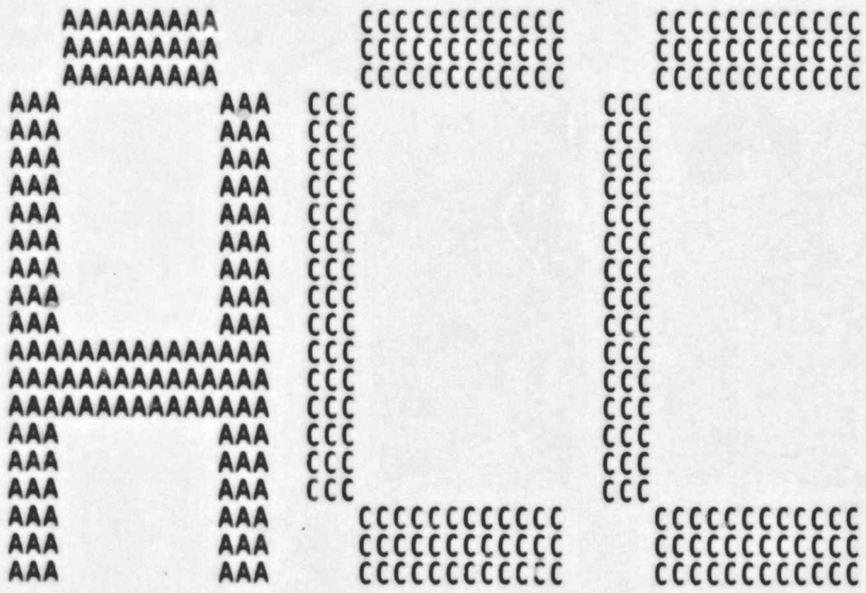
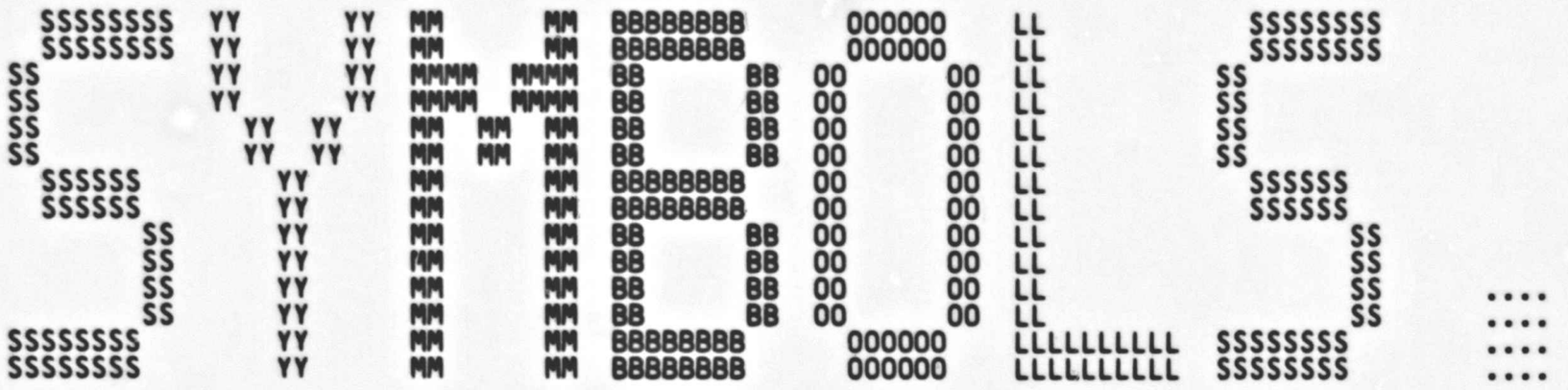
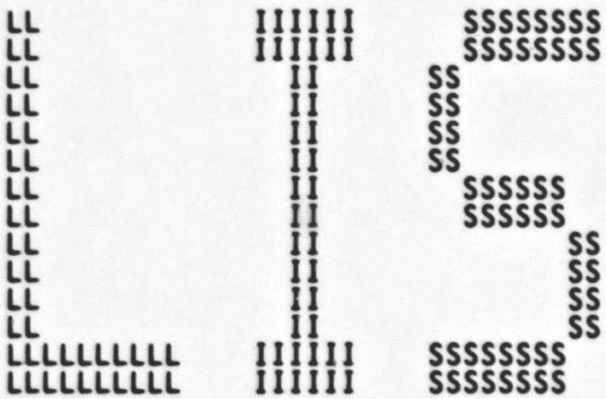
TITLE1**AH-BI13A-BE
TITLE2**VAX/VMS V4.0
FICHENUMBER**1



FILEID**SYMBOLS





```
;     1          0001  0 MODULE symbols (IDENT = 'V04-000') =
;     2          0002  1 BEGIN
;     3          0003  1
;     4          0004  1 !
;     5          0005  1 !*****************************************************************************
;     6          0006  1 !*                                                                           *
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;    24          0024  1 !*                                                                           *
;    25          0025  1 !*                                                                           *
;    26          0026  1 !*****************************************************************************
;    27          0027  1 !
;    28          0028  1
;    29          0029  1 !++
;    30          0030  1 ! FACILITY:  Command language editor
;    31          0031  1 !
;    32          0032  1 ! ABSTRACT:
;    33          0033  1 !
;    34          0034  1 !       This facility is used to enhance the command language
;    35          0035  1 !       and allow user-written commands to be available in the
;    36          0036  1 !       language.
;    37          0037  1 !
;    38          0038  1 ! ENVIRONMENT:
;    39          0039  1 !
;    40          0040  1 !       VAX/VMS operating system. unprivileged user mode,
;    41          0041  1 !
;    42          0042  1 ! AUTHOR:  Tim Halvorsen, Feb 1980
;    43          0043  1 !
;    44          0044  1 ! Modified by:
;    45          0045  1 !
;    46          0046  1 !       V03-001 DAS0001         David Solomon   03-Jul-1984
;    47          0047  1 !               Return success if trying to add a duplicate symbol (SPR 55578).
;    48          0048  1 !
;    49          0049  1 !       V002    DWT0006         David W. Thiel  10-Dec-1981
;    50          0050  1 !               Fix find_record to fail if asked for (n+1)st record.
;    51          0051  1 !
;    52          0052  1 !       V001    TMH0001         Tim Halvorsen   28-Mar-1981
;    53          0053  1 !               Clear upper word of descriptor passed to scan_symbols
;    54          0054  1 !               action routine, in case it uses the entire longword as
;    55          0055  1 !               the length rather than the lower word.
;    56          0056  1 !--
;    57          0057  1
```

```
;    58          0058  1 !
;    59          0059  1 ! Include files
;    60          0060  1 !
;    61          0061  1
;    62          0062  1 LIBRARY 'SYS$LIBRARY:STARLET';          ! VAX/VMS common definitions
;    63          0063  1
;    64          0064  1 !** REQUIRE 'SRC$:CLEDEF';                      ! Utility definitions
;    65          0065  1 !---
;    66          0066  1 !
;    67          0067  1 !       Require file for all modules in the command language editor
;    68          0068  1 !
;    69          0069  1 ! IDENT V02-001
;    70          0070  1 !
;    71          0071  1 !---
;    72          0072  1
;    73          0073  1 !
;    74          0074  1 !*****************************************************************************
;    75          0075  1 !*                                                                           *
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;    93          0093  1 !*                                                                           *
;    94          0094  1 !*                                                                           *
;    95          0095  1 !*****************************************************************************
;    96          0096  1 !
;    97          0097  1
;    98          0098  1 !++
;    99          0099  1 ! FACILITY:  Command language editor
;   100          0100  1 !
;   101          0101  1 ! ABSTRACT:
;   102          0102  1 !
;   103          0103  1 !       This is the common require file for all modules in the
;   104          0104  1 !       command language editor.
;   105          0105  1 !
;   106          0106  1 ! ENVIRONMENT:
;   107          0107  1 !
;   108          0108  1 !       VAX/VMS operating system, unprivileged user mode utility,
;   109          0109  1 !       operates at non-AST level.
;   110          0110  1 !
;   111          0111  1 ! AUTHOR:  Tim Halvorsen,  Feb 1980
;   112          0112  1 !
;   113          0113  1 ! MODIFIED BY:
;   114          0114  1 !
```

```
;  115          0115  1 !       V02-001 BLS0089          Benn Schreiber          16-Oct-1981
;  116          0116  1 !                Add badvalue shared message
;  117          0117  1 !----
```

```
;  119     0118  1
;  120     0119  1 !
;  121     0120  1 !       Define commonly used BLISS definitions
;  122     0121  1 !
;  123     0122  1
;  124     0123  1 !** REQUIRE 'LIB$:UTILDEF';                    ! Commonly used BLISS definitions
;  125     0124  1 !---
;  126     0125  1 !
;  127     0126  1 !       Commonly used definitions for VMS modules written in BLISS
;  128     0127  1 !
;  129     0128  1 ! Version 'V03-000'
;  130     0129  1 !
;  131     0130  1 !****************************************************************************
;  132     0131  1 !*                                                                          *
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;  150     0149  1 !*                                                                          *
;  151     0150  1 !*                                                                          *
;  152     0151  1 !****************************************************************************
;  153     0152  1
;  154     0153  1 !++
;  155     0154  1 ! ABSTRACT:
;  156     0155  1 !
;  157     0156  1 !       This is the common require file for any module written
;  158     0157  1 !       in BLISS
;  159     0158  1 !
;  160     0159  1 ! ENVIRONMENT:
;  161     0160  1 !
;  162     0161  1 !       VAX/VMS operating system.
;  163     0162  1 !
;  164     0163  1 ! AUTHOR:  Tim Halvorsen,  Feb 1980
;  165     0164  1 !
;  166     0165  1 ! MODIFIED BY:
;  167     0166  1 !
;  168     0167  1 !----
```

```
;  170          0168  1 !
;  171          0169  1 !       Equated symbols
;  172          0170  1 !
;  173          0171  1
;  174          0172  1 LITERAL
;  175          0173  1     true        = 1,                    ! boolean true
;  176          0174  1     false       = 0,                    ! boolean false
;  177          0175  1     ok          = 1,                    ! success return code
;  178          0176  1     error       = 2,                    ! error return code
;  179          0177  1     quad        = 8;                    ! quadword allocation definition
;  180          0178  1
;  181          0179  1 !
;  182          0180  1 !       Define structure type for VMS structures
;  183          0181  1 !
