        00000000'  EF 9F  003BA       PUSHAB  P.AAK                                   ; 1890
                           01 DD  003C0               PUSHL   #1
                        00000000'  EF 9F  003C2       PUSHAB  P.AAJ
00000000G            00       03 FB  003C8           CALLS   #3, DBG$PRINT
                           24 AE  9F  003CF           PUSHAB  VAL_DESC                                ; 1891
```

```
                    7E       7A   8F   9A 003D2          MOVZBL  #122, -(SP)                                    ;
                                  55   DD 003D6          PUSHL   R5                                              ;
                FA64     CF       03   FB 003D8          CALLS   #3, DBG$PRIM_TO_VAL                             ;
                         00000000G 00  DD 003DD          PUSHL   DBG$GL_SIGN_FLAG                                ; 1892
                               08     AC   DD 003E3      PUSHL   RADIX                                           ;
                               2C     AE   DD 003E6      PUSHL   VAL_DESC                                        ;
                0000V    CF           03   FB 003E9      CALLS   #3, DBG$PRINT_VALUE                             ;
            00000000G    00           00   FB 003EE      CALLS   #0, DBG$NEWLINE                                 ; 1893
                  04     AE       18  B5   0F 003F5 36$: REMQUE  @24(R5), DUMMY                                 ; 1896
                                      6E   DD 003FA 37$: PUSHL   MARK_ONE                                        ; 1898
            00000000G    00           01   FB 003FC      CALLS   #1, DBG$POP_TEMPMEM                             ;
        02          54               53   F2 00403 38$: AOBLSS  R3, COMPONENT, 39$                              ; 1815
                                     10   11 00407      BRB     41$                                             ; 1682
                                FE27 31   00409 39$:     BRW     28$                                             ; 1815
                         000287D8    8F   DD 0040C 40$: PUSHL   #165848                                         ; 1903
            00000000G    00           01   FB 00412      CALLS   #1, LIB$SIGNAL                                  ;
                  0A     A2           01   8A 00419 41$: BICB2  #1, 10(SUBNODE)                                 ; 1907
                         50       04  AC   D0 0041D      MOVL    PRM_DESC, R0                                    ; 1908
                  04     A0           01   88 00421      BISB2   #1, 4(R0)                                       ;
                  07     A0       08  A2   90 00425      MOVB    8(SUBNODE), 7(R0)                               ; 1909
                  06     A0       09  A2   90 0042A      MOVB    9(SUBNODE), 6(R0)                               ; 1910
                  08     A0       0C  A2   D0 0042F      MOVL    12(SUBNODE), 8(R0)                              ; 1911
                         7E           04   CE 00434 42$: MNEGL   #4, -(SP)                                       ; 1912
                                      02   DD 00437      PUSHL   #2                                              ;
            00000000G    00           02   FB 00439      CALLS   #2, DBG$PRINT_CONTROL                           ;
                                           04 00440      RET                                                     ; 1913

; Routine Size:  1089 bytes,    Routine Base:  DBG$CODE + 0CD5
```

```
;  1803          1914  1 GLOBAL ROUTINE DBG$PRINT_VALUE(val_desc: REF dbg$valdesc,radix) : NOVALUE =
;  1804          1915  2     BEGIN
;  1805          1916  2     BUILTIN ACTUALCOUNT,ACTUALPARAMETER;
;  1806          1917  2
;  1807          1918  2     LOCAL
;  1808          1919  2         sign_flag,
;  1809          1920  2         save_flag,
;  1810          1921  2         vms_desc        : dbg$stg_desc;
;  1811          1922  2
;  1812          1923  2     sign_flag = (actualcount() GTR 2 AND actualparameter(3));
;  1813          1924  2     save_flag = (actualcount() LSS 4 OR  actualparameter(4));
;  1814          1925  2
;  1815          1926  2     IF .save_flag THEN dbg$save_val(.val_desc);
;  1816          1927  2     ch$move(T2,val_desc[dbg$a_value_vmsdesc],vms_desc);
;  1817          1928  2
;  1818          1929  2     IF .val_desc[dbg$v_dhdr_format] NEQ 0 THEN
;  1819          1930  3         BEGIN
;  1820          1931  3         SELECTONE .val_desc[dbg$v_dhdr_format] OF
;  1821          1932  3             SET
;  1822          1933  4             [1]:BEGIN           ! Condition Value
;  1823          1934  4                 LOCAL
;  1824          1935  4                     msgbuffer   : VECTOR [256,BYTE],
;  1825          1936  4                     msg_desc    : dbg$stg_desc;
;  1826          1937  4
;  1827          1938  4                 msg_desc[dsc$b_class]   = dsc$k_class_s;
;  1828          1939  4                 msg_desc[dsc$b_dtype]   = dsc$k_dtype_t;
;  1829          1940  4                 msg_desc[dsc$w_length]  = 256;
;  1830          1941  4                 msg_desc[dsc$a_pointer] = msgbuffer;
;  1831        P 1942  4                 $GETMSG(MSGID  = .val_desc[dbg$l_value_value0],
;  1832        P 1943  4                         MSGLEN =  msg_desc[dsc$w_length],
;  1833          1944  4                         BUFADR =  msg_desc);
;  1834          1945  4                 dbg$print(UPLIT BYTE(%ASCIC '!AS'),msg_desc);
;  1835          1946  3                 END;
;  1836          1947  3
;  1837          1948  3             [2,3]:
;  1838          1949  4                 BEGIN
;  1839          1950  4                 BIND format_tab = UPLIT BYTE(%ASCIC '! '),
;  1840          1951  4                      header_one = UPLIT BYTE(%ASCIC 'CMP TP FPD IS CURMOD PRVMOD IPL'),
;  1841          1952  4                      header_two = UPLIT BYTE(%ASCIC ' DV FU IV T N Z V C'),
;  1842          1953  4                      mode_names = UPLIT ('KRNL','EXEC','SUPR','USER') : VECTOR[4,LONG];
;  1843          1954  4
;  1844          1955  4
;  1845          1956  4                 dbg$newline();
;  1846          1957  4                 dbg$print(format_tab);
;  1847          1958  4                 IF NOT .val_desc[dbg$v_dhdr_format] THEN dbg$print(header_one);
;  1848          1959  4                 dbg$print(header_two);
;  1849          1960  4                 dbg$newline();
;  1850          1961  4                 dbg$print(format_tab);
;  1851          1962  4                 IF NOT .val_desc[dbg$v_dhdr_format]
;  1852          1963  4                   THEN dbg$print(UPLIT BYTE(%ASCIC '!2UL!4UL!3UL!4UL  !AD   !AD!5UL'),
;  1853          1964  4                                  .(val_desc[dbg$l_value_value0])<31,1,0>,
;  1854          1965  4                                  .(val_desc[dbg$l_value_value0])<30,1,0>,
;  1855          1966  4                                  .(val_desc[dbg$l_value_value0])<27,1,0>,
;  1856          1967  4                                  .(val_desc[dbg$l_value_value0])<26,1,0>,
;  1857          1968  4                                  4,mode_names[.(val_desc[dbg$l_value_value0])<24,2,0>],
;  1858          1969  4                                  4,mode_names[.(val_desc[dbg$l_value_value0])<22,2,0>],
;  1859          1970  4                                  .(val_desc[dbg$l_value_value0])<16,5,0>);
```

```
;  1860          1971  4                dbg$print(UPLIT BYTE(%ASCIC '!3(3UL)!5(2UL)')
;  1861          1972  4                                  .(val_desc[dbg$l_value_value0])<7,1,0>,
;  1862          1973  4                                  .(val_desc[dbg$l_value_value0])<6,1,0>,
;  1863          1974  4                                  .(val_desc[dbg$l_value_value0])<5,1,0>,
;  1864          1975  4                                  .(val_desc[dbg$l_value_value0])<4,1,0>,
;  1865          1976  4                                  .(val_desc[dbg$l_value_value0])<3,1,0>,
;  1866          1977  4                                  .(val_desc[dbg$l_value_value0])<2,1,0>,
;  1867          1978  4                                  .(val_desc[dbg$l_value_value0])<1,1,0>,
;  1868          1979  4                                  .(val_desc[dbg$l_value_value0])<0,1,0>);
;  1869          1980  3                END;
;  1870          1981  3
;  1871          1982  3            [OTHERWISE]:          SIGNAL(dbg$_interr,1,UPLIT BYTE(
;  1872          1983  3                                %ASCIC 'DBGVALUES\DBG$PRINT_VALUE - unknown format code'));
;  1873          1984  3                TES;
;  1874          1985  3          RETURN;
;  1875          1986  2          END;
```

```
;1877     1987  2      !+
;1878     1988  2      ! Radix will come in as something other than default if a radix was
;1879     1989  2      ! explicitly specified in the command as in EX/HEX or if a radix
;1880     1990  2      ! override was specified as in SET RADIX/OVERRIDE.
;1881     1991  2      !-
;1882     1992  2      IF .radix NEQ dbg$k_default
;1883     1993  2      THEN
;1884     1994  2          dbg$print_value_as_integer(vms_desc,.radix)
;1885     1995  2      ELSE
;1886     1996  2          BEGIN
;1887     1997  3          !+
;1888     1998  3          ! Unless this is a "DEBUG" descriptor (created because a type override
;1889     1999  3          ! switch has been given),  we first see if we can find any
;1890     2000  3          ! language-specific formatting rules.
;1891     2001  3          !-
;1892     2002  4          IF (.val_desc[dbg$b_dhdr_fcode] NEQ rst$k_type_descr)
;1893     2003  4           OR (.val_desc[dbg$b_value_class] NEQ dsc$k_class_z)
;1894     2004  3            THEN IF dbg$language_format(.val_desc) THEN RETURN;
;1895     2005  3          !+
;1896     2006  3          ! We get here if there are no language-specific formatting
;1897     2007  3          ! rules applicable to this data item,  either because this
;1898     2008  3          ! is a "DEBUG"-built value descriptor or because there are
;1899     2009  3          ! no applicable language-specific format exception entries.
;1900     2010  3          !-
;1901     2011  3          SELECTONE .val_desc[dbg$b_dhdr_fcode]
;1902     2012  3           OF SET
;1903     2013  3              [rst$k_type_enum]:
;1904     2014  4                  BEGIN
;1905     2015  4                  LOCAL
;1906     2016  4                      size,n_elems,elem_vect : REF VECTOR[,LONG];
;1907     2017  4
;1908     2018  4                  dbg$sta_typ_enum(.val_desc[dbg$l_dhdr_typeid],n_elems,elem_vect,size);
;1909     2019  4                  INCR e FROM 0 TO .n_elems-1 DO
;1910     2020  5                      BEGIN
;1911     2021  5                      LOCAL adr_kind,adr_ptrs : VECTOR[3,LONG];
;1912     2022  5                      dbg$sta_symvalue(.elem_vect[.e],adr_ptrs,adr_kind);
;1913     2023  5                      IF .adr_kind NEQ dbg$k_val_literal THEN SIGNAL(dbg$_unimplent);
;1914     2024  5                      IF .(.adr_ptrs[0])<.adr_ptrs[1],.size,0> EQL .val_desc[dbg$l_value_value0] THEN
;1915     2025  6                          BEGIN
;1916     2026  6                          dbg$print_symbol_name(.elem_vect[.e]);
;1917     2027  6                          RETURN;
;1918     2028  5                          END;
;1919     2029  4                      END;
;1920     2030  4                  !+
;1921     2031  4                  ! Warn value out of range for enumeration type.
;1922     2032  4                  !-
;1923     2033  4                  SIGNAL(dbg$_enumrange);
;1924     2034  4                  dbg$print_value_as_integer(vms_desc);
;1925     2035  3                  END;
;1926     2036  3
;1927     2037  3              [rst$k_type_blifld]:
;1928     2038  4                  BEGIN
;1929     2039  4                  LOCAL
;1930     2040  4                      count,
;1931     2041  4                      fields: REF VECTOR[,LONG];
;1932     2042  4
;1933     2043  4                  fields = .val_desc[dbg$l_value_pointer];
```

