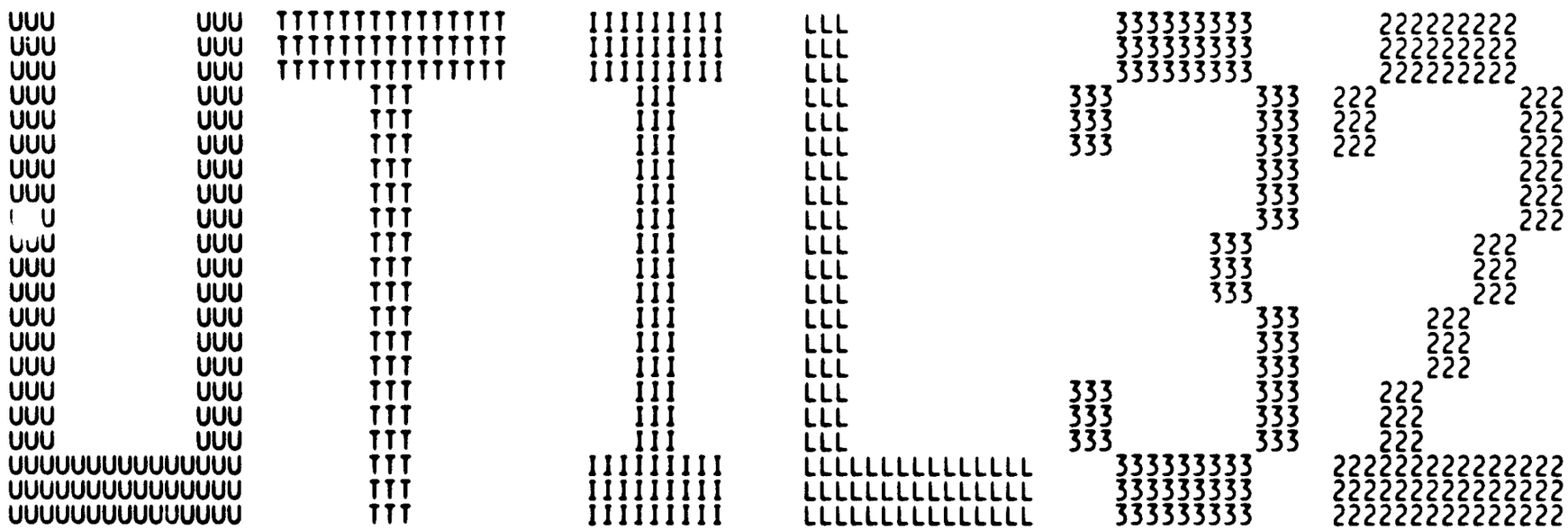
UUU UUU TTTTTTTTTTTTTTT IIIIIIIII LLL 333333333 222222222
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UUUUUUUUUUUUUUUU TTT IIIIIIIII LLLLLLLLLLLLLLL 333333333 222222222222222
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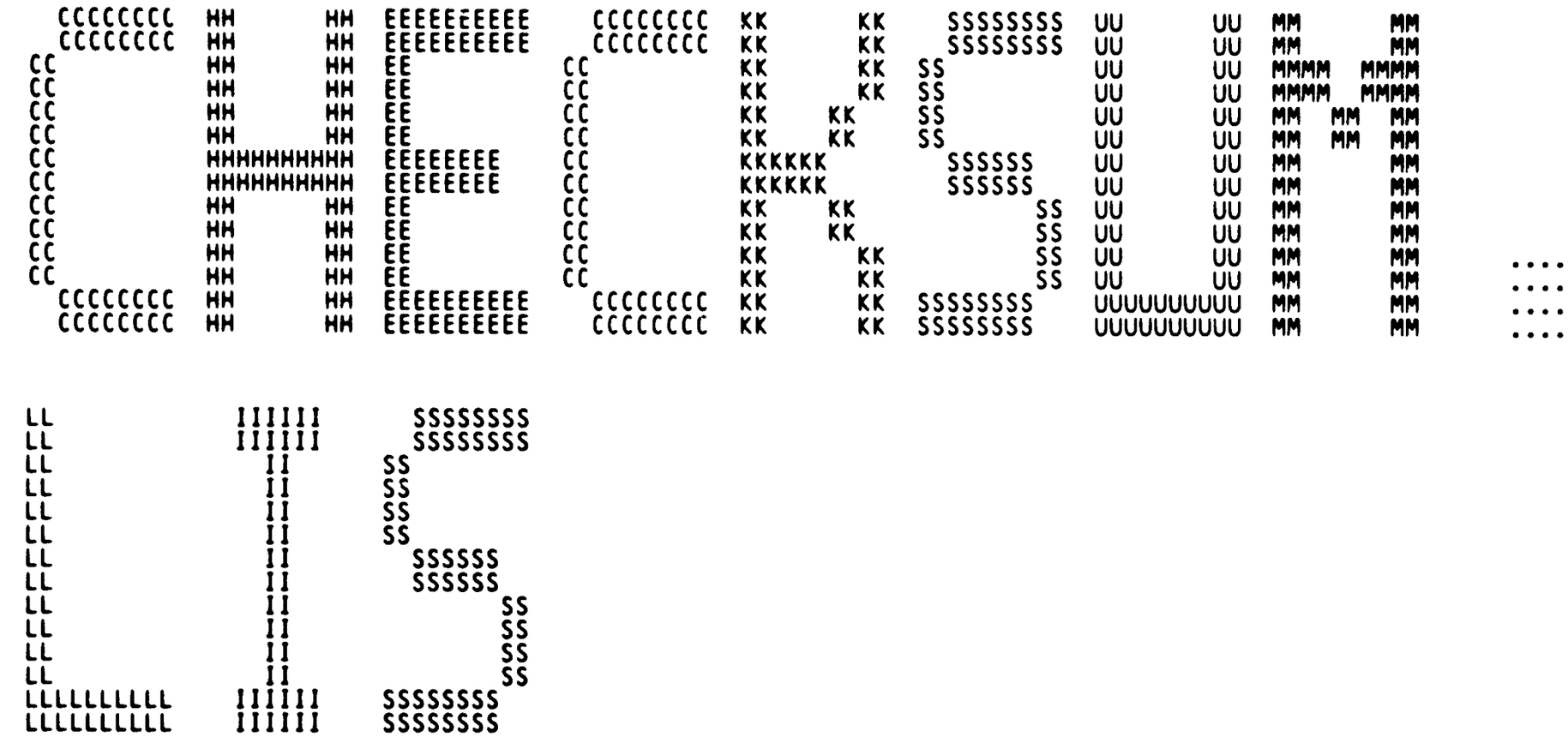
UUUUUUUUUUUUUUUU TTT IIIIIIIII LLLLLLLLLLLLLLL 333333333 222222222222222

FILEID**CHECKSUM

N 2



```
;     1          0001  0 MODULE checksum_image (
;     2          0002  0                         IDENT='V04-000',
;     3          0003  0                         MAIN=checksum$main
;     4          0004  0                         %TITLE  'Checksum the contents of a file'
;     5          0005  0                         ) =
;     6          0006  0
;     7          0007  1 BEGIN
;     8          0008  1 !
;     9          0009  1 !
;    10          0010  1 !*****************************************************************************
;    11          0011  1 !*                                                                           *
;    12          0012  1 !*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                  *
;    13          0013  1 !*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.                    *
;    14          0014  1 !*  ALL RIGHTS RESERVED.                                                      *
;    15          0015  1 !*                                                                           *
;    16          0016  1 !*  THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY BE USED AND COPIED     *
;    17          0017  1 !*  ONLY IN  ACCORDANCE WITH  THE  TERMS  OF  SUCH  LICENSE  AND WITH THE    *
;    18          0018  1 !*  INCLUSION OF THE ABOVE COPYRIGHT NOTICE. THIS SOFTWARE OR  ANY  OTHER     *
;    19          0019  1 !*  COPIES THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAILABLE TO ANY     *
;    20          0020  1 !*  OTHER PERSON.  NO TITLE TO AND OWNERSHIP OF  THE  SOFTWARE IS  HEREBY     *
;    21          0021  1 !*  TRANSFERRED.                                                              *
;    22          0022  1 !*                                                                           *
;    23          0023  1 !*  THE INFORMATION IN THIS SOFTWARE IS  SUBJECT TO CHANGE WITHOUT NOTICE     *
;    24          0024  1 !*  AND  SHOULD  NOT  BE  CONSTRUED AS  A COMMITMENT BY DIGITAL EQUIPMENT     *
;    25          0025  1 !*  CORPORATION.                                                              *
;    26          0026  1 !*                                                                           *
;    27          0027  1 !*  DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE  OR  RELIABILITY OF ITS     *
;    28          0028  1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                   *
;    29          0029  1 !*                                                                           *
;    30          0030  1 !*                                                                           *
;    31          0031  1 !*****************************************************************************
;    32          0032  1 !
;    33          0033  1 !
;    34          0034  1 !++
;    35          0035  1 !
;    36          0036  1 ! FACILITY:  Checksum VAX/VMS image file
;    37          0037  1 !
;    38          0038  1 ! ABSTRACT:
;    39          0039  1 !               Computes the checksum of a file or an image.  The
;    40          0040  1 !               qualifiers on command are /OUTPUT, /FILE and /IMAGE.
;    41          0041  1 !               The /FILE and /IMAGE are conflicting qualifiers.  If
;    42          0042  1 !               specify /IMAGE, then the parts of the image header
;    43          0043  1 !               that can change (Date/Time, etc) are not checksummed.
;    44          0044  1 !               The parameter is the input file(s) to checksum.
;    45          0045  1 !
;    46          0046  1 ! ENVIRONMENT:
;    47          0047  1 !
;    48          0048  1 !       VAX native, user mode.
;    49          0049  1 !
;    50          0050  1 !--
;    51          0051  1 !
;    52          0052  1 !
;    53          0053  1 ! AUTHOR:  Benn Schreiber,       CREATION DATE:  17-Feb-1981
;    54          0054  1 !
;    55          0055  1 ! MODIFIED BY:
;    56          0056  1 !
;    57          0057  1 !       V03-002 LJA0111 Laurie J. Anderson      16-Feb-1984
```

```
;    58          0058  1 !                Change the image checksum to use the new EXEC image
;    59          0059  1 !                header decode routines.  Change the parameters to
;    60          0060  1 !                LIB$FIND_FILE to use the new related file parsing
;    61          0061  1 !                arguments.  Also, add relevant comments so the
;    62          0062  1 !                next person can figure out this mess.
;    63          0063  1 !
;    64          0064  1 !        V03-001 BLS0180 Benn Schreiber          13-Aug-1982
;    65          0065  1 !                Support record by record checksum
;    66          0066  1 !
;    67          0067  1 !--
```

```
;    69          0068  1 LIBRARY
;    70          0069  1         'SYS$LIBRARY:LIB.L32';          !System macro definitions
;    71          0070  1 REQUIRE
;    72          0071  1         'SHRLIB$:IMGMSGDEF.R32';        !Image decode routine's messge literals
;    73          0157  1
;    74          0158  1 MACRO
;    75          0159  1 !
;    76          0160  1 ! Macro to initialize a dynamic descriptor
;    77          0161  1 !
;    78        M 0162  1     $init_ddesc(d) =                    ! Init dynamic string descriptor
;    79        M 0163  1                 begin
;    80        M 0164  1                 d[dsc$w_length] = 0;
;    81        M 0165  1                 d[dsc$b_class] = dsc$k_class_d;
;    82        M 0166  1                 d[dsc$b_dtype] = dsc$k_dtype_t;
;    83        M 0167  1                 d[dsc$a_pointer] = 0;
;    84          0168  1                 end%,
;    85          0169  1 !
;    86          0170  1 ! Macro to generate a pointer to an ascic string
;    87          0171  1 !
;    88          0172  1     cstring (string) = UPLIT(%ASCIC string)%,
;    89          0173  1 !
;    90          0174  1 ! Macro to fao and output a string
;    91          0175  1 !
;    92        M 0176  1     write (string) =
;    93        M 0177  1         cksm_output (fao_buffer (cstring(string)
;    94          0178  1         %IF %LENGTH GTR 1 %THEN ,%REMAINING %FI))%;
;    95          0179  1
;    96          0180  1 !
;    97          0181  1 ! Message codes from shared message definitions
;    98          0182  1 !