;  184          0182  1
;  185          0183  1 STRUCTURE
;  186          0184  1     bblock [o, p, s, e; n] =
;  187          0185  1                [n]
;  188          0186  1                (bblock+o)<p,s,e>;
;  189          0187  1
;  190          0188  1 MACRO
;  191        M 0189  1     descriptor [] =             ! Generate a static string descriptor
;  192        M 0190  1         UPLIT (%CHARCOUNT (%STRING (%REMAINING)),
;  193          0191  1                UPLIT BYTE (%STRING (%REMAINING))) %;
;  194          0192  1
;  195          0193  1 MACRO
;  196        M 0194  1     own_desciptor [] =          ! Generate the actual static string descriptor
;  197        M 0195  1         BBLOCK [8] INITIAL(%CHARCOUNT(%STRING(%REMAINING)),
;  198          0196  1                            UPLIT BYTE (%STRING(%REMAINING))) %;
;  199          0197  1
;  200          0198  1 MACRO
;  201        M 0199  1     return_if_error(command) =
;  202        M 0200  1         BEGIN
;  203        M 0201  1         LOCAL
;  204        M 0202  1             status;
;  205        M 0203  1
;  206        M 0204  1         status = command;
;  207        M 0205  1         IF NOT .status
;  208        M 0206  1         THEN
;  209        M 0207  1             RETURN .status;
;  210          0208  1         END%;
;  211          0209  1
;  212          0210  1 MACRO
;  213        M 0211  1     signal_if_error(command) =
;  214        M 0212  1         BEGIN
;  215        M 0213  1         LOCAL
;  216        M 0214  1             status;
;  217        M 0215  1
;  218        M 0216  1         status = command;
;  219        M 0217  1         IF NOT .status
;  220        M 0218  1         THEN
;  221        M 0219  1             BEGIN
;  222        M 0220  1             SIGNAL(.status);
;  223        M 0221  1             RETURN .status;
;  224        M 0222  1             END;
;  225          0223  1         END%;
;  226          0224  1
```

```
;  227          0225  1 !
;  228          0226  1 ! Macro to implement a function (f) of the message severity level that
;  229          0227  1 ! maps the various severity levels such that arithmetic comparisions of the
;  230          0228  1 ! mapped values (  f(severity) )  yield a order of precedence that is
;  231          0229  1 ! intuivitvely acceptable:
;  232          0230  1 !
;  233          0231  1 !
;  234          0232  1 !                   ERROR NAME      OLDVAL      NEWVAL
;  235          0233  1 !
;  236          0234  1 !                   F(SUCCESS)         1   -->   0
;  237          0235  1 !                   F(INFORMATIONAL)   3   -->   2
;  238          0236  1 !                   F(WARNING)         0   -->   3
;  239          0237  1 !                   F(ERROR)           2   -->   5
;  240          0238  1 !                   F(SEVERE_ERROR)    4   -->   7
;  241          0239  1 !
;  242          0240  1
;  243          0241  1 MACRO
;  244        M 0242  1     severity_level (status) =
;  245        M 0243  1         BEGIN
;  246        M 0244  1         LOCAL code: BBLOCK [LONG];
;  247        M 0245  1         code = status;
;  248        M 0246  1         .code [sts$v_severity] - (4 * .code [sts$v_success]) + 3
;  249          0247  1         END%;
;  250          0248  1
;  251          0249  1 MACRO
;  252        M 0250  1     cli$external(prefix) =
;  253        M 0251  1         %IF %DECLARED(%QUOTE %QUOTE cli$prefix)
;  254        M 0252  1                 %THEN UNDECLARE %QUOTE %QUOTE cli$prefix; %FI
;  255        M 0253  1         MACRO cli$prefix = prefix %QUOTE %;
;  256        M 0254  1         EXTERNAL LITERAL
;  257          0255  1             cli$external_loop(%REMAINING)%,
;  258          0256  1
;  259        M 0257  1     cli$external_loop[name] =
;  260          0258  1         %NAME(cli$prefix,name): UNSIGNED(8)%;
;  261          0259  1
;  262          0260  1 MACRO
;  263        M 0261  1     $external_literal(symbol) =
;  264        M 0262  1         BEGIN
;  265        M 0263  1         %IF NOT %DECLARED(symbol) %THEN EXTERNAL LITERAL symbol
;  266        M 0264  1         %IF %LENGTH GTR 1 %THEN : %REMAINING %FI; %FI
;  267        M 0265  1         symbol
;  268          0266  1         END%;
;  269          0267  1
;  270          0268  1 MACRO
;  271        M 0269  1     $fab_dev(dev_bit) =          ! Access FAB$L_DEV bits of FAB block
;  272        M 0270  1         $BYTEOFFSET(fab$l_dev),
;  273          0271  1         $BITPOSITION(%NAME('dev$v_',dev_bit)),1,0%;
;  274          0272  1
;  275          0273  1 !
;  276          0274  1 ! $SHR_MESSAGES - a macro which defines facility-specific message codes
;  277          0275  1 !         which are based on the system-wide shared message codes.
;  278          0276  1 !
;  279          0277  1 !         $SHR_MESSAGES( name, code, (msg,severity), ... )
;  280          0278  1 !
;  281          0279  1 !         where:
;  282          0280  1 !             "name" is the name of the facility (e.g., COPY)
;  283          0281  1 !             "code" is the corresponding facility code (e.g., 103)
```

```
;   284          0282  1 !           "msg" is the name of the shared message (e.g., BEGIN)
;   285          0283  1 !           "severity" is the desired message severity (e.g., 1, 0, 2)
;   286          0284  1 !
;   287          0285  1
;   288          0286  1 MACRO
;   289        M 0287  1     $SHR_MESSAGES( FACILITY_NAME, FACILITY_CODE ) =
;   290        M 0288  1         LITERAL
;   291          0289  1         SHR$MSG_IDS( FACILITY_NAME, FACILITY_CODE, %REMAINING ); %,
;   292          0290  1
;   293        M 0291  1     SHR$MSG_IDS( FACILITY_NAME, FACILITY_CODE) [ VALUE ] =
;   294          0292  1         SHR$MSG_CALC( FACILITY_NAME, FACILITY_CODE, %REMOVE(VALUE) ) %,
;   295          0293  1
;   296        M 0294  1     SHR$MSG_CALC( FACILITY_NAME, FACILITY_CODE, MSG_ID, SEVERITY ) =
;   297        M 0295  1         %NAME(FACILITY_NAME,'$',MSG_ID) = %NAME('SHR$_',MSG_ID) + FACILITY_CODE*65536 +
;   298        M 0296  1             %IF %DECLARED(%NAME('STS$K_',SEVERITY))
;   299        M 0297  1                 %THEN %NAME('STS$K_',SEVERITY)
;   300          0298  1                 %ELSE SEVERITY %FI %;
```

```
;  302     0299  1
;  303     0300  1 !** REQUIRE 'LIB$:CLIDEF.B32';          ! CLI command table definitions
;  304     0301  1 !
;  305     0302  1 !       Command language interpreter command table structures
;  306     0303  1 !
;  307     0304  1 ! IDENT         V03-003
;  308     0305  1 !
;  309     0306  1
;  310     0307  1 !
;  311     0308  1 !*****************************************************************************
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;  330     0327  1 !*                                                                        *
;  331     0328  1 !*                                                                        *
;  332     0329  1 !*****************************************************************************
;  333     0330  1 !
;  334     0331  1
;  335     0332  1 !++
;  336     0333  1 ! FACILITY:  DCL & MCR Command language interpreters
;  337     0334  1 !
;  338     0335  1 ! ABSTRACT:
;  339     0336  1 !
;  340     0337  1 !       These are the command table structure definitions
;  341     0338  1 !       which describe the generic command table format used
;  342     0339  1 !       by the DCL and MCR command interpreters.
;  343     0340  1 !
;  344     0341  1 ! ENVIRONMENT:
;  345     0342  1 !
;  346     0343  1 !       VAX/VMS operating system. supervisor mode.
;  347     0344  1 !
;  348     0345  1 ! AUTHOR:  Tim Halvorsen, Feb 1980
;  349     0346  1 !
;  350     0347  1 ! Modified by:
;  351     0348  1 !
;  352     0349  1 !       V03-003 PCG0005         Peter George    22-Nov-1982
;  353     0350  1 !               Add INT_W_PMPTLEN and INT_L_PMPTADDR and remove
;  354     0351  1 !               INT_L_PROMPT.
;  355     0352  1 !
;  356     0353  1 !       V03-002 PCG0004         Peter George    18-Oct-1982
;  357     0354  1 !               Add VEC_C_PROMPTMAX, INT_L_PROMPT, and ENT_V_SPELL.
;  358     0355  1 !
```

```
;  359          0356  1  !       V03-001 PCG0003          Peter George    15-Jul-1982
;  360          0357  1  !               Add INT data structure for CLI$INTERFACE routines.
;  361          0358  1  !--
```

```
;  362          0359  1
;  363          0360  1
;  364          0361  1  !
;  365          0362  1  !       Note that the term "SRO" stands for self-relative offset.
;  366          0363  1  !       The actual address is computed by adding the signed contents
;  367          0364  1  !       of the field to the address of the structure.
;  368          0365  1  !
;  369          0366  1  !       If the offset is zero, then there is no associated data.
;  370          0367  1  !
```

```
;  371          0368  1
;  372          0369  1
;  373          0370  1
;  374          0371  1 !
;  375          0372  1 !       DEFINE VECTOR AT FRONT OF COMMAND TABLES DESCRIBING
;  376          0373  1 !       OFFSETS INTO THE SECTION FOR VARIOUS TABLES.
;  377          0374  1 !
