```
SSSSSSSSSSSS  YYY          YYY   SSSSSSSSSSSS
SSSSSSSSSSSS  YYY          YYY   SSSSSSSSSSSS
SSSSSSSSSSSS  YYY          YYY   SSSSSSSSSSSS
SSS           YYY          YYY
SSS           YYY          YYY   SSS
SSS           YYY          YYY   SSS
SSS              YYY    YYY       SSS
SSS              YYY    YYY       SSS
SSS              YYY    YYY       SSS
  SSSSSSSSS         YYY           SSSSSSSSS
  SSSSSSSSS         YYY           SSSSSSSSS
  SSSSSSSSS         YYY           SSSSSSSSS
          SSS       YYY                   SSS
          SSS       YYY                   SSS
          SSS       YYY                   SSS
          SSS       YYY                   SSS
          SSS       YYY                   SSS
          SSS       YYY                   SSS
SSSSSSSSSSSS        YYY           SSSSSSSSSSSS
SSSSSSSSSSSS        YYY           SSSSSSSSSSSS
SSSSSSSSSSSS        YYY           SSSSSSSSSSSS
```

```
SSSSSSSS  YY      YY   SSSSSSSS  CCCCCCC  RRRRRRR   EEEEEEEEEE  DDDDDDD   EEEEEEEEEE  LL
SSSSSSSS  YY      YY   SSSSSSSS  CCCCCCC  RRRRRRR   EEEEEEEEEE  DDDDDDD   EEEEEEEEEE  LL
SS        YY      YY   SS        CC       RR    RR  EE          DD    DD  EE          LL
SS        YY      YY   SS        CC       RR    RR  EE          DD    DD  EE          LL
SS          YY  YY     SS        CC       RR    RR  EE          DD    DD  EE          LL
SS          YY  YY     SS        CC       RR    RR  EE          DD    DD  EE          LL
  SSSSSS      YY         SSSSSS  CC       RRRRRRR   EEEEEEE     DD    DD  EEFEEEEE    LL
  SSSSSS      YY         SSSSSS  CC       RRRRRRR   EEEEEEE     DD    DD  EEEEEEEE    LL
      SS      YY             SS  CC       RR  RR    EE          DD    DD  EE          LL
      SS      YY             SS  CC       RR  RR    EE          DD    DD  EE          LL
      SS      YY             SS  CC       RR    RR  EE          DD    DD  EE          LL
      SS      YY             SS  CC       RR    RR  EE          DD    DD  EE          LL          ....
SSSSSSSS      YY       SSSSSSSS  CCCCCCC  RR    RR  EEEEEEEEEE  DDDDDDD   EEEEEEEEEE  LLLLLLLLLL   ....
SSSSSSSS      YY       SSSSSSSS  CCCCCCC  RR    RR  EEEEEEEEEE  DDDDDDD   EEEEEEEEEE  LLLLLLLLLL   ....

LL          IIIIII    SSSSSSSS
LL          IIIIII    SSSSSSSS
LL            II      SS
LL            II      SS
LL            II      SS
LL            II        SSSSSS
LL            II        SSSSSS
LL            II            SS
LL            II            SS
LL            II            SS
LL            II            SS
LLLLLLLLLL  IIIIII    SSSSSSSS
LLLLLLLLLL  IIIIII    SSSSSSSS
```

SYSCREDEL
V04-000

G 10
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page   1
                                              5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (1)

SYS
V04

```
0000      1              .TITLE  SYSCREDEL - SYSTEM SERVICE CREATE & DELETE PAGE
0000      2              .IDENT  'V04-000'
0000      3      ;
0000      4      ;*******************************************************************************
0000      5      ;*                                                                             *
0000      6      ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                    *
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0000     23      ;*                                                                             *
0000     24      ;*                                                                             *
0000     25      ;*******************************************************************************
0000     26
0000     27      ;++
0000     28      ; FACILITY:      EXECUTIVE, MEMORY MANAGEMENT SERVICES
0000     29      ;
0000     30      ; ABSTRACT:      SYSCREPAG IMPLEMENTS THE SERVICES WHICH CREATE NEW
0000     31      ;        DEMAND ZERO PAGES IN THE VIRTUAL ADDRESS SPACE OF THE CALLER.
0000     32      ;
0000     33      ; ENVIRONMENT:  THESE SERVICES RUN IN KERNEL MODE WITH THE MEMORY
0000     34      ;        MANAGEMENT DATA BASE LOCKED WHEN NECESSARY.
0000     35      ;
0000     36      ;--
0000     37      ;
0000     38              .SBTTL  HISTORY                    ; DETAILED
0000     39      ;
0000     40      ; AUTHOR: PETER H. LIPMAN       , CREATION DATE: 9-SEP-76
0000     41      ;
0000     42      ; MODIFIED BY:
0000     43      ;
0000     44      ;       V03-019 WMC0014         Wayne Cardoza          28-Mar-1984
0000     45      ;               Only window pages above MAXPFN cause process to be locked
0000     46      ;               on primary.
0000     47      ;
0000     48      ;       V03-018 WMC0017         Wayne Cardoza          25-Feb-1983
0000     49      ;               Handle deletion of resident global pages.
0000     50      ;
0000     51      ;       V03-017 WMC0012         Wayne Cardoza          16-Jan-1983
0000     52      ;               CRECOM_DONE path must check for SS$_ABORT.
0000     53      ;
0000     54      ;       V03-016 WMC0011         Wayne Cardoza          28-Sep-1983
0000     55      ;               Move code to FAST_CREATE so CRMPSC can use it.
0000     56      ;
0000     57      ;       V03-015 WMC0010         Wayne Cardoza          26-Sep-1983
```

```
0000   58 ;         Make sure 1 page EXPREG of P1 space returns addresses in
0000   59 ;         correct order.
0000   60 ;
0000   61 ;    V03-014  WMC0009       Wayne Cardoza           28-Aug-1983
0000   62 ;         Don't wait for I/O completion at IPL 2.
0000   63 ;         Major changes to creation of demand zero pages to improve
0000   64 ;         performance.
0000   65 ;
0000   66 ;    V03-013  WMC0008       Wayne Cardoza           22-Aug-1983
0000   67 ;         MOVPTLOCK - don't remove pages from permanent working set.
0000   68 ;
0000   69 ;    V03-012  WMC0007       Wayne Cardoza           03-Aug-1983
0000   70 ;         Misc performance improvements.
0000   71 ;         New entry point for EXPREG with arbitrary protection.
0000   72 ;
0000   73 ;    V03-011  WMC0006       Wayne Cardoza           8-Jun-1983
0000   74 ;         Properly delete demand-zero global page file pages.
0000   75 ;
0000   76 ;    V03-010  TCM0001       Trudy C. Matthews       4-Apr-1983
0000   77 ;         Change references to working set fields in PHD so that
0000   78 ;         they are used as unsigned words.
0000   79 ;
0000   80 ;    V03-009  WMC0005       Wayne Cardoza           18-Mar-1983
0000   81 ;         Fix status returned by delete.
0000   82 ;
0000   83 ;    V03-008  WMC0004       Wayne Cardoza           02-Mar-1983
0000   84 ;         MMG$CRECOMx entry points go away.
0000   85 ;         MMG$RETADRINI, MMG$INADRINI, MMG$RETRANGE will always return
0000   86 ;         status and with an RSB.
0000   87 ;
0000   88 ;    V03-007  WMC0003       Wayne Cardoza           02-Feb-1983
0000   89 ;         Make MMG$CREDEL and MMG$RETRANGE global entry points.
0000   90 ;
0000   91 ;    V03-006  WMC0002       Wayne Cardoza           20-Jan-1983
0000   92 ;         Don't write back a process section page if the checkpoint
0000   93 ;         bit is turned on in the backing store word.
0000   94 ;
0000   95 ;    V03-005  KDM0027       Kathleen D. Morse       10-Nov-1982
0000   96 ;         Invalidate the translation buffer upon deletion of
0000   97 ;         a shared memory global section page.  Do not clear
0000   98 ;         window bit in PTE until sure that deletion can proceed
0000   99 ;         in case I/O wait causes re-execution of $DELPAG.
0000  100 ;
0000  101 ;    V03-004  MLJ0101       Martin L. Jack          13-Nov-1982
0000  102 ;         Fix broken BSBW.
0000  103 ;
0000  104 ;    V03-003  WMC0001       Wayne Cardoza           29-Sep-1982
0000  105 ;         Give up if ADJWSL doesn't change extradyn.
0000  106 ;
0000  107 ;    V03-002  KDM46395      Kathleen D. Morse       25-Jun-1982
0000  108 ;         Place the WSLEs for page table pages that contain
0000  109 ;         PFNMAP and MA780 global pages, into the locked portion
0000  110 ;         of the working set.
0000  111 ;
```