;    99          0183  1
;   100        P 0184  1 $SHR_MSGDEF(cksm, 3 ,LOCAL,              !Facility code = 3 (CLI)
;   101        P 0185  1                 (confqual, severe),     ! Conflicting qualifiers
;   102        P 0186  1                 (openin, error),        ! error opening "x" as input
;   103        P 0187  1                 (openout, severe),      ! error opening "x" as output
;   104        P 0188  1                 (closein, warning),     ! error closing "x" as input
;   105        P 0189  1                 (closeout, warning),    ! error closing "x" as output
;   106        P 0190  1                 (readerr, error),       ! error reading "x"
;   107        P 0191  1                 (writeerr, error),      ! error writing "x"
;   108          0192  1                 (parsefail, warning));  ! error parsing "x"
;   109          0193  1
;   110          0194  1 FORWARD ROUTINE
;   111          0195  1     read_header,                                !Read and process image header
;   112          0196  1     checksum_section,                           !Checksum an image section
;   113          0197  1     cksm_foreign,                               !Checksum non-image file
;   114          0198  1     cksm_header,                                !Checksum image header data
;   115          0199  1     read_blocks,                                !Read next block of header
;   116          0200  1     fao_buffer,                                 !Call fao and return descriptor
;   117          0201  1     cksm_output,                                !Output line to output file
;   118          0202  1     getfilename;                                !Get string descriptor for file
;   119          0203  1
;   120          0204  1 EXTERNAL ROUTINE
;   121          0205  1     cli$get_value : ADDRESSING_MODE(GENERAL),   !Get qualifier value
;   122          0206  1     cli$present : ADDRESSING_MODE(GENERAL),     !Test if qualifier present
;   123          0207  1     img$decode_ihd : ADDRESSING_MODE(GENERAL),  !Decode image header
;   124          0208  1     img$get_next_isd : ADDRESSING_MODE(GENERAL), !Get all ISD's from image
;   125          0209  1     lib$get_vm : ADDRESSING_MODE(GENERAL),      !Allocate virtual memory
```

```
;  126          0210  1      lib$free_vm : ADDRESSING_MODE(GENERAL),      !Free virtual memory
;  127          0211  1      lib$find_file : ADDRESSING_MODE(GENERAL),    !Search for wild card files
;  128          0212  1      lib$set_symbol : ADDRESSING_MODE(GENERAL),   !Define local DCL symbol
;  129          0213  1      str$copy_dx : ADDRESSING_MODE(GENERAL),      !Copy a string
;  130          0214  1      str$upcase : ADDRESSING_MODE(GENERAL);       !Uppercase a string
;  131          0215  1
;  132          0216  1  EXTERNAL LITERAL
;  133          0217  1      cksm$_allischk,                              !Checksum of all image sections
;  134          0218  1      cksm$_badimghdr,                             !Bad image header format
;  135          0219  1      cksm$_file,                                  !Print the filename
;  136          0220  1      cksm$_ihdchksum,                             !Image header checksum
;  137          0221  1      cksm$_isectchk,                              !Checksum of one image section
;  138          0222  1      cksm$_nonimgchk;                             !Non-image file checksum
;  139          0223  1
;  140          0224  1  OWN
;  141          0225  1      chan,                                        !Channel to input file if image
;  142          0226  1      find_context : REF $BBLOCK,                  !Context for lib$find_file
;  143          0227  1      irab : $RAB_DECL,                            !RAB for input
;  144          0228  1      orab : $RAB_DECL,                            ! and output
;  145          0229  1      ixabfhc : $XABFHC_DECL,                      !XAB to get file header characteristics to get file size
;  146          0230  1      outfiledesc : $BBLOCK[dsc$c_s_bln],          !Output file descriptor
;  147          0231  1      find_result : $BBLOCK[dsc$c_s_bln],          !Current input file
;  148          0232  1      headerbuffer : REF $BBLOCK,                  !Pointer to user record buffer
;  149          0233  1      databuffer : REF VECTOR[,LONG],              !and data buffer
;  150          0234  1      exitstatus : $BBLOCK[4];                     !Most severe error status
;  151          0235  1
;  152          0236  1  LITERAL
;  153          0237  1      ihd$k_activoff = ihd$k_length,               !Offset to activation area
;  154          0238  1      ihd$k_symdbgoff = ihd$k_activoff + iha$k_length,
;  155          0239  1      ihd$k_imgidoff = ihd$k_symdbgoff + ihs$k_length,
;  156          0240  1      ihd$k_patchoff = ihd$k_imgidoff + ihi$k_length,
;  157          0241  1      ihd$k_maxlength = ihd$k_patchoff,
;  158          0242  1      maxbytes = 10*512,                           !Maximum record to read
;  159          0243  1      false = 0,                                   !Logical 0
;  160          0244  1      true = 1;                                    ! and 1
;  161          0245  1
;  162          0246  1  GLOBAL
;  163          0247  1      cksm$gl_ihdcksm,                             !Image header checksum
;  164          0248  1      cksm$gl_chksum,                              !Isect checksum
;  165          0249  1      cksm$gl_acucksm,                             !Accumulated checksum
;  166          0250  1      cksm$gl_maxbyt;                              !Maximum record to read
```

```
;  168          0251  1 %sbttl 'allocate_ubf'
;  169          0252  1 ROUTINE allocate_ubf (xab,rab) : NOVALUE =
;  170          0253  2 BEGIN
;  171          0254  2 !
;  172          0255  2 ! Allocate a buffer for records that cross block boundaries
;  173          0256  2 !
;  174          0257  2 MAP
;  175          0258  2     xab : REF $BBLOCK,
;  176          0259  2     rab : REF $BBLOCK;
;  177          0260  2
;  178          0261  2 LOCAL
;  179          0262  2     status,
;  180          0263  2     blocksize;
;  181          0264  2
;  182          0265  2 OWN
;  183          0266  2     ubf_size,           !Size of last UBF
;  184          0267  2     ubf_addr;           !Address of last UBF
;  185          0268  2
;  186          0269  2 !
;  187          0270  2 ! Calculate the max record size based on the longest record in the file.
;  188          0271  2 ! If there is a user buffer allocated and it is not big enough, deallocate
;  189          0272  2 ! it and get a new one.  If it's bigger than needed, then that's fine
;  190          0273  2 !
;  191          0274  2 blocksize = MAXU(MAXU(.xab[xab$w_lrl],.xab[xab$w_mrz]),512);
;  192          0275  2 IF .blocksize GTRU .ubf_size
;  193          0276  3 THEN BEGIN
;  194          0277  3     IF .ubf_size NEQ 0
;  195          0278  3         THEN lib$free_vm(ubf_size,ubf_addr);
;  196          0279  3     ubf_size = .blocksize;
;  197          0280  4     IF NOT (status = lib$get_vm(ubf_size,ubf_addr))
;  198          0281  3         THEN SIGNAL_STOP(.status);
;  199          0282  2     END;
;  200          0283  2 !
;  201          0284  2 ! Set up rab with size and address of the buffer
;  202          0285  2 !
;  203          0286  2 rab[rab$w_usz] = .blocksize;
;  204          0287  2 rab[rab$l_ubf] = .ubf_addr;
;  205          0288  2
;  206          0289  2 RETURN;
;  207          0290  1 END;


                                .TITLE  CHECKSUM_IMAGE Checksum the contents of a file
                                .IDENT  \V04-000\

                                .PSECT  $OWN$,NOEXE,2

                    00000 CHAN:     .BLKB   4
                    00004 FIND_CONTEXT:
                                    .BLKB   4
                    00008 IRAB:     .BLKB   68
                    0004C ORAB:     .BLKB   68
                    00090 IXABFHC:  .BLKB   44
                    000BC OUTFILEDESC:
                                    .BLKB   8
                    000C4 FIND_RESULT:
                                    .BLKB   8
```

```
000CC HEADERBUFFER:
                .BLKB   4
000D0 DATABUFFER:
                .BLKB   4
000D4 EXITSTATUS:
                .BLKB   4
000D8 UBF_SIZE:
                .BLKB   4
000DC UBF_ADDR:
                .BLKB   4

                .PSECT  $GLOBAL$,NOEXE,2

00000 CKSM$GL_IHDCKSM::
                .BLKB   4
00004 CKSM$GL_CHKSUM::
                .BLKB   4
00008 CKSM$GL_ACUCKSM::
                .BLKB   4
0000C CKSM$GL_MAXBYT::
                .BLKB   4

                .EXTRN  CLI$GET_VALUE, CLI$PRESENT
                .EXTRN  IMG$DECODE_IHD, IMG$GET_NEXT_ISD
                .EXTRN  LIB$GET_VM, LIB$FREE_VM
                .EXTRN  LIB$FIND_FILE, LIB$SET_SYMBOL
                .EXTRN  STR$COPY_DX, STR$UPCASE
                .EXTRN  CKSM$_ALLISCHK, CKSM$_BADIMGHDR
                .EXTRN  CKSM$_FILE, CKSM$_IHDCHKSUM
                .EXTRN  CKSM$_ISECTCHK, CKSM$_NONIMGCHK

                .PSECT  $CODE$,NOWRT,2

                        000C 00000 ALLOCATE_UBF:
                                .WORD   Save R2,R3                      ; 0252
                53      0000'   CF  9E 00002    MOVAB   UBF_SIZE, R3
                50        04    AC  D0 00007    MOVL    XAB, R0         ; 0274
                51        0A    A0  3C 0000B    MOVZWL  10(R0), R1
                51        18    A0  B1 0000F    CMPW    24(R0), R1
                                04  1B 00013    BLEQU   1$
                51        18    A0  3C 00015    MOVZWL  24(R0), R1
          0200  8F              51  B1 00019 1$: CMPW    R1, #512
                                05  1E 0001E    BGEQU   2$
                51      0200    8F  3C 00020    MOVZWL  #512, R1
                52              51  D0 00025 2$: MOVL    R1, BLOCKSIZE
                63              52  D1 00028    CMPL    BLOCKSIZE, UBF_SIZE ; 0275
                                2B  1B 0002B    BLEQU   4$
                                63  D5 0002D    TSTL    UBF_SIZE            ; 0277
                                0C  13 0002F    BEQL    3$
                          04    A3  9F 00031    PUSHAB  UBF_ADDR            ; 0278
                                53  DD 00034    PUSHL   R3
 00000000G      00              02  FB 00036    CALLS   #2, LIB$FREE_VM
                63              52  D0 0003D 3$: MOVL    BLOCKSIZE, UBF_SIZE ; 0279
                          04    A3  9F 00040    PUSHAB  UBF_ADDR            ; 0280
                                53  DD 00043    PUSHL   R3
 00000000G      00              02  FB 00045    CALLS   #2, LIB$GET_VM
                09              50  E8 0004C    BLBS    STATUS, 4$
```

```
                                    50  DD 0004F          PUSHL   STATUS                              ; 0281
                                    01  FB 00051          CALLS   #1, LIB$STOP                      ;
                                    50  DO 00058 4$:      MOVL    RAB, R0                           ; 0286
                                    52  B0 0005C          MOVW    BLOCKSIZE, 32(R0)                 ;
                                    A3  D0 00060          MOVL    UBF_ADDR, 36(R0)                  ; 0287
                                        04 00065          RET                                       ; 0290

; Routine Size:  102 bytes,    Routine Base:  $CODE$ + 0000
```

```
;  209          0291  1 %sbttl 'define DCL symbol'
;  210          0292  1 ROUTINE define_sym (value) : NOVALUE =
;  211          0293  2 BEGIN
;  212          0294  2 !
;  213          0295  2 ! Define the symbol CHECKSUM$CHECKSUM with the given value
;  214          0296  2 !
;  215          0297  2 LOCAL
;  216          0298  2     status;
;  217          0299  2
;  218          0300  2 status = lib$set_symbol($descriptor('CHECKSUM$CHECKSUM'),
;  219          0301  2                         fao_buffer(cstring('!UL'),.value));
;  220          0302  2 IF NOT .status
;  221          0303  2     THEN SIGNAL(.status);
;  222          0304  2
;  223          0305  2 RETURN;
;  224          0306  1 END;


                                                                .PSECT  $PLIT$,NOWRT,NOEXE,2

53  4B  43  45  48  43  24  4D  55  53  4B  43  45  48  43  00000 P.AAB:  .ASCII  \CHECKSUM$CHECKSUM\                    ;
                                                  4D  55  0000F                                                       ;
                                                          00011         .BLKB   3                                     ;
                                              00000011    00014 P.AAA:  .LONG   17                                    ;
                                              00000000'   00018         .ADDRESS P.AAB                              ;
                                        4C    55  21  03   0001C P.AAC:  .ASCII  <3>\!UL\                            ;


                                                                .PSECT  $CODE$,NOWRT,2

                                                    0000 00000 DEFINE_SYM:
                                                                .WORD   Save nothing                                  ; 0292
                                                04  AC  DD 00002         PUSHL   VALUE                               ; 0301
                                              0000' CF  9F 00005         PUSHAB  P.AAC                               ;
                                    0000V     CF        02 FB 00009         CALLS   #2, FAO_BUFFER                    ;
                                                        50 DD 0000E         PUSHL   R0                                ;
                                              0000' CF  9F 00010         PUSHAB  P.AAA                               ; 0300
                                00000000G     00        02 FB 00014         CALLS   #2, LIB$SET_SYMBOL                ;
                                              09        50 E8 0001B         BLBS    STATUS, 1$                        ; 0302
                                                        50 DD 0001E         PUSHL   STATUS                            ; 0303
                                00000000G     00        01 FB 00020         CALLS   #1, LIB$SIGNAL                    ;
                                                        04 00027 1$:        RET                                       ; 0306

; Routine Size:  40 bytes,    Routine Base:  $CODE$ + 0066
```

```
;  226          0307  1 %sbttl 'Process CHECKSUM/FILE'
;  227          0308  1 ROUTINE checksum_file : NOVALUE =
;  228          0309  2 BEGIN
;  229          0310  2 !
;  230          0311  2 ! Checksum the contents of a file.  Open the file using RMS and simply read
;  231          0312  2 ! it with $GET's and checksumming the records.  Close the file.
;  232          0313  2 !
;  233          0314  2 LOCAL
;  234          0315  2     checksum,
;  235          0316  2     n_longwords,
;  236          0317  2     n_bytes,
;  237          0318  2     status;
;  238          0319  2
;  239          0320  2 !
;  240          0321  2 ! Open the input file to checksum using RMS.
;  241          0322  2 !
;  242          0323  2 $XABFHC_INIT(xab=ixabfhc);                        !Initialize XAB
;  243        P 0324  2 $RAB_INIT(rab=irab,                               !Initialize input rab
;  244          0325  2         fab=.find_context);
;  245          0326  2
;  246          0327  3 IF NOT (status = $open(fab=.find_context))        !Open the input file
;  247          0328  2 THEN SIGNAL(cksm$_openin, 1,
;  248          0329  2                 find_result, .status,
;  249          0330  2                 .find_context[fab$l_stv])
;  250          0331  2
;  251          0332  3 ELSE IF NOT (status=$connect(rab=irab))           !Connect record stream
;  252          0333  3 THEN BEGIN
;  253          0334  3     SIGNAL(cksm$_openin, 1,
;  254          0335  3                 find_result, .status,
;  255          0336  3                 .irab[rab$l_stv]);
;  256          0337  3     return;
;  257          0338  2     END;
;  258          0339  2
;  259          0340  2 allocate_ubf(ixabfhc,irab);                       !Allocate the buffer to read into
;  260          0341  2
;  261          0342  2 !
;  262          0343  2 ! Checksum the contents.
;  263          0344  2 !
;  264          0345  2 checksum = 0;
;  265          0346  2 WHILE (status = $GET(rab=irab)) NEQ rms$_eof
;  266          0347  3 DO BEGIN
;  267          0348  3     BIND
;  268          0349  3         longbuffer = .irab[rab$l_rbf] : VECTOR[,LONG];
;  269          0350  3
;  270          0351  3     IF NOT .status
;  271          0352  3         THEN SIGNAL(cksm$_readerr,1,find_result,
;  272          0353  3                     .status,.irab[rab$l_stv]);
;  273          0354  3     !
;  274          0355  3     ! Compute number of full longwords and dangling bytes in record
;  275          0356  3     !
;  276          0357  3     n_longwords = (.irab[rab$w_rsz]/4);
;  277          0358  3     n_bytes = .irab[rab$w_rsz] AND 3;
;  278          0359  3     !
;  279          0360  3     ! Checksum the longwords by exclusive or.  Checksum the dangling
;  280          0361  3     ! bytes by simple addition
;  281          0362  3     !
;  282          0363  3     IF .n_longwords NEQ 0
```

```
;   283           0364  3          THEN INCRU i FROM 0 to .n_longwords - 1
;   284           0365  3              DO checksum = .checksum XOR .longbuffer[.i];
;   285           0366  3      IF .n_bytes NEQ 0
;   286           0367  4      THEN BEGIN
;   287           0368  4          BIND
;   288           0369  4              bytebuffer = longbuffer[.n_longwords] : VECTOR[,BYTE];
;   289           0370  4
;   290           0371  4          INCRU i FROM 0 TO .n_bytes - 1
;   291           0372  4              DO checksum = .checksum + .bytebuffer[.i];
;   292           0373  3          END;
;   293           0374  2      END;
;   294           0375  2 !