;  378          0375  1
;  379          0376  1 !...$VECDEF
;  380          0377  1 MACRO           VEC_L_IMAGETBL  = 0,0,32,0%;            ! OFFSET TO IMAGE TABLE
;  381          0378  1 MACRO           VEC_L_PROMPTBL  = 4,0,32,0%;            ! OFFSET TO PROMPT TABLE
;  382          0379  1 MACRO           VEC_L_QUALTBL   = 8,0,32,0%;            ! OFFSET TO QUALIFIER TABLE
;  383          0380  1 MACRO           VEC_L_VERBTBL   = 12,0,32,0%;           ! OFFSET TO BUILT-IN VERB TABLE
;  384          0381  1 MACRO           VEC_L_VERBEND   = 16,0,32,0%;           ! OFFSET TO END OF VERBTBL
;  385          0382  1 MACRO           VEC_L_USRCMD    = 20,0,32,0%;           ! OFFSET TO USER VERB TABLE
;  386          0383  1 MACRO           VEC_L_USREND    = 24,0,32,0%;           ! OFFSET TO END OF USER VERB TABLE
;  387          0384  1 MACRO           VEC_L_COMDPTR   = 28,0,32,0%;           ! OFFSET TO BUILT-IN POINTER TABLE
;  388          0385  1 MACRO           VEC_L_USERPTR   = 32,0,32,0%;           ! OFFSET TO USER POINTER TABLE
;  389          0386  1 MACRO           VEC_L_FREE      = 36,0,32,0%;                   ! OFFSET TO NEXT FREE BYTE
;  390          0387  1 MACRO           VEC_B_STRLVL    = 40,0,8,0%;            ! TABLE STRUCTURE LEVEL
;  391          0388  1 LITERAL
;  392        P 0389  1 $EQULST (VEC_C_,GBL,0,1
;  393        P 0390  1         ,(STRLVL,5)                           ! CURRENT STRUCTURE LEVEL
;  394          0391  1         );
;  395          0392  1 MACRO           VEC_B_PROMPTMAX = 41,0,8,0%;            ! MAXIMUM SIZE OF ANY PROMPT STRING
;  396          0393  1 LITERAL         VEC_C_LENGTH3   = 42;
;  397          0394  1 LITERAL         VEC_K_LENGTH3   = 42;                           ! LENGTH OF STR LEVEL 3 AND BEFORE VEC
;  398          0395  1 MACRO           VEC_B_CLI       = 42,0,8,0%;                    ! CLI TYPE
;  399          0396  1 LITERAL
;  400        P 0397  1 $EQULST (VEC_C_,GBL,0,1
;  401        P 0398  1         ,(DCL,0)                              ! TABLES ARE FOR DCL
;  402        P 0399  1         ,(MCR,1)                              ! TABLES ARE FOR MCR
;  403          0400  1         );
;  404          0401  1 MACRO           VEC_W_SIZE      = 44,0,16,0%;                   ! SIZE IN BYTES OF VECTOR AREA
;  405          0402  1 LITERAL         VEC_C_LENGTH    = 60;
;  406          0403  1 LITERAL         VEC_K_LENGTH    = 60;                           ! LENGTH OF VECTOR AREA
;  407          0404  1 LITERAL         VEC_C_PROMPTMAX = 32;                   ! MAXIMUM SIZE OF ANY PROMPT STRING
;  408          0405  1
```

```
;  409     0406  1
;  410     0407  1
;  411     0408  1 !
;  412     0409  1 !       DEFINE COMMAND DESCRIPTOR BLOCK
;  413     0410  1 !
;  414     0411  1
;  415     0412  1 !...$CMDDEF
;  416     0413  1 MACRO       CMD_B_SIZE      = 0,0,8,0%;             ! SIZE OF COMMAND DESCRIPTOR BLOCK
;  417     0414  1 MACRO       CMD_B_VERBTYP   = 1,0,8,0%;     ! VERB GENERIC TYPE
;  418     0415  1 MACRO       CMD_B_PARMCNT   = 2,0,8,0%;     ! MIN/MAX PARAMETER COUNTS
;  419     0416  1
;  420     0417  1 MACRO       CMD_V_MINPARM   = 2,0,4,0%;     ! MINIMUM NUMBER OF PARAMETERS REQUIRED
;  421     0418  1 MACRO       CMD_V_MAXPARM   = 2,4,4,0%;     ! MAXIMUM NUMBER OF PARAMETERS ALLOWED
;  422     0419  1
;  423     0420  1 MACRO       CMD_B_FLAGS     = 3,0,8,0%;             ! COMMAND FLAGS
;  424     0421  1
;  425     0422  1 MACRO       CMD_V_ABREV     = 3,0,1,0%;             ! COMMAND MAY BE ABBREVIATED NON-UNIQUELY
;  426     0423  1 LITERAL     CMD_M_ABREV     = 1^1 - 1^0;
;  427     0424  1                             ! TO A SINGLE CHARACTER
;  428     0425  1 MACRO       CMD_V_NOSTAT    = 3,1,1,0%;             ! COMMAND DOES NOT RETURN VALID STATUS
;  429     0426  1 LITERAL     CMD_M_NOSTAT    = 1^2 - 1^1;
;  430     0427  1 MACRO       CMD_V_FOREIGN   = 3,2,1,0%;             ! FOREIGN COMMAND - NO PARSING IS DONE
;  431     0428  1 LITERAL     CMD_M_FOREIGN   = 1^3 - 1^2;
;  432     0429  1 MACRO       CMD_V_IMMED     = 3,3,1,0%;             ! COMMAND IS IMMEDIATELY DISPATCHED W/O PARSING
;  433     0430  1 LITERAL     CMD_M_IMMED     = 1^4 - 1^3;
;  434     0431  1 MACRO       CMD_V_MCRPARSE  = 3,4,1,0%;     ! COMMAND IS MCR STYLE COMMAND (OUT=IN)
;  435     0432  1 LITERAL     CMD_M_MCRPARSE  = 1^5 - 1^4;
;  436     0433  1                             ! (THIS FLAG ONLY EXAMINED BY MCR CLI)
;  437     0434  1
;  438     0435  1 MACRO       CMD_W_IMAGE     = 4,0,16,1%;    ! SRO TO ASCIC IMAGE NAME
;  439     0436  1 MACRO       CMD_W_QUALS     = 6,0,16,1%;    ! SRO TO FIRST NONPOSITIONAL ENTITY
;  440     0437  1 MACRO       CMD_W_PARMS     = 8,0,16,1%;    ! SRO TO FIRST POSITIONAL ENTITY
;  441     0438  1 MACRO       CMD_W_OUTPUTS   = 10,0,16,1%;   ! SRO TO LIST OF "OUTPUT" ENTITIES
;  442     0439  1 MACRO       CMD_W_MUTEXSET  = 12,0,16,1%;   ! SRO TO MUTUAL EXCLUSION SET
;  443     0440  1 MACRO       CMD_W_IMPSET    = 14,0,16,1%;   ! SRO TO IMPLICATION SET
;  444     0441  1 LITERAL     CMD_C_LENGTH    = 16;
;  445     0442  1 LITERAL     CMD_K_LENGTH    = 16;                   ! LENGTH OF FIXED PORTION
;  446     0443  1 !
;  447     0444  1 ! OUTPUT LIST FORMAT:
;  448     0445  1 !
;  449     0446  1 ! FIRST BYTE CONTAINS COUNT OF ENTRIES IN LIST EACH ENTRY IS ONE BYTE,
;  450     0447  1 ! SIGNED. DESCRIBING THAT "OUTPUT NUMBER".  NEGATIVE VALUES INDICATE THE
;  451     0448  1 ! OUTPUT IS A PARAMETER AND THE ABS(VALUE) IS THE PARAMETER NUMBER.
;  452     0449  1 ! POSITIVE VALUES INDICATE THE OUTPUT IS A QUALIFIER AND THE VALUE IS A
;  453     0450  1 ! QUALIFIER NUMBER.
;  454     0451  1 !
;  455     0452  1 ! QUAL IS (0:MAXQUALS-1),PARM IS (MAXQUALS:255)
;  456     0453  1 !
;  457     0454  1 LITERAL     CMD_C_MAXPARMS  = 8;            ! MAXIMUM POSSIBLE PARAMETERS
;  458     0455  1 LITERAL     CMD_C_MAXQUALS  = 248;          ! MAXIMUM POSSIBLE QUALIFIERS (256-8)
;  459     0456  1
```

```
;  460          0457  1
;  461          0458  1
;  462          0459  1 !
;  463          0460  1 !       DEFINE ENTITY DESCRIPTOR BLOCK
;  464          0461  1 !
;  465          0462  1
;  466          0463  1 !...$ENTDEF
;  467          0464  1 MACRO           ENT_B_NEXT      = 0,0,8,0%;             ! OFFSET TO NEXT BLOCK IN CHAIN
;  468          0465  1 MACRO           ENT_B_SIZE      = 1,0,8,0%;             ! SIZE OF THIS BLOCK IN BYTES
;  469          0466  1 MACRO           ENT_B_TYPE      = 2,0,8,0%;
;  470          0467  1 LITERAL
;  471        P 0468  1 $EQULST (ENT_C_,GBL,0,1
;  472        P 0469  1         ,(PARAMETER,)               ! POSITIONAL VALUE DELIMITED BY SPACE
;  473        P 0470  1         ,(QUALIFIER,)               ! NONPOSITIONAL KEYWORD DELIMITED BY SLASH
;  474          0471  1         );
;  475          0472  1 MACRO           ENT_B_VALTYPE   = 3,0,8,0%;     ! TYPE OF VALUE
;  476          0473  1 LITERAL
;  477        P 0474  1 $EQULST (ENT_C_,GBL,1,1                   ! (STARTING AT #1)
;  478        P 0475  1         ,(INFILE,)                        ! INPUT FILE SPECIFICATION
;  479        P 0476  1         ,(OUTFILE,)                       ! OUTPUT FILE SPECIFICATION
;  480        P 0477  1         ,(NUMBER,)                        ! DECIMAL INTEGER NUMBER
;  481        P 0478  1         ,(PRIVILEGE,)             ! PRIVILEGE KEYWORD
;  482        P 0479  1         ,(DATETIME,)              ! DATE/TIME SPECIFICATION
;  483        P 0480  1         ,(PROTECTION,)            ! PROTECTION SPECIFICATION
;  484        P 0481  1         ,(PROCESS,)                       ! PROCESS NAME
;  485        P 0482  1         ,(INLOG,)                         ! INPUT LOGICAL NAME
;  486        P 0483  1         ,(OUTLOG,)                        ! OUTPUT LOGICAL NAME
;  487        P 0484  1         ,(INSYM,)                         ! INPUT SYMBOL NAME
;  488        P 0485  1         ,(OUTSYM,)                        ! OUTPUT SYMBOL NAME
;  489        P 0486  1         ,(NODE,)                          ! NODE NAME
;  490        P 0487  1         ,(DEVICE,)                        ! NODE/DEVICE NAME
;  491        P 0488  1         ,(DIR,)                           ! NODE/DEVICE/DIRECTORY NAME
;  492        P 0489  1         ,(UIC,)                           ! UIC SPECIFICATION
;  493        P 0490  1         ,(RESTOFLINE,)            ! GOBBLE REST OF COMMAND STRING AS VALUE
;  494          0491  1         );
;  495          0492  1
;  496          0493  1 MACRO           ENT_W_NAME      = 4,0,16,1%;    ! SRO TO ASCIC ENTITY NAME (USER SPELLING)
;  497          0494  1 MACRO           ENT_W_NUMBER    = 4,0,16,0%;    ! OR, PARAMETER NUMBER (POSITIONAL)