I 10

SYSCREDEL   − SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 3
V04-000   DECLARATIONS   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (2)

```
                    0000    113              .SBTTL  DECLARATIONS
                    0000    114    ;
                    0000    115    ; INCLUDE FILES:
                    0000    116    ;
                    0000    117              $IPLDEF                            ;PROCESSOR PRIORITY LEVELS
                    0000    118              $IRPDEF                            ;I/O REQUEST PACKET DEFINITIONS
                    0000    119              $JIBDEF                            ;JOB INFORMATION BLOCK DEFINITIONS
                    0000    120              $MMGDEF                            ; Offsets from FP into scratch area
                    0000    121              $OPDEF                             ; Define opcode equivalent values
                    0000    122              $PCBDEF                            ;PROCESS CONTROL BLOCK DEFINTIONS
                    0000    123              $PFNDEF                            ;PAGE FRAME NUMBER DATA BASE
                    0000    124              $PHDDEF                            ;PROCESS HEADER DEFINITIONS
                    0000    125              $PRDEF                             ;PROCESSOR REGISTER DEFINTIONS
                    0000    126              $PSLDEF                            ;PSL
                    0000    127              $PTEDEF                            ;PAGE TABLE ENTRY DEFINITIONS
                    0000    128              $RSNDEF                            ;RESOURCE WAIT NUMBER DEFINIONS
                    0000    129              $SECDEF                            ;SECTION TABLE DEFINITIONS
                    0000    130              $SSDEF                             ;SYSTEM STATUS CODE DEFINTIONS
                    0000    131              $VADEF                             ;VIRTUAL ADDRESS VIELDS
                    0000    132              $WSLDEF                            ;WORKING SET LIST ENTRY DEFINTIONS
                    0000    133    ;
                    0000    134    ; EXTERNAL SYMBOLS:
                    0000    135    ;
                    0000    136    ;
                    0000    137    ; MACROS:
                    0000    138    ;
                    0000    139    ;
                    0000    140    ; EQUATED SYMBOLS:
                    0000    141    ;
                    0000    142    ; OFFSET FROM AP
                    0000    143    ;
      00000004      0000    144              INADR        = 4                  ;OFFSET TO INPUT RANGE
      00000004      0000    145              PAGCNT       = 4                  ;OFFSET TO PAGE COUNT
      00000008      0000    146              RETADR       = 8                  ;OFFSET TO RETURN RANGE
      0000000C      0000    147              ACMODE       = 12                 ;ACCESS MODE
      00000010      0000    148              REGION       = 16                 ;OFFSET TO REGION
                    0000    149    ;
                    0000    150    ; OWN STORAGE:
                    0000    151    ;
```

J 10

SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page   4
V04-000   EXPREG - EXPAND PROGRAM/CONTROL REGION   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (3)

SYS
V04

```
0000   153                    .SBTTL   EXPREG - EXPAND PROGRAM/CONTROL REGION
0000   154
0000   155   ;++
0000   156   ; FUNCTIONAL DESCRIPTION:
0000   157   ;
0000   158   ;       THE EXPAND REGION SYSTEM SERVICE EXPANDS THE PROGRAM REGION (REGION = 0)
0000   159   ;       OR THE CONTROL REGION (REGION = 1) OF THE PROCESS SPACE BY THE
0000   160   ;       NUMBER OF PAGES SPECIFIED IN THE PAGCNT PARAMETER.   THE NEW PAGES
0000   161   ;       ARE DEMAND ZERO PAGES OWNED BY THE MODE OF THE CALLER WITH
0000   162   ;       READ/WRITE PROTECTION FOR THE CALLING MODE AND ALL MORE PRIVILEGED MODES.
0000   163   ;
0000   164   ; CALLING SEQUENCE:
0000   165   ;
0000   166   ;       CALLG    ARGLIST,@#SYS$EXPREG
0000   167   ;       CALLG    ARGLIST,MMG$EXPREG              ;PRIVILEGED, NON VECTORED ENTRY POINT
0000   168   ;                                               ;ACCEPTS DESIRED PAGE PROTECTION IN ACMODE+1
0000   169   ;                                               ;PRESERVES IPL IF LEQ ASTDEL
0000   170   ;
0000   171   ; INPUT PARAMETERS:
0000   172   ;
0000   173   ;       PAGCNT(AP) = NUMBER OF PAGES TO ADD TO THE REGION
0000   174   ;       RETADR(AP) = ADDRESS OF A 2 LONGWORD ARRAY INTO WHICH IS RETURNED
0000   175   ;                    THE STARTING AND ENDING VIRTUAL ADDRESSES (INCLUSIVE)
0000   176   ;                    OF THE PAGES JUST CREATED
0000   177   ;       ACMODE(AP) = THE ACCESS MODE (MAXIMIZED WITH THE CALLERS MODE
0000   178   ;                    USED AS THE OWNER OF THE NEW PAGE(S)
0000   179   ;       ACMODE+1(AP) = THE PROTECTION TO USE FOR THE NEW PAGE WHEN
0000   180   ;                    CALLED AT THE PRIVILEGED MMG$EXPREG ENTRY POINT
0000   181   ;       REGION(AP) = THE INDICATOR FOR WHICH REGION TO EXPAND
0000   182   ;                    0 = PROGRAM REGION
0000   183   ;                    1 = CONTROL REGION
0000   184   ;
0000   185   ; IMPLICIT INPUTS:
0000   186   ;
0000   187   ;       CURRENT PCB LOCATED VIA SCH$GL_CURPCB
0000   188   ;       PROCESS HEADER AS SPECIFIED IN PCB$L_PHD OF THE PCB
0000   189   ;
0000   190   ; OUTPUT PARAMETERS:
0000   191   ;
0000   192   ;       R0 = SYSTEM STATUS CODE
0000   193   ;
0000   194   ; IMPLICIT OUTPUTS:
0000   195   ;
0000   196   ;       NONE
0000   197   ;
0000   198   ; COMPLETION CODES:
0000   199   ;
0000   200   ;       SS$_NORMAL                              ;SUCCESSFUL COMPLETION
0000   201   ;       SS$_ACCVIO                              ;RETURN ADDRESS RANGE INACCESSIBLE
0000   202   ;       SS$_VASFULL                             ;VIRTUAL ADDRESS SPACE FULL
0000   203   ;       SS$_ILLPAGCNT                           ;ILLEGAL PAGE COUNT PARAMETER
0000   204   ;
0000   205   ; SIDE EFFECTS:
0000   206   ;
0000   207   ;       NONE
0000   208   ;
0000   209   ;--
```

SYSCREDEL
V04-000

K 10
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 5
EXPREG - EXPAND PROGRAM/CONTROL REGION   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (4)