;   295           0376  2 ! Define a DCL string symbol with the decimal value of the checksum
;   296           0377  2 !
;   297           0378  2 define_sym(.checksum);
;   298           0379  2
;   299           0380  2 !
;   300           0381  2 ! Disconnect the stream and close the input checksummed file.
;   301           0382  2 !
;   302           0383  3 IF NOT (status=$DISCONNECT(rab=irab))   !Disconnect and close output file
;   303           0384  2     THEN SIGNAL(cksm$_closein, 1,
;   304           0385  2                 find_result, .status,
;   305           0386  2                 .irab[rab$l_stv]);
;   306           0387  2
;   307           0388  3 IF NOT (status=$CLOSE(fab=.find_context))
;   308           0389  2     THEN SIGNAL(cksm$_closein, 1,
;   309           0390  2                 find_result, .status,
;   310           0391  2                 .find_context[fab$l_stv]);
;   311           0392  2
;   312           0393  2 RETURN;
;   313           0394  1 END;


                                                $RMS_PTR=           IXABFHC
                                                $RMS_PTR=           IRAB
                                                        .EXTRN  SYS$OPEN, SYS$CONNECT
                                                        .EXTRN  SYS$GET, SYS$DISCONNECT
                                                        .EXTRN  SYS$CLOSE

                                        03FC 00000 CHECKSUM_FILE:
                                                        .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9                    ;0308
                                59 00000000G    00  9E 00002         MOVAB   LIB$SIGNAL, R9
                                58      0000'   CF  9E 00009         MOVAB   $RMS_PTR, R8
        2C              00              6E          00  2C 0000E         MOVC5   #0, (SP), #0, #44, $RMS_PTR             ;0323
                                                0088    C8      00013
                                    0088        C8      2C1D    8F  B0 00016         MOVW    #11293, $RMS_PTR
  0044  8F              00              6E          00  2C 0001D         MOVC5   #0, (SP), #0, #68, $RMS_PTR             ;0325
                                                    68      00024
                                68      4401        8F  B0 00025         MOVW    #17409, $RMS_PTR
                                    3C  A8      FC  A8  D0 0002A         MOVL    FIND_CONTEXT, $RMS_PTR+60
                                        A8      FC  A8  DD 0002F         PUSHL   FIND_CONTEXT                    ;0327
                                00000000G   00          01  FB 00032         CALLS   #1, SYS$OPEN
                                54              50  D0 00039         MOVL    R0, STATUS
                                1A              54  E8 0003C         BLBS    STATUS, 1$
                                50          FC  A8  D0 0003F         MOVL    FIND_CONTEXT, R0                    ;0330
                                            0C  A0  DD 00043         PUSHL   12(R0)
```

```
                                        54  DD 00046          PUSHL   STATUS                                  ; 0329
                                  00BC  C8  9F 00048          PUSHAB  FIND_RESULT                           ; 0328
                                        01  DD 0004C          PUSHL   #1                                    ;
                                0003109A  8F  DD 0004E          PUSHL   #200858                               ;
                                      69  05  FB 00054          CALLS   #5, LIB$SIGNAL                        ;
                                        23  11 00057          BRB     2$                                    ;
                                        58  DD 00059 1$:       PUSHL   R8                                    ; 0332
                            00000000G   00  01  FB 0005B          CALLS   #1, SYS$CONNECT                       ;
                                        54  50  DD 00062          MOVL    R0, STATUS                            ;
                                        14  54  E8 00065          BLBS    STATUS, 2$                            ;
                                        0C  A8  DD 00068          PUSHL   IRAB+12                               ; 0336
                                        54  DD 0006B          PUSHL   STATUS                                ; 0335
                                  00BC  C8  9F 0006D          PUSHAB  FIND_RESULT                           ; 0334
                                        01  DD 00071          PUSHL   #1                                    ;
                                0003109A  8F  DD 00073          PUSHL   #200858                               ;
                                    00CE  31  00079          BRW     12$                                   ;
                                        58  DD 0007C 2$:       PUSHL   R8                                    ; 0340
                                  0088  C8  9F 0007E          PUSHAB  IXABFHC                               ;
                                FEEB    CF  02  FB 00082          CALLS   #2, ALLOCATE_UBF                      ;
                                        56  D4 00087          CLRL    CHECKSUM                              ; 0345
                                        58  DD 00089 3$:       PUSHL   R8                                    ; 0346
                            00000000G   00  01  FB 0008B          CALLS   #1, SYS$GET                           ;
                                        54  50  DD 00092          MOVL    R0, STATUS                            ;
                            0001827A    8F  54  D1 00095          CMPL    STATUS, #98938                        ;
                                        5D  13 0009C          BEQL    10$                                   ;
                                      55  28  A8  D0 0009E          MOVL    IRAB+40, R5                           ; 0349
                                      14  54  E8 000A2          BLBS    STATUS, 4$                            ; 0351
                                        0C  A8  DD 000A5          PUSHL   IRAB+12                               ; 0353
                                        54  DD 000A8          PUSHL   STATUS                                ;
                                  00BC  C8  9F 000AA          PUSHAB  FIND_RESULT                           ; 0352
                                        01  DD 000AE          PUSHL   #1                                    ;
                                00031082  8F  DD 000B0          PUSHL   #200882                               ;
                                      69  05  FB 000B6          CALLS   #5, LIB$SIGNAL                        ;
                                      52  22  A8  3C 000B9 4$:       MOVZWL  IRAB+34, N_LONGWORDS                  ; 0357
                                      52  04  C6 000BD          DIVL2   #4, N_LONGWORDS                       ;
                    53      22  A8        02  00  EF 000C0          EXTZV   #0, #2, IRAB+34, N_BYTES              ; 0358
                                        52  D5 000C6          TSTL    N_LONGWORDS                           ; 0363
                                        13  13 000C8          BEQL    7$                                    ;
                                      51  FF  A2  9E 000CA          MOVAB   -1(R2), R1                            ; 0364
                                        50  D4 000CE          CLRL    I                                     ;
                                        06  11 000D0          BRB     6$                                    ;
                                      56      6540  CC 000D2 5$:       XORL2   (R5)[I], CHECKSUM                     ; 0365
                                        50  D6 000D6          INCL    I                                     ;
                                      51        50  D1 000D8 6$:       CMPL    I, R1                                 ;
                                        F5  1B 000DB          BLEQU   5$                                    ;
                                        53  D5 000DD 7$:       TSTL    N_BYTES                               ; 0366
                                        A8  13 000DF          BEQL    3$                                    ;
                                      50      6542  DE 000E1          MOVAL   (R5)[N_LONGWORDS], R0                 ; 0369
                                      55  FF  A3  9E 000E5          MOVAB   -1(R3), R5                            ; 0371
                                        51  D4 000E9          CLRL    I                                     ;
                                        07  11 000EB          BRB     9$                                    ;
                                      57      8140  9A 000ED 8$:       MOVZBL  (I)+[R0], R7                          ; 0372
                                      56        57  C0 000F1          ADDL2   R7, CHECKSUM                          ;
                                      55        51  D1 000F4 9$:       CMPL    I, R5                                 ;
                                        F4  1B 000F7          BLEQU   8$                                    ;
                                        8E  11 000F9          BRB     3$                                    ; 0346
                                        56  DD 000FB 10$:      PUSHL   CHECKSUM                              ; 0378
```

```
                          FED6   CF              01  FB 000FD          CALLS   #1, DEFINE_SYM                          ;
                                                 58  DD 00102          PUSHL   R8                                     ; 0383
                 00000000G       00              01  FB 00104          CALLS   #1, SYS$DISCONNECT                     ;
                                 54              50  D0 0010B          MOVL    R0, STATUS                             ;
                                 14              54  E8 0010E          BLBS    STATUS, 11$                            ;
                                          0C     A8  DD 00111          PUSHL   IRAB+12                                ; 0386
                                                 54  DD 00114          PUSHL   STATUS                                 ; 0385
                                        00BC     C8  9F 00116          PUSHAB  FIND_RESULT                            ; 0384
                                                 01  DD 0011A          PUSHL   #1                                     ;
                                    00031050     8F  DD 0011C          PUSHL   #200784                                ;
                                 69              05  FB 00122          CALLS   #5, LIB$SIGNAL                         ;
                                          FC     A8  DD 00125 11$:     PUSHL   FIND_CONTEXT                           ; 0388
                 00000000G       00              01  FB 00128          CALLS   #1, SYS$CLOSE                          ;
                                 54              50  D0 0012F          MOVL    R0, STATUS                             ;
                                 18              54  E8 00132          BLBS    STATUS, 13$                            ;
                                 50       FC     A8  D0 00135          MOVL    FIND_CONTEXT, R0                       ; 0391
                                          0C     A0  DD 00139          PUSHL   12(R0)                                 ;
                                                 54  DD 0013C          PUSHL   STATUS                                 ; 0390
                                        00BC     C8  9F 0013E          PUSHAB  FIND_RESULT                            ; 0389
                                                 01  DD 00142          PUSHL   #1                                     ;
                                    00031050     8F  DD 00144          PUSHL   #200784                                ;
                                 69              05  FB 0014A 12$:     CALLS   #5, LIB$SIGNAL                         ;
                                                 04  0014D 13$:     RET                                            ; 0394

; Routine Size:  334 bytes,    Routine Base:  $CODE$ + 008E
```

```
;  315          0395  1 %sbttl 'signal handler'
;  316          0396  1 ROUTINE signal_handler (sigargs, mechargs) =
;  317          0397  2 BEGIN
;  318          0398  2 !
;  319          0399  2 ! This routine is a condition handler called when ever a
;  320          0400  2 ! SIGNAL is done by cksm.  It merely remembers the
;  321          0401  2 ! most severe error for an exit status.
;  322          0402  2 !
;  323          0403  2 MAP
;  324          0404  2     sigargs : REF $BBLOCK,
;  325          0405  2     mechargs : REF $BBLOCK;
;  326          0406  2
;  327          0407  2 BIND
;  328          0408  2     signame = sigargs [chf$l_sig_name] : $BBLOCK;       !Name of signal
;  329          0409  2
;  330          0410  2 IF NOT .signame                                       !If its an error signal
;  331          0411  4     AND ((.signame [sts$v_severity]                    ! and severity is worse than it was
;  332          0412  4         GEQU .exitstatus [sts$v_severity])
;  333          0413  3         OR .exitstatus [sts$v_severity])               ! or we haven't had any errors
;  334          0414  2     THEN exitstatus = .signame;                        ! then remember it for exiting
;  335          0415  2
;  336          0416  2 RETURN ss$_resignal;                                  !Resignal to get the error printed
;  337          0417  1 END;                                                  !Of signal_handler


                                0004 00000 SIGNAL_HANDLER:
                                           .WORD   Save R2                                  ; 0396
                     52   0000' CF  9E 00002        MOVAB   EXITSTATUS, R2                  ;
           50   04       AC    04  C1 00007        ADDL3   #4, SIGARGS, R0                 ; 0408
                         12    60  E8 0000C        BLBS    (R0), 2$                        ; 0410
      51   62             03    00  EF 0000F        EXTZV   #0, #3, EXITSTATUS, R1          ; 0412
      51   60             03    00  ED 00014        CMPZV   #0, #3, (R0), R1                ;
                               03  1E 00019        BGEQU   1$                              ;
                         03    62  E9 0001B        BLBC    EXITSTATUS, 2$                  ; 0413
                         62    60  D0 0001E 1$:     MOVL    (R0), EXITSTATUS                ; 0414
                         50  0918  8F  3C 00021 2$:  MOVZWL  #2328, R0                      ; 0416
                                  04 00026        RET                                     ; 0417

; Routine Size:  39 bytes,    Routine Base:  $CODE$ + 01DC
```

```
;  339          0418  1 %sbttl 'main routine of checksum'
;  340          0419  1 ROUTINE checksum$main =
;  341          0420  2 BEGIN
;  342          0421  2 !
;  343          0422  2 ! This is the main program.  It gathers all the command inputs and calls
;  344          0423  2 ! appropiate routine to checksum either the file or image.
;  345          0424  2 !
;  346          0425  2 LOCAL
;  347          0426  2     status,
;  348          0427  2     file_sum,
;  349          0428  2     ofab : $BBLOCK[fab$c_bln],
;  350          0429  2     onam : $BBLOCK[nam$c_bln],
;  351          0430  2     orss : $BBLOCK[nam$c_maxrss],
;  352          0431  2     oess : $BBLOCK[nam$c_maxrss],
;  353          0432  2     indesc : $BBLOCK [dsc$c_s_bln];             !User's input file spec
;  354          0433  2
;  355          0434  2 ENABLE signal_handler;                        !Enable the condition handler
;  356          0435  2 exitstatus = ss$_normal;                     !Preset success exit status
;  357          0436  2
;  358          0437  2 cksm$gl_maxbyt = maxbytes;
;  359          0438  2 $init_ddesc(indesc);                         !Initialize dynamic descriptor
;  360          0439  2 CH$MOVE(dsc$c_s_bln,indesc,outfiledesc);
;  361          0440  2 CH$MOVE(dsc$c_s_bln,indesc,find_result);
;  362          0441  2
;  363          0442  2 cli$get_value($descriptor('INPUT'),indesc);      .Get input file spec.
;  364          0443  2 cli$get_value($descriptor('OUTPUT'),outfiledesc);!Get user output file spec
;  365          0444  2
;  366          0445  2 file_sum = cli$present($descriptor('FILE'));    !See if /FILE
;  367          0446  2 status = cli$present($descriptor('IMAGE'));     !See if /IMAGE
;  368          0447  3 IF NOT (.file_sum OR .status)                  !If neither were specified
;  369          0448  2     THEN file_sum = true;                      ! then default to /FILE
;  370          0449  2 IF .file_sum                                   !If both were specified
;  371          0450  2     AND .status
;  372          0451  2     THEN SIGNAL_STOP(cksm$_confqual);          ! that's an error
;  373          0452  2 !
;  374          0453  2 ! Create the output file
;  375          0454  2 !
