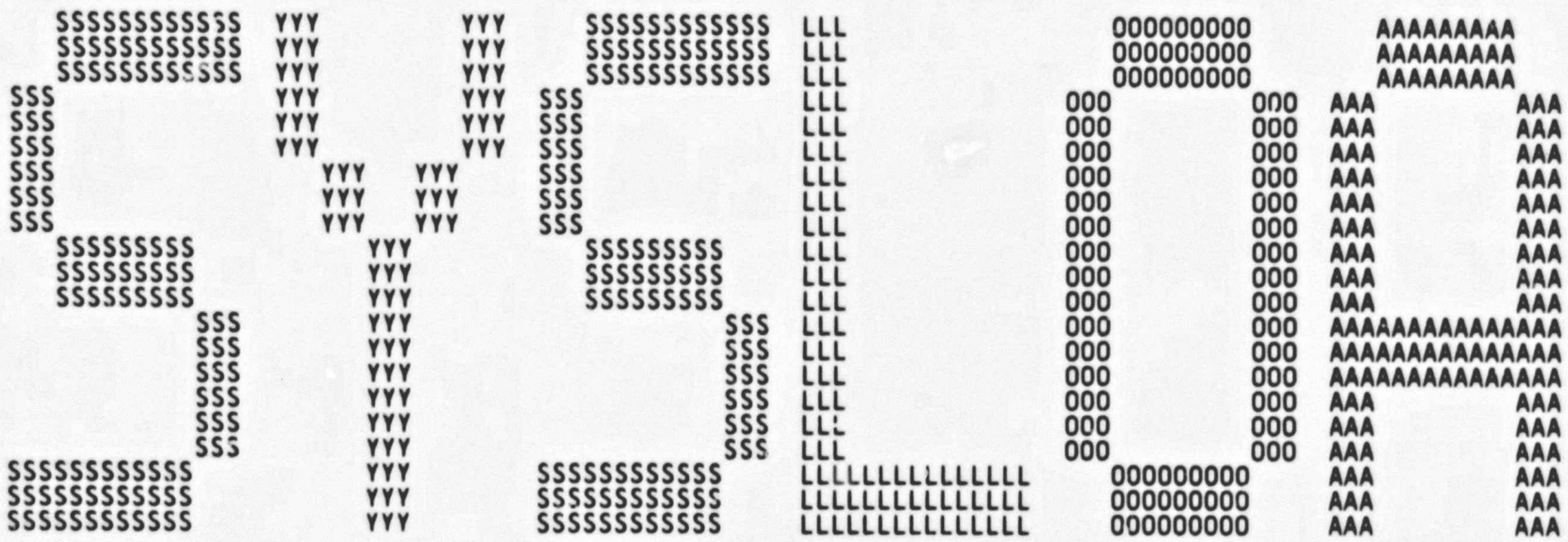
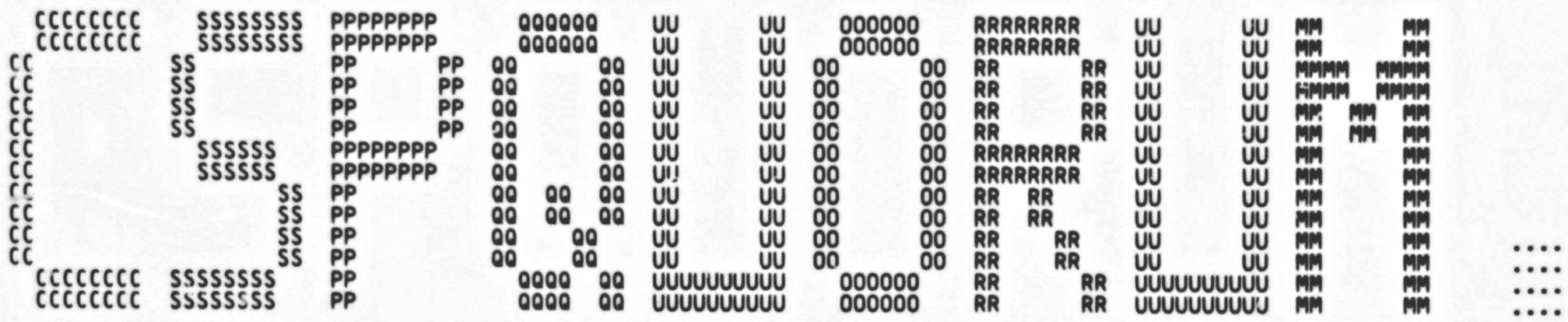

SSSSSSSSSSS YYY YYY SSSSSSSSSSS LLL OOOOOOOOO AAAAAAAAA
SSSSSSSSSSS YYY YYY SSSSSSSSSSS LLL OOOOOOOOO AAAAAAAAA
SSSSSSSSSSS YYY YYY SSSSSSSSSSS LLL OOOOOOOOO AAAAAAAAA
SSS YYY YYY SSS LLL OOO OOO AAA AAA
SSS YYY YYY SSS LLL OOO OOO AAA AAA
SSS YYY YYY SSS LLL OOO OOO AAA AAA
SSS YYY YYY SSS LLL OOO OOO AAA AAA
SSS YYY YYY SSS LLL OOO OOO AAA AAA
SSS YYY YYY SSS LLL OOO OOO AAA AAA
SSSSSSSSS YYY SSSSSSSSS LLL OOO OOO AAA AAA
SSSSSSSSS YYY SSSSSSSSS LLL OOO OOO AAA AAA
SSSSSSSSS YYY SSSSSSSSS LLL OOO OOO AAA AAA
SSS YYY SSS LLL OOO OOO AAAAAAAAAAAAAAA
SSS YYY SSS LLL OOO OOO AAAAAAAAAAAAAAA
SSS YYY SSS LLL OOO OOO AAAAAAAAAAAAAAA
SSS YYY SSS LLL OOO OOO AAA AAA
SSS YYY SSS LLL OOO OOO AAA AAA
SSSSSSSSSSS YYY SSSSSSSSSSS LLLLLLLLLLLLLLL OOOOOOOOO AAA AAA
SSSSSSSSSSS YYY SSSSSSSSSSS LLLLLLLLLLLLLLL OOOOOOOOO AAA AAA
SSSSSSSSSSS YYY SSSSSSSSSSS LLLLLLLLLLLLLLL OOOOOOOOO AAA AAA