;  498          0495  1 MACRO           ENT_W_LABEL     = 6,0,16,1%;    ! SRO TO ASCIC ENTITY LABEL (FOR PGM USE)
;  499          0496  1 MACRO           ENT_W_DEFVAL    = 8,0,16,1%;    ! SRO TO ASCIC DEFAULT VALUE
;  500          0497  1 MACRO           ENT_W_SYNTAX    = 10,0,16,1%;   ! SRO TO SYNTAX LIST
;  501          0498  1 MACRO           ENT_W_KEYWORDS  = 12,0,16,1%;   ! SRO TO VALUE KEYWORD LIST
;  502          0499  1                 ! IF ZERO, ALL VALUES ARE LEGAL
;  503          0500  1 MACRO           ENT_W_PROMPT    = 14,0,16,1%;   ! SRO TO VALUE PROMPT
;  504          0501  1 MACRO           ENT_L_FLAGS     = 16,0,32,0%;           ! ENTITY FLAGS
;  505          0502  1
;  506          0503  1 MACRO           ENT_V_FILE      = 16,0,1,0%;            ! VALUE IS FILE SPECIFICATION
;  507          0504  1 LITERAL         ENT_M_FILE      = 1^1 - 1^0;
;  508          0505  1 MACRO           ENT_V_VAL       = 16,1,1,0%;            ! CAN HAVE A VALUE
;  509          0506  1 LITERAL         ENT_M_VAL       = 1^2 - 1^1;
;  510          0507  1 MACRO           ENT_V_NEG       = 16,2,1,0%;            ! VALUE CAN BE NEGATED
;  511          0508  1 LITERAL         ENT_M_NEG       = 1^3 - 1^2;
;  512          0509  1 MACRO           ENT_V_DEFTRUE   = 16,3,1,0%;            ! TRUE BY DEFAULT
;  513          0510  1 LITERAL         ENT_M_DEFTRUE   = 1^4 - 1^3;
;  514          0511  1 MACRO           ENT_V_BATDEF    = 16,4,1,0%;            ! PRESENT BY DEFAULT IF BATCH JOB
;  515          0512  1 LITERAL         ENT_M_BATDEF    = 1^5 - 1^4;
;  516          0513  1 MACRO           ENT_V_VALREQ    = 16,5,1,0%;            ! VALUE IS REQUIRED
```

```
;   517     0514  1  LITERAL     ENT_M_VALREQ     = 1^6 - 1^5;
;   518     0515  1  MACRO       ENT_V_LIST       = 16,6,1,0%;          ! COMMA-SEPARATED LIST OF VALUES ALLOWED
;   519     0516  1  LITERAL     ENT_M_LIST       = 1^7 - 1^6;
;   520     0517  1  MACRO       ENT_V_CONCAT     = 16,7,1,0%;          ! CONCATENATED VALUES ALLOWED
;   521     0518  1  LITERAL     ENT_M_CONCAT     = 1^8 - 1^7;
;   522     0519  1  MACRO       ENT_V_IMPCAT     = 16,8,1,0%;          ! VALUES ARE IMPLICITLY CONCATENATED
;   523     0520  1  LITERAL     ENT_M_IMPCAT     = 1^9 - 1^8;
;   524     0521  1  MACRO       ENT_V_VERB       = 16,9,1,0%;          ! QUALIFIER CAN APPEAR ON COMMAND VERB
;   525     0522  1  LITERAL     ENT_M_VERB       = 1^10 - 1^9;
;   526     0523  1  MACRO       ENT_V_PARM       = 16,10,1,0%;         ! QUALIFIER CAN APPEAR ON PARAMETER
;   527     0524  1  LITERAL     ENT_M_PARM       = 1^11 - 1^10;
;   528     0525  1  MACRO       ENT_V_MCROPTDLM  = 16,11,1,0%;   ! VALUE DELIMITER IS OPTIONAL (MCR)
;   529     0526  1  LITERAL     ENT_M_MCROPTDLM  = 1^12 - 1^11;
;   530     0527  1  MACRO       ENT_V_MCRIGNORE  = 16,12,1,0%;   ! IGNORE THIS ENTITY BLOCK (MCR)
;   531     0528  1  LITERAL     ENT_M_MCRIGNORE  = 1^13 - 1^12;
;   532     0529  1  MACRO       ENT_V_SPELL      = 16,13,1,0%;         ! ONLY CHECK FIRST FOUR CHARS OF KEYWORD VALUES
;   533     0530  1  LITERAL     ENT_M_SPELL      = 1^14 - 1^13;
;   534     0531  1
;   535     0532  1  LITERAL     ENT_C_LENGTH     = 20;
;   536     0533  1  LITERAL     ENT_K_LENGTH     = 20;                 ! LENGTH OF FIXED LENGTH PORTION
;   537     0534  1
```

```
;  538          0535  1
;  539          0536  1
;  540          0537  1 !
;  541          0538  1 !       DEFINE CHANGE LIST STRUCTURE
;  542          0539  1 !
;  543          0540  1
;  544          0541  1 !...$CHGDEF
;  545          0542  1 MACRO           CHG_B_SIZE      = 0,0,8,0%;             ! SIZE OF CHANGE LIST BLOCK
;  546          0543  1 MACRO           CHG_B_FLAGS     = 1,0,8,0%;             ! FLAGS
;  547          0544  1
;  548          0545  1 MACRO           CHG_V_IMAGE     = 1,0,1,0%;             ! IMAGE CHANGE
;  549          0546  1 LITERAL         CHG_M_IMAGE     = 1^1 - 1^0;
;  550          0547  1 MACRO           CHG_V_PARMS     = 1,1,1,0%;             ! PARAMETER(S) CHANGE
;  551          0548  1 LITERAL         CHG_M_PARMS     = 1^2 - 1^1;
;  552          0549  1 MACRO           CHG_V_QUALS     = 1,2,1,0%;             ! QUALIFIER(S) CHANGE
;  553          0550  1 LITERAL         CHG_M_QUALS     = 1^3 - 1^2;
;  554          0551  1 MACRO           CHG_V_MCRIGNORE = 1,3,1,0%;     ! IGNORE IF CLI IS MCR
;  555          0552  1 LITERAL         CHG_M_MCRIGNORE = 1^4 - 1^3;
;  556          0553  1
;  557          0554  1 MACRO           CHG_W_IMAGE     = 2,0,16,1%;    ! SRO TO NEW IMAGE
;  558          0555  1 MACRO           CHG_B_PARMCNT   = 4,0,8,0%;     ! MIN/MAX PARAMETER COUNTS
;  559          0556  1
;  560          0557  1 MACRO           CHG_V_MINPARM   = 4,0,4,0%;     ! MINIMUM NUMBER OF PARAMETERS REQUIRED
;  561          0558  1 MACRO           CHG_V_MAXPARM   = 4,4,4,0%;     ! MAXIMUM NUMBER OF PARAMETERS ALLOWED
;  562          0559  1
;  563          0560  1 MACRO           CHG_W_PARMS     = 5,0,16,1%;    ! SRO TO FIRST PARAMETER DESCRIPTOR
;  564          0561  1 MACRO           CHG_W_QUALS     = 7,0,16,1%;    ! SRO TO FIRST QUALIFIER DESCRIPTOR
;  565          0562  1 LITERAL         CHG_C_LENGTH    = 9;
;  566          0563  1 LITERAL         CHG_K_LENGTH    = 9;
;  567          0564  1
```

```
;  568          0565  1
;  569          0566  1
;  570          0567  1 !
;  571          0568  1 !       DEFINE IND STRUCTURE FOR CLI$INTERFACE ROUTINES
;  572          0569  1 !
;  573          0570  1
;  574          0571  1 !...$INTDEF
;  575          0572  1
;  576          0573  1 MACRO           INT_B_TYPE      = 0,0,8,0%;             ! TYPE OF REQUEST
;  577          0574  1 MACRO           INT_L_TABLES    = 4,0,32,0%;            ! ADDRESS OF COMMAND TABLES
;  578          0575  1
;  579          0576  1 MACRO           INT_W_ENTLEN    = 8,0,16,0%;    ! LENGTH OF ENTITY NAME
;  580          0577  1 MACRO           INT_L_ENTADDR   = 12,0,32,0%;           ! ADDRESS OF ENTITY NAME
;  581          0578  1
;  582          0579  1 MACRO           INT_W_RETLEN    = 8,0,16,0%;    ! LENGTH OF RETURN VALUE
;  583          0580  1 MACRO           INT_L_RETADDR   = 12,0,32,0%;           ! ADDRESS OF RETURN VALUE
;  584          0581  1 MACRO           INT_L_GETVM     = 16,0,32,0%;           ! ADDRESS OF LIB$GET_VM ROUTINE
;  585          0582  1 MACRO           INT_L_FREEVM    = 20,0,32,0%;           ! ADDRESS OF LIB$FREE_VM ROUTINE
;  586          0583  1 MACRO           INT_L_LIST      = 24,0,32,0%;           ! ADDRESS OF AUXILIARY ARGUMENT LIST
;  587          0584  1 LITERAL         INT_C_LENGTH    = 28;
;  588          0585  1 LITERAL         INT_K_LENGTH    = 28;
;  589          0586  1
;  590          0587  1 MACRO           INT_L_LISTLEN   = 0,0,32,0%;            ! LENGTH OF AUXILIARY ARGUMENT LIST
;  591          0588  1 MACRO           INT_L_PROMPTRTN = 4,0,32,0%;    ! ADDRESS OF PROMPT ROUTINE
;  592          0589  1 MACRO           INT_L_CONTINRTN = 8,0,32,0%;    ! ADDRESS OF CONTINUATION ROUTINE
;  593          0590  1 MACRO           INT_W_PMPTLEN   = 12,0,16,0%;   ! LENGTH OF PROMPT STRING
;  594          0591  1 MACRO           INT_L_PMPTADDR  = 16,0,32,0%;   ! ADDRESS OF PROMPT STRING
;  595          0592  1
;  596          0593  1 !
;  597          0594  1 !       Define shared message codes.
;  598          0595  1 !
;  599          0596  1
;  600        P 0597  1 $SHR_MESSAGES(msg,155,
;  601        P 0598  1               (badvalue,severe),              ! Bad value for keyword
;  602        P 0599  1               (syntax,severe),                ! Syntax error
;  603        P 0600  1               (openin,error),                 ! Unable to access input file
;  604        P 0601  1               (openout,severe),               ! Unable to access output file
;  605        P 0602  1               (readerr,severe),               ! Error reading input file
;  606        P 0603  1               (closedel,error),               ! Unable to close input file
;  607        P 0604  1               (searchfail,error),             ! Error searching for file
;  608        P 0605  1               (writeerr,error),               ! Error writing file
;  609          0606  1               );
;  610          0607  1
;  611          0608  1 MACRO
;  612        M 0609  1     emsg(ident) =
;  613        M 0610  1         BEGIN
;  614        M 0611  1         %IF NOT %DECLARED(%NAME('msg$_',ident))
;  615        M 0612  1                 %THEN EXTERNAL LITERAL %NAME('msg$_',ident); %FI
;  616        M 0613  1         %NAME('msg$_',ident)
;  617          0614  1         END%;
;  618          0615  1
;  619          0616  1 !** REQUIRE 'LIB$:SYMDEF';                       ! Symbol table definitions
;  620          0617  1  !-----
;  621          0618  1  !