```
;  1934          2044  4                count = .fields[0];
;  1935          2045  4                dbg$print(UPLIT BYTE(%ASCIC '['));
;  1936          2046  4                INCR e from 1 to .count-1 DO
;  1937          2047  5                    BEGIN
;  1938          2048  5                    dbg$print(UPLIT BYTE(%ASCIC '!UL'), .fields[.e]);
;  1939          2049  5                    dbg$print(UPLIT BYTE(%ASCIC ', '));
;  1940          2050  4                    END;
;  1941          2051  4
;  1942          2052  4                dbg$print(UPLIT BYTE(%ASCIC '!UL'), .fields[.count]);
;  1943          2053  4                dbg$print(UPLIT BYTE(%ASCIC ']'));
;  1944          2054  3                END;
;  1945          2055  3
;  1946          2056  3            [rst$k_type_set]:
;  1947          2057  3                dbg$print_set_value(.val_desc);
;  1948          2058  3
;  1949          2059  3            [rst$k_type_file]:
;  1950          2060  3                !++
;  1951          2061  3                ! Just print the information that this is a file pointer.
;  1952          2062  3                !--
;  1953          2063  3                dbg$print(UPLIT BYTE(%ASCIC 'file variable'));
```

```
;  1955          2064  3          [OTHERWISE]:
;  1956          2065  4              BEGIN
;  1957          2066  4              !+
;  1958          2067  4              ! Here if there are no special formatting rules for this FCODE.
;  1959          2068  4              ! Just look at the DTYPE in the descriptor, and print the value
;  1960          2069  4              ! in a type-dependent format.  However, we first have to ensure
;  1961          2070  4              ! that we have a valid CLASS field for LIB$CVT_DX_DX.
;  1962          2071  4              !-
;  1963          2072  4              IF .vms_desc[dsc$b_class] EQL dsc$k_class_z THEN vms_desc[dsc$b_class] = dsc$k_class_s;
;  1964          2073  4              CASE .vms_desc[dsc$b_dtype] FROM dbg$k_minimum_dtype TO dbg$k_maximum_dtype OF
;  1965          2074  4                  SET
;  1966          2075  4                  !+
;  1967          2076  4                  ! The first few case entries are for the various types of
;  1968          2077  4                  ! ASCII text (ASCIC, ASCIZ, ASCIW).
;  1969          2078  4                  ! These all get translated to ASCII (DTYPE dsc$k_dtype_t).
;  1970          2079  4                  !-
;  1971          2080  4
;  1972          2081  4                  [dsc$k_dtype_vt]:
;  1973          2082  5                      BEGIN
;  1974          2083  5                      vms_desc[dsc$w_length]  = .(.vms_desc[dsc$a_pointer])<0,16,0>;
;  1975          2084  5                      vms_desc[dsc$a_pointer] = 2+.vms_desc[dsc$a_pointer];
;  1976          2085  5                      vms_desc[dsc$b_class]   = dsc$k_class_s;
;  1977          2086  5                      vms_desc[dsc$b_dtype]   = dsc$k_dtype_t;
;  1978          2087  5                      dbg$print_vms_value(vms_desc);
;  1979          2088  4                      END;
;  1980          2089  4
;  1981          2090  4                  [dsc$k_dtype_ac]:
;  1982          2091  5                      BEGIN
;  1983          2092  5                      vms_desc[dsc$w_length]  = .(.vms_desc[dsc$a_pointer])<0,8,0>;
;  1984          2093  5                      vms_desc[dsc$a_pointer] = 1+.vms_desc[dsc$a_pointer];
;  1985          2094  5                      vms_desc[dsc$b_class]   = dsc$k_class_s;
;  1986          2095  5                      vms_desc[dsc$b_dtype]   = dsc$k_dtype_t;
;  1987          2096  5                      dbg$print_vms_value(vms_desc);
;  1988          2097  4                      END;
;  1989          2098  4
;  1990          2099  4                  [dsc$k_dtype_az]:
;  1991          2100  5                      BEGIN
;  1992          2101  5                      BUILTIN LOCC;
;  1993          2102  5                      LOCAL length;
;  1994          2103  5                      LOCC(%REF(0),vms_desc[dsc$w_length],.vms_desc[dsc$a_pointer];length);
;  1995          2104  5                      vms_desc[dsc$w_length] = .vms_desc[dsc$w_length] - .length;
;  1996          2105  5                      vms_desc[dsc$b_class]  = dsc$k_class_s;
;  1997          2106  5                      vms_desc[dsc$b_dtype]  = dsc$k_dtype_t;
;  1998          2107  5                      dbg$print_vms_value(vms_desc);
;  1999          2108  4                      END;
```

```
;  2001          2109  4                [dsc$k_dtype_b,dsc$k_dtype_bu,dsc$k_dtype_w,dsc$k_dtype_wu,
;  2002          2110  4                 dsc$k_dtype_l,dsc$k_dtype_lu,dsc$k_dtype_q,dsc$k_dtype_qu,
;  2003          2111  4                 dsc$k_dtype_o,dsc$k_dtype_ou]:
;  2004          2112  4                    IF .dbg$gb_radix[dbg$b_radix_output] NEQ dbg$k_decimal
;  2005          2113  4                    THEN
;  2006          2114  4                        dbg$print_value_as_integer(vms_desc)
;  2007          2115  4                    ELSE
;  2008          2116  4                        dbg$print_vms_value(vms_desc, .sign_flag);
;  2009          2117  4
;  2010          2118  4                [dsc$k_dtype_f ,dsc$k_dtype_d  ,dsc$k_dtype_g ,dsc$k_dtype_h  ,
;  2011          2119  4                 dsc$k_dtype_fc,dsc$k_dtype_dc ,dsc$k_dtype_gc,dsc$k_dtype_hc ,
;  2012          2120  4                 dsc$k_dtype_nl,dsc$k_dtype_nlo,dsc$k_dtype_nr,dsc$k_dtype_nro,
;  2013          2121  4                 dsc$k_dtype_nu,dsc$k_dtype_nz ,dsc$k_dtype_p,dsc$k_dtype_t]:
;  2014          2122  4                    dbg$print_vms_value(vms_desc, .sign_flag);
;  2015          2123  4
;  2016          2124  4                [dsc$k_dtype_zi]:
;  2017          2125  4                    dbg$ins_decode(.vms_desc[dsc$a_pointer],true,false);
;  2018          2126  4
;  2019          2127  4                [dsc$k_dtype_zem]:
;  2020          2128  4                    dbg$ins_decode(.vms_desc[dsc$a_pointer],true,true);
;  2021          2129  4
;  2022          2130  4                [dsc$k_dtype_tf]:
;  2023          2131  6                    dbg$print(Format_AC,(IF .(.vms_desc[dsc$a_pointer])
;  2024          2132  5                                        THEN UPLIT BYTE(%ASCIC 'True')
;  2025          2133  4                                        ELSE UPLIT BYTE(%ASCIC 'False')));
;  2026          2134  4
;  2027          2135  4                [dsc$k_dtype_adt]:                                          ! A002
;  2028          2136  4                    dbg$print_vms_value(vms_desc);                          ! A002
;  2029          2137  4
;  2030          2138  4 !              [dsc$k_dtype_dsc]:
;  2031          2139  4
;  2032          2140  4                [INRANGE,OUTRANGE]:
;  2033          2141  4                    dbg$print_value_as_integer(vms_desc);
;  2034          2142  4                TES;            ! CASE .vms_desc[dsc$b_dtype]
;  2035          2143  3            END;
;  2036          2144  3        TES;                    ! SELECTONE .val_desc[dbg$b_dhdr_fcode]
;  2037          2145  2    END;
;  2038          2146  1END;                            ! End of 'dbg$print_value'


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

                                                53  41  21  03  00081 P.AAL:  .ASCII  <3>\!AS\                                          ;
                                                    5F  21  02  00085 P.AAM:  .ASCII  <2>\!_\                                           ;
20  53  49  20  44  50  46  20  50  54  20      50  4D  43  1F  00088 P.AAN:  .ASCII  <31>\CMP TP FPD IS CURMOD PRVMOD IPL\                ;
49  20  44  4F  4D  56  52  50  20  44  4F      4D  52  55  43  00097                                                                   ;
                                                    4C  50  000A6                                                                   ;
20  4E  20  54  20  56  49  20  55  46  20      56  44  20  13  000A8 P.AAO:  .ASCII  <19>\ DV FU IV T N Z V C\                       ;
                                            43      20  56  20  5A  000B7                                                           ;
                                                4C  4E  52  4B  000BC P.AAP:  .ASCII  \KRNL\                                        ;
                                                43  45  58  45  000C0        .ASCII  \EXEC\                                         ;
                                                52  50  55  53  000C4        .ASCII  \SUPR\                                         ;
                                                52  45  53  55  000C8        .ASCII  \USER\                                         ;
34  21  4C  55  33  21  4C  55  34  21  4C      55  32  21  1F  000CC P.AAQ:  .ASCII  <31>\!2UL!4UL!3UL!4UL  !AD   !AD!5UL\           ;
35  21  44  41  21  20  20  20  44  41  21      20  20  4C  55  000DB                                                                   ;
                                                    4C  55  000EA                                                                   ;
```

```
29 4C 55 32 28 35 21 29 4C 55 3) 28 33 21 0E 000EC P.AAR:   .ASCII  <14>\!3(3UL)!5(2UL)\                          ;
24 47 42 44 5C 53 45 55 4C 41 56 47 42 44 2F 000FB P.AAS:   .ASCII  \/DBGVALUES\<92>\DBG$PRINT_VALUE - unkno\     ;
75 20 2D 20 45 55 4C 41 56 5F 54 4E 49 52 50 0010A                                                            ;
                                        6F 6E 6B 6E 00119                                                     ;
   65 64 6F 63 20 74 61 6D 72 6F 66 20 6E 77 0011D          .ASCII  \wn format code\                          ;
                                              5B 01 0012B P.AAT:   .ASCII  <1>\[\                             ;
                                        4C 55 21 03 0012D P.AAU:   .ASCII  <3>\!UL\                           ;
                                              20 2C 02 00131 P.AAV:   .ASCII  <2>\, \                         ;
                                        4C 55 21 03 00134 P.AAW:   .ASCII  <3>\!UL\                           ;
                                              5D 01 00138 P.AAX:   .ASCII  <1>\]\                             ;
   65 6C 62 61 69 72 61 76 20 65 6C 69 66 0D 0013A P.AAY:   .ASCII  <13>\file variable\                       ;
                                     65 75 72 54 04 00148 P.AAZ:   .ASCII  <4>\True\                          ;
                                  65 73 6C 61 46 05 0014D P.ABA:   .ASCII  <5>\False\                         ;

                                                     FORMAT_TAB=        P.AAM
                                                     HEADER_ONE=        P.AAN
                                                     HEADER_TWO=        P.AAO
                                                     MODE_NAMES=        P.AAP
                                                            .EXTRN  SYS$GETMSG