SYS
V04

```
                        0000    211 ;
                        0000    212 ; ************************************************************************
                        0000    213 ;
                        0000    214 ; *************** THE FOLLOWING CODE MAY BE PAGED ****************
                        0000    215 ;
                00000000 216              .PSECT  YSEXEPAGED
                        0000    217 ;
                        0000    218 ; ************************************************************************
                        0000    219 ;
                        0000    220
                        0000    221              .ENABL  LSB
                        0000    222
                        0000    223 MMG$EXPREG::
                01FC    0000    224              .WORD   ^M<R2,R3,R4,R5,R6,R7,R8>
    57    0D AC   9A    0002    225              MOVZBL  ACMODE+1(AP),R7              ;PICK UP DESIRED PAGE PROTECTION IF SPECIFIE
          0A      11    0006    226              BRB     8$
                        0008    227
    50    00FC 8F  3C   0008    228 5$:          MOVZWL  #SS$_ILLPAGCNT,R0           ;ILLEGAL PAGE COUNT PARAM
          04      000D    229 6$:          RET
                        000E    230
                01FC    000E    231              .ENTRY  EXE$EXPREG,^M<R2,R3,R4,R5,R6,R7,R8>
                        0010    232
          57      D4    0010    233              CLRL    R7                          ;NO PAGE PROTECTION SPECIFIED
          5E    1C  C2  0012    234 8$:          SUBL    #-MMG$C_LENGTH,SP           ;RESERVE SCRATCH AREA
          028E    30    0015    235              BSBW    MMG$RETADRINI               ;INIT RETURN RANGE AND SCRATCH AREA
          F2 50   E9    0018    236              BLBC    R0,6$
          013E    30    001B    237              BSBW    MMG$CREPAGINI               ;INIT FOR CREATING DZRO PAGES
          57      D5    001E    238              TSTL    R7                          ;PAGE PROTECTION SPECIFIED?
          05      13    0020    239              BEQL    9$                          ;BRANCH IF NOT
 58  04  1B  57  F0    0022    240              INSV    R7,#PTE$V_PROT,#PTE$S_PROT,R8 ;SET DESIRED PAGE PROTECTION
    56    04 AC   D0    0027    241 9$:          MOVL    PAGCNT(AP),R6               ;PAGES TO BE ALLOCATED
    51  56    01  C3    002B    242              SUBL3   #1,R6,R1                    ;R1=# PAGES TO BE ALLOCATED - 1
    51  FFE00000 8F  D3 002F    243              BITL    #^C<VA$M_VPG & -            ;PAGE COUNT TOO LARGE?
                        0036    244                      ^C<VA$M_P1 ! VA$M_SYSTEM>>@-9,R1 ;(HIGH 11 BITS NOT CLEAR?)
          D0      12    0036    245              BNEQ    5$                          ;BRANCH FOR ERROR IF NOT CLEAR
    51  51    09  78    0038    246              ASHL    #9,R1,R1                    ;EXPRESS AS BYTES
                        003C    247 ;
                        003C    248 ; ***** LOCK THE PROCESS HEADER HERE
                        003C    249 ;
                        003C    250              SETIPL  #IPL$_ASTDEL               ;NO AST'S WHILE MODIFYING PHD
 54  00000000'EF  D0   003F    251              MOVL    SCH$GL_CURPCB,R4            ;R4=PCB
 55  00000000'9F  D0   0046    252              MOVL    @#CTL$GL_PHD,R5             ;R5=PHD ADR
          0A 10 AC  E8  004D    253              BLBS    REGION(AP),10$             ;BRANCH IF P1 SPACE
          52   28 A5 D0 0051    254              MOVL    PHD$L_FREP0VA(R5),R2       ;STARTVA=1ST FREE P0 SPACE PAGE
    53  52    51  C1    0055    255              ADDL3   R1,R2,R3                   ;R3=ENDVA (INCLUSIVE)
          08      11    0059    256              BRB     15$
          52   30 A5 D0 005B    257 10$:         MOVL    PHD$L_FREP1VA(R5),R2       ;STARVA=1ST FREE P1 SPACE PAGE
    53  52    51  C3    005F    258              SUBL3   R1,R2,R3                   ;R3=ENDVA (INCLUSIVE)
                        0063    259
    51  0200 C1   DE    0063    260 15$:         MOVAL   ^X200(R1),R1               ;GET FULL SIZE OF NEW REGION
          0022    30    0068    261              BSBW    MMG$TRY_ALL                ;SEE IF FULL EXPANSION IS POSSIBLE
          05 50   E9    006B    262              BLBC    R0,100$                    ;GO TRY IT THE HARD WAY
                        006E    263
          006C    30    006E    264              BSBW    MMG$FAST_CREATE            ;USE THE FAST CREATE PATH
          08      11    0071    265              BRB     105$
                        0073    266 ;
                        0073    267 ; GET AS FAR AS WE CAN - ONE PAGE AT A TIME
```

```
                         0073   268 ;
    56    0414'CF   DE   0073   269 100$:    MOVAL     W^MMG$CREPAG,R6              ;MMG$CREDEL NEEDS THIS
          02CC      30   0078   270          BSBW      MMG$CREDEL                   ;COMMON CREATE/DELETE LOOP
          50        DD   007B   271 105$:    PUSHL     R0                           ;SAVE STATUS
          0242      30   007D   272          BSBW      MMG$RETRANGE                 ;RETURN RANGE OPERATED ON
          03 50     E8   0080   273          BLBS      R0,110$
    6E    50        D0   0083   274          MOVL      R0,(SP)                      ;THIS STATUS WILL SUPERCEDE CREDEL
          50        BA   0086   275 110$:    POPR      R0
                         0088   276          ENBINT    MMG$L_CALLEDIPL(FP)
          04             008C   277          RET
                         008D   278
                         008D   279          .DSABL    LSB
                         008D   280 ;
                         008D   281 ; TRY EXPANDING REGION TO FIT LAST PAGE TO BE CREATED
                         008D   282 ; THEN CHECK AND ADJUST PAGEFILE QUOTA
                         008D   283 ;
                         008D   284 ;        R1 -> ADDITIONAL SPACE REQUIRED
                         008D   285 ;        R2 -> A VA IN THE REGION
                         008D   286 ;        R4 -> PCB
                         008D   287 ;        R6 -> PAGES TO BE CREATED (MAY BE LESS THAN REQUIRED REGION EXPANSION)
                         008D   288 ;
                         008D   289 MMG$TRY_ALL::
          0442      30   008D   290          BSBW      EXPANDCHK                    ;TRY EXPANDING REGION
          47 50     E9   0090   291          BLBC      R0,70$                       ;NO LUCK
                         0093   292 ;
          08        E1   0093   293          BBC       #MMG$V_CHGPAGFIL,-           ;BRANCH IF NOT CHARGING FOR PAGE FILE
       3E FC AD          0095   294                    MMG$L_MAXACMODE(FP),60$
    50    0080 C4   D0   0098   295          MOVL      PCB$L_JIB(R4),R0             ;GET JIB ADDRESS
    56    3C A0     D1   009D   296          CMPL      JIB$L_PGFLCNT(R0),R6         ;CHECK QUOTA
          37        19   00A1   297          BLSS      70$                          ;BRANCH IF OVER QUOTA
    3C A0 56        C2   00A3   298          SUBL      R6,JIB$L_PGFLCNT(R0)
 50 38 A0 3C A0     C3   00A7   299          SUBL3     JIB$L_PGFLCNT(R0),JIB$L_PGFLQUOTA(R0),R0 ;PAGE FILE PAGES IN USE
 00000000'GF  50    D1   00AD   300          CMPL      R0,G^CTL$GL_VIRTPEAK         ;MAINTAIN MAX PAGE FILE USED
          10        1F   00B4   301          BLSSU     50$
 00000000'GF  50    D0   00B6   302          MOVL      R0,G^CTL$GL_VIRTPEAK         ;SET NEW PEAK VALUE
 00000000'GF  50    D0   00BD   303          MOVL      R0,G^CTL$GL_IPAGEFL          ;SET NEW PEAK VALUE
          10        11   00C4   304          BRB       60$
 00000000'GF  50    D1   00C6   305 50$:     CMPL      R0,G^CTL$GL_IPAGEFL          ;MAINTAIN MAX PAGE FILE USED (IMAGE)
          07        1F   00CD   306          BLSSU     60$
 00000000'GF  50    D0   00CF   307          MOVL      R0,G^CTL$GL_IPAGEFL          ;SET NEW PEAK VALUE
                         00D6   308
    50    01   3C   00D6   309 60$:     MOVZWL    #SS$_NORMAL,R0
          05             00D9   310          RSB
                         00DA   311
    50        D4   00DA   312 70$:     CLRL      R0                           ;CAN'T MAKE IT
          05             00DC   313          RSB
                         00DD   314 ;
                         00DD   315 ;
                         00DD   316 ; FAST CREATE PATH
                         00DD   317 ;
                         00DD   318 ;        R2 -> STARTVA
                         00DD   319 ;        R3 -> ENDVA
                         00DD   320 ;        R5 -> P1 PHD
                         00DD   321 ;        R6 -> PAGE COUNT
                         00DD   322 ;        R8 -> NEW PTE
                         00DD   323 ;
                         00DD   324 MMG$FAST_CREATE::
```
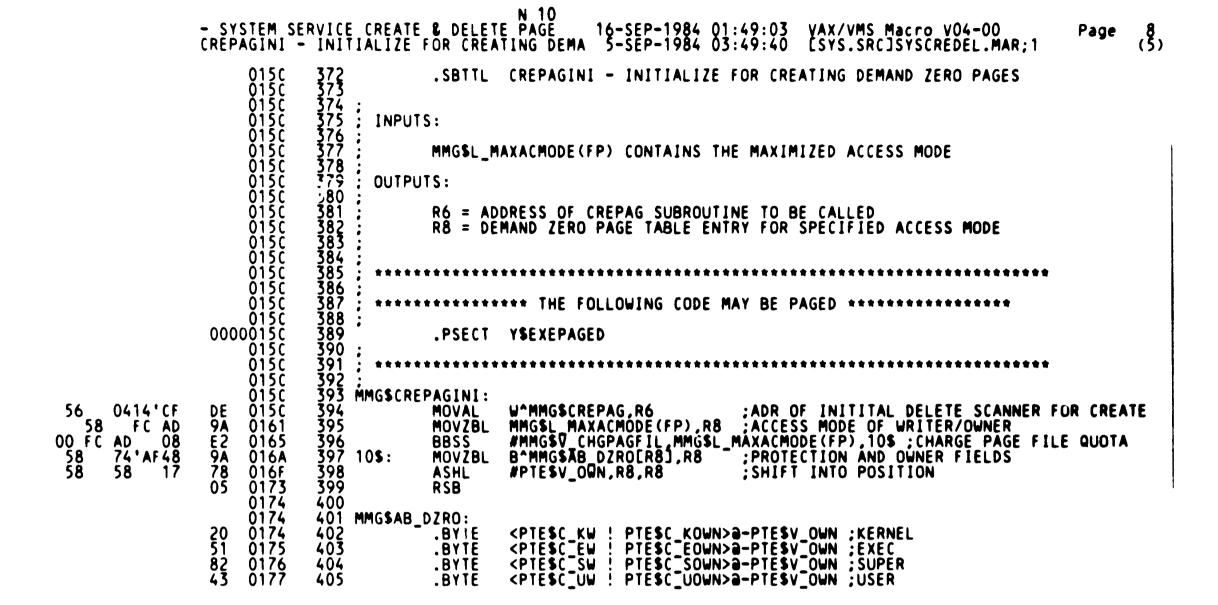
SYSCREDEL
V04-000

M 10
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page   7
EXPREG - EXPAND PROGRAM/CONTROL REGION   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (4)

SYS
V04

```
          7E  52    7D  00DD   325           MOVQ    R2,-(SP)                  ;SAVE THE VA'S
          53  52    D1  00E0   326           CMPL    R2,R3                     ;IS R2 THE LOWEST VA
                03  1F  00E3   327           BLSSU   10$                       ;YES
              52  53  D0  00E5   328           MOVL    R3,R2                     ;NOW IT IS
                        00E8   329
       07 52    1E  E1  00E8   330 10$:       BBC     #VA$V_P1,R2,20$           ;BRANCH IF P0 SPACE
                        00EC   331 ;
                        00EC   332 ; P1 SPACE
                        00EC   333 ;
          53  00D0 C5  DE  00EC   334           MOVAL   PHD$L_P1BR(R5),R3         ;ADR OF POINTER TO P1PT
                05  11  00F1   335           BRB     30$
                        00F3   336 ;
                        00F3   337 ; P0 SPACE
                        00F3   338 ;
          53  00C8 C5  DE  00F3   339 20$:      MOVAL   PHD$L_P0BR(R5),R3         ;ADR OF POINTER TO P0PT
                        00F8   340
   51  52  15  09  EF  00F8   341 30$:      EXTZV   #VA$V_VPN,#VA$S_VPN,R2,R1 ;VIRTUAL PAGE NUMBER
   50  56  02  00  EF  00FD   342           EXTZV   #0,#2,R6,R0               ;PAGES TO LEAVE A MULTIPLE OF 4
                0A  13  0102   343           BEQL    50$
       00 B341  58  D0  0104   344 40$:      MOVL    R8,@(R3)[R1]             ;STORE NEW PTE
                51  D6  0109   345           INCL    R1                       ;NEXT PAGE
             F6 50  F5  010B   346           SOBGTR  R0,40$
       56  56  FE 8F  78  010E   347 50$:      ASHL    #-2,R6,R6
                1F  13  0113   348           BEQL    70$                      ;DONE
       00 B341  58  D0  0115   349 60$:      MOVL    R8,@(R3)[R1]             ;STORE NEW PTE
                51  D6  011A   350           INCL    R1                       ;NEXT PAGE
       00 B341  58  D0  011C   351           MOVL    R8,@(R3)[R1]             ;STORE NEW PTE
                51  D6  0121   352           INCL    R1                       ;NEXT PAGE
       00 B341  58  D0  0123   353           MOVL    R8,@(R3)[R1]             ;STORE NEW PTE
                51  D6  0128   354           INCL    R1                       ;NEXT PAGE
       00 B341  58  D0  012A   355           MOVL    R8,@(R3)[R1]             ;STORE NEW PTE
                51  D6  012F   356           INCL    R1                       ;NEXT PAGE
             E1 56  F5  0131   357           SOBGTR  R6,60$
                        0134   358
          51  8E  7D  0134   359 70$:      MOVQ    (SP)+,R1                 ;GET BACK THE VA'S
          52  51  D1  0137   360           CMPL    R1,R2
                12  1A  013A   361           BGTRU   90$                      ;GOING BACKWARDS
                04  1F  013C   362           BLSSU   80$                      ;GOING FORWARDS
       0C 52    1E  E0  013E   363           BBS     #VA$V_P1,R2,90$          ;EQUAL - P1 IS BACKWARDS
       51  01FF 8F  AA  0142   364 80$:      BICW    #^X1FF,R1                ;STARTVA IS START OF PAGE
       52  01FF 8F  A8  0147   365           BISW    #^X1FF,R2                ;ENDVA IS END OF PAGE
                0A  11  014C   366           BRB     100$
       52  01FF 8F  AA  014E   367 90$:      BICW    #^X1FF,R2                ;STARTVA IS START OF PAGE
       51  01FF 8F  A8  0153   368           BISW    #^X1FF,R1                ;ENDVA IS END OF PAGE
          50  01  3C  0158   369 100$:     MOVZWL  #SS$_NORMAL,R0           ;INDICATE SUCCESSFUL COMPLETION
                05  015B   370           RSB
```