;  622          0619  1  !       Symbol table management structures
;  623          0620  1  !
;  624          0621  1  ! IDENT V02-000
```

```
;  625     0622  1 !
;  626     0623  1 !-----
;  627     0624  1
;  628     0625  1 !
;  629     0626  1 !*****************************************************************************
;  630     0627  1 !*                                                                           *
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;  649     0646  1 !*                                                                           *
;  650     0647  1 !*****************************************************************************
;  651     0648  1 !
;  652     0649  1
;  653     0650  1
;  654     0651  1 !
;  655     0652  1 !       Define symbol table entry
;  656     0653  1 !
;  657     0654  1 !       (Length is SYM$C_FIXEDLEN + .SYM$B_SYMLEN)
;  658     0655  1 !
;  659     0656  1
;  660     0657  1 !...$SYMDEF
;  661     0658  1
;  662     0659  1 MACRO           SYM$L_LINK      = 0,0,32,0%;            ! LINK TO NEXT IN CHAIN
;  663     0660  1 MACRO           SYM$L_VALUE     = 4,0,32,0%;            ! VALUE OF SYMBOL
;  664     0661  1 MACRO           SYM$B_SYMLEN    = 8,0,8,0%;     ! LENGTH OF SYMBOL NAME
;  665     0662  1 LITERAL         SYM$C_FIXEDLEN  = 9;
;  666     0663  1 LITERAL         SYM$K_FIXEDLEN  = 9;            ! LENGTH OF FIXED PORTION OF ENTRY
;  667     0664  1 MACRO           SYM$T_SYMBOL    = 9,0,8,0%;     ! SYMBOL NAME
```

```
;  669          0665  1 !
;  670          0666  1 ! Table of contents
;  671          0667  1 !
;  672          0668  1
;  673          0669  1 FORWARD ROUTINE
;  674          0670  1     add_record,                     ! Add record to linked list
;  675          0671  1     find_record,                    ! Find record by number
;  676          0672  1     delete_list,                    ! Deallocate entire record list
;  677          0673  1     add_symbol,                     ! Add symbol to symbol table
;  678          0674  1     lookup_symbol,                  ! Lookup symbol in symbol table
;  679          0675  1     lookup_value,                   ! Lookup value in symbol table
;  680          0676  1     scan_symbols,                   ! Scan all symbols in symbol table
;  681          0677  1     delete_symbol,                  ! Delete symbol from symbol table
;  682          0678  1     delete_symbols,                 ! Delete entire symbol table
;  683          0679  1     allocate,                       ! Allocate dynamic storage
;  684          0680  1     deallocate;                     ! Deallocate dynamic storage
;  685          0681  1
;  686          0682  1 !
;  687          0683  1 ! Storage definitions
;  688          0684  1 !
;  689          0685  1
;  690          0686  1 GLOBAL
;  691          0687  1     symbol_header:      VECTOR [64]     ! List of listheads for symbol tables
;  692          0688  1                         INITIAL(REP 64 OF (0)); ! Set all listheads empty
;  693          0689  1
;  694          0690  1 !
;  695          0691  1 ! External routines
;  696          0692  1 !
;  697          0693  1
;  698          0694  1 EXTERNAL ROUTINE
;  699          0695  1     lib$get_vm: ADDRESSING_MODE(GENERAL),       ! Allocate dynamic storage
;  700          0696  1     lib$free_vm: ADDRESSING_MODE(GENERAL);      ! Deallocate dynamic storage
```

```
;   702          0697  1 GLOBAL ROUTINE add_record (listhead, address, length) =
;   703          0698  1
;   704          0699  1 !---
;   705          0700  1 !
;   706          0701  1 !       This routine adds a given data record to the
;   707          0702  1 !       end of a given linked list.
;   708          0703  1 !
;   709          0704  1 ! Inputs:
;   710          0705  1 !
;   711          0706  1 !       listhead = Address of listhead for list
;   712          0707  1 !       address = Address of data record
;   713          0708  1 !       length = Length of data record
;   714          0709  1 !
;   715          0710  1 ! Outputs:
;   716          0711  1 !
;   717          0712  1 !       routine = status (already signaled)
;   718          0713  1 !---
;   719          0714  1
;   720          0715  2 BEGIN
;   721          0716  2
;   722          0717  2 LOCAL
;   723          0718  2     new_entry:  REF VECTOR,             ! Address of newly allocated entry
;   724          0719  2     entry:      REF VECTOR;             ! Current entry address
;   725          0720  2
;   726          0721  2
;   727        P 0722  2 RETURN_IF_ERROR                       ! Allocate space; signal any error
;   728          0723  2         (allocate(.length+8,new_entry));
;   729          0724  2
;   730          0725  2 new_entry [1] = .length;                ! Set length into entry
;   731          0726  2 CH$MOVE(.length, .address, new_entry [2]);      ! Copy data into entry
;   732          0727  2
;   733          0728  2 entry = .listhead;                      ! Start at listhead itself
;   734          0729  2
;   735          0730  2 WHILE .entry [0] NEQ 0                  ! While not end of list
;   736          0731  2 DO
;   737          0732  2     entry = .entry [0];                 ! link to next in chain
;   738          0733  2
;   739          0734  2 entry [0] = .new_entry;                 ! set link of last entry to new one
;   740          0735  2 new_entry [0] = 0;                      ! and set new "end of list"
;   741          0736  2
;   742          0737  2 RETURN true;
;   743          0738  2
;   744          0739  1 END;


                                        .TITLE  SYMBOLS
                                        .IDENT  \V04-000\

                                        .PSECT  $GLOBAL$,NOEXE,2

00000000# 00000 SYMBOL_HEADER::
                                        .LONG   0[64]                                   ;

                                        .EXTRN  LIB$GET_VM, LIB$FREE_VM

                                        .PSECT  $CODE$,NOWRT,2
```

```
                                                 007C 00000           .ENTRY  ADD_RECORD, Save R2,R3,R4,R5,R6                 ; 0697
                                              5E 04 C2 00002           SUBL2   #4, SP                                          ;
                                              5E DD 00005              PUSHL   SP                                              ; 0723
                                        7E    0C AC 08 C1 00007        ADDL3   #8, LENGTH, -(SP)                               ;
                                        0000V CF    02 FB 0000C        CALLS   #2, ALLOCATE                                    ;
                                              24    50 E9 00011        BLBC    STATUS, 3$                                      ;
                                              56    6E D0 00014        MOVL    NEW_ENTRY, R6                                   ; 0725
                                           04 A6    0C AC D0 00017     MOVL    LENGTH, 4(R6)                                   ;
                                     08 A6 08 BC    0C AC 28 0001C     MOVC3   LENGTH, @ADDRESS, 8(R6)                         ; 0726
                                              50    04 AC D0 00023     MOVL    LISTHEAD, ENTRY                                 ; 0728
                                                    60 D5 00027 1$:    TSTL    (ENTRY)                                         ; 0730
                                                    05 13 00029        BEQL    2$                                              ;
                                              50    60 D0 0002B        MOVL    (ENTRY), ENTRY                                  ; 0732
                                                    F7 11 0002E        BRB     1$                                              ;
                                              60    56 D0 00030 2$:    MOVL    R6, (ENTRY)                                     ; 0734
                                                    66 D4 00033        CLRL    (R6)                                            ; 0735
                                              50    01 D0 00035        MOVL    #1, R0                                          ; 0737
                                                       04 00038 3$:    RET                                                     ; 0739

; Routine Size:  57 bytes,    Routine Base:  $CODE$ + 0000
```

```
;  746     0740  1 GLOBAL ROUTINE find_record (listhead, number, retadr) =
;  747     0741  1
;  748     0742  1 !---
;  749     0743  1 !
;  750     0744  1 !       This routine locates a given record of data by
;  751     0745  1 !       record number in any given list.  The address
;  752     0746  1 !       returned is the address of the data itself.
;  753     0747  1 !
;  754     0748  1 ! Inputs:
;  755     0749  1 !
;  756     0750  1 !       listhead = Address of listhead of list
;  757     0751  1 !       number = Record number to find
;  758     0752  1 !       retadr = Address of longword to receive data address
;  759     0753  1 !
;  760     0754  1 ! Outputs:
;  761     0755  1 !
;  762     0756  1 !       routine = true if found, else false
;  763     0757  1 !---
;  764     0758  1
;  765     0759  2 BEGIN
;  766     0760  2
;  767     0761  2 LOCAL
;  768     0762  2     entry:      REF VECTOR;             ! Address of current entry
;  769     0763  2
;  770     0764  2 entry = ..listhead;                     ! Start at first entry
;  771     0765  2
;  772     0766  2 INCR i FROM 1 TO .number-1              ! Skip first number-1 entries
;  773     0767  2 DO
;  774     0768  3     BEGIN
;  775     0769  3     IF .entry EQL 0                     ! If premature end of list,
;  776     0770  3     THEN
;  777     0771  3         RETURN false;                   ! return entry not found
;  778     0772  3     entry = .entry [0];                 ! Skip to next entry in list
;  779     0773  2     END;
;  780     0774  2
;  781     0775  2 IF .entry EQL 0                         ! End of list
;  782     0776  2 THEN
;  783     0777  2     RETURN false;
;  784     0778  2
;  785     0779  2 .retadr = entry [2];                    ! Return address of data itself
;  786     0780  2 RETURN true;                            ! Return successful
;  787     0781  2
;  788     0782  1 END;


                                0000 00000          .ENTRY  FIND_RECORD, Save nothing                ;  0740
                          51    04 BC   D0 00002      MOVL    @LISTHEAD, ENTRY                         ;  0764
                                   50   D4 00006      CLRL    I                                        ;  0766
                                   07   11 00008      BRB     2$                                       ;
                                   51   D5 0000A 1$:   TSTL    ENTRY                                    ;  0769
                                   15   13 0000C      BEQL    3$                                       ;
                          51            61   D0 0000E      MOVL    (ENTRY), ENTRY                       ;  0772
                    F4    50    08 AC   F2 00011 2$:   AOBLSS  NUMBER, I, 1$                           ;  0766
                                   51   D5 00016      TSTL    ENTRY                                    ;  0775
```

```
                                    09  13 00018          BEQL    3$                                          ;
                            0C  BC      08  A1  9E 0001A          MOVAB   8(R1), @RETADR                      ; 0779
                                50          01  D0 0001F          MOVL    #1, R0                              ; 0780
                                            04  00022          RET                                         ;
                                            50  D4 00023 3$:     CLRL    R0                                  ; 0782
                                            04  00025          RET                                         ;

; Routine Size:  38 bytes,    Routine Base:  $CODE$ + 0039
```

```
;  790     0783  1 GLOBAL ROUTINE delete_list (listhead) =
;  791     0784  1
;  792     0785  1 !---
;  793     0786  1 !