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

                                      0FFC 00000            .ENTRY  DBG$PRINT_VALUE, Save R2,R3,R4,R5,R6,R7,R8,-;  1914
                                                                    R9,R10,R11
                  5B 00000000G   00   9E 00002            MOVAB   DBG$NEWLINE, R11                            ;
                  5A 00000000G   00   9E 00009            MOVAB   LIB$SIGNAL, R10                             ;
                  59 00000000G   00   9E 00010            MOVAB   DBG$PRINT, R9                               ;
                  58 00000000'   EF   9E 00017            MOVAB   FORMAT_TAB, R8                              ;
                  5E      FED8   CE   9E 0001E            MOVAB   -296(SP), SP                                ;
                                 50   D4 00023            CLRL    R0                                          ;  1923
                  02             6C   91 00025            CMPB    (AP), #2                                    ;
                                 02   1B 00028            BLEQU   1$                                          ;
                                 50   D6 0002A            INCL    R0                                          ;
                  57         0C  AC   D2 0002C 1$:        MCOML   12(AP), SIGN_FLAG                           ;
         57       50             57   CB 00030            BICL3   SIGN_FLAG, R0, SIGN_FLAG                    ;
                                 50   D4 00034            CLRL    R0                                          ;  1924
                  04             6C   91 00036            CMPB    (AP), #4                                    ;
                                 02   1E 00039            BGEQU   2$                                          ;
                                 50   D6 0003B            INCL    R0                                          ;
                  50         10  AC   C8 0003D 2$:        BISL2   16(AP), SAVE_FLAG                           ;
                  0A             50   E9 00041            BLBC    SAVE_FLAG, 3$                               ;  1926
                             04  AC   DD 00044            PUSHL   VAL_DESC                                    ;
         00000000G  00           01   FB 00047            CALLS   #1, DBG$SAVE_VAL                            ;
                  56         04  AC   D0 0004E 3$:        MOVL    VAL_DESC, R6                                ;  1927
       F4 AD   14 A6             0C   28 00052            MOVC3   #12, 20(R6), VMS_DESC                       ;
  52   05 A6      04             04   EF 00058            EXTZV   #4, #4, 5(R6), R2                           ;  1929
                                 03   12 0005E            BNEQ    4$                                          ;
                               00DA   31 00060            BRW     11$                                         ;
                  01             52   D1 00063 4$:        CMPL    R2, #1                                      ;  1933
                                 29   12 00066            BNEQ    5$                                          ;
               10 AE 010E0100    8F   D0 00068            MOVL    #17694976, MSG_DESC                         ;  1940
               14 AE         1C  AE   9E 00070            MOVAB   MSGBUFFER, MSG_DESC+4                       ;  1941
                  7E             0F   7D 00075            MOVQ    #15, -(SP)                                  ;  1944
                             18  AE   9F 00078            PUSHAB  MSG_DESC                                    ;
                             1C  AE   9F 0007B            PUSHAB  MSG_DESC                                    ;
                             20  A6   DD 0007E            PUSHL   32(R6)                                      ;
         00000000G  00           05   FB 00081            CALLS   #5, SYS$GETMSG                              ;
```

```
                                                10  AE  9F 00088          PUSHAB  MSG_DESC                                        ; 1945
                                                FC  A8  9F 0008B          PUSHAB  P.AAL                                           ;
                                                    026D 31 0008E         BRW     40$                                             ;
                                          02            52 D1 00091 5$:   CMPL    R2, #2                                          ; 1948
                                                        03 18 00094       BGEQ    7$                                              ;
                                                    0095 31 00096 6$:     BRW     10$                                             ;
                                          03            52 D1 00099 7$:   CMPL    R2, #3                                          ;
                                                        F8 14 0009C       BGTR    6$                                              ;
                                          6B            00 FB 0009E       CALLS   #0, DBG$NEWLINE                                 ; 1956
                                                        58 DD 000A1       PUSHL   R8                                              ; 1957
                                          69            01 FB 000A3       CALLS   #1, DBG$PRINT                                   ;
                                          06            52 E8 000A6       BLBS    R2, 8$                                          ; 1958
                                                03      A8 9F 000A9       PUSHAB  HEADER_ONE                                      ;
                                          69            01 FB 000AC       CALLS   #1, DBG$PRINT                                   ;
                                                23      A8 9F 000AF 8$:   PUSHAB  HEADER_TWO                                      ; 1959
                                          69            01 FB 000B2       CALLS   #1, DBG$PRINT                                   ;
                                          6B            00 FB 000B5       CALLS   #0, DBG$NEWLINE                                 ; 1960
                                                        58 DD 000B8       PUSHL   R8                                              ; 1961
                                          69            01 FB 000BA       CALLS   #1, DBG$PRINT                                   ;
                                          3B            52 E8 000BD       BLBS    R2, 9$                                          ; 1962
                                          51      20    A6 9E 000C0       MOVAB   32(R6), R1                                      ; 1970
                7E        02    A1                  05    00 EF 000C4       EXTZV   #0, #5, 2(R1), -(SP)                            ;
                50              61                  02    16 EF 000CA       EXTZV   #22, #2, (R1), R0                               ; 1969
                                                37 A840 DF 000CF          PUSHAL  MODE_NAMES[R0]                                  ;
                                                    04 DD 000D3           PUSHL   #4                                              ;
                50        03    A1                  02    00 EF 000D5       EXTZV   #0, #2, 3(R1), R0                               ; 1968
                                                37 A840 DF 000DB          PUSHAL  MODE_NAMES[R0]                                  ;
                                                    04 DD 000DF           PUSHL   #4                                              ; 1969
                7E              61                  01    1A EF 000E1       EXTZV   #26, #1, (R1), -(SP)                            ;
                7E              61                  01    1B EF 000E6       EXTZV   #27, #1, (R1), -(SP)                            ;
                7E              61                  01    1E EF 000EB       EXTZV   #30, #1, (R1), -(SP)                            ;
                7E              61                  01    1F EF 000F0       EXTZV   #31, #1, (R1), -(SP)                            ;
                                                47      A8 9F 000F5       PUSHAB  P.AAQ                                           ; 1963
                                          69            0A FB 000F8       CALLS   #10, DBG$PRINT                                  ; 1969
                                          50      20    A6 9E 000FB 9$:   MOVAB   32(R6), R0                                      ; 1979
                7E              60                  01    00 EF 000FF       EXTZV   #0, #1, (R0), -(SP)                             ;
                7E              60                  01    01 EF 00104       EXTZV   #1, #1, (R0), -(SP)                             ; 1978
                7E              60                  01    02 EF 00109       EXTZV   #2, #1, (R0), -(SP)                             ; 1977
                7E              60                  01    03 EF 0010E       EXTZV   #3, #1, (R0), -(SP)                             ; 1976
                7E              60                  01    04 EF 00113       EXTZV   #4, #1, (R0), -(SP)                             ; 1975
                7E              60                  01    05 EF 00118       EXTZV   #5, #1, (R0), -(SP)                             ; 1974
                7E              60                  01    06 EF 0011D       EXTZV   #6, #1, (R0), -(SP)                             ; 1973
                7E              60                  01    07 EF 00122       EXTZV   #7, #1, (R0), -(SP)                             ; 1972
                                                67      A8 9F 00127       PUSHAB  P.AAR                                           ; 1971
                                          69            09 FB 0012A       CALLS   #9, DBG$PRINT                                   ;
                                                        04 0012D          RET                                                     ; 1931
                                                76      AB 9F 0012E 10$:  PUSHAB  P.AAS                                          ; 1982
                                                    01 DD 00131           PUSHL   #1                                              ;
                                          00028362      8F DD 00133       PUSHL   #164706                                         ;
                                          6A            03 FB 00139       CALLS   #3, LIB$SIGNAL                                  ;
                                                        04 0013C          RET                                                     ; 1930
                                          01      08    AC D1 0013D 11$:  CMPL    RADIX, #1                                       ; 1992
                                                    0C 13 00141           BEQL    12$                                             ;
                                                08      AC DD 00143       PUSHL   RADIX                                           ; 1994
                                                F4      AD 9F 00146       PUSHAB  VMS_DESC                                        ;
                          0000V CF                      02 FB 00149       CALLS   #2, DBG$PRINT_VALUE_AS_INTEGER                  ;
                                                        04 0014E          RET                                                     ;
```

```
                         03        06   A6  91 0014F 12$:    CMPB    6(R6), #3                       ; 2002
                                     05  12  00153           BNEQ    13$
                                 17  A6  95  00155           TSTB    23(R6)                          ; 2003
                                     0D  13  00158           BEQL    14$
                                         56  DD  0015A 13$:  PUSHL   R6                              ; 2004
                    00000000G    00         01  FB  0015C           CALLS   #1, DBG$LANGUAGE_FORMAT
                                 01         50  E9  00163           BLBC    R0, 14$
                                             04  00166           RET
                                 50      06  A6  9A  00167 14$:  MOVZBL  6(R6), R0                   ; 2011
                                 04         50  91  0016B           CMPB    P0, #4                  ; 2013
                                            61  12  0016E           BNEQ    18$
                                            5E  DD  00170           PUSHL   SP                      ; 2018
                                     08     AE  9F  00172           PUSHAB  ELEM_VECT
                                     10     AE  9F  00175           PUSHAB  N_ELEMS
                                     08     A6  DD  00178           PUSHL   8(R6)
                    00000000G    00         04  FB  0017B           CALLS   #4, DBG$STA_TYP_ENUM
                                 52         01  CE  00182           MNEGL   #1, E                   ; 2024
                                            39  11  00185           BRB     17$
                                     0C     AE  9F  00187 15$:  PUSHAB  ADR_KIND                    ; 2022
                                     E8     AD  9F  0018A           PUSHAB  ADR_PTRS
                                     0C BE42    DD  0018D           PUSHL   @ELEM_VECT[E]
                    00000000G    00         03  FB  00191           CALLS   #3, DBG$STA_SYMVALUE
                                 01     0C  AE  D1  00198           CMPL    ADR_KIND, #1            ; 2023
                                            09  13  0019C           BEQL    16$
                                00028800    8F  DD  0019E           PUSHL   #165888
                                 6A         01  FB  001A4           CALLS   #1, LIB$SIGNAL
    50      E8  BD               6E     EC  AD  EF  001A7 16$:  EXTZV   ADR_PTRS+4, SIZE, @ADR_PTRS, R0  ; 2024
                        20   A6             50  D1  001AE           CMPL    R0, 32(R6)
                                            0C  12  001B2           BNEQ    17$
                                     04 BE42    DD  001B4           PUSHL   @ELEM_VECT[E]           ; 2026
                    00000000G    00         01  FB  001B8           CALLS   #1, DBG$PRINT_SYMBOL_NAME
                                            04  001BF           RET                             ; 2025
C2                               52     08  AE  F2  001C0 17$:  AOBLSS  N_ELEMS, E, 15$            ; 2019
                                00028CB    8F  DD  001C5           PUSHL   #165579                 ; 2033
                                 6A         01  FB  001CB           CALLS   #1, LIB$SIGNAL
                                        00F0    31  001CE           BRW     32$                     ; 2034
                                 0E         50  91  001D1 18$:  CMPB    R0, #14                 ; 2037
                                            37  12  001D4           BNEQ    21$
                                 54     18  A6  D0  001D6           MOVL    24(R6), FIELDS          ; 2043
                                 53         64  D0  001DA           MOVL    (FIELDS), COUNT         ; 2044
                                     00A6   C8  9F  001DD           PUSHAB  P.AAT                   ; 2045
                                 69         01  FB  001E1           CALLS   #1, DBG$PRINT
                                            52  D4  001E4           CLRL    E                       ; 2046
                                            11  11  001E6           BRB     20$
                                      6442  DD  001E8 19$:  PUSHL   (FIELDS)[E]                    ; 2048
                                     00A8   C8  9F  001EB           PUSHAB  P.AAU
                                 69         02  FB  001EF           CALLS   #2, DBG$PRINT
                                     00AC   C8  9F  001F2           PUSHAB  P.AAV                   ; 2049
                                 69         01  FB  001F6           CALLS   #1, DBG$PRINT
EB                               52         53  F2  001F9 20$:  AOBLSS  COUNT, E, 19$           ; 2046
                                      6443  DD  001FD           PUSHL   (FIELDS)[COUNT]         ; 2052
                                     00AF   C8  9F  00200           PUSHAB  P.AAW
                                 69         02  FB  00204           CALLS   #2, DBG$PRINT
                                     00B3   C8  9F  00207           PUSHAB  P.AAX                   ; 2053
                                            18  11  0020B           BRB     23$
                                 08         50  91  0020D 21$:  CMPB    R0, #8                  ; 2056
                                            0A  12  00210           BNEQ    22$
```