CSPQUORUM

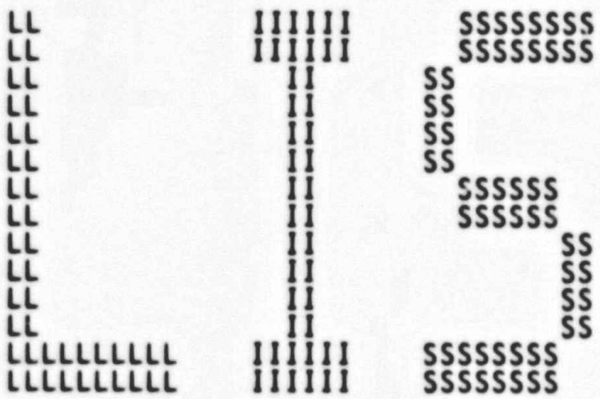

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Table of contents

```
                     0000     1          .TITLE  CSPQUORUM - CSP DISK QUORUM MODULE
;DYC0001             0000   .1          .IDENT  'V04-001'
-1                   0000     3
                     0000     4 ;
                     0000     5 ;*****************************************************************************
                     0000     6 ;*                                                                           *
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                     0000    24 ;*                                                                           *
                     0000    25 ;*                                                                           *
                     0000    26 ;*****************************************************************************
                     0000    27 ;
                     0000    28 ;++
                     0000    29 ; Facility: CSP
                     0000    30 ;
                     0000    31 ; Abstract:
                     0000    32 ;       This module is a "client" thread of the CSP. It is requested by the
                     0000    33 ;       quorum disk code whenever:
                     0000    34 ;
                     0000    35 ;               - SYSINIT did not find the quorum file,
                     0000    36 ;               - an I/O error occurred when reading or writing the quorum file,
                     0000    37 ;               - or the quorum file containes corrupt data.
                     0000    38 ;
                     0000    39 ; Enviornment:
                     0000    40 ;       CSP process
                     0000    41 ;--
                     0000    42 ;
                     0000    43 ; Author:
                     0000    44 ;       R. Scott Hanna, CREATION DATE: 23-Aug-198_
                     0000    45 ;
                     0000    46 ; Modified by:
                     0000    47 ;
;DYC0001              0000   .1 ;       V04-001 DYC0001         Dennis Y. Chan          21-Nov-1984
;DYC0001              0000   .2 ;               Added check in action routine for SS$_FORCEDERROR return
;DYC0001              0000   .3 ;               while trying to validate quorum file and rewrite the
;DYC0001              0000   .4 ;               file with template.
;DYC0001              0000   .5 ;
                     0000    48 ;       V03-006 ADE0002         Alan D. Eldridge        25-Apr-1984
                     0000    49 ;               Use $GETDVIW_S instead of $GETDVI_S with an AST since
                     0000    50 ;               when an AST is delivered upon RO failure indication is
                     0000    51 ;               thought to be unpredictable.
                     0000    52 ;
```

```
0000     53 ;
0000     54 ;       V03-005 DWT0211         David W. Thiel          09-Apr-1984
0000     55 ;               Call CNX$DISK_CHANGE when CLUB$T_QDNAME is filled in.
0000     56 ;
0000     57 ;       V03-004 RSH0133         R. Scott Hanna          03-Apr-1984
0000     58 ;               Modify CLOSE_FILE to only call CSP$$WAIT when the file close
0000     59 ;               I/O is successfully queued.
0000     60 ;
0000     61 ;       V03-003 RSH0126         R. Scott Hanna          21-Feb-1984
0000     62 ;               Incorporate changes to make this algorithm a "client" of
0000     63 ;               the CSP. It is now requested by the QUORUM code rather than
0000     64 ;               periodically running to check for work. In addition this
0000     65 ;               routine can now create a quorum file if none exists and
0000     66 ;               repair one that does but contains corrupt data.
0000     67 ;
0000     68 ;       V03-002 ADE0001         Alan D. Eldridge        28-Feb-1984
0000     69 ;               Change name of CSP$QUORUM to CSP$QUORUM_INIT, add new
0000     70 ;               CSP$QUORUM entry point which is used now only as a place
0000     71 ;               holder.
0000     72 ;
0000     73 ;       V03-001 RSH0079         R. Scott Hanna          10-Nov-1983
0000     74 ;               Modify algorithm to check every 2 minutes to see if the
0000     75 ;               "connection" to the quorum disk has been lost. If so it
0000     76 ;               does the quorum file lookup again.
0000     76 ;--
```

```
                     0000     78
                     0000     79 .SBTTL  Declarations
                     0000     80 ;
                     0000     81 ;       Define Symbols
                     0000     82 ;
                     0000     83
                     0000     84         $ATRDEF                                 ; Attribute control block
                     0000     85         $CCBDEF                                 ; Channel control block
                     0000     86         $CLUBDEF                                ; Cluster block
                     0000     87         $CLUDCBDEF                              ; Cluster quorum disk control block
                     0000     88         $CLUQFDEF                               ; Cluster quorum file
                     0000     89         $DSCDEF                                 ; Descriptor definitions
                     0000     90         $DVIDEF                                 ; $GETDVI item list codes
                     0000     91         $FIBDEF                                 ; File information block
                     0000     92         $FIDDEF                                 ; File ID codes
                     0000     93         $IODEF                                  ; I/O function codes
                     0000     94         $IPLDEF                                 ; Interrupt priority levels
                     0000     95         $SBKDEF                                 ; Attributes statistics block
                     0000     96         $SSDEF                                  ; System service status codes
                     0000     97
                     0000     98 ; Error messages will no longer be reported after ERROR_COUNT reaches
                     0000     99 ; ERROR_THRESHOLD.
                     0000    100
0000000A             0000    101         ERROR_THRESHOLD = 10
                     0000    102
```

```
                        0000   104 .SBTTL  Own storage
                        0000   105
                     00 0000   106 THREAD_ACTIVE:  .BYTE   0                       ; Thread active flag
                        0001   107
                   0000 0001   108 QD_DESCR:       .WORD   0                       ; Quorum disk descriptor
                     0E 0003   109                 .BYTE   DSC$K_DTYPE_T
                     02 0004   110                 .BYTE   DSC$K_CLASS_D
            00000009' 0005   111                 .LONG   QD_NAME
                        0009   112
            00000049  0009   113 QD_NAME:        .BLKB   64                      ; Quorum disk name
                        0049   114
           00E8 0040  0049   115 QD_ITMLST:      .WORD   64,DVI$_FULLDEVNAM      ; $GETDVI item list
            00000009' 004D   116                 .LONG   QD_NAME
            00000001' 0051   117                 .LONG   QD_DESCR
            00000000  0055   118                 .LONG   0
                        0059   119
00000061'010E0000'  0059   120 QF_DESCR:       .ASCID  /QUORUM.DAT;1/          ; Quorum file descriptor
4D 55 52 4F 55 51   0061
31 3B 54 41 44 2E   0067
                        006D   121
            00000000  006D   122 CLUDCB_LBN:     .LONG   0                       ; Quorum file LBN from the CLUDCB
                        0071   123
            00000000  0071   124 LOOKUP_LBN:     .LONG   0                       ; Quorum file LBN from file lookup
                        0075   125
            00000000  0075   126 CHANNEL:        .LONG   0                       ; Quorum disk channel number
                        0079   127
00000000 00000000   0079   128 IOSB:           .QUAD   0                       ; I/O status block
                        0081   129
                     00 0081   130 ERROR_COUNT:   .BYTE   0                       ; Error reported counter
                        0082   131
            00000000  0082   132 ERROR_MESSAGE: .LONG   0                       ; Descr addr of last error message
                        0086   133
                   0040 0086   134 FIB_DESCR:     .WORD   FIB$K_LENGTH            ; FIB descriptor
                     0E 0088   135                 .BYTE   DSC$K_DTYPE_T