;  794     0787  1 !       This routine deallocates all storage associated
;  795     0788  1 !       with a given record list.
;  796     0789  1 !
;  797     0790  1 ! Inputs:
;  798     0791  1 !
;  799     0792  1 !       listhead = Address of listhead for list
;  800     0793  1 !
;  801     0794  1 ! Outputs:
;  802     0795  1 !
;  803     0796  1 !       None
;  804     0797  1 !---
;  805     0798  1
;  806     0799  2 BEGIN
;  807     0800  2
;  808     0801  2 LOCAL
;  809     0802  2     entry:      REF VECTOR;             ! Address of current entry
;  810     0803  2
;  811     0804  2 entry = ..listhead;                     ! Start at first entry
;  812     0805  2
;  813     0806  2 WHILE .entry NEQ 0                      ! For each entry in list,
;  814     0807  2 DO
;  815     0808  3     BEGIN
;  816     0809  3     LOCAL next_entry;
;  817     0810  3     next_entry = .entry [0];            ! Save pointer to next entry
;  818     0811  3     deallocate(.entry [1]+8, .entry);   ! Deallocate memory for entry
;  819     0812  3     entry = .next_entry;                ! Skip to next entry in list
;  820     0813  2     END;
;  821     0814  2
;  822     0815  2 .listhead = 0;                          ! Zero listhead
;  823     0816  2
;  824     0817  2 RETURN true;                            ! Success
;  825     0818  2
;  826     0819  1 END;


                                                000C 00000          .ENTRY  DELETE_LIST, Save R2,R3                 ; 0783
                                  52        04  BC   D0 00002       MOVL    @LISTHEAD, ENTRY                        ;  0804
                                                14   13 00006 1$:   BEQL    2$                                      ;  0806
                                  53            62   D0 00008       MOVL    (ENTRY), NEXT_ENTRY                     ;  0810
                                                52   DD 0000B       PUSHL   ENTRY                                   ;  0811
                              7E        04      A2       08 C1 0000D       ADDL3   #8, 4(ENTRY), -(SP)             ;
                                    0000V       CF       02 FB 00012       CALLS   #2, DEALLOCATE                  ;
                                  52            53   D0 00017       MOVL    NEXT_ENTRY, ENTRY                       ;  0812
                                                EA   11 0001A       BRB     1$                                      ;  0806
                                        04      BC   D4 0001C 2$:   CLRL    @LISTHEAD                               ;  0815
                                  50            01   D0 0001F       MOVL    #1, R0                                  ;  0817
                                                     04 00022       RET                                             ;  0819

; Routine Size:  35 bytes,    Routine Base:  $CODE$ + 005F
```

```
;  828     0820  1 GLOBAL ROUTINE add_symbol (table, name_desc, value) =
;  829     0821  1
;  830     0822  1 !---
;  831     0823  1 !
;  832     0824  1 !       This routine adds a given symbol name and value to
;  833     0825  1 !       the symbol table.  The symbol table list is sorted
;  834     0826  1 !       by symbol name.
;  835     0827  1 !
;  836     0828  1 ! Inputs:
;  837     0829  1 !
;  838     0830  1 !       table = Symbol table index
;  839     0831  1 !       name_desc = Address of descriptor of symbol name
;  840     0832  1 !       value = Value to be assigned to the symbol
;  841     0833  1 !
;  842     0834  1 ! Outputs:
;  843     0835  1 !
;  844     0836  1 !       r0 = status (already signaled)
;  845     0837  1 !---
;  846     0838  1
;  847     0839  2 BEGIN
;  848     0840  2
;  849     0841  2 MAP
;  850     0842  2     name_desc:  REF BBLOCK [DSC$K_S_BLN];! Address of name descriptor
;  851     0843  2
;  852     0844  2 LOCAL
;  853     0845  2     entry:      REF BBLOCK,             ! Address of symbol table entry
;  854     0846  2     location:   REF BBLOCK;             ! Address of closest symbol name
;  855     0847  2
;  856     0848  2 IF lookup_symbol (.table, .name_desc, location) ! If already in symbl table,
;  857     0849  2 THEN
;  858     0850  3     BEGIN
;  859     0851  3 !    SIGNAL(emsg(dupsym), 1, .name_desc);! signal user with bad symbol
;  860     0852  3     RETURN 1;                           ! return success
;  861     0853  2     END;
;  862     0854  2
;  863     0855  2
;  864   P 0856  2 RETURN_IF_ERROR                                  ! Allocate a symbol entry
;  865     0857  2         (allocate(sym$c_fixedlen+.name_desc [dsc$w_length],entry));
;  866     0858  2
;  867     0859  2 entry [sym$l_value] = .value;                   ! Set value of symbol
;  868     0860  2 entry [sym$b_symlen]                            ! Set length of symbol
;  869     0861  2         = .name_desc [dsc$w_length];
;  870     0862  2
;  871     0863  2 CH$MOVE (.name_desc [dsc$w_length],             ! Copy symbol
;  872     0864  2         .name_desc [dsc$a_pointer],
;  873     0865  2         entry [sym$t_symbol]);
;  874     0866  2
;  875     0867  2 entry [sym$l_link]                              ! Link into symbol table
;  876     0868  2         = .location [sym$l_link];               ! in sorted order
;  877     0869  2 location [sym$l_link] = .entry;
;  878     0870  2
;  879     0871  2 RETURN true;
;  880     0872  2
;  881     0873  1 END;
```

```
                                 007C 00000          .ENTRY  ADD_SYMBOL, Save R2,R3,R4,R5,R6                 ; 0820
                          5E        08   C2 00002    SUBL2   #8, SP                                          ;
                                    5E   DD 00005    PUSHL   SP                                              ; 0848
                          52        08   AC   D0 00007    MOVL    NAME_DESC, R2                              ;
                                    52   DD 0000B    PUSHL   R2                                             ;
                                    04   AC   DD 0000D    PUSHL   TABLE                                      ;
                    0000V CF              03   FB 00010    CALLS   #3, LOOKUP_SYMBOL                          ;
                          2C              50   E8 00015    BLBS    R0, 1$                                     ;
                                    04    AE   9F 00018    PUSHAB  ENTRY                                      ; 0857
                          7E              62   3C 0001B    MOVZWL  (R2), -(SP)                                ;
                          6E              09   C0 0001E    ADDL2   #9, (SP)                                   ;
                    0000V CF              02   FB 00021    CALLS   #2, ALLOCATE                               ;
                          1E              50   E9 00026    BLBC    STATUS, 2$                                 ;
                          56        04    AE   D0 00029    MOVL    ENTRY, R6                                  ; 0859
                    04    A6        0C    AC   D0 0002D    MOVL    VALUE, 4(R6)                               ;
                    08    A6              62   90 00032    MOVB    (R2), 8(R6)                                ; 0861
          09   A6       04    B2         62   28 00036    MOVC3   (R2), @4(R2), 9(R6)                        ; 0865
                          66        00    BE   D0 000     MOVL    @LOCATION, (R6)                            ; 0868
                    00    BE              56   D0 00      MOVL    R6, @LOCATION                              ; 0869
                          50              01   D0 00044 1$:  MOVL    #1, R0                                 ; 0871
                                          04   00047 2$:  RET                                                ; 0873

; Routine Size:  72 bytes,    Routine Base:  $CODE$ + 0082
```

```
;   883          0874  1 GLOBAL ROUTINE lookup_symbol (table, name_desc, value) =
;   884          0875  1
;   885          0876  1 !---
;   886          0877  1 !
;   887          0878  1 !       This routine looks up a given symbol in the symbol
;   888          0879  1 !       table and returns the value associated with it.
;   889          0880  1 !       If the symbol is not found, then the address of the
;   890          0881  1 !       last entry preceeding the symbol in collation
;   891          0882  1 !       sequence is returned instead.
;   892          0883  1 !
;   893          0884  1 ! Inputs:
;   894          0885  1 !
;   895          0886  1 !       table = Symbol table index (1-n)
;   896          0887  1 !       name_desc = Descriptor of desired symbol name
;   897          0888  1 !       value = Address of longword to receive value if found
;   898          0889  1 !
;   899          0890  1 ! Outputs:
;   900          0891  1 !
;   901          0892  1 !       value = Value of symbol if found
;   902          0893  1 !       value = Address of previous entry if not found
;   903          0894  1 !       r0 = status
;   904          0895  1 !---
;   905          0896  1
;   906          0897  2 BEGIN
;   907          0898  2
;   908          0899  2 MAP
;   909          0900  2     name_desc:  REF BBLOCK [DSC$K_S_BLN];! Address of descriptor
;   910          0901  2
;   911          0902  2 LOCAL
;   912          0903  2     ptr:        REF BBLOCK;             ! Pointer into list
;   913          0904  2
;   914          0905  2 ptr = symbol_header [.table] - $BYTEOFFSET(sym$l_link); ! Start at listhead
;   915          0906  2 .value = .ptr;
;   916          0907  2
;   917          0908  2 WHILE (ptr = .ptr [sym$l_link]) NEQ 0   ! Until end of list
;   918          0909  2 DO
;   919          0910  2     CASE CH$COMPARE(.ptr [sym$b_symlen], ptr [sym$t_symbol],
;   920          0911  2                     .name_desc [dsc$w_length], .name_desc [dsc$a_pointer])
;   921          0912  2     FROM -1 TO 1 OF SET
;   922          0913  2     [-1]:  .value = .ptr;               ! Table symbol < user symbol
;   923          0914  3     [0]:  BEGIN                         ! Table symbol = user symbol
;   924          0915  3           .value = .ptr [sym$l_value]; !   Return value of symbol
;   925          0916  3           RETURN true;                 !   and exit successful
;   926          0917  2           END;
;   927          0918  2     [1]: RETURN false;                  ! Table symbol > user symbol
;   928          0919  2     TES;
;   929          0920  2
;   930          0921  2 RETURN false;                           ! return symbol not found
;   931          0922  2
;   932          0923  1 END;


                                005C 00000        .ENTRY  LOOKUP_SYMBOL, Save R2,R3,R4,R6     ; 0874
                      50    04 AC  D0 00002        MOVL    TABLE, R0                           ; 0905
```

```
                        54    0000'CF40  DE 00006          MOVAL   SYMBOL_HEADER[R0], PTR                          ;
                     0C BC            54  D0 0000C          MOVL    PTR, @VALUE                                   ;0906
                        56        08  AC  D0 00010          MOVL    NAME_DESC, R6                                 ;0911
                        54            64  D0 00014 1$:      MOVL    (PTR), PTR                                    ;0908
                                      20  13 00017          BEQL    3$                                            ;
                        50        08  A4  9A 00019          MOVZBL  8(PTR), R0                                    ;0910
08 BC           00      09  A4            50  2D 0001D      CMPC5   R0, 9(PTR), #0, @NAME_DESC, @4(R6)            ;
                                  04  B6    00024                                                                 ;
                                      11  1A 00026          BGTRU   3$                                            ;
                                      06  1E 00028          BGEQU   2$                                            ;
                     0C BC            54  D0 0002A          MOVL    PTR, @VALUE                                   ;0913
                                      E4  11 0002E          BRB     1$                                            ;
                     0C BC        04  A4  D0 00030 2$:      MOVL    4(PTR), @VALUE                                ;0915
                        50            01  D0 00035          MOVL    #1, R0                                        ;0916
                                          04 00038          RET                                                   ;
                                      50  D4 00039 3$:      CLRL    R0                                            ;0923
                                          04 0003B          RET                                                   ;

; Routine Size:  60 bytes,    Routine Base:  $CODE$ + 00CA
```

```
;  934     0924  1 GLOBAL ROUTINE lookup_value (table, value, retdesc) =
;  935     0925  1
;  936     0926  1 !---
;  937     0927  1 !