```
                                          56  DD 00212          PUSHL   R6                                     ; 2057
                        00000000G  00     01  FB 00214          CALLS   #1, DBG$PRINT_SET_VALUE                ;
                                              04 0021B          RET                                            ;
                                   0F     50  91 0021C 22$:     CMPB    R0, #15                                ; 2059
                                          08  12 0021F          BNEQ    24$                                    ;
                                  00B5    C8  9F 00221          PUSHAB  P.AAY                                  ; 2063
                                   69     01  FB 00225 23$:     CALLS   #1, DBG$PRINT                          ;
                                              04 00228          RET                                            ;
                                  F7      AD  95 00229 24$:     TSTB    VMS_DESC+3                             ; 2072
                                          04  12 0022C          BNEQ    25$                                    ;
                         F7        AD     01  90 0022E          MOVB    #1, VMS_DESC+3                         ;
              2B                   00   F6  AD  8F 00232 25$:   CASEB   VMS_DESC+2, #0, #43                    ; 2073
0081          0081          008A          008A     00237 26$:   .WORD   32$-26$,-                              ;
0081          0081          0081          0081     0023F                32$-26$,-                              ;
0093          0093          0081          0081     00247                31$-26$,-                              ;
0093          0093          0093          0093     0024F                31$-26$,-                              ;
0093          0093          0093          0093     00257                31$-26$,-                              ;
00A2          009E          0093          0093     0025F                31$-26$,-                              ;
0093          0081          0081          008A     00267                31$-26$,-                              ;
008A          0093          0093          0093     0026F                31$-26$,-                              ;
00CB          008A          008A          008A     00277                31$-26$,-                              ;
006F          0065          005A          008A     0027F                31$-26$,-                              ;
008A          008A          008A          00B1     00287                33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        34$-26$,-                              ;
                                                                        35$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        31$-26$,-                              ;
                                                                        31$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        33$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        41$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        27$-26$,-                              ;
                                                                        28$-26$,-                              ;
                                                                        29$-26$,-                              ;
                                                                        37$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        32$-26$,-                              ;
                                                                        32$-26$                                ;
                                          30  11 0028F          BRB     32$                                    ; 2141
```

```
                        F4  AD        F8  BD  B0 00291 27$:   MOVW    @VMS_DESC+4, VMS_DESC                    ; 2083
                        F8  AD            02  C0 00296        ADDL2   #2, VMS_DESC+4                           ; 2084
                                          14  11 0029A        BRB     30$                                      ; 2085
                        F4  AD        F8  BD  9B 0029C 28$:   MOVZBW  @VMS_DESC+4, VMS_DESC                    ; 2092
                            AD        F8  AD  D6 002A1        INCL    VMS_DESC+4                               ; 2093
                                          0A  11 002A4        BRB     30$                                      ; 2094
F8  BD                  F4  AD            00  3A 002A6 29$:   LOCC    #0, VMS_DESC, @VMS_DESC+4                ; 2103
                        F4  AD            50  A2 002AC        SUBW2   LENGTH, VMS_DESC                         ; 2104
                        F6  AD      010E  8F  B0 002B0 30$:   MOVW    #270, VMS_DESC+2                         ; 2106
                                          4A  11 002B6        BRB     41$                                      ; 2107
                            0A 00000000G  00  91 002B8 31$:   CMPB    DBG$GB_RADIX+1, #10                      ; 2112
                                          09  13 002BF        BEQL    33$                                      ;
                                F4        AD  9F 002C1 32$:   PUSHAB  VMS_DESC                                ; 2114
                    0000V   CF            01  FB 002C4        CALLS   #1, DBG$PRINT_VALUE_AS_INTEGER           ;
                                          04  002C9        RET                                              ;
                                          57  DD 002CA 33$:   PUSHL   SIGN_FLAG                               ; 2122
                                F4        AD  9F 002CC        PUSHAB  VMS_DESC                                 ;
                    0000V   CF            02  FB 002CF        CALLS   #2, DBG$PRINT_VMS_VALUE                  ;
                                          04  002D4        RET                                              ;
                                          7E  D4 002D5 34$:   CLRL    -(SP)                                    ; 2125
                                          02  11 002D7        BRB     36$                                      ;
                                          01  DD 002D9 35$:   PUSHL   #1                                       ; 2128
                                          01  DD 002DB 36$:   PUSHL   #1                                       ;
                                F8        AD  DD 002DD        PUSHL   VMS_DESC+4                               ;
            00000000G   00                03  FB 002E0        CALLS   #3, DBG$INS_DECODE                       ;
                                          04  002E7        RET                                              ;
                            07      F8    BD  E9 002E8 37$:   BLBC    @VMS_DESC+4, 38$                         ; 2131
                            50      00C3  C8  9E 002EC        MOVAB   P.AAZ, R0                                ; 2132
                                          05  11 002F1        BRB     39$                                      ;
                            50      00C8  C8  9E 002F3 38$:   MOVAB   P.ABA, R0                                ; 2133
                                          50  DD 002F8 39$:   PUSHL   R0                                       ;
                                FF7B      C8  9F 002FA        PUSHAB  FORMAT_AC                                ; 2131
                            69            02  FB 002FE 40$:   CALLS   #2, DBG$PRINT                            ;
                                          04  00301        RET                                              ;
                                F4        AD  9F 00302 41$:   PUSHAB  VMS_DESC                                ; 2136
                    0000V   CF            01  FB 00305        CALLS   #1, DBG$PRINT_VMS_VALUE                  ;
                                          04  0030A        RET                                              ; 2146

; Routine Size:  779 bytes,    Routine Base:  DBG$CODE + 1116
```

```
;2040          2147  1 GLOBAL ROUTINE DBG$PRINT_VALUE_AS_INTEGER(vms_desc: REF dbg$stg_desc) : NOVALUE =
;2041          2148  2     BEGIN
;2042          2149  2     BUILTIN ACTUALCOUNT,ACTUALPARAMETER,MOVC5;
;2043          2150  2     LOCAL
;2044          2151  2         radix,
;2045          2152  2         radix_override_flag,    ! TRUE if radix override was applied
;2046          2153  2         data_bytes,
;2047          2154  2         byte_size,
;2048          2155  2         data_size,
;2049          2156  2         data_addr,
;2050          2157  2         data_buff       : VECTOR [512*4,BYTE],
;2051          2158  2         digit_count,
;2052          2159  2         digit_value     : BYTE,
;2053          2160  2         text_index,
;2054          2161  2         text_buff       : VECTOR [512*9,BYTE];
;2055          2162  2
;2056          2163  2     BIND digit = UPLIT BYTE('0123456789ABCDEF') : VECTOR [16,BYTE];
;2057          2164  2
;2058          2165  2     radix_override_flag = FALSE;
;2059          2166  2     IF actualcount() GTR 1
;2060          2167  2     THEN
;2061          2168  3         BEGIN
;2062          2169  3         radix = actualparameter(2);
;2063          2170  3         IF .radix EQL dbg$k_default
;2064          2171  3         THEN
;2065          2172  3             radix = dbg$nget_radix()
;2066          2173  3         ELSE
;2067          2174  3             radix_override_flag = TRUE;
;2068          2175  3         END
;2069          2176  2     ELSE
;2070          2177  2         radix = dbg$nget_radix();
;2071          2178  2
;2072          2179  2     text_index = 512*9;
;2073          2180  2
;2074          2181  2     data_addr = .vms_desc[dsc$a_pointer];
;2075          2182  2     IF (data_size = dbg$data_length(.vms_desc)) GTR 512*%BPUNIT THEN
;2076          2183  3         BEGIN
;2077          2184  3         ! ****   SIGNAL(truncation)     ****************************
;2078          2185  3         data_size = 512*%BPUNIT;
;2079          2186  2         END;
;2080          2187  2     data_bytes = (.data_size + (%BPUNIT-1))/%BPUNIT;
;2081          2188  2     MOVC5(data_bytes,.data_addr,%REF(0),%REF(512*4),data_buff);
;2082          2189  2     IF (.data_size AND (%BPUNIT-1)) NEQ 0
;2083          2190  2       THEN data_buff[.data_bytes-1] =
;2084          2191  2           .data_buff[.data_bytes-1] AND NOT (-1^(.data_size AND (%BPUNIT-1)));
;2085          2192  2
;2086          2193  2     SELECTONE .radix OF
;2087          2194  2         SET
;2088          2195  2         [dbg$k_decimal]:
;2089          2196  3             BEGIN
;2090          2197  3             SELECTONE .vms_desc[dsc$b_dtype] OF
;2091          2198  3                 SET
;2092          2199  3                 [dsc$k_dtype_bu,dsc$k_dtype_wu,
;2093          2200  3                  dsc$k_dtype_lu,dsc$k_dtype_qu,
;2094          2201  3                  dsc$k_dtype_ou,dsc$k_dtype_z ,
;2095          2202  3                  dsc$k_dtype_v,dsc$k_dtype_vu]:
;2096          2203  3                      IF .radix_override_flag
```

```
;  2097          2204  3                THEN
;  2098          2205  3                  IF .(data_buff)<.data_size-1,1,0> THEN
;  2099          2206  4                    BEGIN
;  2100          2207  4                    dbg$print(format_AD,1,UPLIT BYTE('-'));
;  2101          2208  4                    INCR m FROM 0 TO .data_bytes-1 DO
;  2102          2209  4                      IF .data_buff[.m] NEQ 0 THEN
;  2103          2210  5                        BEGIN
;  2104          2211  5                        data_buff[.m] = -.data_buff[.m];
;  2105          2212  5                        INCR n FROM .m+1 TO .data_bytes-1 DO
;  2106          2213  5                          data_buff[.n] = NOT .data_buff[.n];
;  2107          2214  5                        EXITLOOP;
;  2108          2215  4                        END;
;  2109          2216  4                    IF (.data_size AND (%BPUNIT-1)) NEQ 0
;  2110          2217  4                      THEN data_buff[.data_bytes-1] =
;  2111          2218  4                        .data_buff[.data_bytes-1] AND NOT (-1^(.data_size AND (%BPUNIT-1)));
;  2112          2219  3                    END;
;  2113          2220  3
;  2114          2221  3              [OTHERWISE]:
;  2115          2222  3                  IF .(data_buff)<.data_size-1,1,0> THEN
;  2116          2223  4                    BEGIN
;  2117          2224  4                    dbg$print(format_AD,1,UPLIT BYTE('-'));
;  2118          2225  4                    INCR m FROM 0 TO .data_bytes-1 DO
;  2119          2226  4                      IF .data_buff[.m] NEQ 0 THEN
;  2120          2227  5                        BEGIN
;  2121          2228  5                        data_buff[.m] = -.data_buff[.m];
;  2122          2229  5                        INCR n FROM .m+1 TO .data_bytes-1 DO
;  2123          2230  5                          data_buff[.n] = NOT .data_buff[.n];
;  2124          2231  5                        EXITLOOP;
;  2125          2232  4                        END;
;  2126          2233  4                    IF (.data_size AND (%BPUNIT-1)) NEQ 0
;  2127          2234  4                      THEN data_buff[.data_bytes-1] =
;  2128          2235  4                        .data_buff[.data_bytes-1] AND NOT (-1^(.data_size AND (%BPUNIT-1)));
;  2129          2236  3                    END;
;  2130          2237  3                TES;
;  2131          2238  3
;  2132          2239  3              WHILE (data_size = .data_bytes) GTR 0 DO
;  2133          2240  4                  BEGIN
;  2134          2241  4                  LOCAL digit_val;
;  2135          2242  4                  data_bytes = 0;
;  2136          2243  4                  digit_val  = 0;
;  2137          2244  4                  DECR d FROM .data_size-1 TO 0 DO
;  2138          2245  5                      BEGIN
;  2139          2246  5                      digit_val = (.digit_val^8)+.data_buff[.d];
;  2140          2247  5                      IF (data_buff[.d] = .digit_val/10) NEQ 0
;  2141          2248  5                        THEN IF .data_bytes EQL 0 THEN data_bytes = .d+1;
;  2142          2249  5                      digit_val = .digit_val - 10*(.digit_val/10);
;  2143          2250  4                      END;
;  2144          2251  4                  text_buff[(text_index=.text_index-1)] = .digit_val<0,8,0>+'0';
;  2145          2252  3                  END;
;  2146          2253  3              dbg$print(format_AD,512*9-.text_index,text_buff[.text_index]);
;  2147          2254  3              RETURN;
;  2148          2255  2              END;
;  2149          2256  2
;  2150          2257  2          [dbg$k_binary]: byte_size = 1;
;  2151          2258  2          [dbg$k_octal]:  byte_size = 3;
;  2152          2259  2          [dbg$k_hex]:    byte_size = 4;
;  2153          2260  2 !        [OTHERWISE]:
```