                     01 0089   136                 .BYTE   DSC$K_CLASS_S
            0000008E' 008A   137                 .LONG   FIB
                        008E   138
            000000CE  008E   139 FIB:           .BLKB   FIB$K_LENGTH            ; File information block
                        00CE   140
           0009 0020  00CE   141 ATTRIB_BLOCK:  .WORD   ATR$S_STATBLK,ATR$C_STATBLK ; Attribute control block
            000000EA' 00D2   142                 .LONG   STATBLK
           0015 0004  00D6   143                 .WORD   ATR$S_UIC,ATR$C_UIC
            0000010A' 00DA   144                 .LONG   UIC
           0016 0002  00DE   145                 .WORD   ATR$S_FPRO,ATR$C_FPRO
            0000010E' 00E2   146                 .LONG   FPRO
            00000000  00E6   147                 .LONG   0
                        00EA   148
            0000010A  00EA   149 STATBLK:       .BLKB   ATR$S_STATBLK           ; Statistics block
                        010A   150
           0001 0004  010A   151 UIC:           .WORD   4,1                     ; File owner UIC ([1,4])
                        010E   152
                   FF00 010E   153 FPRO:          .WORD   ^XFF00                  ; File protection (S:RWED,O:RWED)
                        0110   154
4D 55 52 4F 55 51   0110   155 IDENT_STRING: .ASCII  /QUORUM  FILE/           ; Quorum file ID string
45 4C 49 46 20 20   0116
                        011C   156                 ASSUME  CLUQF$S_IDENT EQ .-IDENT_STRING
                        011C   157
```

```
00000000 00000000  011C   158 RESCHEDULE_TIMER: .QUAD 0                        ; Reschedule interval
                   0124   159
         00000524  0124   160 QF_BUFFER:       .BLKB   CLUQF$K_BLOCKS*512     ; Quorum file buffer
                   0524   161
0000052C'010E0000' 0524   162 MSSG1:   .ASCID  \%CSP-W-QFNOTFOUND, Previously existing quorum file not found\
57 2D 50 53 43 25  052C
54 4F 4E 46 51 2D  0532
2C 44 4E 55 4F 46  0538
69 76 65 72 50 20  053E
20 79 6C 73 75 6F  0544
69 74 73 69 78 65  054A
6F 75 71 20 67 6E  0550
69 66 20 6D 75 72  0556
74 6F 6E 20 65 6C  055C
64 6E 75 6F 66 20  0562
00000570'010E0000' 0568   163 MSSG2:   .ASCID  \%CSP-I-QFCREATED, Quorum file created\
49 2D 50 53 43 25  0570
45 52 43 46 51 2D  0576
20 2C 44 45 54 41  057C
6D 75 72 6F 75 51  0582
20 65 6C 69 66 20  0588
65 74 61 65 72 63  058E
                64 0594
0000059D'010E0000' 0595   164 MSSG3:   .ASCID  \%CSP-W-QFCHANGED, Quorum file location has changed\
57 2D 50 53 43 25  059D
41 48 43 46 51 2D  05A3
20 2C 44 45 47 4E  05A9
6D 75 72 6F 75 51  05AF
20 65 6C 69 66 20  05B5
69 74 61 63 6F 6C  05BB
73 61 68 20 6E 6F  05C1
67 6E 61 68 63 20  05C7
             64 65 05CD
000005D7'010E0000' 05CF   165 MSSG4:   .ASCID  \%CSP-I-QFINIT, Quorum file initialized\
49 2D 50 53 43 25  05D7
49 4E 49 46 51 2D  05DD
6F 75 51 20 2C 54  05E3
69 66 20 6D 75 72  05E9
69 6E 69 20 65 6C  05EF
7A 69 6C 61 69 74  05F5
             64 65 05FB
00000605'010E0000' 05FD   166 MSSG5:   .ASCID  \%CSP-E-QDASSIGN, Quorum disk assign error\
45 2D 50 53 43 25  0605
53 53 41 44 51 2D  060B
51 20 2C 4E 47 49  0611
20 6D 75 72 6F 75  0617
61 20 6B 73 69 64  061D
20 6E 67 69 73 73  0623
   72 6F 72 72 65  0629
00000636'010E0000' 062E   167 MSSG6:   .ASCID  \%CSP-E-QFOPEN, Quorum file open/create error\
45 2D 50 53 43 25  0636
45 50 4F 46 51 2D  063C
6F 75 51 20 2C 4E  0642
69 66 20 6D 75 72  0648
65 70 6F 20 65 6C  064E
61 65 72 63 2F 6E  0654
72 72 65 20 65 74  065A
```

```
                        72 6F  0660
0000066A'010E0000'      0662    168 MSSG7:  .ASCID  \%CSP-E-QFRATT, Quorum file read attributes error\
45 2D 50 53 43 25       066A
54 41 52 46 51 2D       0670
6F 75 51 20 2C 54       0676
69 66 20 6D 75 72       067C
61 65 72 20 65 6C       0682
72 74 74 61 20 64       0688
73 65 74 75 62 69       068E
72 6F 72 72 65 20       0694
000006A2'010E0000'      069A    169 MSSG8:  .ASCID  \%CSP-E-QFREAD, Quorum file read error\
45 2D 50 53 43 25       06A2
41 45 52 46 51 2D       06A8
6F 75 51 20 2C 44       06AE
69 66 20 6D 75 72       06B4
61 65 72 20 65 6C       06BA
6F 72 72 65 20 64       06C0
                        06C6
000006CF'010E0000'      06C7    170 MSSG9:  .ASCID  \%CSP-E-QFWRITE, Quorum file write error\
45 2D 50 53 43 25       06CF
49 52 57 46 51 2D       06D5
75 51 20 2C 45 54       06DB
66 20 6D 75 72 6F       06E1
72 77 20 65 6C 69       06E7
72 65 20 65 74 69       06ED
                72 6F   06F3
000006FE'010E0000'      06F6    171 MSSG10: .ASCID  \%CSP-E-QDGETDVI, Quorum disk $GETDVI failed\
45 2D 50 53 43 25       06FE
54 45 47 44 51 2D       0704
51 20 2C 49 56 44       070A
20 6D 75 72 6F 75       0710
24 20 6B 73 69 64       0716
49 56 44 54 45 47       071C
65 6C 69 61 66 20       0722
                64      0728
                        0729    172
```

```
                     0729   174 .SBTTL  CSP$QUORUM - Disk quorum action routine
                     0729   175
                     0729   176 ;++
                     0729   177 ;       This routine is requested when some type of error has occured with the
                     0729   178 ;       quorum disk. It acknowledges the request and gets the quorum disk name
                     0729   179 ;       and logical block number from the CLUDCB. It then does a access with a
                     0729   180 ;       create modifier QIO to the ACP. (i.e. If the quorum file does not exist
                     0729   181 ;       it creates one.) If a quorum file exists the data in the file is
                     0729   182 ;       validated. If the quorum file contents are invalid or the quorum file
                     0729   183 ;       was created, a template quorum block is written back to the file. The
                     0729   184 ;       request is completed by updating the logical block number, the request
                     0729   185 ;       and acknowledge bits, and the state field in the CLUDCB.
                     0729   186 ;
                     0729   187 ; CALLING SEQUENCE:
                     0729   188 ;
                     0729   189 ;       JSB     CSP$QUORUM
                     0729   190 ;
                     0729   191 ; INPUTS:
                     0729   192 ;
                     0729   193 ;       NONE
                     0729   194 ;
                     0729   195 ; OUTPUT:
                     0729   196 ;
                     0729   197 ;       NONE
                     0729   198 ;--
                     0729   199 CSP$QUORUM::
F8D2 CF   00   E3    0729   200         BBCS    #0,THREAD_ACTIVE,1$             ; Br if thread not active
                     03 072E
      015A   31      072F   201         BRW     17$                             ; Thread active, ignore request
   00FC 8F   BB      0732   202 1$:     PUSHR   #^M<R2,R3,R4,R5,R6,R7>          ; Save registers
                     0736   203                                                 ;
                     0736   204         $CMKRNL_S       REQUEST_INIT            ; Do the initial work
      03 50   E8     0745   205         BLBS    R0,2$                           ; Br if request necessary
       0139   31     0748   206         BRW     16$
                     074B   207
    F8B2 CF   B5     074B   208 2$:     TSTW    QD_DESCR                        ; Do we have the quorum disk name?
        10   12      074F   209         BNEQU   3$                              ; Br if yes
000008C6'EF   16     0751   210         JSB     GET_QDNAME                      ; Get quorum disk name
      07 50   E8     0757   211         BLBS    R0,3$                           ; Br if success
 51   99 AF   DE     075A   212         MOVAL   MSG10,R1                        ; Quorum disk assign error
       00A4   31     075E   213         BRW     11$
                     0761   214
                     0761   215 3$:     $ASSIGN_S       DEVNAM  = QD_DESCR,-    ; Assign a channel to
                     0761   216                         CHAN    = CHANNEL       ; the quorum disk
      08 50   E8     0772   217         BLBS    R0,4$                           ; Br if success
51   FE84 CF   DE     0775   218         MOVAL   MSG5,R1                         ; Quorum disk assign error
       0088   31     077A   219         BRW     11$
                     077D   220
00000945'EF   16     077D   221 4$:     JSB     OPEN_FILE                       ; Open the quorum file
      07 50   E8     0783   222         BLBS    R0,5$                           ; Br if success
51   FEA4 CF   DE     0786   223         MOVAL   MSG6,R1                         ; Quorum disk open/create error