;  376        P 0455  2 $FAB_INIT(fab=ofab,                           !Initialize output fab
;  377        P 0456  2           nam=onam,
;  378        P 0457  2           fns=.outfiledesc[dsc$w_length],
;  379        P 0458  2           fna=.outfiledesc[dsc$a_pointer],
;  380        P 0459  2           rat=(cr),                           !With carriage control
;  381        P 0460  2           fop=(ofp),                          !Output file parse
;  382          0461  2           fac=(put));                         !Will do put's to file
;  383          0462  2
;  384          0463  2 CH$FILL(0,nam$c_maxrss,orss);                 !Zero resultant name string
;  385          0464  2 CH$FILL(0,nam$c_maxrss,oess);                 ! and expanded name string
;  386        P 0465  2 $NAM_INIT(nam=onam,                           !Initialize output file nam block
;  387        P 0466  2           rss=nam$c_maxrss,
;  388        P 0467  2           rsa=orss,
;  389        P 0468  2           ess=nam$c_maxrss,
;  390          0469  2           esa=oess);
;  391          0470  2
;  392        P 0471  2 $RAB_INIT(rab=orab,                           !Initialize output file rab
;  393          0472  2           fab=ofab);
;  394          0473  2
;  395          0474  2 status = $CREATE(fab=ofab);
```

```
;  396     0475  2 CH$MOVE(dsc$c_s_bln,getfilename(ofab),          !Get the resulting filename
;  397     0476  2                                 outfiledesc);
;  398     0477  2 IF NOT .status                                  !If error opening output file
;  399     0478  2     THEN SIGNAL_STOP(cksm$_openout,1,outfiledesc, ! then give up now
;  400     0479  2                      .status,.ofab[fab$l_stv]);
;  401     0480  2
;  402     0481  3 IF NOT (status=$CONNECT(rab=orab))              !Connect the record stream
;  403     0482  2     THEN SIGNAL_STOP(cksm$_openout,1,outfiledesc,
;  404     0483  2                      .status,.orab[rab$l_stv]);
;  405     0484  2 !
;  406     0485  2 ! Loop. calling lib$find_file to get files matching the output spec
;  407     0486  2 !
;  408     0487  2 find_context = 0;                               !Initial context is 0
;  409     0488  2
;  410     0489  3 WHILE (status = lib$find_file(indesc,find_result,find_context,
;  411     0490  4                               (IF .file_sum
;  412     0491  4                                   THEN $descriptor('.DAT')
;  413     0492  3                                   ELSE $descriptor('.EXE')),
;  414     0493  2                               0, 0, %REF(2)) ) NEQ rms$_nmf
;  415     0494  2 DO
;  416     0495  2 IF NOT .status                                  !Report error if find_file failure
;  417     0496  2         THEN SIGNAL(cksm$_parsefail,1,find_result,
;  418     0497  2                     .find_context[fab$l_sts],.find_context[fab$l_stv])
;  419     0498  3 ELSE BEGIN
;  420     0499  3     find_context[fab$v_get] = true;             !Initialize for GET's
;  421     0500  3     IF NOT .file_sum
;  422     0501  3         THEN find_context[fab$v_bio] = true;    ! and block i/o
;  423     0502  3
;  424     0503  3 !
;  425     0504  3 ! Call the appropiate routine to do the checksumming of the file contents
;  426     0505  3 ! or image.
;  427     0506  3 !
;  428     0507  3     IF .file_sum                                !If /FILE then checksum the file
;  429     0508  4         THEN BEGIN                              ! by simply reading it
;  430     0509  4             find_context[fab$l_xab] = ixabfhc;  !Set XAB address
;  431     0510  4             checksum_file();                    ! Output is DCL symbol checksum$checksum
;  432     0511  4             END
;  433     0512  4         ELSE BEGIN
;  434     0513  5             IF NOT (status = lib$get_vm(cksm$gl_maxbyt,
;  435     0514  5                                         databuffer))
;  436     0515  4                 THEN SIGNAL_STOP(.status);
;  437     0516  4             find_context[fab$l_xab] = 0; !No need to use XAB
;  438     0517  4             read_header();                      !Process CHECKSUM/IMAGE
;  439     0518  3             END;
;  440     0519  3
;  441     0520  2     END;                                        !Of loop calling lib$find_file
;  442     0521  2 !
;  443     0522  2 ! Close the output file
;  444     0523  2 !
;  445     0524  3 IF NOT (status=$DISCONNECT(rab=orab))
;  446     0525  2     THEN SIGNAL(cksm$_closeout, 1,
;  447     0526  2                 outfiledesc, .status,
;  448     0527  2                 .orab[rab$l_stv]);
;  449     0528  2
;  450     0529  3 IF NOT (status=$CLOSE(fab=ofab))
;  451     0530  2     THEN SIGNAL(cksm$_closeout, 1,
;  452     0531  2                 outfiledesc, .status,
```

```
;  453          0532  2                          .ofab[fab$l_stv]);
;  454          0533  2
;  455          0534  2 RETURN (status = .exitstatus OR sts$m_inhib_msg);       !Exit with no message
;  456          0535  1 END;


                                                    .PSECT  $PLIT$,NOWRT,NOEXE,2

                                 54  55  50  4E  49  00020 P.AAE:   .ASCII  \INPUT\                    ;
                                                     00025          .BLKB   3
                                   00000005          00028 P.AAD:   .LONG   5                        ;
                                   00000000'         0002C          .ADDRESS P.AAE                   ;
                             54  55  50  54  55  4F  00030 P.AAG:   .ASCII  \OUTPUT\                  ;
                                                     00036          .BLKB   2
                                   00000006          00038 P.AAF:   .LONG   6                        ;
                                   00000000'         0003C          .ADDRESS P.AAG                   ;
                                       45  4C  49  46  00040 P.AAI:   .ASCII  \FILE\                  ;
                                   00000004          00044 P.AAH:   .LONG   4                        ;
                                   00000000'         00048          .ADDRESS P.AAI                   ;
                                 45  47  41  4D  49  0004C P.AAK:   .ASCII  \IMAGE\                  ;
                                                     00051          .BLKB   3
                                   00000005          00054 P.AAJ:   .LONG   5                        ;
                                   00000000'         00058          .ADDRESS P.AAK                   ;
                                       54  41  44  2E  0005C P.AAM:   .ASCII  \.DAT\                  ;
                                   00000004          00060 P.AAL:   .LONG   4                        ;
                                   00000000'         00064          .ADDRESS P.AAM                   ;
                                       45  58  45  2E  00068 P.AAO:   .ASCII  \.EXE\                  ;
                                   00000004          0006C P.AAN:   .LONG   4                        ;
                                   00000000'         00070          .ADDRESS P.AAO                   ;

                                                    $RMS_PTR=           ORAB
                                                            .EXTRN  SYS$CREATE

                                                            .PSECT  $CODE$,NOWRT,2

                                                00FFC 00000 CHECKSUM$MAIN:
                                                            .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9,R10,R11    ; 0419
                                   5B 00000000G   00    9E 00002        MOVAB   LIB$SIGNAL, R11            ;
                                   5A     0000'   CF    9E 00009        MOVAB   P.AAD, R10                 ;
                                   59 00000000G   00    9E 0000E        MOVAB   LIB$STOP, R9               ;
                                   58     0000'   CF    9E 00015        MOVAB   OUTFILEDESC, R8            ;
                                   5E     FD44    CE    9E 0001A        MOVAB   -700(SP), SP               ;
                                   6D     0221    CF    DE 0001F        MOVAL   17$, (FP)                  ; 0420
                                 18   A8          01    D0 00024        MOVL    #1, EXITSTATUS             ; 0435
                               0000'  CF    1400    8F    3C 00028        MOVZWL  #5120, CKSM$GL_MAXBYT      ; 0437
                                 04   AE 020E0000    8F    D0 0002F        MOVL    #34471936, INDESC          ; 0438
                                           08   AE    D4 00037        CLRL    INDESC+4                   ;
                             68    04   AE          08    28 0003A        MOVC3   #8, INDESC, OUTFILEDESC    ; 0439
                         08  A8    04   AE          08    28 0003F        MOVC3   #8, INDESC, FIND_RESULT    ; 0440    ; R
                                           04   AE    9F 00045        PUSHAB  INDESC                     ; 0442
                                                5A    DD 00048        PUSHL   R10                        ;
                                 00000000G   00       02    FB 0004A        CALLS   #2, CLI$GET_VALUE          ;
                                                58    DD 00051        PUSHL   R8                         ; 0443
                                           10   AA    9F 00053        PUSHAB  P.AAF                      ;
                                 00000000G   00       02    FB 00056        CALLS   #2, CLI$GET_VALUE          ;
                                           1C   AA    9F 0005D        PUSHAB  P.AAH                      ; 0445
```

```
                        00000000G   00              01  FB 00060          CALLS   #1, CLI$PRESENT                                  ;
                                    57              50  D0 00067          MOVL    R0, FILE_SUM                                    ;
                                                    9F  AA 0006A          PUSHAB  P.AAJ                                           ; 0446
                        00000000G   00              01  FB 0006D          CALLS   #1, CLI$PRESENT                                 ;
                                    56              50  D0 00074          MOVL    R0, STATUS                                      ;
                                    09              57  E8 00077          BLBS    FILE_SUM, 2$                                    ; 0447
                                    03              56  E8 0007A          BLBS    STATUS, 1$                                      ;
                                    57              01  D0 0007D          MOVL    #1, FILE_SUM                                    ; 0448
                                    0C              57  E9 00080 1$:       BLBC    FILE_SUM, 3$                                    ; 0449
                                    09              56  E9 00083 2$:       BLBC    STATUS, 3$                                      ; 0450
                                            000312E4    8F  DD 00086          PUSHL   #201444                                         ; 0451
                                    69              01  FB 0008C          CALLS   #1, LIB$STOP                                    ;
    0050    8F          00          6E              00  2C 0008F 3$:       MOVC5   #0, (SP), #0, #80, $RMS_PTR                     ; 0461
                                                B0  AD  00096
                                B0  AD      5003    8F  B0 00098          MOVW    #20483, $RMS_PTR                                ;
                                B4  AD  20000000    8F  D0 0009E          MOVL    #536870912, $RMS_PTR+4                          ;
                                C6  AD              01  90 000A6          MOVB    #1, $RMS_PTR+22                                 ;
                                CE  AD      0202    8F  B0 000AA          MOVW    #514, $RMS_PTR+30                               ;
                                D8  AD      FF50    CD  9E 000B0          MOVAB   ONAM, $RMS_PTR+40                               ;
                                DC  AD        04    A8  D0 000B6          MOVL    OUTFILEDESC+4, $RMS_PTR+44                      ;
                                E4  AD              68  90 000BB          MOVB    OUTFILEDESC, $RMS_PTR+52                        ;
    00FF    8F          00          6E              00  2C 000BF          MOVC5   #0, (SP), #0, #255, ORSS                        ; 0463
                                            010C    CE      000C6
    00FF    8F          00          6E              00  2C 000C9          MOVC5   #0, (SP), #0, #255, OESS                        ; 0464
                                              0C    AE      000D0
    0060    8F          00          6E              00  2C 000D2          MOVC5   #0, (SP), #0, #96, $RMS_PTR                     ; 0469
                                            FF50    CD      000D9
                            FF50    CD      6002    8F  B0 000DC          MOVW    #24578, $RMS_PTR                                ;
                            FF52    CD              01  8E 000E3          MNEGB   #1, $RMS_PTR+2                                  ;
                            FF54    CD      010C    CE  9E 000E8          MOVAB   ORSS, $RMS_PTR+4                                ;
                            FF5A    CD              01  8E 000EF          MNEGB   #1, $RMS_PTR+10                                 ;
                            FF5C    CD        0C    AE  9E 000F4          MOVAB   OESS, $RMS_PTR+12                               ;
    0044    8F          00          6E              00  2C 000FA          MOVC5   #0, (SP), #0, #68, $RMS_PTR                     ; 0472
                                              90    A8      00101
                                90  A8      4401    8F  B0 00103          MOVW    #17409, $RMS_PTR                                ;
                                CC  A8        B0    AD  9E 00109          MOVAB   OFAB, $RMS_PTR+60                               ;
                                              B0    AD  9F 0010E          PUSHAB  OFAB                                            ; 0474
                        00000000G   00              01  FB 00111          CALLS   #1, SYS$CREATE                                  ;
                                    56              50  D0 00118          MOVL    R0, STATUS                                      ;
                                                    B0  AD  9F 0011B      PUSHAB  OFAB                                            ; 0475
                            0000V   CF              01  FB 0011E          CALLS   #1, GETFILENAME                                 ;
                        68          60              08  28 00123          MOVC3   #8, (R0), OUTFILEDESC                           ;
                                    12              56  E8 00127          BLBS    STATUS, 4$                                      ; 0477
                                                    BC  AD  DD 0012A      PUSHL   OFAB+12                                         ; 0479
                                                        56  DD 0012D      PUSHL   STATUS                                          ;
                                                        58  DD 0012F      PUSHL   R8                                              ; 0478
                                                        01  DD 00131      PUSHL   #1                                              ;
                                            000310A4    8F  DD 00133      PUSHL   #200868                                         ;
                                    69              05  FB 00139          CALLS   #5, LIB$STOP                                    ;
                                                    90  A8  9F 0013C 4$:   PUSHAB  ORAB                                           ; 0481
                        00000000G   00              01  FB 0013F          CALLS   #1, SYS$CONNECT                                 ;
                                    56              50  D0 00146          MOVL    R0, STATUS                                      ;
                                    12              56  E8 00149          BLBS    STATUS, 5$                                      ;
                                                    9C  A8  DD 0014C      PUSHL   ORAB+12                                         ; 0483
                                                        56  DD 0014F      PUSHL   STATUS                                          ;
                                                        58  DD 00151      PUSHL   R8                                              ; 0482
                                                        01  DD 00153      PUSHL   #1                                              ;
```

```
                    000310A4   8F   DD 00155          PUSHL   #200868                      ;
              69               05   FB 0015B          CALLS   #5, LIB$STOP                 ;
                        FF48   C8   D4 0015E 5$:      CLRL    FIND_CONTEXT                 ; 0487
              6E               02   D0 00162 6$:      MOVL    #2, (SP)                     ; 0493
                               5E   DD 00165          PUSHL   SP                           ;
                               7E   7C 00167          CLRQ    -(SP)                        ; 0489
              06               57   E9 00169          BLBC    FILE_SUM, 7$                 ; 0490
              50          38   AA   9E 0016C          MOVAB   P.AAC, R0                    ; 0491
                               04   11 00170          BRB     8$                           ;
              50          44   AA   9E 00172 7$:      MOVAB   P.AAN, R0                    ; C492
                               50   DD 00176 8$:      PUSHL   R0                           ;
                        FF48   C8   9F 00178          PUSHAB  FIND_CONTEXT                 ; 0489
                          08   A8   9F 0017C          PUSHAB  FIND_RESULT                  ;
                          1C   AE   9F 0017F          PUSHAB  INDESC                       ;
         00000000G    00       07   FB 00182          CALLS   #7, LIB$FIND_FILE            ;
              56               50   D0 00189          MOVL    R0, STATUS                   ;
         000182CA     8F       56   D1 0018C          CMPL    STATUS, #99018               ; 0493
                               5E   13 00193          BEQL    14$                          ;
              52        FF48   C8   D0 00195          MOVL    FIND_CONTEXT, R2             ; 0497
              14               56   E8 0019A          BLBS    STATUS, 10$                  ; 0495
              7E          08   A2   7D 0019D          MOVQ    8(R2), -(SP)                 ; 0497
                          08   A8   9F 001A1          PUSHAB  FIND_RESULT                  ; 0496
                               01   DD 001A4          PUSHL   #1                           ;
                    00031248   8F   DD 001A6          PUSHL   #201288                      ;
              6B               05   FB 001AC          CALLS   #5, LIB$SIGNAL               ;
                               B1   11 001AF 9$:      BRB     6$                           ;
      16      A2               02   88 001B1 10$:     BISB2   #2, 22(R2)                   ; 0499
              07               57   E8 001B5          BLBS    FILE_SUM, 11$                ; 0500
      16      A2               20   88 001B8          BISB2   #32, 22(R2)                  ; 0501
              0C               57   E9 001BC          BLBC    FILE_SUM, 12$                ; 0507
      24      A2          D4   A8   9E 001BF 11$:     MOVAB   IXABFHC, 36(R2)              ; 0509
    FCC2      CF               00   FB 001C4          CALLS   #0, CHECKSUM_FILE            ; 0510
                               97   11 001C9          BRB     6$                           ; 0507
                          14   A8   9F 001CB 12$:     PUSHAB  DATABUFFER                   ; 0513
                       0000'   CF   9F 001CE          PUSHAB  CKSM$GL_MAXBYT               ;
         00000000G    00       02   FB 001D2          CALLS   #2, LIB$GET_VM               ;
              56               50   D0 001D9          MOVL    R0, STATUS                   ;
              05               56   E8 001DC          BLBS    STATUS, 13$                  ;
                               56   DD 001DF          PUSHL   STATUS                       ; 0515
              69               01   FB 001E1          CALLS   #1, LIB$STOP                 ;
              50        FF48   C8   D0 001E4 13$:     MOVL    FIND_CONTEXT, R0             ; 0516
                          24   A0   D4 001E9          CLRL    36(R0)                       ;
           0000V      CF       00   FB 001EC          CALLS   #0, READ_HEADER              ; 0517
                               BC   11 001F1          BRB     9$                           ; 0495
                          90   A8   9F 001F3 14$:     PUSHAB  ORAB                         ; 0524
         00000000G    00       01   FB 001F6          CALLS   #1, SYS$DISCONNECT           ;
              56               50   D0 001FD          MOVL    R0, STATUS                   ;
              12               56   E8 00200          BLBS    STATUS, 15$                  ;
                          9C   A8   DD 00203          PUSHL   ORAB+12                      ; 0527
                               56   DD 00206          PUSHL   STATUS                       ; 0526
                               58   DD 00208          PUSHL   R8                           ; 0525
                               01   DD 0020A          PUSHL   #1                           ;
                    00031058   8F   DD 0020C          PUSHL   #200792                      ;
              6B               05   FB 00212          CALLS   #5, LIB$SIGNAL               ;
                          B0   AD   9F 00215 15$:     PUSHAB  OFAB                         ; 0529
         00000000G    00       01   FB 00218          CALLS   #1, SYS$CLOSE                ;
              56               50   D0 0021F          MOVL    R0, STATUS                   ;
```

```
                 12          56  E8 00222       BLBS    STATUS, 16$                          ;
                         BC  AD  DD 00225       PUSHL   OFAB+12                              ; 0532
                             56  DD 00228       PUSHL   STATUS                               ; 0531
                             58  DD 0022A       PUSHL   R8                                   ; 0530
                             01  DD 0022C       PUSHL   #1                                   ;
              00031058       8F  DD 0022E       PUSHL   #200792                              ;
                 6B          05  FB 00234       CALLS   #5, LIB$SIGNAL                       ;
    56      18   A8 10000000 8F  C9 00237 16$:  BISL3   #268435456, EXITSTATUS, STATUS       ; 0534
                 50          56  D0 00240       MOVL    STATUS, R0                           ;
                                 04 00243       RET                                          ; 0535
                               0000 00244 17$:  .WORD   Save nothing                         ; 0420
                             7E  D4 00246       CLRL    -(SP)                                ;
                             5E  DD 00248       PUSHL   SP                                   ;
                 7E      04  AC  7D 0024A       MOVQ    4(AP), -(SP)                         ;
           FD86  CF          03  FB 0024E       CALLS   #3, SIGNAL_HANDLER                   ;
                                 04 00253       RET                                          ;

; Routine Size:  596 bytes,    Routine Base:  $CODE$ + 0203
```

```
;  458          0536  1 %sbttl 'Catch signals'
;  459          0537  1 ROUTINE catch_signals (sigargs,mechargs) =
;  460          0538  2 BEGIN
;  461          0539  2 !