```
;  2154          2261  2          TES;
;  2155          2262  2
;  2156          2263  2      digit_count = (.data_size + (.byte_size-1))/.byte_size;
;  2157          2264  2
;  2158          2265  2      INCR index FROM 0 TO .digit_count-1 DO
;  2159          2266  3          BEGIN
;  2160          2267  4          IF (.byte_size NEQ 3) AND ((.index AND 7) EQL 0) AND (.index NEQ 0)
;  2161          2268  3            THEN text_buff[(text_index = .text_index-1)] = ' ';
;  2162          2269  3          digit_value = .digit[.(data_buff)<.index*.byte_size,.byte_size,0>];
;  2163          2270  3          text_buff[(text_index = .text_index-1)] = .digit_value;
;  2164          2271  2          END;
;  2165          2272  2
;  2166          2273  2      IF .digit_value GTRU '9' THEN text_buff[(text_index = .text_index-1)] = '0';
;  2167          2274  2
;  2168          2275  2      dbg$print(Format_AD,512*9-.text_index,text_buff[.text_index]);
;  2169          2276  1      END;                            ! End of routine 'dbg$print_value_as_integer'


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

45  44  43  42  41  39  38  37  36  35  34  33  32  31  30  00153 P.ABB:  .ASCII  \0123456789ABCDEF\                          ;
                                                        46  00162                                                           ;
                                                        2D  00163 P.ABC:  .ASCII  \-\                                       ;
                                                        2D  00164 P.ABD:  .ASCII  \-\                                       ;
                                                                  DIGIT=          P.ABB


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

                                                    0FFC 00000          .ENTRY  DBG$PRINT_VALUE_AS_INTEGER, Save R2,R3,R4,- ; 2147
                                                                                R5,R6,R7,R8,R9,R10,R11                      ;
                                          5E    EBFC  CE  9E 00002          MOVAB   -5124(SP), SP                           ;
                                                      5B  D4 00007          CLRL    RADIX_OVERRIDE_FLAG                     ; 2165
                                          01          6C  91 00009          CMPB    (AP), #1                                ; 2166
                                                      0E  1B 0000C          BLEQU   1$                                      ;
                                          5A    08    AC  D0 0000E          MOVL    8(AP), RADIX                            ; 2169
                                          01          5A  D1 00012          CMPL    RADIX, #1                               ; 2170
                                                      05  13 00015          BEQL    1$                                      ;
                                          5B          01  D0 00017          MOVL    #1, RADIX_OVERRIDE_FLAG                 ; 2174
                                                      0A  11 0001A          BRB     2$                                      ; 2166
                                00000000G 00          00  FB 0001C 1$:      CALLS   #0, DBG$NGET_RADIX                      ; 2177
                                          5A          50  D0 00023          MOVL    R0, RADIX                               ;
                                          57  1200    8F  3C 00026 2$:      MOVZWL  #4608, TEXT_INDEX                       ; 2179
                                          58    04    AC  D0 0002B          MOVL    VMS_DESC, R8                            ; 2181
                                          52    04    A8  D0 0002F          MOVL    4(R8), DATA_ADDR                        ;
                                                      58  DD 00033          PUSHL   R8                                      ; 2182
                                    EBA5  CF          01  FB 00035          CALLS   #1, DBG$DATA_LENGTH                     ;
                                          59          50  D0 0003A          MOVL    R0, DATA_SIZE                           ;
                                00001000  8F          59  D1 0003D          CMPL    DATA_SIZE, #4096                        ;
                                                      05  15 00044          BLEQ    3$                                      ;
                                          59  1000    8F  3C 00046          MOVZWL  #4096, DATA_SIZE                        ; 2185
                                          50    07    A9  9E 0004B 3$:      MOVAB   7(R9), R0                               ; 2187
                                    56                50  08 C7 0004F          DIVL3   #8, R0, DATA_BYTES                      ;
0204  8F                          00                62      56 2C 00053          MOVC5   DATA_BYTES, (DATA_ADDR), #0, #516, - ; 2188
                                                    FDFC  CD     0005A                  DATA_BUFF                           ;
```

```
                                                52  D4 0005D          CLRL    R2                                      ; 2189
                                          07    59  93 0005F          BITB    DATA_SIZE, #7
                                                15  13 00062          BEQL    4$
                                                52  D6 00064          INCL    R2
                50                        03    00  EF 00066          EXTZV   #0, #3, DATA_SIZE, R0                   ; 2191
                50 FFFFFFFF               8F    50  78 0006B          ASHL    R0, #-1, R0
                                    FDFB CD46   50  8A 00073          BICB2   R0, DATA_BUFF-1[DATA_BYTES]
                                          0A    5A  D1 00079 4$:      CMPL    RADIX, #T0                              ; 2195
                                                03  13 0007C          BEQL    5$
                                              0109  31 0007E          BRW     24$
                                          50    02  A8  9A 00081 5$:  MOVZBL  2(R8), R0                              ; 2197
                                          05        50  91 00085      CMPB    R0, #5                                  ; 2199
                                                0A  1B 00088          BLEQU   6$
                                          19        50  91 0008A      CMPB    R0, #25
                                                05  13 0008D          BEQL    6$
                                          22        50  91 0008F      CMPB    R0, #34
                                                52  12 00092          BNEQ    13$
                                          03        5B  E8 00094 6$:  BLBS    RADIX_OVERRIDE_FLAG, 8$                 ; 2203
                                              00AC  31 00097 7$:      BRW     19$
                                          50    FF  A9  9E 0009A 8$:  MOVAB   -1(R9), R0                             ; 2205
                F3      FDFC      CD            50  E1 0009E          BBC     R0, DATA_BUFF, 7$
                                  00000000'     EF  9F 000A4          PUSHAB  P.ABC                                   ; 2207
                                                01  DD 000AA          PUSHL   #1
                                  00000000'     EF  9F 000AC          PUSHAB  FORMAT_AD
                   00000000G      00            03  FB 000B2          CALLS   #3, DBG$PRINT
                                          51        01  CE 000B9      MNEGL   #1, M                                   ; 2208
                                                22  11 000BC          BRB     12$
                                          50    FDFC CD41   9A 000BE 9$:  MOVZBL  DATA_BUFF[M], R0                   ; 2209
                                                1A  13 000C4          BEQL    12$
                                    FDFC CD41         50  8E 000C6    MNEGB   R0, DATA_BUFF[M]                        ; 2211
                                          50        51  D0 000CC      MOVL    M, N                                    ; 2212
                                                09  11 000CF          BRB     11$
                                    FDFC CD40   FDFC CD40   92 000D1 10$:  MCOMB   DATA_BUFF[N], DATA_BUFF[N]       ; 2213
                F3                        50        56  F2 000DA 11$:  AOBLSS  DATA_BYTES, N, 10$
                                                50  11 000DE          BRB     18$                                     ; 2210
                DA                        51        56  F2 000E0 12$:  AOBLSS  DATA_BYTES, M, 9$                      ; 2209
                                                4A  11 000E4          BRB     18$                                     ; 2216
                                          50    FF  A9  9E 000E6 13$:  MOVAB   -1(R9), R0                             ; 2222
                56      FDFC      CD            50  E1 000EA          BBC     R0, DATA_BUFF, 19$
                                  00000000'     EF  9F 000F0          PUSHAB  P.ABD                                   ; 2224
                                                01  DD 000F6          PUSHL   #1
                                  00000000'     EF  9F 000F8          PUSHAB  FORMAT_AD
                   00000000G      00            03  FB 000FE          CALLS   #3, DBG$PRINT
                                          51        01  CE 00105      MNEGL   #1, M                                   ; 2225
                                                22  11 00108          BRB     17$
                                          50    FDFC CD41   9A 0010A 14$:  MOVZBL  DATA_BUFF[M], R0                   ; 2226
                                                1A  13 00110          BEQL    17$
                                    FDFC CD41         50  8E 00112    MNEGB   R0, DATA_BUFF[M]                        ; 2228
                                          50        51  D0 00118      MOVL    M, N                                    ; 2229
                                                09  11 0011B          BRB     16$
                                    FDFC CD40   FDFC CD40   92 0011D 15$:  MCOMB   DATA_BUFF[N], DATA_BUFF[N]       ; 2230
                F3                        50        56  F2 00126 16$:  AOBLSS  DATA_BYTES, N, 15$
                                                04  11 0012A          BRB     18$                                     ; 2227
                DA                        51        56  F2 0012C 17$:  AOBLSS  DATA_BYTES, M, 14$                     ; 2226
                                                13  52  E9 00130 18$:  BLBC    R2, T9$                                 ; 2233
                50                        03    00  EF 00133          EXTZV   #0, #3, DATA_SIZE, R0                   ; 2235
                50 FFFFFFFF               8F    50  78 00138          ASHL    R0, #-1, R0
```

```
                FDFB CD46          50  8A 00140          BICB2   R0, DATA_BUFF-1[DATA_BYTES]
                    59             56  D0 00146 19$:      MOVL    DATA_BYTES, DATA_SIZE                   ; 2239
                                   03  14 00149          BGTR    20$
                                 009C  31 0014B          BRW     31$
                                   56  D4 0014E 20$:      CLRL    DATA_BYTES                              ; 2242
                                   51  D4 00150          CLRL    DIGIT_VAL                               ; 2243
                        50         59  D0 00152          MOVL    DATA_SIZE, D                            ; 2244
                                   29  11 00155          BRB     23$
                    52  51         08  78 00157 21$:      ASHL    #8, DIGIT_VAL, R2                       ; 2246
                        51 FDFC CD40  9A 0015B          MOVZBL  DATA_BUFF[D], DIGIT_VAL
                        51         52  C0 00161          ADDL2   R2, DIGIT_VAL
                    52  51         0A  C7 00164          DIVL3   #10, DIGIT_VAL, R2                      ; 2247
                FDFC CD40          52  90 00168          MOVB    R2, DATA_BUFF[D]
                                   52  D5 0016E          TSTL    R2
                                   08  13 00170          BEQL    22$
                                   56  D5 00172          TSTL    DATA_BYTES                              ; 2248
                                   04  12 00174          BNEQ    22$
                        56       01  A0  9E 00176          MOVAB   1(R0), DATA_BYTES
                        52         0A  C4 0017A 22$:      MULL2   #10, R2                                 ; 2249
                        51         52  C2 0017D          SUBL2   R2, DIGIT_VAL
                        D4         50  F4 00180 23$:      SOBGEQ  D, 21$                                  ; 2244
                    774E  51       30  81 00183          ADDB3   #48, DIGIT_VAL, TEXT_BUFF[SP]           ; 2251
                                   BC  11 00188          BRB     19$                                     ; 2239
                        02         5A  D1 0018A 24$:      CMPL    RADIX, #2                               ; 2257
                                   05  12 0018D          BNEQ    25$
                        53         01  D0 0018F          MOVL    #1, BYTE_SIZE
                                   12  11 00192          BRB     27$
                        08         5A  D1 00194 25$:      CMPL    RADIX, #8                               ; 2258
                                   05  12 00197          BNEQ    26$
                        53         03  D0 00199          MOVL    #3, BYTE_SIZE
                                   08  11 0019C          BRB     27$
                        10         5A  D1 0019E 26$:      CMPL    RADIX, #16                              ; 2259
                                   03  12 001A1          BNEQ    27$
                        53         04  D0 001A3          MOVL    #4, BYTE_SIZE
                        50     FF A349  9E 001A6 27$:      MOVAB   -1(BYTE_SIZE)[DATA_SIZE], R0            ; 2263
                55      50         53  C7 001AB          DIVL3   BYTE_SIZE, R0, DIGIT_COUNT
                        50         01  CE 001AF          MNEGL   #1, INDEX                               ; 2265
                                   29  11 001B2          BRB     30$
                        03         53  D1 001B4 28$:      CMPL    BYTE_SIZE, #3                           ; 2267
                                   0D  13 001B7          BEQL    29$
                        07         50  93 001B9          BITB    INDEX, #7
                                   08  12 001BC          BNEQ    29$
                                   50  D5 001BE          TSTL    INDEX
                                   04  13 001C0          BEQL    29$
                    774E           20  90 001C2          MOVB    #32, TEXT_BUFF[SP]                      ; 2268
                52      50         53  C5 001C6 29$:      MULL3   BYTE_SIZE, INDEX, R2                    ; 2269
51      FDFC    CD      53         52  EF 001CA          EXTZV   R2, BYTE_SIZE, DATA_BUFF, R1
                    54 00000000'EF41  90 001D1          MOVB    DIGIT[R1], DIGIT_VALUE
                    774E           54  90 001D9          MOVB    DIGIT_VALUE, TEXT_BUFF[SP]              ; 2270
                D3      50         55  F2 001DD 30$:      AOBLSS  DIGIT_COUNT, INDEX, 28$                 ; 2265
                        39         54  91 001E1          CMPB    DIGIT_VALUE, #57                        ; 2273
                                   04  1B 001E4          BLEQU   31$
                    774E           30  90 001E6          MOVB    #48, TEXT_BUFF[SP]
                              6E47  9F  9F 001EA 31$:      PUSHAB  TEXT_BUFF[TEXT_INDEX]                   ; 2275
                          EE00     C7  9F 001ED          PUSHAB  -4608(TEXT_INDEX)
                        6E         6E  CE 001F1          MNEGL   (SP), (SP)
                    00000000'      EF  9F 001F4          PUSHAB  FORMAT_AD
```