         78   11     078B   224         BRB     11$
                     078D   225
0619 8F   50   B1    078D   226 5$:     CMPW    R0,#SS$_CREATED                 ; Did we create the file?
        2E   12      0792   227         BNEQU   8$                              ; Br if not
000009C3'EF   16     0794   228         JSB     GET_LBN                         ; Get the quorum file LBN
      07 50   E8     079A   229         BLBS    R0,6$                           ; Br if error
```

```
                51   FEC1 CF    DE   079D   230          MOVAL   MSSG7,R1                        ; Quorum disk read attributes error
                          61    11   07A2   231          BRB     11$
                                07A4   232
                     F8C5 CF    D5   07A4   233 6$:      TSTL    CLUDCB_LBN                      ; Did the file exist before?
                          0B    13   07A8   234          BEQLU   7$                              ; Br if not
                     FD76 CF    7F   07AA   235          PUSHAQ  MSSG1
                          01    FB   07AE   236          CALLS   #1,CSP$TELL_OPCOM               ; Output message via opcom
                00000000'EF             07B0
                                07B5   237
                     FDAF CF    7F   07B5   238 7$:      PUSHAQ  MSSG2
                          01    FB   07B9   239          CALLS   #1,CSP$TELL_OPCOM               ; Output message via opcom
                00000000'EF             07BB
                          35    11   07C0   240          BRB     10$
                                07C2   241
                     F8A7 CF    D5   07C2   242 8$:      TSTL    CLUDCB_LBN                      ; Did the file exist before?
                          14    13   07C6   243          BEQLU   9$                              ; Br if not
                     F8A1 CF    D1   07C8   244          CMPL    CLUDCB_LBN,LOOKUP_LBN           ; Do the LBN's match?
                     F8A2 CF         07CC
                          0B    13   07CF   245          BEQLU   9$                              ; Br if they do
                     FDC0 CF    7F   07D1   246          PUSHAQ  MSSG3
                          01    FB   07D5   247          CALLS   #1,CSP$TELL_OPCOM               ; Output message via opcom
                00000000'EF             07D7
                                07DC   248
                00000A19'EF    16   07DC   249 9$:      JSB     VALIDATE_FILE                   ; Validate the file contents
                        4D 50  E8   07E2   250          BLBS    R0,13$                          ; Br if quorum file valid
                           50  D5   07E5   251          TSTL    R0                              ; I/O error?
                           0E  13   07E7   252          BEQLU   10$                             ; Br if not
;DYC0001        2144 8F    50  B1   07E9    .1          CMPW    R0,#SS$_FORCEDERROR             ; Block revectored
;DYC0001                    07  13   07EE    .2          BEQLU   10$                             ; Rewrite the file
                51   FEA6 CF    DE   07F0   253          MOVAL   MSSG8,R1                        ; Quorum file read error
                          0E    11   07F5   254          BRB     11$
                                07F7   255
                00000A84'EF    16   07F7   256 10$:     JSB     WRITE_FILE                      ; Write a template quorum file
                        27 50  E8   07FD   257          BLBS    R0,12$                          ; Br if success
                51   FEC3 CF    DE   0800   258          MOVAL   MSSG9,R1                        ; Quorum file write error
                                0805   259
                F878 CF    51  D1   0805   260 11$:     CMPL    R1,ERROR_MESSAGE                ; Same error as last reported?
                          2E    13   080A   261          BEQLU   14$                             ; Br if yes
                F871 CF    51  D0   080C   262          MOVL    R1,ERROR_MESSAGE                ; Save address of last error message
                F86B CF    0A  91   0811   263          CMPB    #ERROR_THRESHOLD,ERROR_COUNT    ; Should we report this one?
                          22    13   0816   264          BEQLU   14$                             ; Br if not
                     F865 CF    96   0818   265          INCB    ERROR_COUNT                     ; Increment error count
                          61    DF   081C   266          PUSHAL  (R1)                            ; Push address of message descr
                          01    FB   081E   267          CALLS   #1,CSP$TELL_OPCOM               ; Output message via opcom
                00000000'EF             0820
                          13    11   0825   268          BRB     14$
                                0827   269
                     FDA4 CF    7F   0827   270 12$:     PUSHAQ  MSSG4
                          01    FB   082B   271          CALLS   #1,CSP$TELL_OPCOM               ; Output message via opcom
                00000000'EF             082D
                     F84B CF    94   0832   272 13$:     CLRB    ERROR_COUNT                     ; Reset error count and...
                     F848 CF    D4   0836   273          CLRL    ERROR_MESSAGE                   ; ...error pointer.
                00000AEB'EF    16   083A   274 14$:     JSB     CLOSE_FILE                      ; Close the quorum file
                                0840   275          $DASSGN_S       CHAN = CHANNEL              ; Deassign the quorum disk channel
                     F831 CF    95   084C   276          TSTB    ERROR_COUNT                     ; Have we completed the request?
                          23    13   0850   277          BEQLU   15$                             ; Br if yes
                                0852   278          $SETIMR_S       DAYTIM = RESCHEDULE_TIMER,- ; Delay and try again
```

```
                     0852   279                          ASTADR  = CSP$$RESUME,-
                     0852   280                          REQIDT  = CSP$GL_CURCTX
          00   FB   086B   281          CALLS   #0,CSP$$WAIT                    ; Wait for completion
00000000'EF         086D
        FED6   31   0872   282          BRW     2$
                     0875   283
                     0875   284 15$:    $CMKRNL_S       REQUEST_COMPLETE        ; Complete the request
      F778 CF   94   0884   285 16$:    CLRB    THREAD_ACTIVE                   ; Clear thread active flag
                     0888   286                                                  ;
      00FC 8F   BA   0888   287          POPR    #^M<R2,R3,R4,R5,R6,R7>          ; Restore registers
      50   01   D0   088C   288 17$:    MOVL    #SS$_NORMAL,R0                  ; Return success
                05   088F   289          RSB
                     0890   290
```

```
                     0890   292 .SBTTL  REQUEST_INIT - Request initialization
                     0890   293
                     0890   294 ;++
                     0890   295 ;
                     0890   296 ;       This routine acknowledges the request, gets the quorum disk LBN
                     0890   297 ;       and name, and initializes the reschedule timer.
                     0890   298 ;
                     0890   299 ; CALLING SEQUENCE:
                     0890   300 ;
                     0890   301 ;       $CMKRNL_S       REQUEST_INIT
                     0890   302 ;
                     0890   303 ; INPUTS:
                     0890   304 ;
                     0890   305 ;       NONE
                     0890   306 ;
                     0890   307 ; OUTPUT:
                     0890   308 ;
                     0890   309 ;       R0 = Status
                     0890   310 ;                SS$_NORMAL - Request is necessary (Quorum disk state is NOT_READY)
                     0890   311 ;                         0 - Request not necessary
                     0890   312 ;       R1,R3 Destroyed
                     0890   313 ;--
                     0890   314
                     0890   315 REQUEST_INIT:
                0000 0890   316         .WORD   0
             50  D4  0892   317         CLRL    R0                              ; Assume request is not necessary
00000000'GF  D0  0894   318         MOVL    G^CLU$GL_CLUB,R3                ; Get CLUB address
          53        089A
   53 00B4 C3  D0  089B   319         MOVL    CLUB$L_CLUDCB(R3),R3            ; Get CLUDCB address
             01  B1  08A0   320         CMPW    #CLUDCB$M_QS_NOT_READY,-        ; Is state NOT_READY?
           20  A3        08A2   321                 CLUDCB$W_STATE(R3)