N 10

SYSCREDEL
V04-000

- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 8
CREPAGINI - INITIALIZE FOR CREATING DEMA   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (5)

SYS
V04

```
                        015C    372              .SBTTL  CREPAGINI - INITIALIZE FOR CREATING DEMAND ZERO PAGES
                        015C    373 ;
                        015C    374 ;
                        015C    375 ; INPUTS:
                        015C    376 ;
                        015C    377 ;         MMG$L_MAXACMODE(FP) CONTAINS THE MAXIMIZED ACCESS MODE
                        015C    378 ;
                        015C    379 ; OUTPUTS:
                        015C   ;80 ;
                        015C    381 ;         R6 = ADDRESS OF CREPAG SUBROUTINE TO BE CALLED
                        015C    382 ;         R8 = DEMAND ZERO PAGE TABLE ENTRY FOR SPECIFIED ACCESS MODE
                        015C    383 ;
                        015C    384 ;
                        015C    385 ; ****************************************************************************
                        015C    386 ;
                        015C    387 ; *************** THE FOLLOWING CODE MAY BE PAGED *****************
                        015C    388 ;
                   0000015C    389              .PSECT  Y$EXEPAGED
                        015C    390 ;
                        015C    391 ; ****************************************************************************
                        015C    392 ;
                        015C    393 MMG$CREPAGINI:
     56    0414'CF    DE   015C    394              MOVAL   W^MMG$CREPAG,R6          ;ADR OF INITITAL DELETE SCANNER FOR CREATE
           58    FC AD    9A   0161    395              MOVZBL  MMG$L_MAXACMODE(FP),R8   ;ACCESS MODE OF WRITER/OWNER
  00 FC AD    08   E2   0165    396              BBSS    #MMG$V_CHGPAGFIL,MMG$L_MAXACMODE(FP),10$ ;CHARGE PAGE FILE QUOTA
     58    74'AF48    9A   016A    397 10$:         MOVZBL  B^MMG$AB_DZRO[R8],R8     ;PROTECTION AND OWNER FIELDS
     58    58    17    78   016F    398              ASHL    #PTE$V_OWN,R8,R8         ;SHIFT INTO POSITION
           05   0173    399              RSB
                        0174    400
                        0174    401 MMG$AB_DZRO:
        20   0174    402              .BYTE   <PTE$C_KW ! PTE$C_KOWN>@-PTE$V_OWN ;KERNEL
        51   0175    403              .BYTE   <PTE$C_EW ! PTE$C_EOWN>@-PTE$V_OWN ;EXEC
        82   0176    404              .BYTE   <PTE$C_SW ! PTE$C_SOWN>@-PTE$V_OWN ;SUPER
        43   0177    405              .BYTE   <PTE$C_UW ! PTE$C_UOWN>@-PTE$V_OWN ;USER
```

SYSCREDEL
VO4-000

B 11
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 9
CRETVA - CREATE PAGES AT SPECIFIED VIRTU 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (6)

SYS
VO4

```
0178   407                .SBTTL   CRETVA - CREATE PAGES AT SPECIFIED VIRTUAL ADDRES
0178   408
0178   409  ;++
0178   410  ; FUNCTIONAL DESCRIPTION:
0178   411  ;        THE CREATE VIRTUAL ADDRESS SPACE SYSTEM SERVICE CREATES NEW DEMAND
0178   412  ;        ZERO PAGES IN THE SPECIFIED RANGE OF VIRTUAL ADDRESSES.
0178   413  ;        IF ANY PAGES ALREADY EXIST IN THE RANGE, THEY ARE DELETED
0178   414  ;        THE NEW PAGES ARE READ/WRITE TO THE CALLING MODE AND ALL MORE
0178   415  ;        PRIVILEGED MODES.
0178   416  ;
0178   417  ; CALLING SEQUENCE:
0178   418  ;
0178   419  ;        CALLG    ARGLIST,@#SYS$CRETVA
0178   420  ;        CALLG    ARGLIST,MMG$CRETVA        ;PRIVILEGED, NON VECTORED ENTRY POINT
0178   421  ;                                          ;ACCEPTS DESIRED PAGE PROTECTION IN ACMODE+1
0178   422  ;                                          ;PRESERVES IPL IF LEQ ASTDEL
0178   423  ;
0178   424  ;
0178   425  ; INPUT PARAMETERS:
0178   426  ;
0178   427  ;        INADR(AP) = ADDRESS OF 2 LONG WORDS THE 1ST OF WHICH SPECIFIES
0178   428  ;                    THE STARTING VIRTUAL ADDRESS TO CREATE, THE 2ND SPECIFIES
0178   429  ;                    THE ENDING VIRTUAL ADDRESS TO CREATE (INCLUSIVE).
0178   430  ;        RETADR(AP) = ADDRESS OF A 2 LONGWORD ARRAY INTO WHICH IS RETURNED
0178   431  ;                    THE STARTING AND ENDING VIRTUAL ADDRESSES (INCLUSIVE)
0178   432  ;                    OF THE PAGES JUST CREATED
0178   433  ;        ACMODE(AP) = THE ACCESS MODE (MAXIMI7ED WITH CALLING MODE)
0178   434  ;                    USED AS THE OWNER OF THE NEW PAGE(S)
0178   435  ;        ACMODE+1(AP) = THE PROTECTION TO USE FOR THE NEW PAGE WHEN
0178   436  ;                    CALLED AT THE PRIVILEGED MMG$CRETVA ENTRY POINT
0178   437  ;
0178   438  ; IMPLICIT INPUTS:
0178   439  ;
0178   440  ;        NONE
0178   441  ;
0178   442  ; OUTPUT PARAMETERS:
0178   443  ;
0178   444  ;        R0 = SYSTEM STATUS CODE
0178   445  ;
0178   446  ; IMPLICIT OUTPUTS:
0178   447  ;
0178   448  ;        NONE
0178   449  ;
0178   450  ; COMPLETION CODES:
0178   451  ;
0178   452  ;        SS$_NORMAL                         :SUCCESSFUL COMPLETION
0178   453  ;        SS$_ACCVIO                         :ACCESS VIOLATION
0178   454  ;        SS$_NOPRIV                         :NO PRIVILEGE TO CREATE/DELETE PAGE
0178   455  ;        SS$_VASFULL                        :VIRTUAL ADDRESS SPACE FULL
0178   456  ;
0178   457  ; SIDE EFFECTS:
0178   458  ;
0178   459  ;        NONE
0178   460  ;
0178   461  ;--
```