;  462          0540  2 ! This condition handler is enabled when the image is being
;  463          0541  2 ! processed.  It catches info messages, and diverts them to
;  464          0542  2 ! the output file.  Any other errors are resignaled.
;  465          0543  2 !
;  466          0544  2 MAP
;  467          0545  2     sigargs : REF $BBLOCK,
;  468          0546  2     mechargs : REF $BBLOCK;
;  469          0547  2
;  470          0548  2 BIND
;  471          0549  2     signame = sigargs[chf$l_sig_name] : $BBLOCK;
;  472          0550  2
;  473          0551  2 LOCAL
;  474          0552  2     status,
;  475          0553  2     outadr : $BBLOCK[4],
;  476          0554  2     outbufdesc : $BBLOCK[dsc$c_s_bln],
;  477          0555  2     msgbufdesc : $BBLOCK[dsc$c_s_bln],
;  478          0556  2     msgbuf : $BBLOCK[256],
;  479          0557  2     outbuf : $BBLOCK[512];
;  480          0558  2
;  481          0559  2 IF NOT .signame                                  !If this is not an informational message
;  482          0560  2     THEN RETURN ss$_resignal;                   ! then we don't want it to go to output file
;  483          0561  2 msgbufdesc[dsc$w_length] = 256;                 !Initialize the descriptors
;  484          0562  2 msgbufdesc[dsc$a_pointer] = msgbuf;
;  485          0563  2 outbufdesc[dsc$w_length] = 512;
;  486          0564  2 outbufdesc[dsc$a_pointer] = outbuf;
;  487          0565  2 !
;  488          0566  2 ! Get the message and format the string
;  489          0567  2 !
;  490        P 0568  3 IF NOT (status = $GETMSG(msgid=.signame,msglen=msgbufdesc[dsc$w_length],
;  491          0569  3                        bufadr=msgbufdesc,flags=1,outadr=outadr))
;  492          0570  2     THEN RETURN ss$_resignal                    !Not found, so resignal
;  493        P 0571  3 ELSE IF NOT (status =$faol(ctrstr=msgbufdesc,outlen=outbufdesc,   !Format the string
;  494          0572  3                  outbuf=outbufdesc,prmlst=sigargs[chf$l_sig_arg1]+4))    ! (skip the signal count longword)
;  495          0573  2     THEN RETURN ss$_resignal                    !FAO error, so resignal
;  496          0574  2     ELSE cksm_output(outbufdesc);               !All is well, write string to output        ; F
;  497          0575  2
;  498          0576  2 signame[sts$v_inhib_msg] = true;                !Inhibit further message printing
;  499          0577  2 mechargs[chf$l_mch_savr0] = .signame[sts$v_inhib_msg];
;  500          0578  2
;  501          0579  2 RETURN ss$_continue
;  502          0580  2
;  503          0581  1 END;


                                                .EXTRN  SYS$GETMSG, SYS$FAOL

                                0004 00000 CATCH_SIGNALS:
                                           .WORD   Save R2                                  ; 0537
                          5E    FCEC    CE  9E 00002         MOVAB   -788(SP), SP          ;
                52        04    AC            04  C1 00007   ADDL3   #4, SIGARGS, R2        ; 0549
                              45            62  E9 0000C     BLBC    (R2), 1$              ; 0559
                          F0    AD      0100  8F  B0 0000F   MOVW    #256, MSGBUFDESC      ; 0561
```

```
                                 F4   AD      FEF0    CD   9E 00015          MOVAB   MSGBUF, MSGBUFDESC+4                    ; 0562
                                 F8   AD      0200    8F   B0 0001B          MOVW    #512, OUTBUFDESC                        ; 0563
                                 FC   AD        04    AE   9E 00021          MOVAB   OUTBUF, OUTBUFDESC+4                    ; 0564
                                                      5E   DD 00026          PUSHL   SP                                      ; 0569
                                                      01   DD 00028          PUSHL   #1
                                                   F0   AD   9F 0002A          PUSHAB  MSGBUFDESC
                                                   F0   AD   9F 0002D          PUSHAB  MSGBUFDESC
                                                      62   DD 00030          PUSHL   (R2)
                              00000000G   00              05   FB 00032          CALLS   #5, SYS$GETMSG
                                          18              50   E9 00039          BLBC    STATUS, 1$
                           7E       04   AC              0C   C1 0003C          ADDL3   #12, SIGARGS, -(SP)                  ; 0572
                                                   F8   AD   9F 00041          PUSHAB  OUTBUFDESC
                                                   F8   AD   9F 00044          PUSHAB  OUTBUFDESC
                                                   F0   AD   9F 00047          PUSHAB  MSGBUFDESC
                              00000000G   00              04   FB 0004A          CALLS   #4, SYS$FAOL
                                          06              50   E8 00051          BLBS    STATUS, 2$
                                          50      0918    8F   3C 00054 1$:      MOVZWL  #2328, R0                       ; 0573
                                                          04   00059          RET
                                                   F8   AD   9F 0005A 2$:      PUSHAB  OUTBUFDESC                      ; 0574
                                 0000V    CF              01   FB 0005D          CALLS   #1, CKSM_OUTPUT
                                    03    A2              10   88 00062          BISB2   #16, 3(R2)                      ; 0576
                                          50        08    AC   D0 00066          MOVL    MECHARGS, R0                    ; 0577
                  0C   A0           62              01        EF 0006A          EXTZV   #28, #1, (R2), 12(R0)
                                          50              01   D0 0007U          MOVL    #1, R0                          ; 0579
                                                          04   00072          RET                                     ; 0581

; Routine Size:  116 bytes,    Routine Base:  $CODE$ + 0457
```

```
;  505          0582  1 %sbttl 'Process CHECKSUM/IMAGE'
;  506          0583  1 ROUTINE read_header =
;  507          0584  2 BEGIN
;  508          0585  2 !
;  509          0586  2 ! Open the file using RMS with the UFO (User File Open) bit set.  The
;  510          0587  2 ! read the image header using the EXEC routines which do $QIO's given
;  511          0588  2 ! the channel from the RMS open., and checksum the image sections.  Ignore
;  512          0589  2 ! the parts of the image header that can always be different, (ex: date/time).
;  513          0590  2 !
;  514          0591  2 LOCAL
;  515          0592  2         isdnum,                                 !isd number
;  516          0593  2         header : $BBLOCK[512],                  !Buffer containing decoded header
;  517          0594  2         curhdrisd : $BBLOCK[512],               !current isd in header
;  518          0595  2         hdr_blk : $BBLOCK[512],                 !buffer for image header -undecoded
;  519          0596  2         status,
;  520          0597  2         vbn,                                    !Used by header decode routines
;  521          0598  2         offset,                                 !Used by header decode routines
;  522          0599  2         hdrver,                                 !Used by header decode routines
;  523          0600  2         alias ;                                 !Used by header decode routines
;  524          0601  2
;  525          0602  2 ENABLE catch_signals;                           !We want output to go to output file also
;  526          0603  2 cksm$gl_ihdcksm = 0;                           !Zero image header checksum
;  527          0604  2 isdnum = 0;                                     !first isect is 1
;  528          0605  2 cksm$gl_acucksm = 0;                           !Zero accumulated checksum
;  529          0606  2 SIGNAL(cksm$_file,1,find_result);               !Print the filename
;  530          0607  2
;  531          0608  2 !
;  532          0609  2 ! First, open the file using RMS with an UFO option.
;  533          0610  2 !
;  534          0611  2 find_context[fab$v_ufo] = true;                 !User file open option
;  535          0612  3 IF NOT (status = $open(fab=.find_context))      !Open the input file
;  536          0613  2 THEN SIGNAL(cksm$_openin, 1,
;  537          0614  2                 find_result, .status,
;  538          0615  2                 .find_context[fab$l_stv]);
;  539          0616  2 find_context[fab$v_ufo] = false;                !clear the bit after open
;  540          0617  2 chan = .find_context[fab$l_stv];                !Keep around the assigned channel
;  541          0618  2
;  542          0619  2 !
;  543          0620  2 ! Read the image header into a buffer decoded by the special EXEC routines
;  544          0621  2 !
;  545          0622  2 status = img$decode_ihd( .chan,hdr_blk,header,vbn,offset,hdrver,alias);
;  546          0623  2 IF NOT .status
;  547          0624  2 THEN
;  548          0625  2     SIGNAL( .status );                         !signal any errors in image file
;  549          0626  2
;  550          0627  2 !
;  551          0628  2 ! The following checks are made on the image header fixed portion to see if legal
;  552          0629  2 ! Major neader id must match.  The header fixed part must be less than a block and must
;  553          0630  2 ! contain patch area.  header block count is > 0.
;  554          0631  2 !
;  555          0632  2 IF .header[ihd$w_majorid] NEQ ihd$k_majorid
;  556          0633  4     OR (.(header[ihd$w_minorid])<0,8,0> EQL (ihd$k_minorid and %x'ff')
;  557          0634  3         AND .(header[ihd$w_minorid])<8,8,0> GTRU (ihd$k_minorid and %x'ff00')/256)
;  558          0635  3     OR .header[ihd$w_size] GTRU MAXU((.header[ihd$w_patchoff]
;  559          0636  2                             + ihp$k_length),ihd$k_maxlength)
;  560          0637  3     OR ( .header[ihd$b_hdrblkcnt] LEQ 0)
;  561          0638  3     OR (header + .header[ihd$w_symdbgoff])
```

```
;  562          0639  3                          GEQU (header + .header[ihd$w_size])
;  563          0640  3      THEN BEGIN
;  564          0641  3          SIGNAL(cksm$_badimghdr,1,find_result);  !any above not true, fatal image header error
;  565          0642  3          status = $dassgn(chan=.chan);          !deassign channel
;  566          0643  3          cksm_foreign();                        !Checksum non-image file
;  567          0644  3          RETURN true
;  568          0645  2          END;
;  569          0646  2
;  570          0647  2  ! Otherwise just checksum the contents of the fixed portion of the image
;  571          0648  2  ! header
;  572          0649  2  !
;  573          0650  2  cksm_header(header);
;  574          0651  2
;  575          0652  2  !
;  576          0653  2  ! Now, checksum all the ISD's (Image Section Descriptors)
;  577          0654  2  !
;  578          0655  2  WHILE 1
;  579          0656  3  DO BEGIN
;  580          0657  3      status = img$get_next_isd(.chan,hdr_blk,header,vbn,offset,curhdrisd);
;  581          0658  3      IF .status EQLU IMG$_ENDOFHDR              ! Until no more ISD's....