             1F  12  08A4   322         BNEQU   1$                              ; Br if not
             10  A8  08A6   323         BISW    #CLUDCB$M_QF_CSPACK,-           ; Ack the request
           22  A3        08A8   324                 CLUDCB$W_FLAGS(R3)
           1C  A3  D0  08AA   325         MOVL    CLUDCB$L_QFLBN(R3),CLUDCB_LBN   ; Get the LBN
         F7BD  CF        08AD
00000000'GF  3C  08B0   326         MOVZWL  G^CLU$GW_QDSKINTERVAL,R1        ; Get quorum disk timeout value
          51        08B6
             51  7A  08B7   327         EMUL    R1,#-10000000,#0,-              ; Convert to seconds (Delta form)
 FF676980  8F        08B9
             00        08BE
         F85A  CF        08BF   328                 RESCHEDULE_TIMER
             50  01  D0  08C2   329         MOVL    #SS$_NORMAL,R0                  ; Request is necessary
                 04  08C5   330 1$:     RET
```

```
                                                I  4
                     08C6   332 .SBTTL  GET_QDNAME - Get the quorum disk name
                     08C6   333
                     08C6   334 ;++
                     08C6   335 ;       This routine gets the full quorum disk name and makes sure that a
                     08C6   336 ;       copy is in the CLUB.
                     08C6   337 ;
                     08C6   338 ; CALLING SEQUENCE:
                     08C6   339 ;
                     08C6   340 ;       JSB     GET_QDNAME
                     08C6   341 ;
                     08C6   342 ; INPUTS:
                     08C6   343 ;
                     08C6   344 ;       NONE
                     08C6   345 ;
                     08C6   346 ; OUTPUT:
                     08C6   347 ;
                     08C6   348 ;       R0 = Status
                     08C6   349 ;       R1-R7 Destroyed
                     08C6   350 ;--
                     08C6   351
                     08C6   352 GET_QDNAME:
          10   28   08C6   353         MOVC3   #CLUDCB$S_DISK_QUORUM,-         ; Get copy of quorum disk name
00000000'GF         08C8   354                 G^CLU$GB_QDISK,QD_NAME
    F739 CF         08CD
    10   20   3A   08D0   355         LOCC    #^A/ /,#CLUDCB$S_DISK_QUORUM,-  ; Locate end of name
    F733 CF         08D3   356                 QD_NAME
    10   50   A3   08D6   357         SUBW3   R0,#CLUDCB$S_DISK_QUORUM,QD_DESCR ; Store name length
    F725 CF         08D9
                    08DC   358         $GETDVIW_S      DEVNAM = QD_DESCR,-     ; Get full device name
                    08DC   359                         ITMLST = QD_ITMLST,-
                    08DC   360         -;              ASTADR = CSP$$RESUME,-
                    08DC   361         -;              ASTPRM = CSP$GL_CURCTX,-
                    08DC   362                         IOSB = IOSB
      1C 50    E9   08F8   363         BLBC    R0,1$                           ; Br if error
                    08FB   364 -;       CALLS   #0,CSP$$WAIT                    ; Wait for completion
50  F77A CF    3C   08FB   365         MOVZWL  IOSB,R0                         ; Get completion status
      14 50    E9   0900   366         BLBC    R0,1$                           ; Br if error
                    0903   367         $CMKRNL_S       GET_QDNAME1             ; Put name in CLUB
      50   01    D0   0912   368         MOVL    #1,R0                           ; Return success
           04    11   0915   369         BRB     2$
    F6E6 CF    B4   0917   370 1$:     CLRW    QD_DESCR                        ; Zero name size
                05   091B   371 2$:     RSB
                    091C   372
                    091C   373 GET_QDNAME1:
               0000 091C   374         .WORD   0
00000000'GF    D0   091E   375         MOVL    G^CLU$GL_CLUB,R6                ; Get CLUB address
           56       0924
      00B8 C6    95   0925   376         TSTB    CLUB$T_QDNAME(R6)               ; Is name in CLUB already?
           19    12   0929   377         BNEQU   1$                              ; Br if yes
F6D1 CF    02   A3   092B   378         SUBW3   #2,QD_DESCR,R7                  ; Get adjusted name size
           57       0930
F6D4 CF    57   28   0931   379         MOVC3   R7,QD_NAME+1,CLUB$T_QDNAME+1(R6) ; Put name in CLUB
      00B9 C6       0936
0088 C6    57   90   0939   380         MOVB    R7,CLUB$T_QDNAME(R6)            ; Put name size in CLUB
 00000000'GF    16   093E   381         JSB     G^CNX$DISK_CHANGE               ; Tell connection manager
                04   0944   382 1$:     RET
```

```
                     0945   384 .SBTTL  OPEN_FILE - Open the quorum file
                     0945   385
                     0945   386 ;++
                     0945   387 ;       This routine "opens" the quorum file and obtains its logical block
                     0945   388 ;       number. It will first attempt to find any existing quorum file but
                     0945   389 ;       if unsuccessful, it will create a new one. Note that the logical
                     0945   390 ;       block number is only returned if the file was not created. This is
                     0945   391 ;       due to the fact that the statistics block is not returned on a create.
                     0945   392 ;
                     0945   393 ; CALLING SEQUENCE:
                     0945   394 ;
                     0945   395 ;       JSB     OPEN_FILE
                     0945   396 ;
                     0945   397 ; INPUTS:
                     0945   398 ;
                     0945   399 ;       NONE
                     0945   400 ;
                     0945   401 ; OUTPUT:
                     0945   402 ;
                     0945   403 ;       R0 = Status of file open
                     0945   404 ;
                     0945   405 ;       R1-R6 Destroyed
                     0945   406 ;--
                     0945   407
                     0945   408 OPEN_FILE:
                     0945   409
                     0945   410 ;
                     0945   411 ; First we initialize the FIB.
                     0945   412 ;
56   F745 CF    DE   0945   413         MOVAL   FIB,R6                          ; Get FIB pointer
00   6E     00  2C   094A   414         MOVC5   #0,(SP),#0,#FIB$K_LENGTH,(R6)   ; Init FIB to all zeros
66   0040 8F         094E
 00080501 8F    D0   0952   415         MOVL    #FIB$M_WRITE!FIB$M_NOREAD!FIB$M_NOWRITE!FIB$M_WRITETHRU,-
            66        0958   416                 FIB$L_ACCTL(R6)                 ; Access bits
  0A A6     04   B0   0959   417         MOVW    #FID$C_MFD,FIB$W_DID_NUM(R6)    ; Directory is the MFD
  0C A6     04   B0   095D   418         MOVW    #FID$C_MFD,FIB$W_DID_SEQ(R6)
      0085 8F    B0   0961   419         MOVW    #FIB$M_EXTEND!FIB$M_ALCON!FIB$M_FILCON,- ; Extend control bits
        16 A6         0965   420                 FIB$W_EXCTL(R6)
  18 A6     02   D0   0967   421         MOVL    #CLUQF$K_BLOCKS,FIB$L_EXSZ(R6)  ; Allocation size
                     096B   422 ;
                     096B   423 ; Attempt to lookup/create the quorum file and access for read/write
                     096B   424 ;
                     096B   425         $QIO_S          CHAN    = CHANNEL,-
                     096B   426                         FUNC    = #IO$_ACCESS!IO$M_ACCESS!IO$M_CREATE,-
                     096B   427                         IOSB    = IOSB,-
                     096B   428                         ASTADR  = CSP$$RESUME,-
                     096B   429                         ASTPRM  = CSP$GL_CURCTX,-
                     096B   430                         P1      = FIB_DESCR,-
                     096B   431                         P2      = #QF_DESCR,-
                     096B   432                         P5      = #ATTRIB_BLOCK
        1D 50    E9  09A2   433         BLBC    R0,1$                           ; Br if error
           00    FB  09A5   434         CALLS   #0,CSP$$WAIT                    ; Wait for completion
 00000000'EF         09A7
50   F6C9 CF    3C   09AC   435         MOVZWL  IOSB,R0                         ; Get I/O completion status
        0E 50    E9  09B1   436         BLBC    R0,1$                           ; Br if error
                     09B4   437 ;
                     09B4   438 ; Get the quorum file LBN.
```

```
                    09B4   439 ;
F734 CF        B0   09B4   440          MOVW    STATBLK+SBK$W_STLBNL,LOOKUP_LBN ; Get the Low-order LBN
F6B6 CF             09B8
F72B CF        B0   09BB   441          MOVW    STATBLK+SBK$W_STLBNH,LOOKUP_LBN+2 ; Get the High-order LBN
F6B1 CF             09BF
               05   09C2   442 1$:      RSB
```