;  938     0928  1 !       This routine locates the first occurrence of a symbol
;  939     0929  1 !       containing the specified value and returns a descriptor
;  940     0930  1 !       of the symbol associated with the value.
;  941     0931  1 !
;  942     0932  1 ! Inputs:
;  943     0933  1 !
;  944     0934  1 !       table = Symbol table index (1-n)
;  945     0935  1 !       value = Value to be looked up
;  946     0936  1 !       retdesc = Address of quadword to receive descriptor
;  947     0937  1 !
;  948     0938  1 ! Outputs:
;  949     0939  1 !
;  950     0940  1 !       routine = status
;  951     0941  1 !---
;  952     0942  1
;  953     0943  2 BEGIN
;  954     0944  2
;  955     0945  2 MAP
;  956     0946  2     retdesc:    REF VECTOR;             ! Address of descriptor
;  957     0947  2
;  958     0948  2 LOCAL
;  959     0949  2     ptr:        REF BBLOCK;             ! Pointer into list
;  960     0950  2
;  961     0951  2 ptr = .symbol_header [.table];          ! Start at first entry
;  962     0952  2
;  963     0953  2 WHILE .ptr NEQ 0                        ! Until end of list
;  964     0954  2 DO
;  965     0955  3     BEGIN
;  966     0956  3     IF .ptr [sym$l_value] EQL .value    ! If value matches,
;  967     0957  3     THEN
;  968     0958  4         BEGIN                           ! Return descriptor of name
;  969     0959  4         retdesc [0] = .ptr [sym$b_symlen];
;  970     0960  4         retdesc [1] = ptr [sym$t_symbol];
;  971     0961  4         RETURN true;                    ! and exit successful
;  972     0962  3         END;
;  973     0963  3     ptr = .ptr [sym$l_link];            ! If no match, go to next entry
;  974     0964  2     END;
;  975     0965  2
;  976     0966  2 RETURN false;                           ! return symbol not found
;  977     0967  2
;  978     0968  1 END;


                                    0000 00000          .ENTRY  LOOKUP_VALUE, Save nothing                  ; 0924
                50      04   AC    D0 00002            MOVL    TABLE, R0                                   ; 0951
                51  0000'CF40   D0 00006            MOVL    SYMBOL_HEADER[R0], PTR                      ;
                        1D   13 0000C 1$:           BEQL    3$                                          ; 0953
            08  AC      04   A1   D1 0000E            CMPL    4(PTR), VALUE                               ; 0956
                        11   12 00013                BNEQ    2$                                          ;
                50      0C   AC   D0 00015            MOVL    RETDESC, R0                                 ; 0959
```

```
                60      08    A1  9A 00019          MOVZBL  8(PTR), (R0)                                    ;
          04    A0      09    A1  9E 0001D          MOVAB   9(R1), 4(R0)                                   ; 0960
                50            01  D0 00022          MOVL    #1, R0                                         ; 0961
                              04  00025          RET                                                    ;
                51            61  D0 00026 2$:     MOVL    (PTR), PTR                                     ; 0963
                              E1  11 00029          BRB     1$                                             ; 0953
                              50  D4 0002B 3$:     CLRL    R0                                             ; 0966
                              04  0002D          RET                                                    ; 0968

; Routine Size:  46 bytes,    Routine Base:  $CODE$ + 0106
```

```
;  980          0969  1 GLOBAL ROUTINE scan_symbols (table, action_routine) =
;  981          0970  1
;  982          0971  1 !---
;  983          0972  1 !
;  984          0973  1 !       This routine calls a specified action routine for
;  985          0974  1 !       each symbol in the specified symbol table.
;  986          0975  1 !
;  987          0976  1 ! Inputs:
;  988          0977  1 !
;  989          0978  1 !       table = Symbol table index (1-n)
;  990          0979  1 !       action_routine = Address of action routine to call
;  991          0980  1 !                        with the following argument list:
;  992          0981  1 !                                1) Address of descriptor of symbol name
;  993          0982  1 !                                2) Value associated with symbol
;  994          0983  1 !
;  995          0984  1 ! Outputs:
;  996          0985  1 !
;  997          0986  1 !       The status of the last action routine executed is returned.
;  998          0987  1 !---
;  999          0988  1
; 1000          0989  2 BEGIN
; 1001          0990  2
; 1002          0991  2 LOCAL
; 1003          0992  2     status,                         ! Catch-all status return bucket
; 1004          0993  2     desc:       VECTOR [2],         ! Descriptor of symbol name
; 1005          0994  2     ptr:        REF BBLOCK;         ! Address of current symbol entry
; 1006          0995  2
; 1007          0996  2 ptr = .symbol_header [.table];      ! Start at first entry
; 1008          0997  2
; 1009          0998  2 WHILE .ptr NEQ 0                    ! Until end of list,
; 1010          0999  2 DO
; 1011          1000  3     BEGIN                           ! Setup descriptor of name
; 1012          1001  3     desc [0] = .ptr [sym$b_symlen];
; 1013          1002  3     desc [1] = ptr [sym$t_symbol];
; 1014          1003  3     status = (.action_routine)(desc, .ptr [sym$l_value]); ! Call action routine
; 1015          1004  3     IF NOT .status THEN EXITLOOP;   ! If failed, exit unsuccessful
; 1016          1005  3     ptr = .ptr [sym$l_link];        ! Skip to next in chain
; 1017          1006  2     END;
; 1018          1007  2
; 1019          1008  2 RETURN .status;                     ! return successful
; 1020          1009  2
; 1021          1010  1 END;


                                0004 00000          .ENTRY  SCAN_SYMBOLS, Save R2                   ; 0969
                             5E   08   C2 00002     SUBL2   #8, SP                                  ;
                             50 04 AC   D0 00005     MOVL    TABLE, R0                               ; 0996
                             52 0000'CF40   D0 00009 MOVL    SYMBOL_HEADER[R0], PTR                  ;
                                1B   13 0000F 1$:    BEQL    2$                                      ; 0998
                             6E   08   A2 9A 00011     MOVZBL  8(PTR), DESC                        ; 1001
                          04 AE   09   A2 9E 00015     MOVAB   9(R2), DESC+4                       ; 1002
                                04   A2 DD 0001A     PUSHL   4(PTR)                                  ; 1003
                                04   AE 9F 0001D     PUSHAB  DESC                                    ;
                          08 BC      02 FB 00020     CALLS   #2, @ACTION_ROUTINE                     ;
```

```
                05              50  E9 00024         BLBC    STATUS, 2$                              ; 1004
                52              62  D0 00027         MOVL    (PTR), PTR                              ; 1005
                                E3  11 0002A         BRB     1$                                      ; 0998
                                    04 0002C 2$:     RET                                             ; 1010

; Routine Size:  45 bytes,    Routine Base:  $CODE$ + 0134
```

```
;  1023     1011  1 GLOBAL ROUTINE delete_symbol (table, name_desc) =
;  1024     1012  1
;  1025     1013  1 !---
;  1026     1014  1 !
;  1027     1015  1 !       This routine deletes a given symbol from the symbol
;  1028     1016  1 !       table.
;  1029     1017  1 !
;  1030     1018  1 ! Inputs:
;  1031     1019  1 !
;  1032     1020  1 !       table = Symbol table index (1-n)
;  1033     1021  1 !       name_desc = Descriptor of symbol name to be deleted
;  1034     1022  1 !
;  1035     1023  1 ! Outputs:
;  1036     1024  1 !