```
                    00000000G  00        03  FB 001FA          CALLS   #3, DBG$PRINT                    ;
                                            04 00201          RET                                      ; 2276

; Routine Size:  514 bytes,    Routine Base:  DBG$CODE + 1421
```

```
;  2171          2277  1 ROUTINE DBG$PRINT_VMS_VALUE(vms_desc: REF dbg$stg_desc) : NOVALUE =
;  2172          2278  2     BEGIN
;  2173          2279  2     BUILTIN ACTUALCOUNT,ACTUALPARAMETER;
;  2174          2280  2     BIND exp_zero = UPLIT BYTE('E+0000');       ! Hack to fix FOR$CVT bug
;  2175          2281  2     LOCAL
;  2176          2282  2         local_desc      : dbg$stg_desc,
;  2177          2283  2         buffer_desc     : dbg$stg_desc,
;  2178          2284  2         status,
;  2179          2285  2         text_buffer     : VECTOR [64,BYTE],
;  2180          2286  2         text_length     : WORD;
;  2181          2287  2
;  2182          2288  2     ch$move(12,.vms_desc,local_desc);
;  2183          2289  2     buffer_desc[dsc$b_class]   = dsc$k_class_s;
;  2184          2290  2     buffer_desc[dsc$b_dtype]   = dsc$k_dtype_t;
;  2185          2291  2     buffer_desc[dsc$w_length]  = 64;
;  2186          2292  2     buffer_desc[dsc$a_pointer] = text_buffer;
;  2187          2293  2
;  2188          2294  2     SELECTONE .vms_desc[dsc$b_dtype] OF
;  2189          2295  2         SET
;  2190          2296  2         [dsc$k_dtype_fc,dsc$k_dtype_dc,dsc$k_dtype_gc,dsc$k_dtype_hc]:
;  2191          2297  3             BEGIN
;  2192          2298  3             local_desc[dsc$w_length] = .local_desc[dsc$w_length]/2;
;  2193          2299  3             local_desc[dsc$b_dtype]  = .local_desc[dsc$b_dtype] -2;
;  2194          2300  3             local_desc[dsc$b_class]  =  dsc$k_class_s;
;  2195          2301  3             dbg$print(FORMAT_AD,1,UPLIT BYTE('('));
;  2196          2302  3             dbg$print_vms_value(local_desc);
;  2197          2303  3             dbg$print(FORMAT_AD,1,UPLIT BYTE(','));
;  2198          2304  3             local_desc[dsc$a_pointer] = .local_desc[dsc$a_pointer] + .local_desc[dsc$w_length];
;  2199          2305  3             dbg$print_vms_value(local_desc);
;  2200          2306  3             dbg$print(FORMAT_AD,1,UPLIT BYTE(')'));
;  2201          2307  3             END;
;  2202          2308  2
;  2203          2309  2         [dsc$k_dtype_f]:
;  2204          2310  3             BEGIN
;  2205          2311  3             BUILTIN CVTFD;
;  2206          2312  3             LOCAL dvalue : BLOCK[8,BYTE];
;  2207          2313  3             LOCAL digits,spaces,length;
;  2208          2314  3             BUILTIN SKPC,LOCC;
;  2209          2315  3
;  2210          2316  3             ! Use the FORTRAN "G" format routine, which only prints the
;  2211          2317  3             ! answer in exponential form if it has to.
;  2212          2318  3             ! Since there is not FOR$CVT_F_TG routine, convert the source
;  2213          2319  3             ! to d_float.
;  2214          2320  3             !
;  2215          2321  3             CVTFD(.local_desc[dsc$a_pointer], dvalue);
;  2216          2322  3             IF NOT for$cvt_d_tg( dvalue,
;  2217          2323  3                                  buffer_desc,
;  2218          2324  3                                  7,              ! Significant digits
;  2219          2325  3                                  0,              ! Scale factor
;  2220          2326  3                                  1,              ! Digits before decimal point
;  2221          2327  3                                                  ! in exponential form
;  2222          2328  3                                  2)              ! Digits after "E"
;  2223          2329  3                                                  ! in exponential form
;  2224          2330  3             THEN
;  2225          2331  3                 $DBG_ERROR('DBGVALUES\DBG$PRINT_VMS_VALUE');
;  2226          2332  3
;  2227          2333  3             ! The result is right-justified. Find the position where
```

```
;  2228          2334  3          ! the result begins (the first non-blank character in the
;  2229          2335  3          ! buffer) and print the result.
;  2230          2336  3          !
;  2231          2337  3          SKPC(%REF(' '),%REF(64),text_buffer;length,digits);
;  2232          2338  3          LOCC(%REF(' '),length,.digits;,spaces);
;  2233          2339  3          IF ch$eql(4,.spaces-4,4,exp_zero) THEN spaces = .spaces-4;
;  2234          2340  4          IF (actualcount() GTR 1 AND actualparameter(2))
;  2235          2341  4            AND (.(.digits)<0,8,0> NEQ '-')
;  2236          2342  3              THEN DBG$PRINT(format_AD,1,UPLIT BYTE('+'));
;  2237          2343  3          dbg$print(format_AD, .spaces - .digits, .digits);
;  2238          2344  2          END;
;  2239          2345  2
;  2240          2346  2      [dsc$k_dtype_d]:
;  2241          2347  3          BEGIN
;  2242          2348  3          LOCAL digits,spaces,length;
;  2243          2349  3          BUILTIN SKPC,LOCC;
;  2244          2350  3
;  2245          2351  3          ! Use the FORTRAN "G" format routine, which only prints the
;  2246          2352  3          ! answer in exponential form if it has to.
;  2247          2353  3          !
;  2248          2354  3          IF NOT for$cvt_d_tg(.local_desc[dsc$a_pointer],
;  2249          2355  3                              buffer_desc,
;  2250          2356  3                              16,             ! Significant digits
;  2251          2357  3                              0,              ! Scale factor
;  2252          2358  3                              1,              ! Digits before decimal point
;  2253          2359  3                                              ! in exponential form
;  2254          2360  3                              2)              ! Digits after "E"
;  2255          2361  3                                              ! in exponential form
;  2256          2362  3          THEN
;  2257          2363  3              $DBG_ERROR('DBGVALUES\DBG$PRINT_VMS_VALUE');
;  2258          2364  3
;  2259          2365  3          ! The result is right-justified. Find the position where
;  2260          2366  3          ! the result begins (the first non-blank character in the
;  2261          2367  3          ! buffer) and print the result.
;  2262          2368  3          !
;  2263          2369  3          SKPC(%REF(' '),%REF(64),text_buffer;length,digits);
;  2264          2370  3          LOCC(%REF(' '),length,.digits;,spaces);
;  2265          2371  3          IF ch$eql(4,.spaces-4,4,exp_zero) THEN spaces = .spaces-4;
;  2266          2372  4          IF (actualcount() GTR 1 AND actualparameter(2))
;  2267          2373  4            AND (.(.digits)<0,8,0> NEQ '-')
;  2268          2374  3              THEN DBG$PRINT(format_AD,1,UPLIT BYTE('+'));
;  2269          2375  3          dbg$print(format_AD, .spaces - .digits, .digits);
;  2270          2376  2          END;
;  2271          2377  2
;  2272          2378  2      [dsc$k_dtype_g]:
;  2273          2379  3          BEGIN
;  2274          2380  3          LOCAL digits,spaces,length;
;  2275          2381  3          BUILTIN SKPC,LOCC;
;  2276          2382  3
;  2277          2383  3          ! Use the FORTRAN "G" format routine, which only prints the
;  2278          2384  3          ! answer in exponential form if it has to.
;  2279          2385  3          !
;  2280          2386  3          IF NOT for$cvt_g_tg(.local_desc[dsc$a_pointer],
;  2281          2387  3                              buffer_desc,
;  2282          2388  3                              15,             ! Significant digits
;  2283          2389  3                              0,              ! Scale factor
;  2284          2390  3                              1,              ! Digits before decimal point
```

```
;2285     2391  3                                       ! in exponential form
;2286     2392  3                                3)     ! Digits after "E"
;2287     2393  3                                       ! in exponential form
;2288     2394  3          THEN
;2289     2395  3              $DBG_ERROR('DBGVALUES\DBG$PRINT_VMS_VALUE');
;2290     2396  3
;2291     2397  3          ! The result is right-justified. Find the position where
;2292     2398  3          ! the result begins (the first non-blank character in the
;2293     2399  3          ! buffer) and print the result.
;2294     2400  3          !
;2295     2401  3          SKPC(%REF(' '),%REF(64),text_buffer;length,digits);
;2296     2402  3          LOCC(%REF(' '),length,.digits;,spaces);
;2297     2403  3          IF ch$eql(5,.spaces-5,5,exp_zero) THEN spaces = .spaces-5;
;2298     2404  4          IF (actualcount() GTR 1 AND actualparameter(2))
;2299     2405  4            AND (.(.digits)<0,8,0> NEQ '-')
;2300     2406  3              THEN DBG$PRINT(format_AD,1,UPLIT BYTE('+'));
;2301     2407  3          dbg$print(format_AD, .spaces - .digits, .digits);
;2302     2408  2          END;
;2303     2409  2
;2304     2410  2      [dsc$k_dtype_h]:
;2305     2411  3          BEGIN
;2306     2412  3          LOCAL digits,spaces,length;
;2307     2413  3          BUILTIN SKPC,LOCC;
;2308     2414  3
;2309     2415  3          ! Use the FORTRAN "G" format routine, which only prints the
;2310     2416  3          ! answer in exponential form if it has to.
;2311     2417  3          !
;2312     2418  3          IF NOT for$cvt_h_tg(.local_desc[dsc$a_pointer],
;2313     2419  3                              buffer_desc,
;2314     2420  3                              33,             ! Significant digits
;2315     2421  3                              0,              ! Scale factor
;2316     2422  3                              1,              ! Digits before decimal point
;2317     2423  3                                              ! in exponential form
;2318     2424  3                              4)              ! Digits after "E"
;2319     2425  3                                              ! in exponential form
;2320     2426  3          THEN
;2321     2427  3              $DBG_ERROR('DBGVALUES\DBG$PRINT_VMS_VALUE');
;2322     2428  3
;2323     2429  3          ! The result is right-justified. Find the position where
;2324     2430  3          ! the result begins (the first non-blank character in the
;2325     2431  3          ! buffer) and print the result.
;2326     2432  3          !
;2327     2433  3          SKPC(%REF(' '),%REF(64),text_buffer;length,digits);
;2328     2434  3          LOCC(%REF(' '),length,.digits;,spaces);
;2329     2435  3          IF ch$eql(6,.spaces-6,6,exp_zero) THEN spaces = .spaces-6;
;2330     2436  4          IF (actualcount() GTR 1 AND actualparameter(2))
;2331     2437  4            AND (.(.digits)<0,8,0> NEQ '-')
;2332     2438  3              THEN DBG$PRINT(format_AD,1,UPLIT BYTE('+'));
;2333     2439  3          dbg$print(format_AD, .spaces - .digits, .digits);
;2334     2440  2          END;
;2335     2441  2
;2336     2442  2      [dsc$k_dtype_t]:
;2337     2443  3          BEGIN
;2338     2444  3          BUILTIN
;2339     2445  3              PROBER;
;2340     2446  3          LOCAL
;2341     2447  3              addr,
```