OPD
V04

```
                        09C3    444 .SBTTL  GET_LBN - Get the quorum file logical block number
                        09C3    445
                        09C3    446 ;++
                        09C3    447 ;       This routine reads the quorum file attributes and gets the quorum
                        09C3    448 ;       file logical block number.
                        09C3    449 ;
                        09C3    450 ; CALLING SEQUENCE:
                        09C3    451 ;
                        09C3    452 ;       JSB     GET_LBN
                        09C3    453 ;
                        09C3    454 ; INPUTS:
                        09C3    455 ;
                        09C3    456 ;       NONE
                        09C3    457 ;
                        09C3    458 ; OUTPUT:
                        09C3    459 ;
                        09C3    460 ;       R0 = Status of file open
                        09C3    461 ;
                        09C3    462 ;       R1 Destroyed
                        09C3    463 ;--
                        09C3    464
                        09C3    465 GET_LBN:
                        09C3    466
                        09C3    467         $QIO_S          CHAN    = CHANNEL,-     ; Read the file attributes
                        09C3    468                         FUNC    = #IO$_ACCESS,-
                        09C3    469                         IOSB    = IOSB,-
                        09C3    470                         ASTADR  = CSP$$RESUME,-
                        09C3    471                         ASTPRM  = CSP$GL_CURCTX,-
                        09C3    472                         P1      = FIB_DESCR,-
                        09C3    473                         P2      = #QF_DESCR,-
                        09C3    474                         P5      = #ATTRIB_BLOCK
              1D 50   E9  09F8  475         BLBC    R0,1$                           ; Br if error
                 00   FB  09FB  476         CALLS   #0,CSP$$WAIT                    ; Wait for completion
 00000000'EF            09FD
50    F673   CF   3C    0A02  477         MOVZWL  IOSB,R0                         ; Get I/O completion status
              0E 50   E9  0A07  478         BLBC    R0,1$                           ; Br if error
                        0A0A  479 ;
                        0A0A  480 ; Get the quorum file LBN.
                        0A0A  481 ;
        F6DE   CF   B0  0A0A  482         MOVW    STATBLK+SBK$W_STLBNL,LOOKUP_LBN ; Get the Low-order LBN
        F660   CF       0A0E
        F6D5   CF   B0  0A11  483         MOVW    STATBLK+SBK$W_STLBNH,LOOKUP_LBN+2 ; Get the High-order LBN
        F65B   CF       0A15
                    05  0A18  484 1$:     RSB
```

```
                                0A19   486 .SBTTL  VALIDATE_FILE - Validate the quorum file
                                0A19   487
                                0A19   488 ;++
                                0A19   489 ;       This routine reads the quorum file and validates its contents.
                                0A19   490 ;
                                0A19   491 ; CALLING SEQUENCE:
                                0A19   492 ;
                                0A19   493 ;       JSB     VALIDATE_FILE
                                0A19   494 ;
                                0A19   495 ; INPUTS:
                                0A19   496 ;
                                0A19   497 ;       NONE
                                0A19   498 ;
                                0A19   499 ; OUTPUT:
                                0A19   500 ;
                                0A19   501 ;       R0 = Status of validate
                                0A19   502 ;
                                0A19   503 ;               If R0 = SS$_NORMAL the file is valid. If R0 = 0 the file is
                                0A19   504 ;               invalid. Otherwise R0 contains an I/O status error.
                                0A19   505 ;
                                0A19   506 ;       R1-R3,R6,R7 Destroyed
                                0A19   507 ;--
                                0A19   508
                                0A19   509 VALIDATE_FILE:
                                0A19   510
                                0A19   511 ;
                                0A19   512 ; Queue a read request to the quorum file
                                0A19   513 ;
                                0A19   514         $QIO_S          CHAN    = CHANNEL,-
                                0A19   515                         FUNC    = #IO$_READLBLK,-
                                0A19   516                         IOSB    = IOSB,-
                                0A19   517                         ASTADR  = CSP$$RESUME,-
                                0A19   518                         ASTPRM  = CSP$GL_CURCTX,-
                                0A19   519                         P1      = QF_BUFFER,-
                                0A19   520                         P2      = #CLUQF$K_BLOCKS*512,-
                                0A19   521                         P3      = LOOKUP_LBN
          34 50    E9   0A4C   522         BLBC    R0,2$                           ; Br if error
             00    FB   0A4F   523         CALLS   #0,CSP$$WAIT                    ; Wait for completion
 00000000'EF          0A51
50   F61F CF    3C   0A56   524         MOVZWL  IOSB,R0                         ; Get I/O completion status
          25 50    E9   0A5B   525         BLBC    R0,2$                           ; Br if error
                                0A5E   526 ;
                                0A5E   527 ; Validate the data in the quorum file
                                0A5E   528 ;
             7E    D4   0A5E   529         CLRL    -(SP)                           ; Assume file not valid
56   F6C0 CF    DE   0A60   530         MOVAL   QF_BUFFER,R6                    ; Get buffer pointer
 00000B53'EF    16   0A65   531         JSB     CALCULATE_CHECKSUM              ; Get the checksum
             57    D5   0A68   532         TSTL    R7                              ; Is checksum valid?
             11    12   0A6D   533         BNEQU   1$                              ; Br if not
             0C    29   0A6F   534         CMPC3   #CLUQF$S_IDENT,-                ; Validate ID area
             66         0A71   535                 CLUQF$T_IDENT(R6),-
          F69B CF       0A72   536                 IDENT_STRING
             09    12   0A75   537         BNEQU   1$                              ; Br if file invalid
             02    B1   0A77   538         CMPW    #CLUQF$K_VERSION,-              ; Is version correct?
             0C    A6   0A79   539                 CLUQF$W_VERSION(R6)
             03    12   0A7B   540         BNEQU   1$                              ; Br if not
          6E 01    9A   0A7D   541         MOVZBL  #SS$_NORMAL,(SP)                ; File is valid
```

```
                50   8E   D0  0A80    542 1$:     MOVL    (SP)+,R0                        ; Return status
                          05  0A83    543 2$:     RSB
```

```
                        0A84   545 .SBTTL  WRITE_FILE - Write the quorum file
                        0A84   546
                        0A84   547 ;++
                        0A84   548 ;       This routine builds a template quorum file and writes it to the disk.
                        0A84   549 ;
                        0A84   550 ; CALLING SEQUENCE:
                        0A84   551 ;
                        0A84   552 ;       JSB     WRITE_FILE
                        0A84   553 ;
                        0A84   554 ; INPUTS:
                        0A84   555 ;
                        0A84   556 ;       NONE
                        0A84   557 ;
                        0A84   558 ; OUTPUT:
                        0A84   559 ;
                        0A84   560 ;       R0 = Status of the write
                        0A84   561 ;
                        0A84   562 ;       R1-R7 Destroyed
                        0A84   563 ;--
                        0A84   564
                        0A84   565 WRITE_FILE:
                        0A84   566
                        0A84   567 ;
                        0A84   568 ; Build a template quorum file
                        0A84   569 ;
56  F69C CF    DE       0A84   570         MOVAL   QF_BUFFER,R6                    ; Get buffer pointer
00  6E   00    2C       0A89   571         MOVC5   #0,(SP),#0,-                    ; Zero buffer
66  0400 8F               0A8D   572                 #CLUQF$K_BLOCKS*512,(R6)
             0C    28     0A91   573         MOVC3   #CLUQF$S_IDENT,-                ; Store ident string
        F67A CF             0A93   574                 IDENT_STRING,-
             66             0A96   575                 CLUQF$T_IDENT(R6)
    63       02    B0       0A97   576         MOVW    #CLUQF$K_VERSION,(R3)           ; Store version number
00000B53'EF      16         0A9A   577         JSB     CALCULATE_CHECKSUM              ; Get the checksum
 44 A6       57    D0       0AA0   578         MOVL    R7,CLUQF$L_CHECKSUM(R6)         ; Store checksum
 48 A6       01    90       0AA4   579         MOVB    #1,CLUQF$B_IGNORE(R6)           ; Set ignore flag
                        0AA8   580 ;
                        0AA8   581 ; Write the template quorum file.
                        0AA8   582 ;
                        0AA8   583         $QIO_S          CHAN    = CHANNEL,-
                        0AA8   584                         FUNC    = #IO$_WRITELBLK,-
                        0AA8   585                         IOSB    = IOSB,-
                        0AA8   586                         ASTADR  = CSP$$RESUME,-
                        0AA8   587                         ASTPRM  = CSP$GL_CURCTX,-
                        0AA8   588                         P1      = QF_BUFFER,-
                        0AA8   589                         P2      = #CLUQF$K_BLOCKS*512,-
                        0AA8   590                         P3      = LOOKUP_LBN
       0C 50    E9       0ADB   591         BLBC    R0,1$                           ; Br if error
          00    FB       0ADE   592         CALLS   #0,CSP$$WAIT                    ; Wait for completion
00000000'EF              0AE0
50  F590 CF    3C       0AE5   593         MOVZWL  IOSB,R0                         ; Get I/O completion status
             05    0AEA   594 1$:     RSB
```

```
                     0AEB   596 .SBTTL  CLOSE_FILE - Close the quorum file
                     0AEB   597
                     0AEB   598 ;++
                     0AEB   599 ;       This routine "closes" the quorum file by issuing a QIO with the
                     0AEB   600 ;       IO$_DEACCESS function code.
                     0AEB   601 ;
                     0AEB   602 ; CALLING SEQUENCE:
                     0AEB   603 ;
                     0AEB   604 ;       JSB     CLOSE_FILE
                     0AEB   605 ;
                     0AEB   606 ; INPUTS:
                     0AEB   607 ;
                     0AEB   608 ;       NONE
                     0AEB   609 ;
                     0AEB   610 ; OUTPUT:
                     0AEB   611 ;
                     0AEB   612 ;       R0,R1 Destroyed
                     0AEB   613 ;--
                     0AEB   614
                     0AEB   615 CLOSE_FILE:
                     0AEB   616
                     0AEB   617         $QIO_S          CHAN    = CHANNEL,-     ; Queue deaccess request
                     0AEB   618                         FUNC    = #IO$_DEACCESS,-
                     0AEB   619                         IOSB    = IOSB,-
                     0AEB   620                         ASTADR  = CSP$$RESUME,-
                     0AEB   621                         ASTPRM  = CSP$GL_CURCTX
           07 50  E9 0B14   622         BLBC    R0,1$                           ; Br if error
              00  FB 0B17   623         CALLS   #0,CSP$$WAIT                    ; Wait for completion
00000000'EF        0B19
                   05 0B1E   624 1$:     RSB
```

```
                           0B1F   .SBTTL  REQUEST_COMPLETE - Request completion
                           0B1F
                           0B1F   ;++
                           0B1F   ;       This routine completes the request by updating the CLUDCB fields.
                           0B1F   ;
                           0B1F   ; CALLING SEQUENCE:
                           0B1F   ;
                           0B1F   ;       $CMKRNL_S       REQUEST_COMPLETE
                           0B1F   ;
                           0B1F   ; INPUTS:
                           0B1F   ;
                           0B1F   ;       NONE
                           0B1F   ;
                           0B1F   ; OUTPUT:
                           0B1F   ;
                           0B1F   ;       R0,R1 Destroyed
                           0B1F   ;--
                           0B1F
                           0B1F   REQUEST_COMPLETE:
                           0B1F
                     0000  0B1F           .WORD   0
      00000000'GF    D0    0B21           MOVL    G^CLU$GL_CLUB,R0                ; Get CLUB address
               50          0B27
 50     00B4 C0      D0    0B28           MOVL    CLUB$L_CLUDCB(R0),R0            ; Get CLUDCB address
 51     F544 CF      D0    0B2D           MOVL    CHANNEL,R1                      ; Get channel number
               51    C3    0B32           SUBL3   R1,@#CTL$GL_CCBBASE,R1          ; Form CCB address
      00000000'9F          0B34
               51          0B39
                           0B3A           SETIPL  #IPL$_TIMER                     ; Synchronize access to CLUDCB
     0C A0     61    D0    0B3D           MOVL    CCB$L_UCB(R1),CLUDCB$L_UCB(R0)  ; Store UCB address in CLUDCB
        F52C CF      D0    0B41           MOVL    LOOKUP_LBN,CLUDCB$L_QFLBN(R0)   ; Put LBN in CLUDCB
            1C A0          0B45
               10    AA    0B47           BICW    #CLUDCB$M_QF_CSPACK,-           ; Clear the in progress bit
            22 A0          0B49                   CLUDCB$W_FLAGS(R0)
               02    B0    0B4B           MOVW    #CLUDCB$M_QS_READY,-            ; Set state to ready
            20 A0          0B4D                   CLUDCB$W_STATE(R0)
                           0B4F           SETIPL  #0                              ; Restore IPL
                     04    0B52           RET
```

```
                     0B53    661 .SBTTL  CALCULATE_CHECKSUM - Calculate the quorum file checksum
                     0B53    662
                     0B53    663 ;++
                     0B53    664 ;       This routine calulates the checksum of the quorum block pointed to
                     0B53    665 ;       by R6. It includes the field CLUQF$L_CHECKSUM in the checksum
                     0B53    666 ;       calculation.
                     0B53    667 ;
                     0B53    668 ; CALLING SEQUENCE:
                     0B53    669 ;
                     0B53    670 ;       JSB     CALCULATE_CHECKSUM
                     0B53    671 ;
                     0B53    672 ; INPUTS:
                     0B53    673 ;
                     0B53    674 ;       R6 = Pointer to the quorum block
                     0B53    675 ;
                     0B53    676 ; OUTPUT:
                     0B53    677 ;
                     0B53    678 ;       R7 = Quorum block checksum
                     0B53    679 ;
                     0B53    680 ;       R2,R3   Destroyed
                     0B53    681 ;--
                     0B53    682
                     0B53    683 CALCULATE_CHECKSUM:
                     0B53    684
52    12     D0      0B53    685         MOVL    #CLUQF$K_CHECK_LENGTH/4,R2      ; R2 = checksum longword count
53    56     D0      0B56    686         MOVL    R6,R3                           ; Copy buffer address
       57    D4      0B59    687         CLRL    R7                              ; Form checksum in R7
57    83     CC      0B5B    688 1$:     XORL2   (R3)+,R7                        ; Accumulate checksum
  FA  52     F5      0B5E    689         SOBGTR  R2,1$                           ; Br if more
             05      0B61    690         RSB
                     0B62    691
                     0B62    692         .END
```

```
$$T1                            = 00000000
ATR$C_FPRO                      = 00000016
ATR$C_STATBLK                   = 00000009
ATR$C_UIC                       = 00000015
ATR$S_FPRO                      = 00000002
ATR$S_STATBLK                   = 00000020
ATR$S_UIC                       = 00000004
ATTRIB_BLOCK                      000000CE R      01
CALCULATE_CHECKSUM                00000B53 R      01
CCB$L_UCB                       = 00000000
CHANNEL                           00000075 R      01
CLOSE_FILE                        00000AEB R      01
CLU$GB_QDISK                      ******** X    01
CLU$GL_CLUB                       ******** X    01
CLU$GW_QDSKINTERVAL               ******** X    01
CLUB$L_CLUDCB                   = 000000B4
CLUB$T_QDNAME                   = 000000B8
CLUDCB$L_QFLBN                  = 0000001C
CLUDCB$L_UCB                    = 0000000C
CLUDCB$M_QF_CSPACK              = 00000010
CLUDCB$M_QS_NOT_READY           = 00000001
CLUDCB$M_QS_READY               = 00000002
CLUDCB$S_DISK_QUORUM            = 00000010
CLUDCB$W_FLAGS                  = 00000022
CLUDCB$W_STATE                  = 00000020
CLUDCB_LBN                        0000006D R      01
CLUQF$B_IGNORE                  = 00000048
CLUQF$K_BLOCKS                  = 00000002
CLUQF$K_CHECK_LENGTH            = 00000048
CLUQF$K_VERSION                 = 00000002
CLUQF$L_CHECKSUM                = 00000044
CLUQF$S_IDENT                   = 0000000C
CLUQF$T_IDENT                   = 00000000
CLUQF$W_VERSION                 = 0000000C
CNX$DISK_CHANGE                   ******** X    01
CSP$$RESUME                       ******** X    01
CSP$$WAIT                         ******** X    01
CSP$GL_CURCTX                     ******** X    01
CSP$QUORUM                        00000729 RG     01
CSP$TELL_OPCOM                    ******** X    01
CTL$GL_CCBBASE                    ******** X    01
DSC$K_CLASS_D                   = 00000002
DSC$K_CLASS_S                   = 00000001
DSC$K_DTYPE_T                   = 0000000E
DVI$_FULLDEVNAM                 = 000000E8
ERROR_COUNT                       00000081 R      01
ERROR_MESSAGE                     00000082 R      01
ERROR_THRESHOLD                 = 0000000A
FIB                               0000008E R      01
FIB$K_LENGTH                    = 00000040
FIB$L_ACCTL                     = 00000000
FIB$L_EXSZ                      = 00000018
FIB$M_ALCON                     = 00000001
FIB$M_EXTEND                    = 00000080
FIB$M_FILCON                    = 00000004
FIB$M_NOREAD                    = 00000400
FIB$M_NOWRITE                   = 00000001
FIB$M_WRITE                     = 00000100
FIB$M_WRITETHRU                 = 00080000
FIB$W_DID_NUM                   = 0000000A
FIB$W_DID_SEQ                   = 0000000C
FIB$W_EXCTL                     = 00000016
FIB_DESCR                         00000086 R      01
FID$C_MFD                       = 00000004
FPRO                              0000010E R      01
GET_LBN                           000009C3 R      01
GET_QDNAME                        000008C6 R      01
GET_QDNAME1                       0000091C R      01
IDENT_STRING                      00000110 R      01
IO$M_ACCESS                     = 00000040
IO$M_CREATE                     = 00000080
IO$_ACCESS                      = 00000032
IO$_DEACCESS                    = 00000034
IO$_READLBLK                    = 00000021
IO$_WRITELBLK                   = 00000020
IOSB                              00000079 R      01
IPL$_TIMER                      = 00000008
LOOKUP_LBN                        00000071 R      01
MSSG1                             00000524 R      01
MSSG10                            000006F6 R      01
MSSG2                             00000568 R      01
MSSG3                             00000595 R      01
MSSG4                             000005CF R      01
MSSG5                             000005FD R      01
MSSG6                             0000062E R      01
MSSG7                             00000662 R      01
MSSG8                             0000069A R      01
MSSG9                             000006C7 R      01
OPEN_FILE                         00000945 R      01
PR$_IPL                           ********   X    01
QD_DESCR                          00000001 R      01
QD_ITMLST                         00000049 R      01
QD_NAME                           00000009 R      01
QF_BUFFER                         00000124 R      01
QF_DESCR                          00000059 R      01
REQUEST_COMPLETE                  00000B1F R      01
REQUEST_INIT                      00000890 R      01
RESCHEDULE_TIMER                  0000011C R      01
SBK$W_STLBNH                    = 00000000
SBK$W_STLBNL                    = 00000002
SS$_CREATED                     = 00000619
SS$_FORCEDERROR                 = 00002144
SS$_NORMAL                      = 00000001
STATBLK                           000000EA R      01
SYS$ASSIGN                        ********  GX    01
SYS$CMKRNL                        ********  GX    01
SYS$DASSGN                        ********  GX    01
SYS$GETDVIW                       ********  GX    01
SYS$QIO                           ********  GX    01
SYS$SETIMR                        ********  GX    01
THREAD_ACTIVE                     00000000 R      01
UIC                               0000010A R      01
VALIDATE_FILE                     00000A19 R      01
WRITE_FILE                        00000A84 R      01
```