;  1037     1025  1 !       r0 = true if deleted, false if not found
;  1038     1026  1 !---
;  1039     1027  1
;  1040     1028  2 BEGIN
;  1041     1029  2
;  1042     1030  2 MAP
;  1043     1031  2     name_desc:  REF BBLOCK [DSC$K_S_BLN];! Address of descriptor
;  1044     1032  2
;  1045     1033  2 LOCAL
;  1046     1034  2     prev:       REF BBLOCK,             ! Pointer to previous symbol
;  1047     1035  2     ptr:        REF BBLOCK;             ! Pointer into list
;  1048     1036  2
;  1049     1037  2 ptr = symbol_header [.table] - $BYTEOFFSET(sym$l_link); ! Start at listhead
;  1050     1038  2 prev = .ptr;                            !  Ditto
;  1051     1039  2
;  1052     1040  2 WHILE (ptr = .ptr [sym$l_link]) NEQ 0   ! Until end of list
;  1053     1041  2 DO
;  1054     1042  2     CASE CH$COMPARE(.ptr [sym$b_symlen], ptr [sym$t_symbol],
;  1055     1043  2                 .name_desc [dsc$w_length], .name_desc [dsc$a_pointer])
;  1056     1044  2     FROM -1 TO 1 OF SET
;  1057     1045  2     [-1]:  prev = .ptr;                 ! Table symbol < user symbol
;  1058     1046  3     [0]:  BEGIN                         ! Table symbol = user symbol
;  1059     1047  3           prev [sym$l_link] = .ptr [sym$l_link];        ! Delink it
;  1060     1048  3           RETURN deallocate (sym$c_fixedlen+.ptr[sym$b_symlen], .ptr); ! free VM
;  1061     1049  2           END;
;  1062     1050  2     [1]: RETURN false;                 ! Table symbol > user symbol
;  1063     1051  2     TES;
;  1064     1052  2
;  1065     1053  2
;  1066     1054  2 RETURN false;                          ! return symbol not found
;  1067     1055  2
;  1068     1056  1 END;


                                00DC 00000          .ENTRY  DELETE_SYMBOL, Save R2,R3,R4,R6,R7          ; 1011
                50      04   AC  D0 00002          MOVL    TABLE, R0                                   ; 1037
                54  0000'CF40  DE 00006          MOVAL   SYMBOL_HEADER[R0], PTR                      ;
                57        54   D0 0000C          MOVL    PTR, PREV                                   ; 1038
                56      08   AC  D0 0000F          MOVL    NAME_DESC, R6                               ; 1043
                54        64   D0 00013 1$:      MOVL    (PTR), PTR                                  ; 1040
```

```
                                                 28  13 00016          BEQL    3$                                                      ;
                                          50     A4  9A 00018          MOVZBL  8(PTR), R0                                              ; 1042
      08  BC            00        09    A4     50  2D 0001C          CMPC5   R0, 9(PTR), #0, @NAME_DESC, @4(R6)                      ;
                                          04     B6  00023                                                                          ;
                                                 19  1A 00025          BGTRU   3$                                                      ;
                                                 05  1E 00027          BGEQU   2$                                                      ;
                                          57     54  D0 00029          MOVL    PTR, PREV                                               ; 1045
                                                 E5  11 0002C          BRB     1$                                                      ;
                                          67     64  D0 0002E 2$:      MOVL    (PTR), (PREV)                                           ; 1047
                                                 54  DD 00031          PUSHL   PTR                                                     ; 1048
                                          7E     A4  9A 00033          MOVZBL  8(PTR), -(SP)                                           ;
                                          6E     09  C0 00037          ADDL2   #9, (SP)                                                ;
                                   0000V  CF        02  FB 0003A          CALLS   #2, DEALLOCATE                                          ;
                                                    04  0003F          RET                                                             ;
                                                 50  D4 00040 3$:      CLRL    R0                                                      ; 1056
                                                     04  00042          RET                                                             ;

; Routine Size:  67 bytes,    Routine Base:  $CODE$ + 0161
```

```
;  1070     1057  1 GLOBAL ROUTINE delete_symbols (table) =
;  1071     1058  1
;  1072     1059  1 !---
;  1073     1060  1 !
;  1074     1061  1 !       This routine deallocates all symbols in a specified
;  1075     1062  1 !       symbol table.
;  1076     1063  1 !
;  1077     1064  1 ! Inputs:
;  1078     1065  1 !
;  1079     1066  1 !       table = Symbol table index (1-n)
;  1080     1067  1 !
;  1081     1068  1 ! Outputs:
;  1082     1069  1 !
;  1083     1070  1 !       None
;  1084     1071  1 !---
;  1085     1072  1
;  1086     1073  2 BEGIN
;  1087     1074  2
;  1088     1075  2 LOCAL
;  1089     1076  2     ptr:        REF BBLOCK;             ! Address of current entry
;  1090     1077  2
;  1091     1078  2 ptr = .symbol_header [.table];          ! Start at first entry
;  1092     1079  2
;  1093     1080  2 WHILE .ptr NEQ 0                        ! Until end of list,
;  1094     1081  2 DO
;  1095     1082  3     BEGIN
;  1096     1083  3     LOCAL next_entry;
;  1097     1084  3     next_entry = .ptr [sym$l_link];     ! Save pointer to next entry
;  1098     1085  3     deallocate(sym$c_fixedlen+.ptr [sym$b_symlen], .ptr);       ! Deallocate entry
;  1099     1086  3     ptr = .next_entry;                  ! Point to next entry in list
;  1100     1087  3     END;
;  1101     1088  2
;  1102     1089  2 symbol_header [.table] = 0;             ! Zero listhead
;  1103     1090  2
;  1104     1091  2 RETURN true;
;  1105     1092  2
;  1106     1093  1 END;


                                001C 00000          .ENTRY  DELETE_SYMBOLS, Save R2,R3,R4                   ; 1057
                            52  04   AC  D0 00002    MOVL    TABLE, R2                                       ; 1078
                            53  0000'CF42  D0 00006    MOVL    SYMBOL_HEADER[R2], PTR                      ;
                                    16  13 0000C 1$:  BEQL    2$                                          ; 1080
                            54          63  D0 0000E    MOVL    (PTR), NEXT_ENTRY                           ; 1084
                                        53  DD 00011    PUSHL   PTR                                         ; 1085
                            7E      08  A3  9A 00013    MOVZBL  8(PTR), -(SP)                               ;
                            6E          09  C0 00017    ADDL2   #9, (SP)                                    ;
                        0000V   CF      02  FB 0001A    CALLS   #2, DEALLOCATE                              ;
                            53          54  D0 0001F    MOVL    NEXT_ENTRY, PTR                             ; 1086
                                        E8  11 00022    BRB     1$                                          ; 1080
                                0000'CF42  D4 00024 2$:  CLRL    SYMBOL_HEADER[R2]                           ; 1089
                            50          01  D0 00029    MOVL    #1, R0                                      ; 1091
                                        04  0002C    RET                                                     ; 1093
```

```
; Routine Size:  45 bytes,    Routine Base:  $CODE$ + 01A4
```

```
;  1108          1094  1 GLOBAL ROUTINE allocate (bytes, address) =
;  1109          1095  1
;  1110          1096  1 !---
;  1111          1097  1 !
;  1112          1098  1 !       Allocate dynamic storage and return the address.
;  1113          1099  1 !       If an error occurs, the error is signaled.
;  1114          1100  1 !
;  1115          1101  1 ! Inputs:
;  1116          1102  1 !
;  1117          1103  1 !       bytes = Number of bytes to allocate
;  1118          1104  1 !       address = Longword to receive address of storage
;  1119          1105  1 !
;  1120          1106  1 ! Outputs:
;  1121          1107  1 !
;  1122          1108  1 !       address = Address of storage
;  1123          1109  1 !---
;  1124          1110  1
;  1125          1111  2 BEGIN
;  1126          1112  2
;  1127          1113  2 LOCAL
;  1128          1114  2     status;
;  1129          1115  2
;  1130          1116  2 status = lib$get_vm(bytes,.address);
;  1131          1117  2
;  1132          1118  2 IF NOT .status                    ! if unsuccessful,
;  1133          1119  2 THEN
;  1134          1120  2     SIGNAL(.status);             ! then signal the error
;  1135          1121  2
;  1136          1122  2 RETURN .status;                  ! return with status;
;  1137          1123  2
;  1138          1124  1 END;


                                0004 00000          .ENTRY  ALLOCATE, Save R2                       ; 1094
                          08    AC  DD 00002          PUSHL   ADDRESS                                 ; 1116
                          04    AC  9F 00005          PUSHAB  BYTES                                   ;
                00000000G   00      02 FB 00008          CALLS   #2, LIB$GET_VM                       ;
                            52      50 D0 0000F          MOVL    R0, STATUS                           ;
                            09      52 E8 00012          BLBS    STATUS, 1$                           ; 1118
                                    52 DD 00015          PUSHL   STATUS                               ; 1120
                00000000G   00      01 FB 00017          CALLS   #1, LIB$SIGNAL                       ;
                            50      52 D0 0001E 1$:      MOVL    STATUS, R0                           ; 1122
                                       04 00021          RET                                          ; 1124

; Routine Size:  34 bytes,    Routine Base:  $CODE$ + 01D1
```

```
;  1140          1125  1 GLOBAL ROUTINE deallocate (bytes, address) =
;  1141          1126  1
;  1142          1127  1 !---
;  1143          1128  1 !
;  1144          1129  1 !       Deallocate dynamic storage.
;  1145          1130  1 !       If an error occurs, the error is signaled.
;  1146          1131  1 !
;  1147          1132  1 ! Inputs:
;  1148          1133  1 !
;  1149          1134  1 !       bytes = Number of bytes to deallocate
;  1150          1135  1 !       address = Address of storage to deallocate
;  1151          1136  1 !
;  1152          1137  1 ! Outputs:
;  1153          1138  1 !
;  1154          1139  1 !       None
;  1155          1140  1 !---
;  1156          1141  1
;  1157          1142  2 BEGIN
;  1158          1143  2
;  1159          1144  2 LOCAL
;  1160          1145  2     status;
;  1161          1146  2
;  1162          1147  2 status = lib$free_vm(bytes,address);
;  1163          1148  2
;  1164          1149  2 IF NOT .status                    ! if unsuccessful,
;  1165          1150  2 THEN
;  1166          1151  2     SIGNAL(.status);             ! then signal the error
;  1167          1152  2
;  1168          1153  2 RETURN .status;                  ! return with status;
;  1169          1154  2
;  1170          1155  1 END;


                                    0004 00000         .ENTRY  DEALLOCATE, Save R2                             ;  1125
                              08    AC   9F 00002      PUSHAB  ADDRESS                                         ;  1147
                              04    AC   9F 00005      PUSHAB  BYTES                                           ;
                    00000000G   00     02   FB 00008  CALLS   #2, LIB$FREE_VM                                 ;
                                52     50   D0 0000F  MOVL    R0, STATUS                                      ;
                                09     52   E8 00012  BLBS    STATUS, 1$                                      ;  1149
                                       52   DD 00015  PUSHL   STATUS                                          ;  1151
                    00000000G   00     01   FB 00017  CALLS   #1, LIB$SIGNAL                                 ;
                                50     52   D0 0001E 1$:  MOVL    STATUS, R0                                  ;  1153
                                       04   00021      RET                                                     ;  1155

; Routine Size:  34 bytes,    Routine Base:  $CODE$ + 01F3
```

```
; 1172          1156  1 END
; 1173          1157  0 ELUDOM


                                                        .EXTRN  LIB$SIGNAL

;                               PSECT SUMMARY
;
;       Name                    Bytes                   Attributes
;
;  $GLOBAL$                        256  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;  $CODE$                          533  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)


;                             Library Statistics
;
;                                      -------- Symbols --------      Pages       Processing
;       File                           Total    Loaded   Percent      Mapped      Time
;
;  _$255$DUA28:[SYSLIB]STARLET.L32;1     9776        22         0         581        00:01.0



;                                   COMMAND QUALIFIERS

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

; Size:         533 code + 256 data bytes
; Run Time:          00:19.7
; Elapsed Time:      00:49.6
; Lines/CPU Min:      3529
; Lexemes/CPU-Min: 22581
; Memory Used:  90 pages
; Compilation Complete
```

AEDCLENUP
LIS

SYMBOLS
LIS

UTILITY
LIS

ACLEDTDEF
REQ

ACLEDT

SETSHOACL
MAP

ACLEDT
MAP

AEDLCLDEE
SDL

SUMMARY
LIS

SYMBOLMSG
LIS

AEDDECODE
LIS