;  582          0659  3      THEN
;  583          0660  3          EXITLOOP;
;  584          0661  3      IF NOT .status
;  585          0662  4      THEN BEGIN
;  586          0663  4          SIGNAL(cksm$_badimghdr,1,find_result);  !signal error
;  587          0664  4          status = $dassgn(chan=.chan);          !deassign channel
;  588          0665  4          cksm_foreign();                        !and checksum as foreign image
;  589          0666  4          RETURN true;
;  590          0667  4          END
;  591          0668  3      ELSE
;  592          0669  4          BEGIN
;  593          0670  4          isdnum = .isdnum + 1;
;  594          0671  4          checksum_section(curhdrisd);           !compute isect checksum
;  595          0672  4          IF .curhdrisd[isd$l_vbn] NEQ 0         !If section has disk file space
;  596          0673  4              AND NOT .curhdrisd[isd$v_dzro]     ! and is not demand zero
;  597          0674  5          THEN BEGIN
;  598          0675  5              SIGNAL(cksm$_isectchk,2,.isdnum,.cksm$gl_chksum);   !Print isect checksum
;  599          0676  5              cksm$gl_acucksm = .cksm$gl_acucksm XOR .cksm$gl_chksum;!Accumulate new improved checksum
;  600          0677  4              END;
;  601          0678  3          END;
;  602          0679  2      END;                                       !end of isection loop
;  603          0680  2
;  604          0681  2  !
;  605          0682  2  ! Print checksum of image header and total checksum, and define a DCL
;  606          0683  2  ! symbol with the checksum value
;  607          0684  2  !
;  608          0685  2  SIGNAL(cksm$_ihdchksum,1,.cksm$gl_ihdcksm);
;  609          0686  2  SIGNAL(cksm$_allischk,1,.cksm$gl_acucksm);
;  610          0687  2  define_sym(.cksm$gl_acucksm);
;  611          0688  2
;  612          0689  3  IF NOT (status=$DASSGN(chan=.chan))
;  613          0690  2      THEN SIGNAL(cksm$_closein, 1,
;  614          0691  2                  find_result, .status);
;  615          0692  2
;  616          0693  2  RETURN true
;  617          0694  1  END;
```

```
                                                .EXTRN  SYS$DASSGN

                                        01FC 00000 READ_HEADER:
                                                .WORD   Save R2,R3,R4,R5,R6,R7,R8               ; 0583
                         58 00000000G   00   9E 00002           MOVAB   SYS$DASSGN, R8          ;
                         57      0000'  CF   9E 00009           MOVAB   CKSM$GL_ACUCKSM, R7     ;
                         56      0000'  CF   9E 0000E           MOVAB   CHAN, R6                ;
                         55 00000000G   00   9E 00013           MOVAB   LIB$SIGNAL, R5          ;
                         5E      F9F0   CE   9E 0001A           MOVAB   -1552(SP), SP           ;
                         6D      0194   CF   DE 0001F           MOVAL   11$, (FP)               ; 0584
                                   F8   A7   D4 00024           CLRL    CKSM$GL_IHDCKSM         ; 0603
                                        53   D4 00027           CLRL    ISDNUM                  ; 0604
                                        67   D4 00029           CLRL    CKSM$GL_ACUCKSM         ; 0605
                                   00C4 C6   9F 0002B           PUSHAB  FIND_RESULT             ; 0606
                                        01   DD 0002F           PUSHL   #1                      ;
                                00000000G   8F   DD 00031       PUSHL   #CKSM$_FILE             ;
                                        65   03   FB 00037       CALLS   #3, LIB$SIGNAL          ;
                                        50      04   A6   D0 0003A       MOVL    FIND_CONTEXT, R0        ; 0611
                                  06    A0           02   88 0003E       BISB2   #2, 6(R0)               ;
                                                     50   DD 00042       PUSHL   R0                      ; 0612
                             00000000G  00           01   FB 00044       CALLS   #1, SYS$OPEN            ;
                                        52           50   D0 0004B       MOVL    R0, STATUS              ;
                                        18           52   E8 0004E       BLBS    STATUS, 1$              ;
                                        50      04   A6   D0 00051       MOVL    FIND_CONTEXT, R0        ; 0615
                                              0C     A0   DD 00055       PUSHL   12(R0)                  ;
                                                     52   DD 00058       PUSHL   STATUS                  ; 0614
                                           00C4      C6   9F 0005A       PUSHAB  FIND_RESULT             ; 0613
                                                     01   DD 0005E       PUSHL   #1                      ;
                                        0003109A     8F   DD 00060       PUSHL   #200858                 ;
                                                65   05   FB 00066       CALLS   #5, LIB$SIGNAL          ;
                                                50      04   A6   D0 00069 1$:    MOVL    FIND_CONTEXT, R0        ; 0616
                                          06    A0           02   8A 0006D       BICB2   #2, 6(R0)               ;
                                                66      0C   A0   D0 00071       MOVL    12(R0), CHAN            ; 0617
                                                     5E   DD 00075       PUSHL   SP                      ; 0622
                                                   08     AE   9F 00077       PUSHAB  HDRVER                  ;
                                                   10     AE   9F 0007A       PUSHAB  OFFSET                  ;
                                                   18     AE   9F 0007D       PUSHAB  VBN                     ;
                                                 FE00     CD   9F 00080       PUSHAB  HEADER                  ;
                                                   24     AE   9F 00084       PUSHAB  HDR_BLK                 ;
                                                     66   DD 00087           PUSHL   CHAN                    ;
                                 00000000G       00       07   FB 00089       CALLS   #7, IMG$DECODE_IHD      ;
                                                 52       50   D0 00090       MOVL    R0, STATUS              ;
                                                 05       52   E8 00093       BLBS    STATUS, 2$              ; 0623
                                                          52   DD 00096       PUSHL   STATUS                  ; 0625
                                                 65       01   FB 00098       CALLS   #1, LIB$SIGNAL          ;
                                            3230 8F     FE0C     CD   B1 0009B 2$:    CMPW    HEADER+12, #12848       ; 0632
                                                          03   13 000A2       BEQL    3$                      ;
                                                      0083     31 000A4       BRW     7$                      ;
                                                 30       FE0E CD   91 000A7 3$:    CMPB    HEADER+14, #48          ; 0633
                                                          07   12 000AC       BNEQ    4$                      ;
                                                 35       FE0F CD   91 000AE       CMPB    HEADER+15, #53          ; 0634
                                                          75   1A 000B3       BGTRU   7$                      ;
                                                 50       FE08 CD   3C 000B5 4$:    MOVZWL  HEADER+8, R0            ; 0635
                                                 50           2C   C0 000BA       ADDL2   #44, R0                 ;
                                 000000A8        8F           50   D1 000BD       CMPL    R0, #168                ;
```

```
                                        04   1E 000C4        BGEQU   5$                                  :
                            50      A8  8F   9A 000C6        MOVZBL  #168, R0                            :
       50    FE00   CD              10  00   ED 000CA 5$:    CMPZV   #0, #16, HEADER, R0                 :
                                        57   1A 000D1        BGTRU   7$                                  :
                                  FE10  CD   95 000D3        TSTB    HEADER+16                           : 0637
                                        51   13 000D7        BEQL    7$                                  :
                            51    FE00  CD   9E 000D9        MOVAB   HEADER, R1                          : 0638
                            50    FE04  CD   3C 000DE        MOVZWL  HEADER+4, R0                        :
                            51          50   C0 000E3        ADDL2   R0, R1                              :
                            50    FE00  CD   9E 000E6        MOVAB   HEADER, R0                          : 0639
                            54    FE00  CD   3C 000EB        MOVZWL  HEADER, R4                          :
                            50          54   C0 000F0        ADDL2   R4, R0                              :
                            50          51   D1 000F3        CMPL    R1, R0                              :
                                        32   1E 000F6        BGEQU   7$                                  :
                                  FE00  CD   9F 000F8        PUSHAB  HEADER                              : 0650
                    0000V   CF          01   FB 000FC        CALLS   #1, CKSM_HEADER                     :
                                  0210  CE   9F 00101 6$:    PUSHAB  CURHDRISD                           : 0657
                                    0C  AE   9F 00105        PUSHAB  OFFSET                              :
                                    14  AE   9F 00108        PUSHAB  VBN                                 :
                                  FE00  CD   9F 0010B        PUSHAB  HEADER                              :
                                    20  AE   9F 0010F        PUSHAB  HDR_BLK                             :
                                        66   DD 00112        PUSHL   CHAN                                :
                00000000G   00          06   FB 00114        CALLS   #6, IMG$GET_NEXT_ISD                :
                            52          50   D0 0011B        MOVL    R0, STATUS                          :
                084D8640    8F          52   D1 0011E        CMPL    STATUS, #139298368                  : 0658
                                        4E   13 00125        BEQL    9$                                  :
                            1E          52   E8 00127        BLBS    STATUS, 8$                          : 0661
                                  00C4  C6   9F 0012A 7$:    PUSHAB  FIND_RESULT                         : 0663
                                        01   DD 0012E        PUSHL   #1                                  :
                             00000000G  8F   DD 00130        PUSHL   #CKSM$_BADIMGHDR                    :
                            65          03   FB 00136        CALLS   #3, LIB$SIGNAL                      :
                                        66   DD 00139        PUSHL   CHAN                                : 0664
                            68          01   FB 0013B        CALLS   #1, SYS$DASSGN                      :
                            52          50   D0 0013E        MOVL    R0, STATUS                          :
                    0000V   CF          00   FB 00141        CALLS   #0, CKSM_FOREIGN                    : 0665
                                        6B   11 00146        BRB     10$                                 : 0666
                                        53   D6 00148 8$:    INCL    ISDNUM                              : 0670
                                  0210  CE   9F 0014A        PUSHAB  CURHDRISD                           : 0671
                    0000V   CF          01   FB 0014E        CALLS   #1, CHECKSUM_SECTION                :
                                  021C  CE   D5 00153        TSTL    CURHDRISD+12                        : 0672
                                        A8   13 00157        BEQL    6$                                  :
             A2     0218    CE          02   E0 00159        BBS     #2, CURHDRISD+8, 6$                 : 0673
                                    FC  A7   DD 0015F        PUSHL   CKSM$GL_CHKSUM                      : 0675
                                        53   DD 00162        PUSHL   ISDNUM                              :
                                        02   DD 00164        PUSHL   #2                                  :
                             00000000G  8F   DD 00166        PUSHL   #CKSM$_ISECTCHK                     :
                            65          04   FB 0016C        CALLS   #4, LIB$SIGNAL                      :
                            67      FC  A7   CC 0016F        XORL2   CKSM$GL_CHKSUM, CKSM$GL_ACUCKSM     : 0676
                                        8C   11 00173        BRB     6$                                  : 0655
                                    F8  A7   DD 00175 9$:    PUSHL   CKSM$GL_IHDCKSM                     : 0685
                                        01   DD 00178        PUSHL   #1                                  :
                             00000000G  8F   DD 0017A        PUSHL   #CKSM$_IHDCHKSUM                    :
                            65          03   FB 00180        CALLS   #3, LIB$SIGNAL                      :
                                        67   DD 00183        PUSHL   CKSM$GL_ACUCKSM                     : 0686
                                        01   DD 00185        PUSHL   #1                                  :
                             00000000G  8F   DD 00187        PUSHL   #CKSM$_ALLISC                       :
                            65          03   FB 0018D        CALLS   #3, LIB$SIGNAL                      :
```

```
                                    67  DD 00190          PUSHL   CKSM$GL_ACUCKSM                  ; 0687
                          FA04      CF 01  FB 00192          CALLS   #1, DEFINE_SYM                  ;
                                    66  DD 00197          PUSHL   CHAN                            ; 0689
                                68  01  FB 00199          CALLS   #1, SYS$DASSGN                  ;
                                52  50  DO 0019C          MOVL    R0, STATUS                      ;
                                11  52  E8 0019F          BLBS    STATUS, 10$                     ;
                                    52  DD 001A2          PUSHL   STATUS                          ; 0691
                                  00C4  C6  9F 001A4          PUSHAB  FIND_RESULT                     ; 0690
                                    01  DD 001A8          PUSHL   #1                              ;
                             00031050  8F  DD 001AA          PUSHL   #200784                         ;
                                65  04  FB 001B0          CALLS   #4, LIB$SIGNAL                  ;
                                50  01  DO 001B3 10$:      MOVL    #1, R0                          ; 0693
                                    04  001B6          RET                                     ; 0694
                                  0000  001B7 11$:      .WORD   Save nothing                    ; 0584
                                    7E  D4 001B9          CLRL    -(SP)                           ;
                                    5E  DD 001BB          PUSHL   SP                              ;
                                7E      04  AC  7D 001BD          MOVQ    4(AP), -(SP)                    ;
                          FDC6      CF 03  FB 001C1          CALLS   #3, CATCH_SIGNALS               ;
                                    04 001C6          RET                                     ;

; Routine Size:  455 bytes,    Routine Base:  $CODE$ + 04CB
```

```
;  619          0695  1 %sbttl 'Checksum image header contents'
;  620          0696  1 ROUTINE cksm_header (imageheader) =
;  621          0697  2 BEGIN
;  622          0698  2 !
;  623          0699  2 ! Checksums the non-variable contents of the image header
;  624          0700  2 !
;  625          0701  2 ! INPUTS:
;  626          0702  2 !
;  627          0703  2 !       Imageheader     points to the first block of image header in memory
;  628          0704  2 !
;  629          0705  2 ! NOTE:
;  630          0706  2 !
;  631          0707  2 !       This routine expects the fixed part of the image header to be contained
;  632          0708  2 !       in the first block of the image.
;  633          0709  2 !
;  634          0710  2 MAP
;  635          0711  2     imageheader : REF $BBLOCK;
;  636          0712  2
;  637          0713  2 BIND
;  638          0714  2     cksm = cksm$gl_ihdcksm,
;  639          0715  2     iha = .imageheader + .imageheader[ihd$w_activoff] : VECTOR[,LONG],
;  640          0716  2     ihs = .imageheader + .imageheader[ihd$w_symdbgoff] : VECTOR[,LONG],
;  641          0717  2     ihi = .imageheader + .imageheader[ihd$w_imgidoff] : $BBLOCK,
;  642          0718  2     ihp = .imageheader + .imageheader[ihd$w_patchoff] : VECTOR[,LONG];
;  643          0719  2
;  644          0720  2 cksm = .cksm XOR .imageheader[ihd$l_lnkflags];  !Include the link flags
;  645          0721  2 !
;  646          0722  2 ! Checksum the activation data
;  647          0723  2 !
;  648          0724  2 INCRU i FROM 0 TO 2
;  649          0725  2 DO IF .iha[.i] EQL 0
;  650          0726  2     THEN EXITLOOP
;  651          0727  2     ELSE cksm = .cksm XOR .iha[.i];
;  652          0728  2 !