C 11

SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 10   SYS
V04-000   CRETVA - CREATE PAGES AT SPECIFIED VIRTU 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (7)   V04

```
                         0178    463 ;
                         0178    464 ; ************************************************************************
                         0178    465 ;
                         0178    466 ; *************** THE FOLLOWING CODE MAY BE PAGED *****************
                         0178    467 ;
                00000178  468              .PSECT  Y$EXEPAGED
                         0178    469 ;
                         0178    470 ; ************************************************************************
                         0178    471 ;
                         0178    472
                         0178    473              .ENABL  LSB
                         0178    474
      50   24    3C      0178    475 5$:         MOVZWL  #SS$_NOPRIV,R0           ;NO PRIVILEGE
          F4 AD   D4     017B    476             CLRL    MMGS[_SAVRETADR(FP)     ;NULL RETURN ADR FOR NULL RANGE
                  04     017E    477 6$:         RET
                         017F    478
                         017F    479 MMG$CRETVA::
                01FC     017F    480             .WORD   ^M<R2,R3,R4,R5,R6,R7,R8>
      57   0D AC  9A     0181    481             MOVZBL  ACMODE+1(AP),R7         ;PICK UP DESIRED PAGE PROTECTION IF SPECIFIE
                  04 11  0185    482             BRB     10$
                         0187    483
                01FC     0187    484             .ENTRY  EXE$CRETVA,^M<R2,R3,R4,R5,R6,R7,R8>
                         0189    485
                57  D4   0189    486             CLRL    R7                      ;NO PAGE PROTECTION SPECIFIED
          5E   1C C2     018B    487 10$:        SUBL    #-MMG$C_LENGTH,SP       ;RESERVE SCRATCH AREA
                0106 30  018E    488             BSBW    MMG$INADRINI            ;GET INPUT RANGE TO R4, R5
                         0191    489                                             ;INIT RETURN RANGE AND SCRATCH AREA
          EA 50  E9      0191    490             BLBC    R0,6$
          FFC5   30      0194    491             BSBW    MMG$CREPAGINI           ;INIT FOR CREATING DZRO PAGES
                57  D5   0197    492             TSTL    R7                      ;PAGE PROTECTION SPECIFIED?
                05  13   0199    493             BEQL    20$                     ;BRANCH IF NOT
   58  04  1B  57 F0     019B    494             INSV    R7,#PTE$V_PROT,#PTE$S_PROT,R8 ;SET DESIRED PAGE PROTECTION
          52  54  7D     01A0    495 20$:        MOVQ    R4,R2                   ;R2 = START OF RANGE, R3 = END
                         01A3    496 ;
                         01A3    497 ; OPERATE ON PAGES STARTING WITH THE ADDRESS IN R2 ENDING WITH THE
                         01A3    498 ; ADDRESS IN R3 INCLUSIVE.
                         01A3    499 ;
                         01A3    500 ;
                         01A3    501 ; ***** LOCK THE PROCESS HEADER HERE
                         01A3    502 ;
                         01A6    503             SETIPL  #IPL$_ASTDEL            ;NO AST'S WHILE MODIFYING PHD
                         01A6    504 ;
      CE 52  1F   E0     01A6    505             BBS     #31,R2,5$               ;CHECK FOR SYSTEM SPACE ADDRESS
      CA 53  1F   E0     01AA    506             BBS     #31,R3,5$               ;CHECK FOR SYSTEM SPACE ADDRESS
          2F  10        01AE    507             BSBB    MMG$IN_REGION           ;IS REQUESTED SPACE IN EXITING SPACE
          12 50  E9      01B0    508             BLBC    R0,100$                 ;YES - DO CREATE THE HARD WAY
                         01B3    509 ;
   54  00000000'EF  D0  01B3    510             MOVL    SCH$GL_CURPCB,R4
          FED0   30      01BA    511             BSBW    MMG$TRY_ALL             ;CHECK EXPANSION AND QUOTAS
          05 50  E9      01BD    512             BLBC    R0,100$                 ;NO LUCK - DO IT THE SLOW WAY
          FF1A  30       01C0    513             BSBW    MMG$FAST_CREATE         ;FILL IN THE PTE'S
                08  11   01C3    514             BRB     110$
                         01C5    515
                         01C5    516 ;
                         01C5    517 ; R2 = STARTING VA, R3 = ENDING VA
                         01C5    518 ; R6 = SUBROUTINE TO CALL, R8 = PROTECTION
                         01C5    519 ;
```

D 11

SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 11   SYS
V04-000   CRETVA - CREATE PAGES AT SPECIFIED VIRTU 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (7)   V04

```
        56   0414'CF  DE  01C5  520 100$:    MOVAL   W^MMG$CREPAG,R6              ;MMG$CREDEL NEEDS THIS
             017A  30      01CA  521          BSBW    MMG$CREDEL                   ;COMMON CREATE/DELETE LOOP
                50  DD      01CD  522 110$:    PUSHL   R0                           ;SAVE STATUS
              00F0  30      01CF  523          BSBW    MMG$RETRANGE                 ;RETURN RANGE OPERATED ON
             03 50  E8      01D2  524          BLBS    R0,60$
           6E   50  D0      01D5  525          MOVL    R0,(SP)                      ;THIS STATUS WILL SUPERCEDE CREDEL
                50  BA      01D8  526 60$:     POPR    R0
                    01DA  527          ENBINT  MMG$L_CALLEDIPL(FP)          ;RESTORE IPL AT CALL
                04      01DE  528          RET
                        01DF  529
                        01DF  530          .DSABL  LSB
                        01DF  531  ;
                        01DF  532  ;
                        01DF  533  ; CHECK TO SEE IF ADDRESS SPACE OVERMAPS EXISTING SPACE
                        01DF  534  ;
                        01DF  535  ;        INPUTS
                        01DF  536  ;          R4 -> STARTING VA
                        01DF  537  ;          R5 -> ENDING VA
                        01DF  538  ;        OUTPUTS
                        01DF  539  ;          R0 -> SUCCESS OR FAILURE
                        01DF  540  ;          R1 -> BYTES TO EXPAND REGION
                        01DF  541  ;          R5 -> P1 PHD
                        01DF  542  ;          R6 -> PAGE COUNT OF VA REQUEST (NOT EXPANSION SIZE)
                        01DF  543  ;
                        01DF  544 MMG$IN_REGION::
        54   01FF  8F  AA  01DF  545          BICW    #^X1FF,R4                    ; GET THE REQUESTED PAGE COUNT
        55   01FF  8F  AA  01E4  546          BICW    #^X1FF,R5
     56  55   54  C3      01E9  547          SUBL3   R4,R5,R6
  56  56   F7  8F  78  01ED  548          ASHL    #-9,R6,R6                    ;GET A PAGE COUNT
             03  18      01F2  549          BGEQ    30$
        56   56  CE      01F4  550          MNEGL   R6,R6                        ;MAKE IT A POSITIVE NUMBER
             56  D6      01F7  551 30$:     INCL    R6                           ;IT WAS SHORT BY ONE
                        01F9  552  ;
                        01F9  553  ; DECIDE IF THIS IS ALL PAST CURRENT END OF REGION
                        01F9  554  ;
        51   55  D0      01F9  555          MOVL    R5,R1                        ;ASSUME THIS IS FURTHEST OUT
     55  00000000'9F  D0  01FC  556          MOVL    @#CTL$GL_PHD,R5              ;P1 PHD ADDRESS
        1B 51   1E  E0      0203  557          BBS     #VA$V_P1,R1,40$
        50   28 A5  D0      0207  558          MOVL    PHD$L_FREP0VA(R5),R0         ;FIRST FREE P0
        50   54  D1      020B  559          CMPL    R4,R0
             35  19      020E  560          BLSS    100$                         ;NOT IN FREE SPACE
        51   54  D1      0210  561          CMPL    R4,R1                        ;WHICH IS REALLY FURTHER OUT
             08  19      0213  562          BLSS    35$
        50   51  D1      0215  563          CMPL    R1,R0                        ;R1 WAS REALLY CLOSER
             2B  19      0218  564          BLSS    100$                         ;NOT IN FREE SPACE
        51   54  D0      021A  565          MOVL    R4,R1                        ;WE WERE WRONG THE FIRST TIME
        51   50  C2      021D  566 35$:     SUBL    R0,R1                        ;BYTES NEEDED (ONE PAGE SHORT)
             1A  11      0220  567          BRB     50$
        50   30 A5  D0      0222  568 40$:     MOVL    PHD$L_FREP1VA(R5),R0         ;FIRST FREE P1
        50   54  D1      0226  569          CMPL    R4,R0
             1A  14      0229  570          BGTR    100$                         ;NOT IN FREE SPACE
        51   54  D1      022B  571          CMPL    R4,R1                        ;WHICH IS REALLY FURTHER OUT
             08  14      022E  572          BGTR    45$
        50   51  D1      0230  573          CMPL    R1,R0                        ;R1 WAS REALLY CLOSER
             10  14      0233  574          BGTR    100$                         ;NOT IN FREE SPACE
        51   54  D0      0235  575          MOVL    R4,R1                        ;WE WERE WRONG THE FIRST TIME
     51  50   51  C3      0238  576 45$:     SUBL3   R1,R0,R1                     ;BYTES NEEDED (ONE PAGE SHORT)
```

SYSCREDEL
V04-000

E 11
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 12
CRETVA - CREATE PAGES AT SPECIFIED VIRTU   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (7)

```
51  0200 C1   DE  023C   577 50$:     MOVAL   ^X200(R1),R1              ;ADD IN THE EXTRA PAGE
    50   01   D0  0241   578          MOVL    #1,R0                    ;SUCCESS
         05       0244   579          RSB
                  0245   580  ;
         50   D4  0245   581 100$:    CLRL    R0                       ;FAILURE
         05       0247   582          RSB
                  0248   583
```

F 11
SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 13   SYS
V04-000   CNTREG - CONTRACT PROGRAM/CONTROL REGION   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (8)   V04

```
0248   585              .SBTTL   CNTREG - CONTRACT PROGRAM/CONTROL REGION
0248   586   ;++
0248   587   ; FUNCTIONAL DESCRIPTION:
0248   588   ;
0248   589   ;
0248   590   ; CALLING SEQUENCE:
0248   591   ;
0248   592   ;        CALLG   ARGLIST,@#SYS$CNTREG
0248   593   ;
0248   594   ;
0248   595   ; INPUT PARAMETERS:
0248   596   ;
0248   597   ;        PAGCNT(AP)      =        NUMBER OF PAGES TO DELETE
0248   598   ;        RETADR(AP)      =        RETURN ADDRES RANGE OF PAGES DELETED
0248   599   ;        ACMODE(AP)      =        ACCESS MODE TO CHECK AGAINST PAGE OWNER
0248   600   ;        REGION(AP)      =        0 FOR PROGRAM REGION
0248   601   ;                        =        1 FOR CONTROL REGION
0248   602   ;
0248   603   ; IMPLICIT INPUTS:
0248   604   ;        NONE
0248   605   ;
0248   606   ; OUTPUT PARAMETERS:
0248   607   ;
0248   608   ;        R0 = SYSTEM STATUS CODE
0248   609   ;
0248   610   ; IMPLICIT OUTPUTS:
0248   611   ;        NONE
0248   612   ;
0248   613   ; COMPLETION CODES:
0248   614   ;
0248   615   ;        SS$_NORMAL                      ;SUCCESSFUL COMPLETION
0248   616   ;        SS$_ACCVIO                      ;ACCESS VIOLATION
0248   617   ;        SS$_ILLPAGCNT                   ;ILLEGAL PAGE COUNT
0248   618   ;        SS$_PAGOWNVIO                   ;PAGE OWNER VIOLATION
0248   619   ;
0248   620   ; SIDE EFFECTS:
0248   621   ;        NONE
0248   622   ;
0248   623   ;--
```