```
;  2342          2448  3                bytes;
;  2343          2449  3
;  2344          2450  3            local_desc[dsc$w_length] = MIN(.local_desc[dsc$w_length],2048);
;  2345          2451  3
;  2346          2452  3            ! Check for read access to the address. There are certain
;  2347          2453  3            ! cases where we can get here with the address in the descriptor
;  2348          2454  3            ! not readable. One example is EXAMINE/ASCID X, where X points
;  2349          2455  3            ! to the descriptor
;  2350          2456  3            !     0000FFFF
;  2351          2457  3            !     00000000
;  2352          2458  3            ! In this case the VMS descriptor came from a volatile value
;  2353          2459  3            ! descriptor, and the address "0" in the descriptor was never
;  2354          2460  3            ! checked for readability.
;  2355          2461  3            !
;  2356          2462  3            addr = .local_desc[dsc$a_pointer];
;  2357          2463  3            bytes = .local_desc[dsc$w_length];
;  2358          2464  3            IF NOT PROBER(%REF(0),bytes,.addr)
;  2359          2465  3            THEN
;  2360          2466  3                SIGNAL(dbg$_noaccessr,1,.addr);
;  2361          2467  3
;  2362          2468  3            dbg$print(UPLIT BYTE(%ASCIC '''!AF'''),.local_desc[dsc$w_length],
;  2363          2469  3                                                  .local_desc[dsc$a_pointer]);
;  2364          2470  2            END;
;  2365          2471  2
;  2366          2472  2        [OTHERWISE]:
;  2367          2473  3            BEGIN
;  2368          2474  3
;  2369          2475  3            !+
;  2370          2476  3            ! Somewhat of a hack for FORTRAN - the FORTRAN compiler gives
;  2371          2477  3            ! us types BU, WU, LU for LOGICAL variables even though they
;  2372          2478  3            ! are really treated as signed integers. Change the dtype here
;  2373          2479  3            ! so we print them right.
;  2374          2480  3            !-
;  2375          2481  3            IF .dbg$gb_language EQL dbg$k_fortran
;  2376          2482  3            THEN
;  2377          2483  3                IF .local_desc[dsc$b_dtype] EQL dsc$k_dtype_bu
;  2378          2484  3                THEN local_desc[dsc$b_dtype] = dsc$k_dtype_b
;  2379          2485  3                ELSE IF .local_desc[dsc$b_dtype] EQL dsc$k_dtype_wu
;  2380          2486  3                THEN local_desc[dsc$b_dtype] = dsc$k_dtype_w
;  2381          2487  3                ELSE IF .local_desc[dsc$b_dtype] EQL dsc$k_dtype_lu
;  2382          2488  3                THEN local_desc[dsc$b_dtype] = dsc$k_dtype_l;
;  2383          2489  3
;  2384          2490  3            dbg$cvt_dx_dx(local_desc,buffer_desc,text_length);
;  2385          2491  3
;  2386          2492  3            IF .signed_dtype[.local_desc[dsc$b_dtype]] AND
;  2387          2493  3             (actualcount() GTR 1 AND actualparameter(2)) AND
;  2388          2494  3             (.text_buffer[0] NEQ '-') AND (.text_buffer[0] NEQ '+') THEN
;  2389          2495  4                BEGIN
;  2390          2496  4                ch$move(.text_length,text_buffer[0],text_buffer[1]);
;  2391          2497  4                text_buffer[0] = '+';
;  2392          2498  4                text_length = .text_length + 1;
;  2393          2499  3                END;
;  2394          2500  3
;  2395          2501  3            dbg$print(format_AD,.text_length,text_buffer);
;  2396          2502  2            END;
;  2397          2503  2        TES;
;  2398          2504  1    END;                        ! End of dbg$print_vms_value
```

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

                                                                30  30  30  30  2B  45  00165 P.ABE:  .ASCII  \E+0000\
                                                                                    28  0016B P.ABF:  .ASCII  \(\
                                                                                    2C  0016C P.ABG:  .ASCII  \,\
                                                                                    29  0016D P.ABH:  .ASCII  \)\
24  47  42  44  5C  53  45  55  4C  41  56  47  42  44          1D  0016E P.ABI:  .ASCII  <29>\DBGVALUES\<92>\DBG$PRINT_VMS_VALU\
    55  4C  41  56  5F  53  4D  56  5F  54  4E  49  52          50  0017D
                                                                45  0018B          .ASCII  \E\
                                                                2B  0018C P.ABJ:  .ASCII  \+\
24  47  42  44  5C  53  45  55  4C  41  56  47  42  44          1D  0018D P.ABK:  .ASCII  <29>\DBGVALUES\<92>\DBG$PRINT_VMS_VALU\
    55  4C  41  56  5F  53  4D  56  5F  54  4E  49  52          50  0019C
                                                                45  001AA          .ASCII  \E\
                                                                2B  001AB P.ABL:  .ASCII  \+\
24  47  42  44  5C  53  45  55  4C  41  56  47  42  44          1D  001AC P.ABM:  .ASCII  <29>\DBGVALUES\<92>\DBG$PRINT_VMS_VALU\
    55  4C  41  56  5F  53  4D  56  5F  54  4E  49  52          50  001BB
                                                                45  001C9          .ASCII  \E\
                                                                2B  001CA P.ABN:  .ASCII  \+\
24  47  42  44  5C  53  45  55  4C  41  56  47  42  44          1D  001CB P.ABO:  .ASCII  <29>\DBGVALUES\<92>\DBG$PRINT_VMS_VALU\
    55  4C  41  56  5F  53  4D  56  5F  54  4E  49  52          50  001DA
                                                                45  001E8          .ASCII  \E\
                                                                2B  001E9 P.ABP:  .ASCII  \+\
                                                            22  46  41  21  22  05  001EA P.ABQ:  .ASCII  <5>\"!AF"\

                                                                        EXP_ZERO=           P.ABE


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

                                                                07FC 00000 DBG$PRINT_VMS_VALUE:
                                                                           .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9,R10        ; 2277
                                    5A 00000000G   00   9E 00002          MOVAB   FOR$CVT_D_TG, R10
                                    59 00000000G   00   9E 00009          MOVAB   LIB$SIGNAL, R9
                                    58 00000000G   00   9E 00010          MOVAB   DBG$PRINT, R8
                                    57 00000000'   EF   9E 00017          MOVAB   FORMAT_AD, R7
                                    5E         9C  AE   9E 0001E          MOVAB   -100(SP), SP
                                    56         04  AC   D0 00022          MOVL    VMS_DESC, R6                    ; 2288
58  AE                              66             0C   28 00026          MOVC3   #12, (R6), LOCAL_DESC
                                4C  AE 010E0040    8F   D0 0002B          MOVL    #17694784, BUFFER_DESC          ; 2291
                                50  AE         0C  AE   9E 00033          MOVAB   TEXT_BUFFER, BUFFER_DESC+4      ; 2292
                                    50         02  A6   9A 00038          MOVZBL  2(R6), R0                       ; 2294
                                    0C             50   91 0003C          CMPB    R0, #12                         ; 2296
                                                   05   1F 0003F          BLSSU   1$
                                    0D             50   91 00041          CMPB    R0, #13
                                                   0A   1B 00044          BLEQU   2$
                                    1D             50   91 00046 1$:      CMPB    R0, #29
                                                   4E   1F 00049          BLSSU   3$
                                    1E             50   91 0004B          CMPB    R0, #30
                                                   49   1A 0004E          BGTRU   3$
                                    51         58  AE   3C 00050 2$:      MOVZWL  LOCAL_DESC, R1                  ; 2298
                                    51             02   C6 00054          DIVL2   #2, R1
                                58  AE             51   B0 00057          MOVW    R1, LOCAL_DESC
                                5A  AE             02   82 0005B          SUBB2   #2, LOCAL_DESC+2                ; 2299
                                5B  AE             01   90 0005F          MOVB    #1, LOCAL_DESC+3                ; 2300
```

```
                                0167   C7  9F 00063          PUSHAB  P.ABF                                    ; 2301
                                       01  DD 00067          PUSHL   #1
                                       57  DD 00069          PUSHL   R7
                          68           03  FB 0006B          CALLS   #3, DBG$PRINT
                                  58   AE  9F 0006E          PUSHAB  LOCAL_DESC                              ; 2302
                        8B    AF       01  FB 00071          CALLS   #1, DBG$PRINT_VMS_VALUE
                                0168   C7  9F 00075          PUSHAB  P.ABG                                   ; 2303
                                       01  DD 00079          PUSHL   #1
                                       57  DD 0007B          PUSHL   R7
                          68           03  FB 0007D          CALLS   #3, DBG$PRINT
                          50      58   AE  3C 00080          MOVZWL  LOCAL_DESC, R0                          ; 2304
                        5C    AE       50  C0 00084          ADDL2   R0, LOCAL_DESC+4
                                  58   AE  9F 00088          PUSHAB  LOCAL_DESC                              ; 2305
                      FF70    CF       01  FB 0008B          CALLS   #1, DBG$PRINT_VMS_VALUE
                                0169   C7  9F 00090          PUSHAB  P.ABH                                   ; 2306
                                       01  DD 00094          PUSHL   #1
                                     0236  31  00096          BRW     27$
                          0A           50  91 00099 3$:      CMPB    R0, #10                                 ; 2309
                                       57  12 0009C          BNEQ    6$
                        04    AE    5C   BE  56 0009E          CVTFD   @LOCAL_DESC+4, DVALUE                   ; 2321
                                       02  DD 000A3          PUSHL   #2                                      ; 2322
                                       01  DD 000A5          PUSHL   #1
                          7E           07  7D 000A7          MOVQ    #7, -(SP)
                                  5C   AE  9F 000AA          PUSHAB  BUFFER_DESC
                                  18   AE  9F 000AD          PUSHAB  DVALUE
                          6A           06  FB 000B0          CALLS   #6, FOR$CVT_D_TG
                          0F           50  E8 000B3          BLBS    R0, 4$
                                0016A  C7  9F 000B6          PUSHAB  P.ABI                                   ; 2331
                                       01  DD 000BA          PUSHL   #1
                             00028362  8F  DD 000BC          PUSHL   #164706
                          69           03  FB 000C2          CALLS   #3, LIB$SIGNAL
                0C    AE      0040   8F      20  3B 000C5 4$:      SKPC    #32, #64, TEXT_BUFFER               ; 2337
                                       53      51  D0 000CC          MOVL    R1, R3
                              63       50      20  3A 000CF          LOCC    #32, LENGTH, (DIGITS)               ; 2338
                                       52      51  D0 000D3          MOVL    R1, R2
                                0161   C7  FC  A2  D1 000D6          CMPL    -4(SPACES), EXP_ZERO                ; 2339
                                               03  12 000DC          BNEQ    5$
                                       52      04  C2 000DE          SUBL2   #4, SPACES
                                       01      6C  91 000E1 5$:      CMPB    (AP), #1                            ; 2340
                                               6B  1B 000E4          BLEQU   10$
                                       67  08  AC  E9 000E6          BLBC    8(AP), 10$
                                       2D      63  91 000EA          CMPB    (DIGITS), #45                       ; 2341
                                               62  13 000ED          BEQL    10$
                                         0188  C7  9F 000EF          PUSHAB  P.ABJ                               ; 2342
                                               55  11 000F3          BRB     9$
                                       0B      50  91 000F5 6$:      CMPB    R0, #11                             ; 2346
                                               60  12 000F8          BNEQ    11$
                                               02  DD 000FA          PUSHL   #2                                  ; 2354
                                               01  DD 000FC          PUSHL   #1
                                       7E      10  7D 000FE          MOVQ    #16, -(SP)
                                          5C   AE  9F 00101          PUSHAB  BUFFER_DESC
                                          70   AE  DD 00104          PUSHL   LOCAL_DESC+4
                                       6A      06  FB 00107          CALLS   #6, FOR$CVT_D_TG
                                       0F      50  E8 0010A          BLBS    R0, 7$
                                         0189  C7  9F 0010D          PUSHAB  P.ABK                               ; 2363
                                               01  DD 00111          PUSHL   #1
                                     00028362  8F  DD 00113          PUSHL   #164706
```

```
                        69              03  FB 00119           CALLS   #3, LIB$SIGNAL
                0C  AE      0040        8F              20  3B 0011C 7$:    SKPC    #32, #64, TEXT_BUFFER           ;2369
                                        53              51  D0 00123        MOVL    R1, R3
                    63                  50              20  3A 00126        LOCC    #32, LENGTH, (DIGITS)           ;2370
                                        52              51  D0 0012A        MOVL    R1, R2