;  653          0729  2 ! Checksum the symbol table and debug data
;  654          0730  2 !
;  655          0731  2 IF .imageheader[ihd$w_symdbgoff] NEQ 0
;  656          0732  2 THEN INCRU i FROM 0 TO ihs$c_length/4
;  657          0733  2     DO cksm = .cksm XOR .ihs[.i];
;  658          0734  2 !
;  659          0735  2 ! Checksum the image header ident section data
;  660          0736  2 !
;  661          0737  2 ! Not done, since it's all variable data
;  662          0738  2 !
;  663          0739  2
;  664          0740  2 !
;  665          0741  2 ! Checksum the patch data
;  666          0742  2 !
;  667          0743  2 IF .imageheader[ihd$w_patchoff] NEQ 0
;  668          0744  2 THEN INCRU i FROM 0 to (ihp$c_length-1)/4
;  669          0745  2     DO cksm = .cksm XOR .ihp[.i];
;  670          0746  2
;  671          0747  2 RETURN true
;  672          0748  2
;  673          0749  1 END;
```

```
                                        CKSM=                   CKSM$GL_IHDCKSM


                                007C 00000 CKSM_HEADER:
                                           .WORD   Save R2,R3,R4,R5,R6                     ; 0696
                     56  0000'   CF  9E 00002       MOVAB   CKSM, R6
                     50    04   AC  D0 00007       MOVL    IMAGEHEADER, R0                 ; 0715
                     51    02   A0  3C 0000B       MOVZWL  2(R0), R1
                52   50         51  C1 0000F       ADDL3   R1, R0, R2
                     51    04   A0  3C 00013       MOVZWL  4(R0), R1                       ; 0716
                55   50         51  C1 00017       ADDL3   R1, R0, R5
                     53    08   A0  3C 0001B       MOVZWL  8(R0), R3                       ; 0718
                54   50         53  C1 0001F       ADDL3   R3, R0, R4
                     66    20   A0  CC 00023       XORL2   32(R0), CKSM                    ; 0720
                                50  D4 00027       CLRL    I                               ; 0724
                                6240 D5 00029 1$:  TSTL    (R2)[I]                         ; 0725
                                  0B 13 0002C       BEQL    2$
                     66         6240 CC 0002E       XORL2   (R2)[I], CKSM                   ; 0727
                                50  D6 00032       INCL    I                               ; 0725
                     02         50  D1 00034       CMPL    I, #2
                                F0  1B 00037       BLEQU   1$
                                51  D5 00039 2$:   TSTL    R1                              ; 0731
                                0D  13 0003B       BEQL    4$
                                51  D4 0003D       CLRL    I                               ; 0732
                     66         6541 CC 0003F 3$:  XORL2   (R5)[I], CKSM                   ; 0733
                                51  D6 00043       INCL    I
                     05         51  D1 00045       CMPL    I, #5
                                F5  1B 00048       BLEQU   3$
                                53  D5 0004A 4$:   TSTL    R3                              ; 0743
                                0D  13 0004C       BEQL    6$
                                50  D4 0004E       CLRL    I                               ; 0744
                          66    6440 CC 00050 5$:  XORL2   (R4)[I], CKSM                   ; 0745
                                50  D6 00054       INCL    I
                          0A    50  D1 00056       CMPL    I, #10
                                F5  1B 00059       BLEQU   5$
                          50    01  D0 0005B 6$:   MOVL    #1, R0                          ; 0747
                                04  0005E       RET                                     ; 0749

; Routine Size:  95 bytes,    Routine Base:  $CODE$ + 0692
```

```
;  675          0750  1 %sbttl 'Read block'
;  676          0751  1 ROUTINE read_blocks (nblocks,first_block) =
;  677          0752  2 BEGIN
;  678          0753  2
;  679          0754  2 LOCAL
;  680          0755  2         iosb    : VECTOR[ 4, WORD ],
;  681          0756  2         readerror;
;  682          0757  2
;  683        P 0758  3 IF NOT (readerror = $qiow(              !Attempt to read file
;  684        P 0759  3                 efn = 7,
;  685        P 0760  3                 chan = .chan,
;  686        P 0761  3                 func = io$_readvblk,    ! Read a virtual block
;  687        P 0762  3                 iosb = iosb,            ! I/O Status block
;  688        P 0763  3                 p1 = .databuffer,       ! Buffer to read in to
;  689        P 0764  3                 p2 = .nblocks*512,      ! number of bytes to read
;  690        P 0765  3                 p3 = .first_block       ! starting VBN to read
;  691          0766  3               ))
;  692          0767  2 THEN SIGNAL(cksm$_readerr,1,find_result,.readerror);
;  693          0768  2
;  694          0769  2 RETURN .iosb[0];
;  695          0770  1 END;


                                                .EXTRN  SYS$QIOW

                                0000 00000 READ_BLOCKS:
                                                .WORD   Save nothing                    ; 0751
                             5E                 SUBL2   #8, SP                          ;
                                7E  7C 00002    CLRQ    -(SP)                           ; 0766
                                7E  D4 00007    CLRL    -(SP)                           ;
                                08  DD 00009    PUSHL   FIRST_BLOCK                     ;
                          7E    04  AC  09 78 0000C    ASHL    #9, NBLOCKS, -(SP)      ;
                                0000' CF  DD 00011    PUSHL   DATABUFFER                ;
                                7E  7C 00015    CLRQ    -(SP)                           ;
                                20  AE  9F 00017    PUSHAB  IOSB                      ;
                                31  DD 0001A    PUSHL   #49                           ;
                                0000' CF  DD 0001C    PUSHL   CHAN                      ;
                                07  DD 00020    PUSHL   #7                            ;
                    00000000G   00  0C  FB 00022    CALLS   #12, SYS$QIOW             ;
                                15  50  E8 00029    BLBS    READERROR, 1$             ;
                                50  DD 0002C    PUSHL   READERROR                     ; 0767
                                0000' CF  9F 0002E    PUSHAB  FIND_RESULT             ;
                                01  DD 00032    PUSHL   #1                            ;
                             000310B2   8F  DD 00034    PUSHL   #200882               ;
                    00000000G   00  04  FB 0003A    CALLS   #4, LIB$SIGNAL            ;
                                50  6E  3C 00041 1$:  MOVZWL  IOSB, R0                ; 0769
                                    04 00044    RET                                 ; 0770

; Routine Size:  69 bytes,    Routine Base:  $CODE$ + 06F1
```

```
;  597          0771  1 %sbttl 'Checksum image section descriptor'
;  698          0772  1 ROUTINE checksum_section (isd) =
;  699          0773  2 BEGIN
;  700          0774  2 !
;  701          0775  2 ! Checksums the contents of an image section
;  702          0776  2 !
;  703          0777  2 ! INPUTS:
;  704          0778  2 !
;  705          0779  2 !       isd     pointer to the image section descriptor for
;  706          0780  2 !               an image section.
;  707          0781  2 !
;  708          0782  2 MAP
;  709          0783  2     isd : REF $BBLOCK;
;  710          0784  2
;  711          0785  2 BIND
;  712          0786  2     isdvecbyt = .isd : VECTOR[,LONG];
;  713          0787  2
;  714          0788  2 LOCAL
;  715          0789  2     maxblocks,
;  716          0790  2     tblocks,
;  717          0791  2     blockoff,
;  718          0792  2     iblocks;
;  719          0793  2
;  720          0794  2 !
;  721          0795  2 ! Add isd into image header checksum
;  722          0796  2 !
;  723          0797  2 INCRU i FROM 0 TO .isd[isd$w_size]-1
;  724          0798  2     DO cksm$gl_ihdcksm = .cksm$gl_ihdcksm XOR isdvecbyt[.i];
;  725          0799  2
;  726          0800  2 IF .isd[isd$v_dzro]                        !Skip section if demand zero
;  727          0801  2     OR .isd[isd$l_vbn] EQL 0                ! or no disk address assigned
;  728          0802  2     OR .isd[isd$w_pagcnt] EQL 0             ! or no pages (should never happen)
;  729          0803  2 THEN RETURN true;
;  730          0804  2
;  731          0805  2 cksm$gl_chksum = 0;                       !Zero checksum for section
;  732          0806  2 maxblocks = .cksm$gl_maxbyt/512;          !Figure max number of pages
;  733          0807  2 iblocks = .isd[isd$w_pagcnt];             !Get size of image section
;  734          0808  2 blockoff = 0;
;  735          0809  2 WHILE .iblocks GTRU 0                     !Do all blocks in the image section
;  736          0810  3 DO BEGIN
;  737          0811  3     tblocks = MINU(.iblocks,.maxblocks);   !Compute size of this read
;  738          0812  3     IF read_blocks(.tblocks,.isd[isd$l_vbn]+.blockoff)
;  739          0813  3     THEN
;  740          0814  3         !
;  741          0815  3         ! Checksum what we have read
;  742          0816  3         !
;  743          0817  3         INCRU i FROM 0 TO .tblocks*127
;  744          0818  3             DO cksm$gl_chksum = .cksm$gl_chksum XOR .databuffer[.i];
;  745          0819  3     blockoff = .blockoff + .tblocks;       !Update block offset
;  746          0820  3     iblocks = .iblocks - .tblocks;         ! and blocks to go
;  747          0821  2     END;
;  748          0822  2
;  749          0823  2 RETURN true
;  750          0824  1 END;
```

```
                                00FC 00000 CHECKSUM_SECTION:
                                           .WORD   Save R2,R3,R4,R5,R6,R7                          ; 0772
                     57     0000'  CF  9E 00002        MOVAB   CKSM$GL_CHKSUM, R7
                     54       04   AC  D0 00007        MOVL    ISD, R4                             ; 0786
                     52            64  3C 0000B        MOVZWL  (R4), R2                            ; 0797
                                   52  D7 0000E        DECL    R2
                                   50  D4 00010        CLRL    I
                                   0A  11 00012        BRB     2$
                     51          6440  DE 00014 1$:     MOVAL   (R4)[I], R1                     ; 0798
                  FC A7               51  CC 00018        XORL2   R1, CKSM$GL_IHDCKSM
                                      50  D6 0001C        INCL    I
                     52               50  D1 0001E 2$:     CMPL    I, R2
                                      F1  1B 00021        BLEQU   1$
               5C    08 A4                02  E0 00023        BBS     #2, 8(R4), 8$               ; 0800
                                  0C   A4  D5 00028        TSTL    12(R4)                          ; 0801
                                       57  13 0002B        BEQL    8$
                                  02   A4  B5 0002D        TSTW    2(R4)                           ; 0802
                                       52  13 00030        BEQL    8$
                                       67  D4 00032        CLRL    CKSM$GL_CHKSUM                  ; 0805
               56    08 A7 00000200   8F  C7 00034        DIVL3   #512, CKSM$GL_MAXBYT, MAXBLOCKS ; 0806
                     53       02   A4  3C 0003D        MOVZWL  2(R4), IBLOCKS                  ; 0807
                                       55  D4 00041        CLRL    BLOCKOFF                        ; 0808
                                       53  D5 00043 3$:     TSTL    IBLOCKS                         ; 0809
                                       3D  13 00045        BEQL    8$
                     50                53  D0 00047        MOVL    IBLOCKS, R0                     ; 0811
                     56                50  D1 0004A        CMPL    R0, MAXBLOCKS
                                       03  1B 0004D        BLEQU   4$
                     50                56  D0 0004F        MOVL    MAXBLOCKS, R0
                     52                50  D0 00052 4$:     MOVL    R0, TBLOCKS
                                  0C B445  9F 00055        PUSHAB  @12(R4)[BLOCKOFF]               ; 0812
                                       52  DD 00059        PUSHL   TBLOCKS
                  FF5B CF              02  FB 0005B        CALLS   #2, READ_BLOCKS
                     19                50  E9 00060        BLBC    R0, 7$
            51                   52 0000007F   8F  C5 00063        MULL3   #127, TBLOCKS, R1       ; 0817
                                       50  D4 0006B        CLRL    I                               ; 0818
                                       08  11 0006D        BRB     6$
                     67     0000'DF40   CC  0006F 5$:     XORL2   @DATABUFFER[I], CKSM$GL_CHKSUM
                                       50  D6 00075        INCL    I
                     51                50  D1 00077 6$:     CMPL    I, R1
                                       F3  1B 0007A        BLEQU   5$
                     55                52  C0 0007C 7$:     ADDL2   TBLOCKS, BLOCKOFF               ; 0819
                     53                52  C2 0007F        SUBL2   TBLOCKS, IBLOCKS                ; 0820
                                       BF  11 00082        BRB     3$                              ; 0809
                     50                01  D0 00084 8$:     MOVL    #1, R0                          ; 0823
                                           04 00087        RET                                     ; 0824

; Routine Size:  136 bytes,    Routine Base:  $CODE$ + 0736
```

```
;  752          0825  1 %sbttl 'checksum foreign image files'
;  753          0826  1 ROUTINE cksm_foreign =
;  754          0827  2 BEGIN
;  755          0828  2 !
;  756          0829  2 ! Open the file using RMS with a FHC XAB attached to get the End of File
;  757          0830  2 ! information.  Do a checksum of the non-image file.
;  758          0831  2 !