SYSCREDEL
V04-000

G 11
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 14
CNTREG - CONTRACT PROGRAM/CONTROL REGION   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (9)

SYS
V04

```
                              0248    625 ;
                              0248    626 ; ****************************************************************
                              0248    627 ;
                              0248    628 ; *************** THE FOLLOWING CODE MAY BE PAGED ***************
                              0248    629 ;
                      00000248 630              .PSECT  Y$EXEPAGED
                              0248    631 ;
                              0248    632 ; ****************************************************************
                              0248    633 ;
                 00FC  0248    634              .ENTRY  EXE$CNTREG,^M<R2,R3,R4,R5,R6,R7>
                       024A    635
        5E    1C    C2  024A   636              SUBL    #-MMG$C_LENGTH,SP         ;RESERVE SCRATCH AREA
              57    10  024D   637              BSBB    MMG$RETADRINI            ;INIT RETURN RANGE AND SCRATCH AREA
              44 50    E9  024F 638              BLBC    R0,30$
   51   04 AC    01    C3  0252  639              SUBL3   #1,PAGCNT(AP),R1         ;R1=DESIRED PAGE COUNT - 1
   51 FFE00000 8F    D3  0257  640              BITL    #^C<VA$M_VPG & -          ;PAGE COUNT TOO LARGE
                       025E   641              ^C<VA$M_P1 ! VA$M_SYSTEM>>a-9,R1 ;(HIGH 11 BITS NOT CLEAR?)
              31    12  025E   642              BNEQ    20$                     ;BRANCH FOR ERROR IF NOT CLEAR
        51    51 09    78  0260  643              ASHL    #9,R1,R1                ;FORM BYTE COUNT
                       0264   644 ;
                       0264   645 ; ***** LOCK THE PROCESS HEADER HERE
                       0264   646 ;
                       0264   647              SETIPL  #IPL$_ASTDEL             ;NO AST'S WHILE MODIFYING THE PHD
   55  00000000'9F    D0  0267  648              MOVL    @#CTL$GL_PHD,R5          ;R5=PROCESS HEADER
              0F 10 AC    E8  026E  649              BLBS    REGION(AP),10$          ;BRANCH IF CONTROL REGION
                       0272   650 ;
                       0272   651 ; FORM R2 = THE FIRST ADDRESS TO DELETE, AND R3 = THE LAST ADDRESS
                       0272   652 ; DELETE STARTING FROM THE END OF THE REGION
                       0272   653 ;
52  28 A5  00000200 8F    C3  0272  654              SUBL3   #^X200,PHD$L_FREP0VA(R5),R2 ;LAST ADR IN P0 SPACE
        53    52    51  C3  027B  655              SUBL3   R1,R2,R3                ;END OF RANGE TO DELETE
                  0D    11  027F  656              BRB     15$                     ;TO THE COMMON DELETE CODE
52  30 A5  00000200 8F    C1  0281  657 10$:         ADDL3   #^X200,PHD$L_FREP1VA(R5),R2 ;END OF P1 SPACE
        53    52    51  C1  028A  658              ADDL3   R1,R2,R3                ;END OF RANGE TO DELETE
                  0091    31  028E  659 15$:         BRW     DELCOM                  ;TO THE COMMON DELETE CODE
        50  00FC 8F    3C  0291  660 20$:         MOVZWL  #SS$_ILLPAGCNT,R0       ;ILLEGAL PAGE COUNT
                  04  0296  661 30$:         RET
```

```
0297   663                   .SBTTL INADRINI, RETADRINI - INIT SCRATCH AREA AND RANGES
0297   664    ;++
0297   665    ; FUNCTIONAL DESCRIPTION:
0297   666    ;
0297   667    ;       GET THE INPUT RANGE, INITIALIZE THE RETURN RANGE, AND INITIALIZE
0297   668    ; THE SCRATCH AREA WHICH IS ASSUMED TO ALREADY BE RESERVED ON THE STACK.
0297   669    ;
0297   670    ; CALLING SEQUENCE:
0297   671    ;
0297   672    ;       BSBW    MMG$INADRINI                ;GET INPUT RANGE AND FALL INTO RETADRINI
0297   673    ;       BSBW    MMG$RETADRINI               ;INIT RETURN RANGE AND SCRATCH AREA
0297   674    ;
0297   675    ; INPUT PARAMETERS:
0297   676    ;
0297   677    ;       NONE
0297   678    ;
0297   679    ; IMPLICIT INPUTS:
0297   680    ;
0297   681    ;       MMG$C_LENGTH BYTES RESERVED ON TOP OF STACK AND ADDRESSED  BY FP
0297   682    ;
0297   683    ; OUTPUT PARAMETERS:
0297   684    ;
0297   685    ;       R4, R5 CONTAIN THE INPUT RANGE IF ENTERED AT INADRINI
0297   686    ;       MMG$L_MAXACMODE(FP)     =       MAXIMIZED ACCESS MODE
0297   687    ;       MMG$L_CALLEDIPL(FP)     =       CALLERS IPL
0297   688    ;       MMG$L_SAVRETADR(FP)     =       RETURN ADDRESS SPECIFIED BY USER
0297   689    ;       USER SPECIFIED RETURN RANGE INITIALIZED TO -1,-1
0297   690    ;
0297   691    ; IMPLICIT OUTPUTS:
0297   692    ;
0297   693    ;       NONE
0297   694    ;
0297   695    ; COMPLETION CODES:
0297   696    ;
0297   697    ;       SS$_ACCVIO                      ;ACCESS VIOLATION
0297   698    ;
0297   699    ; SIDE EFFECTS:
0297   700    ;
0297   701    ;       NONE
0297   702    ;
0297   703    ;--
0297   704    ;
0297   705    ;       MMG$RETRANGE
0297   706    ;
0297   707    ;++
0297   708    ; FUNCTIONAL DESCRIPTION:
0297   709    ;
0297   710    ;       THIS ROUTINE RETURNS THE RANGE OF PAGES OPERATED ON TO THE
0297   711    ; USER SPECIFIED ADDRESS.  A ZERO ADDRESS INDICATES NO RETURN RANGE
0297   712    ; AND THE ADDRESS IS PROBED FOR WRITING 8 BYTES.
0297   713    ;
0297   714    ; CALLING SEQUENCE:
0297   715    ;
0297   716    ;       BSBW    MMG$RETRANGE
0297   717    ;
0297   718    ; INPUT PARAMETERS:
0297   719    ;
```

```
0297   720 ;         R1, R2 = RANGE OF ADDRESSES TO BE RETURNED
0297   721 ;
0297   722 ; IMPLICIT INPUTS:
0297   723 ;
0297   724 ;         MMG$L_SAVRETADR(FP) = THE USER SPECIFIED RETURN ADDRESS
0297   725 ;
0297   726 ; OUTPUT PARAMETERS:
0297   727 ;
0297   728 ;         R0 PRESERVED
0297   729 ;
0297   730 ; IMPLICIT OUTPUTS:
0297   731 ;
0297   732 ;         NONE
0297   733 ;
0297   734 ; COMPLETION CODES:
0297   735 ;
0297   736 ;         SS$_ACCVIO                           ACCESS VIOLATION IF CAN'T WRITE RANGE
0297   737 ;
0297   738 ; SIDE EFFECTS:
0297   739 ;
0297   740 ;         NONE
0297   741 ;
0297   742 ;--
```

```
                      0297   744  ;
                      0297   745  ; ***********************************************************************
                      0297   746  ;
                      0297   747  ; **************** THE FOLLOWING CODE MAY BE PAGED ****************
                      0297   748  ;
                  00000297   749         .PSECT  Y$EXEPAGED
                      0297   750  ;
                      0297   751  ; ***********************************************************************
                      0297   752  ;
                      0297   753  MMG$INADRINI::
        54    04 AC  DO  0297   754         MOVL    INADR(AP),R4          ;GET ADDRESS OF INPUT RANGE
                 38  13  029B   755         BEQL    ACCVIORET             ;ERROR IF NO ADDRESS RANGE SPECIFIED
                      029D   756         IFNORD  #8,(R4),ACCVIORET     ;BRANCH IF RANGE IS INACCESSIBLE
        54    64  7D  02A3   757         MOVQ    (R4),R4               ;GET THE INPUT RANGE
                      02A6   758  MMG$RETADRINI::
  50   OC AC  02  00. EF  02A6   759         EXTZV   #0,#2,ACMODE(AP),R0   ;GET CALLER SPECIFIED ACCESS MODE
              FD51'  30  02AC   760         BSBW    EXE$MAXACMODE         ;MAXIMIZE WITH PREVIOUS
        FC AD   50  DO  02AF   761         MOVL    R0,MMG$L_MAXACMODE(FP) ;AND SAVE RESULT IN THE SCRATCH AREA
                      02B3   762         SAVIPL  MMG$L_CALLEDIPL(FP)   ;STORE CALLER'S IPL