                            0161        C7      FC      A2  D1 0012D        CMPL    -4(SPACES), EXP_ZERO            ;2371
                                                        03  12 00133        BNEQ    8$
                                        52              04  C2 00135        SUBL2   #4, SPACES
                                        01              6C  91 00138 8$:    CMPB    (AP), #1                        ;2372
                                                        14  1B 0013B        BLEQU   10$
                                        10          08  AC  E9 0013D        BLBC    8(AP), 10$
                                        2D              63  91 00141        CMPB    (DIGITS), #45                   ;2373
                                                        0B  13 00144        BEQL    10$
                                    01A7        C7      9F  00146           PUSHAB  P.ABL                           ;2374
                                                01      DD  0014A 9$:       PUSHL   #1
                                                57      DD  0014C           PUSHL   R7
                                        68              03  FB 0014E        CALLS   #3, DBG$PRINT
                                                        53  DD 00151 10$:   PUSHL   DIGITS                         ;2375
                    7E                  52              53  C3 00153        SUBL3   DIGITS, SPACES, -(SP)
                                                    0175    31 00157        BRW     27$
                                        1B              50  91 0015A 11$:   CMPB    R0, #27                         ;2378
                                                        57  12 0015D        BNEQ    14$
                                                        03  DD 0015F        PUSHL   #3                              ;2386
                                                        01  DD 00161        PUSHL   #1
                                        7E              0F  7D 00163        MOVQ    #15, -(SP)
                                                    5C  AE  9F  00166       PUSHAB  BUFFER_DESC
                                                    70  AE  DD  00169       PUSHL   LOCAL_DESC+4
                        00000000G       00              06  FB 0016C        CALLS   #6, FOR$CVT_G_TG
                                        0F              50  E8 00173        BLBS    R0, 12$
                                    01A8        C7      9F  00176           PUSHAB  P.ABM                           ;2395
                                                01      DD  0017A           PUSHL   #1
                                        00028362        8F  DD 0017C        PUSHL   #164706
                        69                              03  FB 00182        CALLS   #3, LIB$SIGNAL
                0C  AE      0040        8F              20  3B 00185 12$:   SKPC    #32, #64, TEXT_BUFFER           ;2401
                                        55              51  D0 0018C        MOVL    R1, R5
                    65                  50              20  3A 0018F        LOCC    #32, LENGTH, (DIGITS)           ;2402
                                        54              51  D0 00193        MOVL    R1, R4
            0161    C7          FB      A4              05  29 00196        CMPC3   #5, -5(SPACES), EXP_ZERO        ;2403
                                                        03  12 0019D        BNEQ    13$
                                        54              05  C2 0019F        SUBL2   #5, SPACES
                                        01              6C  91 001A2 13$:   CMPB    (AP), #1                        ;2404
                                                        70  1B 001A5        BLEQU   18$
                                        6C          08  AC  E9 001A7        BLBC    8(AP), 18$
                                        2D              65  91 001AB        CMPB    (DIGITS), #45                   ;2405
                                                        67  13 001AE        BEQL    18$
                                    01C6        C7      9F  001B0           PUSHAB  P.ABN                           ;2406
                                                        5A  11 001B4        BRB     17$
                                        1C              50  91 001B6 14$:   CMPB    R0, #28                         ;2410
                                                        65  12 001B9        BNEQ    19$
                                                        04  DD 001BB        PUSHL   #4                              ;2418
                                                        01  DD 001BD        PUSHL   #1
                                        7E              21  7D 001BF        MOVQ    #33, -(SP)
                                                    5C  AE  9F  001C2       PUSHAB  BUFFER_DESC
                                                    70  AE  DD  001C5       PUSHL   LOCAL_DESC+4
                        00000000G       00              06  FB 001C8        CALLS   #6, FOR$CVT_H_TG
                                        0F              50  E8 001CF        BLBS    R0, 15$
                                    01C7        C7      9F  001D2           PUSHAB  P.ABO                           ;2427
```

```
                                    01 DD 001D6          PUSHL   #1
                          00028362  8F DD 001D8          PUSHL   #164706
                                69  03 FB 001DE          CALLS   #3, LIB$SIGNAL
                             0C AE  0040 8F  20 3B 001E1 15$:    SKPC    #32, #64, TEXT_BUFFER                   ;  2433
                                    55  D0 001E8          MOVL    R1, R5
                                65  50  20 3A 001EB          LOCC    #32, LENGTH, (DIGITS)                   ;  2434
                                    54  D1 001EF          MOVL    R1, R4
                           0161 C7  FA  A4 06 29 001F2          CMPC3   #6, -6(SPACES), EXP_ZERO                ;  2435
                                    03  12 001F9          BNEQ    16$
                                    54  06 C2 001FB          SUBL2   #6, SPACES
                                    01  6C 91 001FE 16$:    CMPB    (AP), #1                                ;  2436
                                    14  1B 00201          BLEQU   18$
                                10  08  AC E9 00203          BLBC    8(AP), 18$
                                2D      65 91 00207          CMPB    (DIGITS), #45                           ;  2437
                                    0B  13 0020A          BEQL    18$
                                01E5    C7 9F 0020C          PUSHAB  P.ABP                                   ;  2438
                                    01  DD 00210 17$:    PUSHL   #1
                                    57  DD 00212          PUSHL   R7
                                68      03 FB 00214          CALLS   #3, DBG$PRINT
                                    55  DD 00217 18$:    PUSHL   DIGITS                                  ;  2439
                             7E     54  55 C3 00219          SUBL3   DIGITS, SPACES, -(SP)
                                00AF    31 0021D          BRW     27$
                                0E      50 91 00220 19$:    CMPB    R0, #14                                 ;  2442
                                    3C  12 00223          BNEQ    22$
                                50  58  AE 3C 00225          MOVZWL  LOCAL_DESC, R0                          ;  2450
                           0800 8F      50 B1 00229          CMPW    R0, #2048
                                    05  1B 0022E          BLEQU   20$
                                50  0800 8F 3C 00230          MOVZWL  #2048, R0
                             58 AE      50 B0 00235 20$:    MOVW    R0, LOCAL_DESC
                                51  5C  AE D0 00239          MOVL    LOCAL_DESC+4, ADDR                      ;  2462
                                50  58  AE 3C 0023D          MOVZWL  LOCAL_DESC, BYTES                       ;  2463
                        61      50      00 0C 00241          PROBER  #0, BYTES, (ADDR)                       ;  2464
                                    0D  12 00245          BNEQ    21$
                                    51  DD 00247          PUSHL   ADDR                                    ;  2466
                                    01  DD 00249          PUSHL   #1
                          00028228  8F DD 0024B          PUSHL   #164392
                                69  03 FB 00251          CALLS   #3, LIB$SIGNAL
                                5C  AE DD 00254 21$:    PUSHL   LOCAL_DESC+4                            ;  2469
                                7E  5C  AE 3C 00257          MOVZWL  LOCAL_DESC, -(SP)                       ;  2468
                                01E6    C7 9F 0025B          PUSHAB  P.ABQ
                                    70  11 0025F          BRB     28$
                                01 00000000G 00 91 00261 22$:    CMPB    DBG$GB_LANGUAGE, #1                     ;  2481
                                    22  12 00268          BNEQ    25$
                                02      5A  AE 91 0026A          CMPB    LOCAL_DESC+2, #2                        ;  2483
                                    06  12 0026E          BNEQ    23$
                             5A AE      06 90 00270          MOVB    #6, LOCAL_DESC+2                        ;  2484
                                    16  11 00274          BRB     25$
                                03      5A  AE 91 00276 23$:    CMPB    LOCAL_DESC+2, #3                        ;  2485
                                    06  12 0027A          BNEQ    24$
                             5A AE      07 90 0027C          MOVB    #7, LOCAL_DESC+2                        ;  2486
                                    0A  11 00280          BRB     25$
                                04      5A  AE 91 00282 24$:    CMPB    LOCAL_DESC+2, #4                        ;  2487
                                    04  12 00286          BNEQ    25$
                             5A AE      08 90 00288          MOVB    #8, LOCAL_DESC+2                        ;  2488
                                    5E  DD 0028C 25$:    PUSHL   SP                                      ;  2490
                                50  AE  9F 0028E          PUSHAB  BUFFER_DESC
                                60  AE  9F 00291          PUSHAB  LOCAL_DESC
```

```
                    00000000G  00              03  FB 00294          CALLS   #3, DBG$CVT_DX_DX                                    ;
                               50        5A     AE  9A 00298          MOVZBL  LOCAL_DESC+2, R0                                    ; 2492
                 21 00000000'  EF              50  E1 0029F          BBC     R0, SIGNED_DTYPE, 26$                               ;
                               01              6C  91 002A7          CMPB    (AP), #1                                            ; 2493
                                               1C  1B 002AA          BLEQU   26$                                                 ;
                               18        08    AC  E9 002AC          BLBC    8(AP), 26$                                          ;
                               2D        0C    AE  91 002B0          CMPB    TEXT_BUFFER, #45                                    ; 2494
                                               12  13 002B4          BEQL    26$                                                 ;
                               2B        0C    AE  91 002B6          CMPB    TEXT_BUFFER, #43                                    ;
                                               0C  13 002BA          BEQL    26$                                                 ;
                    0D    AE        0C    AE        6E  28 002BC          MOVC3   TEXT_LENGTH, TEXT_BUFFER, TEXT_BUFFER+1             ; 2496
                              0C    AE              2B  90 002C2          MOVB    #43, TEXT_BUFFER                                    ; 2497
                                                    6E  B6 002C6          INCW    TEXT_LENGTH                                         ; 2498
                                          0C    AE  9F 002C8 26$:         PUSHAB  TEXT_BUFFER                                         ; 2501
                               7E         04    AE  3C 002CB          MOVZWL  TEXT_LENGTH, -(SP)                                  ;
                                                    57  DD 002CF 27$:       PUSHL   R7                                          ;
                               68                   03  FB 002D1 28$:       CALLS   #3, DBG$PRINT                               ;
                                                    04  002D4          RET                                                         ; 2504

; Routine Size:  725 bytes,    Routine Base:  DBG$CODE + 1623
```

```
; 2400          2505  1 END
; 2401          2506  0 ELUDOM


                                                .EXTRN  LIB$SIGNAL

;                               PSECT SUMMARY

;       Name                    Bytes                   Attributes

;  DBG$OWN                         6  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,  PIC,ALIGN(2)
;  DBG$PLIT                      496  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(0)
;  DBG$CODE                     6392  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        55         0        1000        00:01.9
;  _$255$DUA28:[DEBUG.OBJ]STRUCDEF.L32;1
;                                        32         0         0           7        00:00.1
;  _$255$DUA28:[DEBUG.OBJ]DBGLIB.L32;1
;                                      1545       191        12          97        00:01.9
;  _$255$DUA28:[DEBUG.OBJ]DSTRECRDS.L32;1
;                                       418        15         3          31        00:00.3
;  _$255$DUA28:[DEBUG.OBJ]DBGMSG.L32;1
;                                       386        10         2          22        00:00.3


;                                   COMMAND QUALIFIERS

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

; Size:          6392 code + 502 data bytes
; Run Time:         01:43.8
; Elapsed Time:     01:53.6
; Lines/CPU Min:     1448
; Lexemes/CPU-Min: 18095
; Memory Used:  478 pages
; Compilation Complete
```

DBGTASK
LIS

DBGVALUES
LIS

DBGTBK
LIS

GETMEMORY
LIS

DSTRECORDS
LIS

ISSH
LIS

RESETSSI
LIS