;  759          0832  2 LOCAL
;  760          0833  2     isectdesc : $BBLOCK[isd$k_lenpriv],
;  761          0834  2     status;
;  762          0835  2
;  763          0836  2 find_context[fab$l_xab] = ixabfhc;                !Set XAB address
;  764          0837  2 $XABFHC_INIT(xab=ixabfhc);                        !Initialize XAB
;  765          0838  3 IF NOT (status = $open(fab=.find_context))        !Open the input file
;  766          0839  3 THEN BEGIN
;  767          0840  3     SIGNAL(cksm$_openin, 1,
;  768          0841  3         find_result, .status,
;  769          0842  3         .find_context[fab$l_stv]);
;  770          0843  3     RETURN false;
;  771          0844  2     END;
;  772          0845  2
;  773          0846  2 CH$FILL(0,isd$k_lenpriv,isectdesc);
;  774          0847  2 isectdesc[isd$w_size] = isd$k_lenpriv;             !Make it look like an isd
;  775          0848  2 isectdesc[isd$l_vbn] = 1;                         !File starts with first block
;  776          0849  2 isectdesc[isd$w_pagcnt] = .ixabfhc[xab$l_ebk] +   !Set length of file
;  777          0850  2                         1*(.ixabfhc[xab$w_ffb] NEQ 0);
;  778          0851  2 checksum_section(isectdesc);                      !Checksum it
;  779          0852  2 SIGNAL(cksm$_nonimgchk,1,.cksm$gl_chksum);
;  780          0853  2
;  781          0854  3 IF NOT (status=$CLOSE(fab=.find_context))
;  782          0855  2     THEN SIGNAL(cksm$_closein, T,
;  783          0856  2                 find_result, .status,
;  784          0857  2                 .find_context[fab$l_stv]);
;  785          0858  2
;  786          0859  2 RETURN true
;  787          0860  1 END;


                                                $RMS_PTR=           IXABFHC


                                        01FC 00000 CKSM_FOREIGN:
                                                   .WORD    Save R2,R3,R4,R5,R6,R7,R8                ; 0826
                                 58 00000000G   00  9E 00002        MOVAB   LIB$SIGNAL, R8
                                 57     0000'   CF  9E 00009        MOVAB   FIND_CONTEXT, R7
                                 5E             10  C2 0000E        SUBL2   #16, SP
                                 56             67  D0 00011        MOVL    FIND_CONTEXT, R6                ; 0836
                              24 A6     008C    C7  9E 00014        MOVAB   IXABFHC, 36(R6)
                           2C    00       6E    00  2C 0001A        MOVC5   #0, (SP), #0, #44, $RMS_PTR     ; 0837
                                          008C  C7     0001F
                                 008C     C7    2C1D  8F  B0 00022  MOVW    #11293, $RMS_PTR
                                                   56  DD 00029    PUSHL   R6                              ; 0838
                                 00000000G 00          01  FB 0002B  CALLS   #1, SYS$OPEN
                                 56            50  D0 00032        MOVL    R0, STATUS
                                 19            56  E8 00035        BLBS    STATUS, 1$
                                 50            67  D0 00038        MOVL    FIND_CONTEXT, R0                ; 0842
```

```
                                                    0C    A0  DD 0003B          PUSHL   12(R0)                                          ;
                                                          56  DD 0003E          PUSHL   STATUS                                          ; 0841
                                                    00C0  C7  9F 00040         PUSHAB  FIND_RESULT                                     ; 0840
                                                          01  DD 00044          PUSHL   #1                                              ;
                                               0003109A   8F  DD 00046          PUSHL   #200858                                         ;
                                            68            05  FB 0004C          CALLS   #5, LIB$SIGNAL                                  ;
                                                          5E  11 0004F          BRB     4$                                              ; 0843
                10          00                6E          00  2C 00051 1$:     MOVC5   #0, (SP), #0, #16, ISECTDESC                    ; 0846
                                                          6E     00056                                                                ;
                                                          6E  10 BO 00057       MOVW    #16, ISECTDESC                                  ; 0847
                                                    0C    AE  01 DO 0005A       MOVL    #1, ISECTDESC+12                                ; 0848
                                                          50  D4 0005E          CLRL    R0                                              ; 0850
                                                    00A0  C7  B5 00060         TSTW    IXABFHC+20                                      ;
                                                          02  13 00064          BEQL    2$                                              ;
                                                          50  D6 00066          INCL    R0                                              ;
                    02      AE                50    009C  C7  A1 00068 2$:     ADDW3   IXABFHC+16, R0, ISECTDESC+2                     ;
                                                          5E  DD 0006F          PUSHL   SP                                              ; 0851
                                                FF02      CF  01 FB 00071       CALLS   #1, CHECKSUM_SECTION                            ;
                                                    0000'     CF  DD 00076      PUSHL   CKSM$GL_CHKSUM                                  ; 0852
                                                          01  DD 0007A          PUSHL   #1                                              ;
                                            00000000G     8F  DD 0007C          PUSHL   #CKSM$_NONIMGCHK                                ;
                                            68            03  FB 00082          CALLS   #3, LIB$SIGNAL                                  ;
                                                          67  DD 00085          PUSHL   FIND_CONTEXT                                    ; 0854
                                       00000000G          00  01 FB 00087      CALLS   #1, SYS$CLOSE                                   ;
                                                          56  50 D0 0008E       MOVL    R0, STATUS                                      ;
                                                          17  56 E8 00091       BLBS    STATUS, 3$                                      ;
                                                          50  67 D0 00094       MOVL    FIND_CONTEXT, R0                                ; 0857
                                                    0C    A0  DD 00097          PUSHL   12(R0)                                          ;
                                                          56  DD 0009A          PUSHL   STATUS                                          ; 0856
                                                    00C0  C7  9F 0009C         PUSHAB  FIND_RESULT                                     ; 0855
                                                          01  DD 000A0          PUSHL   #1                                              ;
                                               00031050   8F  DD 000A2          PUSHL   #200784                                         ;
                                            68            05  FB 000A8          CALLS   #5, LIB$SIGNAL                                  ;
                                            50            01  D0 000AB 3$:      MOVL    #1, R0                                          ; 0859
                                                             04 000AE          RET                                                     ;
                                                          50  D4 000AF 4$:      CLRL    R0                                              ; 0860
                                                             04 000B1          RET                                                     ;

; Routine Size:  178 bytes,    Routine Base:  $CODE$ + 07BE
```

```
;  789          0861  1 %sbttl 'Call FAOL'
;  790          0862  1 ROUTINE fao_buffer (ctrstr,args) =
;  791          0863  2 BEGIN
;  792          0864  2 !
;  793          0865  2 ! Call FAOL
;  794          0866  2 !
;  795          0867  2 OWN
;  796          0868  2     desc :      $BBLOCK [dsc$c_s_bln],  !Result descriptor
;  797          0869  2     buf :       VECTOR [132, BYTE];     !Output buffer
;  798          0870  2
;  799          0871  2 MAP
;  800          0872  2     ctrstr :    REF VECTOR [,BYTE],
;  801          0873  2     args :      VECTOR [4];
;  802          0874  2
;  803          0875  2 LOCAL
;  804          0876  2     faodesc : $BBLOCK [dsc$c_s_bln];
;  805          0877  2
;  806          0878  2 faodesc [dsc$w_length] = .ctrstr [0];          !Set up descriptor for fao control string
;  807          0879  2 faodesc [dsc$a_pointer] = ctrstr [1];
;  808          0880  2 desc [dsc$w_length] = 132;                    !Set up result descriptor
;  809          0881  2 desc [dsc$a_pointer] = buf;
;  810        P 0882  2 $faol (ctrstr=faodesc,outlen=desc,            !Format the string
;  811          0883  2                 outbuf=desc,prmlst=args);
;  812          0884  2
;  813          0885  2 RETURN desc;                                  !Return value is address of resulting descriptor
;  814          0886  1 END;


                                                        .PSECT  $OWN$,NOEXE,2

                                            000E0 DESC: .BLKB   8
                                            000E8 BUF:  .BLKB   132


                                                        .PSECT  $CODE$,NOWRT,2

                                                0004 00000 FAO_BUFFER:
                                                        .WORD   Save R2                         ; 0862
                                    52      0000'   CF  9E 00002        MOVAB   DESC, R2        ;
                                    5E              08  C2 00007        SUBL2   #8, SP          ;
                                    6E        04    BC  9B 0000A        MOVZBW  @CTRSTR, FAODESC        ; 0878
                04    AE      04    AC              01  C1 0000E        ADDL3   #1, CTRSTR, FAODESC+4   ; 0879
                                    62        84    8F  9B 00014        MOVZBW  #132, DESC      ; 0880
                              04    A2        08    A2  9E 00018        MOVAB   BUF, DESC+4     ; 0881
                                              08    AC  9F 0001D        PUSHAB  ARGS            ; 0883
                                                    52  DD 00020        PUSHL   R2              ;
                                                    52  DD 00022        PUSHL   R2              ;
                                              0C    AE  9F 00024        PUSHAB  FAODESC         ;
                          00000000G   00              04  FB 00027      CALLS   #4, SYS$FAOL    ;
                                    50              62  9E 0002E        MOVAB   DESC, R0        ; 0885
                                                    04  00031          RET                     ; 0886

; Routine Size:  50 bytes,    Routine Base:  $CODE$ + 0870
```

```
;  816          0887  1 %sbttl 'Output checksum to output file'
;  817          0888  1 ROUTINE cksm_output (desc) =
;  818          0889  2 BEGIN
;  819          0890  2 !
;  820          0891  2 ! Write record to output file
;  821          0892  2 !
;  822          0893  2 MAP
;  823          0894  2     desc : REF $BBLOCK;
;  824          0895  2
;  825          0896  2 LOCAL
;  826          0897  2     status;
;  827          0898  2
;  828          0899  2 orab[rab$w_rsz] = .desc[dsc$w_length];          !Set length of line
;  829          0900  2 orab[rab$l_rbf] = .desc[dsc$a_pointer];         ! and it's address
;  830          0901  2 status = $PUT(RAB=orab);                       !Write the line
;  831          0902  2 IF NOT .status                                  !Report any error
;  832          0903  2     THEN SIGNAL(cksm$_writeerr,1,outfiledesc,
;  833          0904  2                 .status,.orab[rab$l_stv]);
;  834          0905  2
;  835          0906  2 RETURN .status
;  836          0907  1 END;


                                                .EXTRN  SYS$PUT

                                000C 00000 CKSM_OUTPUT:
                                                .WORD   Save R2,R3                      ; 0888
                            53      0000'   CF  9E 00002       MOVAB   ORAB+34, R3
                            50        04    AC  D0 00007       MOVL    DESC, R0        ; 0899
                            63              60  B0 0000B       MOVW    (R0), ORAB+34
                          06    A3          04  A0 0000E       MOVL    4(R0), ORAB+40  ; 0900
                                            DE  A3 9F 00013     PUSHAB  ORAB            ; 0901
                    00000000G   00              01  FB 00016   CALLS   #1, SYS$PUT
                                52              50  D0 0001D   MOVL    R0, STATUS
                                17              52  E8 00020   BLBS    STATUS, 1$      ; 0902
                                            EA  A3  DD 00023    PUSHL   ORAB+12         ; 0904
                                52              DD 00026    PUSHL   STATUS
                                            4E  A3  9F 00028    PUSHAB  OUTFILEDESC     ; 0903
                                01              DD 0002B    PUSHL   #1
                                    000310D2    8F  DD 0002D    PUSHL   #200914
                    00000000G   00              05  FB 00033   CALLS   #5, LIB$SIGNAL
                                50              52  D0 0003A 1$:    MOVL    STATUS, R0  ; 0906
                                                04  0003D       RET                     ; 0907

; Routine Size:  62 bytes,    Routine Base:  $CODE$ + 08A2
```

```
;  838          0908  1 %sbttl 'Get file name'
;  839          0909  1 GLOBAL ROUTINE getfilename (fab) =
;  840          0910  2 BEGIN
;  841          0911  2 !++
;  842          0912  2 ! FUNCTIONAL DESCRIPTION:
;  843          0913  2 !
;  844          0914  2 !       This routine returns a string descriptor for a file.
;  845          0915  2 !
;  846          0916  2 ! Inputs:
;  847          0917  2 !
;  848          0918  2 !       fab             Address of the fab
;  849          0919  2 !
;  850          0920  2 ! Outputs:
;  851          0921  2 !
;  852          0922  2 !       Routine value is address of string descriptor for file name
;  853          0923  2 !
;  854          0924  2 !--
;  855          0925  2
;  856          0926  2 MAP
;  857          0927  2     fab : REF $BBLOCK;
;  858          0928  2
;  859          0929  2 BIND
;  860          0930  2     nam = .fab [fab$l_nam] : $BBLOCK;
;  861          0931  2
;  862          0932  2 OWN
;  863          0933  2     filedesc : $BBLOCK[dsc$c_s_bln];
;  864          0934  2
;  865          0935  2 IF (filedesc [dsc$w_length] = .nam [nam$b_rsl]) NEQ 0   !If resultant name present
;  866          0936  2 THEN filedesc [dsc$a_pointer] = .nam [nam$l_rsa]
;  867          0937  2 ELSE IF (filedesc [dsc$w_length] = .nam [nam$b_esl]) NEQ 0 !If expanded name present
;  868          0938  2     THEN filedesc [dsc$a_pointer] = .nam [nam$l_esa]
;  869          0939  3     ELSE BEGIN
;  870          0940  3         filedesc [dsc$w_length] = .fab [fab$b_fns];     !Use filename string
;  871          0941  3         filedesc [dsc$a_pointer] = .fab [fab$l_fna];    ! if all else fails
;  872          0942  2         END;
;  873          0943  2
;  874          0944  2 RETURN filedesc
;  875          0945  1 END;                                                   !Of getfilename


                                                        .PSECT  $OWN$,NOEXE,2

                                        0016C FILEDESC:
                                                        .BLKB   8


                                                        .PSECT  $CODE$,NOWRT,2

                                          0004 00000    .ENTRY  GETFILENAME, Save R2                    ; 0909
                              52  0000'  CF  9E 00002    MOVAB   FILEDESC, R2                            ;
                              51    04  AC  D0 00007    MOVL    FAB, R1                                 ; 0930
                              50    28  A1  D0 0000B    MOVL    40(R1), R0                              ;
                              62    03  A0  9B 0000F    MOVZBW  3(R0), FILEDESC                         ; 0935
                                        07  13 00013    BEQL    1$                                      ;
                        04    A2    04  A0  D0 00015    MOVL    4(R0), FILEDESC+4                       ; 0936
```

```
                              16  11 0001A         BRB     3$                       ;
             62         0B    A0  9B 0001C 1$:     MOVZBW  11(R0), FILEDESC         ; 0937
                              07  13 00020         BEQL    2$                       ;
        04   A2         0C    A0  D0 00022         MOVL    12(R0), FILEDESC+4       ; 0938
                              09  11 00027         BRB     3$                       ;
             62         34    A1  9B 00029 2$:     MOVZBW  52(R1), FILEDESC         ; 0940
        04   A2         2C    A1  D0 0002D         MOVL    44(R1), FILEDESC+4       ; 0941
             50               62  9E 00032 3$:     MOVAB   FILEDESC, R0             ; 0944
                                  04 00035         RET                              ; 0945

; Routine Size:  54 bytes,    Routine Base:  $CODE$ + 08E0


;  876          0946  1
;  877          0947  1 END
;  878          0948  0 ELUDOM



                                                   .EXTRN  LIB$SIGNAL, LIB$STOP

;                          PSECT SUMMARY
;
;      Name                      Bytes                      Attributes
;
;  $OWN$                           372  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;  $GLOBAL$                         16  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;  $CODE$                         2326  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;  $PLIT$                          116  NOVEC,NOWRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)


;                        Library Statistics
;
;                                        -------- Symbols --------      Pages      Processing
;      File                              Total    Loaded   Percent      Mapped     Time
;
;  _$255$DUA28:[SYSLIB]LIB.L32;1         18619       164         0      1000         00:01.9



;                              COMMAND QUALIFIERS

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

; Size:          2326 code + 504 data bytes
; Run Time:         00:39.7
; Elapsed Time:     01:16.2
; Lines/CPU Min:     1432
; Lexemes/CPU-Min: 24741
; Memory Used:  233 pages
```

```
; Compilation Complete
```