   F4 AD  08 AC  DO  02B7   763         MOVL    RETADR(AP),MMG$L_SAVRETADR(FP) ;GET THE RETURN ADDRESS
           51   01  CE  02BC   764         MNEGL   #1,R1                 ;INIT THE RANGE TO -1, -1
           52   51  DO  02BF   765         MOVL    R1,R2
                      02C2   766  ;
                      02C2   767  ; FALL THROUGH TO MMG$RETRANGE
                      02C2   768  ;
                      02C2   769  MMG$RETRANGE::
        53  F4 AD  DO  02C2   770         MOVL    MMG$L_SAVRETADR(FP),R3 ;USER SPECIFIED RETURN ADR
                 09  13  02C6   771         BEQL    20$                   ;BRANCH IF NONE SPECIFIED
                      02C8   772         IFNOWRT #8,(R3),ACCVIORET     ;BRANCH IF NOT WRITABLE
        63   51  7D  02CE   773         MOVQ    R1,(R3)               ;RETURN THE RANGE
                      02D1   774  20$:
        50   01  DO  02D1   775         MOVL    #SS$_NORMAL,R0
                 05  02D4   776         RSB
                      02D5   777  ;
                      02D5   778  ; ACCESS VIOLATION
                      02D5   779  ;
                      02D5   780  ACCVIORET:
        50   OC  3C  02D5   781         MOVZWL  #SS$_ACCVIO,R0        ;SET ACCESS VIOLATION CODE
                 05  02D8   782         RSB                           ;AND RETURN IT
```

```
02D9   784              .SBTTL   DELTVA - DELETE VIRTUAL ADDRESS SPACE PAGES
02D9   785   ;++
02D9   786   ; FUNCTIONAL DESCRIPTION:
02D9   787   ;
02D9   788   ;         DELTVA DELETES PAGES STARTING WITH THE SECOND ADDRESS FROM INADR
02D9   789   ;         ENDING WITH THE FIRST ADR IN INADR. THE SPECIFIED ACCESS MODE
02D9   790   ;         (MAXIMIZED WITH THE CALLER'S MODE) IS CHECKED AGAINST THE
02D9   791   ;         OWNER OF EACH PAGE AND MUST BE AT LEAST AS PRIVILEGED.
02D9   792   ;         EACH PAGE IS MADE INACCESSIBLE.
02D9   793   ;
02D9   794   ; CALLING SEQUENCE:
02D9   795   ;
02D9   796   ;         CALLG    ARGLIST,@#SYS$DELTVA
02D9   797   ;
02D9   798   ;
02D9   799   ; INPUT PARAMETERS:
02D9   800   ;
02D9   801   ;         INADR(AP)          =          INPUT RANGE OF ADDRESSES
02D9   802   ;         RETADR(AP)         =          RETURN RANGE OF ADDRESSES
02D9   803   ;         ACMODE(AP)         =          ACCESS MODE TO USE FOR CHECK OF DELETE PRIV
02D9   804   ;
02D9   805   ; IMPLICIT INPUTS:
02D9   806   ;         NONE
02D9   807   ;
02D9   808   ; OUTPUT PARAMETERS:
02D9   809   ;
02D9   810   ;         R0 = SYSTEM STATUS CODE
02D9   811   ;
02D9   812   ; IMPLICIT OUTPUTS:
02D9   813   ;
02D9   814   ;         NONE
02D9   815   ;
02D9   816   ; COMPLETION CODES:
02D9   817   ;
02D9   818   ;         SS$_NORMAL                              ;SUCCESSFUL COMPLETION
02D9   819   ;         SS$_ACCVIO                              ;ACCESS VIOLATION
02D9   820   ;         SS$_PAGOWNVIO                           ;PAGE OWNER VIOLATION
02D9   821   ;         SS$_NOPRIV                              ;NO PRIVILEGE, TRIED TO DELETE SYS PAGE
02D9   822   ;
02D9   823   ; SIDE EFFECTS:
02D9   824   ;         NONE
02D9   825   ;
02D9   826   ;--
```

```
                        02D9    828 ;
                        02D9    829 ;**************************************************************************
                        02D9    830 ;
                        02D9    831 ;************** THE FOLLOWING CODE MAY BE PAGED *****************
                        02D9    832 ;
                 000002D9    833            .PSECT  Y$EXEPAGED
                        02D9    834 ;
                        02D9    835 ;**************************************************************************
                        02D9    836 ;
             00FC       02D9    837            .ENTRY  EXE$DELTVA,^M<R2,R3,R4,R5,R6,R7>
                        02DB    838
        5E   1C   C2    02DB    839            SUBL    #-MMG$C_LENGTH,SP         ;RESERVE SCRATCH AREA
             B7   10    02DE    840            BSBB    MMG$INADRINI             ;GET INPUT RANGE TO R4, R5
        27   50   E9    02E0    841            BLBC    R0,5$
                        02E3    842                                             ;INIT RETURN RANGE AND SCRATCH AREA
        52   55   D0    02E3    843            MOVL    R5,R2                    ;DELETE FROM THE 2ND ADDRESS
        53   54   D0    02E6    844            MOVL    R4,R3                    ;THROUGH THE FIRST
                        02E9    845 ;
                        02E9    846 ; ***** LOCK THE PROCESS HEADER HERE
                        02E9    847 ;
                        02E9    848            SETIPL  #IPL$_ASTDEL             ;NO AST'S WHILE MODIFYING THE PHD
   55  00000000'9F  D0  02EC    849            MOVL    @#CTL$GL_PHD,R5          ;ADDRESS OF PROCESS HEADER
        14 52   1E  E0  02F3    850            BBS     #VA$V_P1,R2,10$          ;BRANCH IF P1 SPACE ADDRESS
                        02F7    851 ;
                        02F7    852 ; P0 SPACE ADDRESS
                        02F7    853 ;
        28 A5   52  D1  02F7    854            CMPL    R2,PHD$L_FREP0VA(R5)     ;FIRST ADDRESS WITHIN REGION
             25   1F    02FB    855            BLSSU   20$                      ;BRANCH IF YES
        28 A5   53  D1  02FD    856            CMPL    R3,PHD$L_FREP0VA(R5)     ;IF SECOND ADDRESS IS ALSO BEYOND END
             1F   1E    0301    857            BGEQU   20$                      ;THEN FORGET ADJUSTING THE RANGE
   52  28 A5   01  C3  0303    858            SUBL3   #1,PHD$L_FREP0VA(R5),R2  ;START WITH FIRST EXISTING PAGE
             18   11    0308    859            BRB     20$
                        030A    860 ;
             04        030A    861 5$:        RET
                        030B    862 ;
                        030B    863 ;
                        030B    864 ; P1 SPACE ADDRESS
                        030B    865 ;
   50  30 A5  000001FF 8F  C1  030B  866 10$:   ADDL3   #^X1FF,PHD$L_FREP1VA(R5),R0 ;FIRST BYTE ADR NOT IN P1 SPACE
        52   50   D1    0314    867            CMPL    R0,R2                    ;FIRST ADDRESS WITHIN REGION
             09   1F    0317    868            BLSSU   20$                      ;BRANCH IF YES
        53   50   D1    0319    869            CMPL    R0,R3                    ;IF SECOND ADDRESS IS ALSO BEYOND END
             04   1E    031C    870            BGEQU   20$                      ;THEN FORGET ADJUSTING THE RANGE
   52  50   01   C1    031E    871            ADDL3   #1,R0,R2                 ;START WITH FIRST PAGE IN REGION
                        0322    872 20$:
                        0322    873 ;
                        0322    874 ; 0(SP) = SAVED CALLER'S IPL, R2 = STARTING VA, R3 = ENDING VA
                        0322    875 ; R6 = SUBROUTINE TO CALL
                        0322    876 ;
                        0322    877 DELCOM:
   56  00000141'EF  DE  0322    878            MOVAL   L^MMG$DELPAG,R6          ;R6 = ADR OF INITIAL DELETE SCANNER
                        0329    879                                             ;CALLED TO SCAN WORKING SET LIST
   7E  53   52   C3    0329    880            SUBL3   R2,R3,-(SP)              ;SAVE WHETHER STARTVA = ENDVA
             18   10    032D    881            BSBB    MMG$CREDEL               ;DO THE DELETION
             8E   D5    032F    882            TSTL    (SP)+                    ;IF STARTVA WAS = ENDVA
             06   13    0331    883            BEQL    10$                      ;SKIP THE RETURN RANGE EXCHANGE
        52   51   7D    0333    884            MOVQ    R1,R2                    ;EXCHANGE R1 AND R2
```