Psect synopsis

PSECT name	Allocation	PSECT No.	Attributes
. ABS .	00000000 (0.)	00 (0.)	NOPIC USR CON ABS LCL NOSHR NOEXE NORD NOWRT NOVEC BYTE
. BLANK .	00000B62 (2914.)	01 (1.)	NOPIC USR CON REL LCL NOSHR EXE RD WRT NOVEC BYTE
ABS	00000000 (0.)	02 (2.)	NOPIC USR CON ABS LCL NOSHR EXE RD WRT NOVEC BYTE

Performance indicators

Phase	Page faults	CPU Time	Elapsed Time
Initialization	63	00:00:00.29	00:00:01.19
Command processing	87	00:00:00.76	00:00:02.03
Pass 1	456	00:00:20.35	00:00:48.63
Symbol table sort	0	00:00:02.75	00:00:06.44
Pass 2	146	00:00:03.65	00:00:13.00
Symbol table output	15	00:00:00.10	00:00:00.31
Psect synopsis output	1	00:00:00.03	00:00:00.03
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	770	00:00:27.93	00:01:11.64

The working set limit was 1950 pages.
95950 bytes (188 pages) of virtual memory were used to buffer the intermediate code.
There were 100 pages of symbol table space allocated to hold 1706 non-local and 28 local symbols.
699 source lines were read in Pass 1, producing 17 object records in Pass 2.
32 pages of virtual memory were used to define 31 macros.

Macro library statistics

Macro library name	Macros defined
_255DUA18:[SYSLOA.OBJ]CLUSTER.MLB;2	1
_255DUA18:[SYS.OBJ]LIB.MLB;1	5
_255DUA18:[SYSLIB]STARLET.MLB;3	22
TOTALS (all libraries)	28

1869 GETS were required to define 28 macros.

There were no errors, warnings or information messages.

```
MACRO/LIS=LIS$:CSPQUORUM/OBJ=OBJ$:CSPQUORUM MSRC$:CSPQUORUM/UPDATE=(BUG$:CSPQUORUM)+EXECML$/LIB+LIB$:CLUSTER/LIB
```

0448 AH-EF71A-SE
VAX/VMS V4.1 SRC LST MCRF UPD

CSP
LIS

TTYCHARI
LIS

TTDRVR

OPDRVWS
LIS

TTDRIVER
MAP

YCDRIVER
MAP

CSPQUORUM
LIS

TTYCHARO
LIS