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M 11
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00
DELTVA - DELETE VIRTUAL ADDRESS SPACE PA 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1

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```
51  53  DO  0336   885        MOVL    R3,R1                      ;VIA R3
            0339   886  10$:
            0339   887        ENBINT  MMG$L_CALLEDIPL(FP)        ;RESTORE CALLER'S IPL
    50  DD  033D   888        PUSHL   R0                         ;SAVE CURRENT STATUS
    81  10  033F   889        BSBB    MMG$RETRANGE               ;RETURN THE RANGE DELETED
 02 50  E9  0341   890        BLBC    R0,20$                     ;ERROR - USE THIS STATUS
    50  BA  0344   891        POPR    R0                         ;GET BACK OLD STATUS
        04  0346   892  20$:  RET                                ;AND EXIT
```

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SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 21
V04-000   CREDEL - CREATE/DELETE COMMON LOOP   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (14)

```
                    0347      894                .SBTTL  CREDEL - CREATE/DELETE COMMON LOOP
                    0347      895      ;
                    0347      896      ; INPUTS
                    0347      897      ;          R2 = FIRST ADDRESS TO CREATE/DELETE/SET PROTECTION
                    0347      898      ;          R3 = LAST ADDRESS TO CREATE/DELETE/SET PROTECTION
                    0347      899      ;          R6 = SUBROUTINE TO CALL
                    0347      900      ;                 CREPAG, DELPAG, SETPRTPAG, LKWSETPAG, ULWSETPAG
                    0347      901      ;          R7 = SAVED AND READY TO USE AS LOOP INCREMENT
                    0347      902      ;          R8 = NEW PAGE PROTECTION IF THIS IS SETPRT
                    0347      903      ;          MMG$L_MAXACMODE(FP) = MAXIMIZED ACCESS MODE
                    0347      904      ;
                    0347      905      ; OUTPUTS:
                    0347      906      ;          R0 = COMPLETION CODE
                    0347      907      ;          R1 = FIRST ADDRESS CREATED/DELETED
                    0347      908      ;          R2 = LAST ADDRESS CREATED/DELETED
                    0347      909      ;          R4 = PCB ADDRESS
                    0347      910      ;          R5 = PROCESS HEADER ADDRESS IN P1 SPACE
                    0347      911      ;          R6,R7 ALTERED
                    0347      912      ;
                    0347      913      ;
                    0347      914      ; *********************************************************************
                    0347      915      ;
                    0347      916      ; *************** THE FOLLOWING CODE MAY BE PAGED ****************
                    0347      917      ;
                00000347      918                .PSECT  Y$EXEPAGED
                    0347      919      ;
                    0347      920      ; *********************************************************************
                    0347      921      ;
                    0347      922      MMG$CREDEL::
                    0347      923      ;
                    0347      924      ; EACH OF THE PER PAGE SUBROUTINES IS CALLED WITH THE FOLLOWING REGISTERS
                    0347      925      ;          R0 = ACCESS MODE
                    0347      926      ;          R2 = VIRTUAL ADDRESS OF PAGE TO OPERATE ON (LOW 9 BITS CLEAR)
                    0347      927      ;          R4 = PROCESS CONTROL BLOCK ADDRESS
                    0347      928      ;          R5 = PROCESS HEADER ADDRESS (P1 SPACE)
                    0347      929      ;          R6 = NUMBER OF PAGES - 1 LEFT TO PROCESS (INCLUDING THE ONE IN R2)
                    0347      930      ;          R7 = +^X200 IF GOING FORWARD IN ADDRESS SPACE
                    0347      931      ;             = -^X200 IF GOING BACKWARDS IN ADDRESS SPACE
                    0347      932      ;
                    0347      933      ; ALL ROUTINES ARE EXPECTED TO PRESERVE R2, R4, R5, R6, R7, BUT IT IS
                    0347      934      ; OK FOR A ROUTINE TO DO MORE THAN ONE PAGE BY ADDING R7 TO R2 FOR EACH
                    0347      935      ; AND DECREMENTING R6.
                    0347      936      ;
                    0347      937                .ENABL  LSB
         19 52   1F  E0  0347  938                BBS     #31,R2,50$              ;CHECK FOR SYSTEM SPACE ADDRESS
         15 53   1F  E0  034B  939                BBS     #31,R3,50$              ;CHECK FOR SYSTEM SPACE ADDRESS
                 1A  10  034F  940                BSBB    CRECOM_INIT
    50   FC AD   DC  0351  941  30$:               MOVL    MMG$L_MAXACMODE(FP),R0  ;ACCESS MODE
         F0 BD   16  0355  942                JSB     @MMG$C_PAGESUBR(FP)     ;CALL THE PER-PAGE ROUTINE
         06 50   E9  0358  943                BLBC    R0,40$                  ;BRANCH IF ERROR CONDITION
    52   57   C0  035B  944                ADDL    R7,R2                   ;NEXT VIRTUAL ADDRESS
         F0 56   F4  035E  945                SOBGEQ  R6,30$                  ;LOOP THROUGH THE PAGES
              45   10  0361  946  40$:               BSBB    CRECOM_DONE
                 05  0363  947                RSB
                    0364  948      ;
    50   24   3C  0364  949  50$:               MOVZWL  #SS$_NOPRIV,R0          ;NO PRIVILEGE
         F4 AD   D4  0367  950                CLRL    MMG$C_SAVRETADR(FP)     ;NULL RETURN ADR FOR NULL RANGE
```

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SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 22
V04-000   CREDEL - CREATE/DELETE COMMON LOOP   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (14)

SYS
V04

```
              05   036A   951           RSB
                   036B   952           .DSABL  LSB
                   036B   953  :
                   036B   954  ; INITIALIZATION FOR PER/PAGE LOOP
                   036B   955  :
                   036B   956  CRECOM_INIT:
   54  00000000'EF  DO   036B   957           MOVL    L^SCH$GL_CURPCB,R4       ;PROCESS CONTROL BLOCK ADDRESS
   55  00000000'9F  DO   0372   958           MOVL    @#CTL$GL_PHD,R5          ;PROCESS HEADER ADDRESS
      FO AD   56   DO   0379   959           MOVL    R6,MMG$L_PAGESUBR(FP)    ;ADDRESS OF PER/PAGE SUBROUTINE
      57   01   09   78   037D   960           ASHL    #9,#1,R7                ;ADDRESS INCREMENT IF GOING FORWARDS
   56   53   F7 8F   78   0381   961           ASHL    #-9,R3,R6               ;HIGH VIRTUAL PAGE NUMBER
   50   52   F7 8F   78   0386   962           ASHL    #-9,R2,R0               ;LOW VIRTUAL PAGE NUMBER
         56   50   C2   038B   963           SUBL    R0,R6                   ;NUMBER OF PAGES BASE 0
                   038E   964  :
                   038E   965  ; THE FOLLOWING COMPARE MUST BE DONE WITH R2, R3 EXACTLY AS THEY
                   038E   966  ; CAME FROM THE CALLER SO THAT A RANGE OF 205,204 WILL YIELD A RETURN
                   038E   967  ; RANGE OF 3FF,200 INSTEAD OF 200,3FF.
                   038E   968  :
      53   52   D1   038E   969           CMPL    R2,R3                   ;GOING FORWARDS IN THE ADDRESS SPACE?
           0C   1F   0391   970           BLSSU   10$                     ;BRANCH IF YES
           04   1A   0393   971           BGTRU   5$                      ;BRANCH IF BACKWARDS
      06 52   1E   E1   0395   972           BBC     #VA$V_P1,R2,10$         ;IF EQUAL, THEN FORWARD FOR P0
                   0399   973                                           ;BACKWARDS FOR P1
      56   56   CE   0399   974  5$:       MNEGL   R6,R6                   ;NO, BACKWARDS, MAKE PAGE COUNT POSITIVE
      57   57   CE   039C   975           MNEGL   R7,R7                   ;ADDRESS INCREMENT = -^X200
   52   50   09   78   039F   976  10$:     ASHL    #9,R0,R2                ;NORMALIZED STARTING VA
   EC AD   52   DO   03A3   977           MOVL    R2,MMG$L_SVSTARTVA(FP)   ;SAVE STARTING VA
              05   03A7   978           RSB
                   03A8   979  :
                   03A8   980  ; COMPLETION PROCESSING FOR PER/PAGE LOOP
                   03A8   981  :
                   03A8   982  CRECOM_DONE:
      51   EC AD   DO   03A8   983           MOVL    MMG$L_SVSTARTVA(FP),R1  ;RECOVER STARTING VIRTUAL ADDRESS
         52   51   D1   03AC   984           CMPL    R1,R2                   ;ANY PAGES SUCCESSFULLY PROCESSED?
         48   13   03AF   985           BEQL    60$                     ;BRANCH IF NO
      52   57   C2   03B1   986  10$:     SUBL    R7,R2                   ;BACK TO LAST PAGE PROCESSED
      07 57   1F   E0   03B4   987           BBS     #31,R7,45$              ;BRANCH IF GOING BACKWARDS
   52   01FF 8F   A8   03B8   988           BISW    #^X1FF,R2               ;ENDVA IS END OF PAGE
              05   11   03BD   989           BRB     46$
      51   01FF 8F   A8   03BF   990  45$:     BISW    #^X1FF,R1               ;ENDVA IS END OF PAGE
      56   0080 C4   DO   03C4   991  46$:     MOVL    PCB$L_JIB(R4),R6
   56   38 A6   3C A6   C3   03C9   992           SUBL3   JIB$L_PGFLCNT(R6),JIB$L_PGFLQUOTA(R6),R6  ;PAGE FILE PAGES IN USE
00000000'GF   56   D1   03CF   993           CMPL    R6,G^CTL$GL_VIRTPEAK    ;MAINTAIN MAX PAGE FILE USED
         10   1F   03D6   994           BLSSU   50$
00000000'GF   56   DO   03D8   995           MOVL    R6,G^CTL$GL_VIRTPEAK    ;SET NEW PEAK VALUE
00000000'GF   56   DO   03DF   996           MOVL    R6,G^CTL$GL_IPAGEFL     ;SET NEW PEAK VALUE
         10   11   03E6   997           BRB     52$
00000000'GF   56   D1   03E8   998  50$:     CMPL    R6,G^CTL$GL_IPAGEFL     ;MAINTAIN MAX PAGE FILE USFD (IMAGE)
         07   1F   03EF   999           BLSSU   52$
00000000'GF   56   DO   03F1   1000  52$:     MOVL    R6,G^CTL$GL_IPAGEFL     ;SET NEW PEAK VALUE
              05   C3F8   1001  52$:     RSB
                   03F9   1002
      2C   50   D1   03F9   1003  60$:     CMPL    R0,#SS$_ABORT           ;WAS IT AN ABORT OF A CRMPSC
         B3   13   03FC   1004           BEQL    10$                     ;YES - FIX UP R2, LEAVE RETADR ALONE
      F4 AD   D4   03FE   1005           CLRL    MMG$L_SAVRETADR(FP)     ;NULL RETURN ADR FOR NULL RANGE
              05   0401   1006           RSB
                   0402   1007
```

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SYSCREDEL   – SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 23
V04-000   CREPAG – CREATE A SINGLE PAGE   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (15)

SYS
V04

```
0402   1009                    .SBTTL  CREPAG – CREATE A SINGLE PAGE
0402   1010
0402   1011   ;++
0402   1012   ; FUNCTIONAL DESCRIPTION:
0402   1013   ;       CREPAG CREATES ONE PAGE IN THE P0 OR P1 PAGE TABLE.  IF NECESSARY
0402   1014   ; THE PAGE TABLE IS EXTENDED, WHICH CAN FAIL WHEN THERE ARE NO PTE'S
0402   1015   ; AVAILABLE.  THE PTE IS DELETED IF NECESSARY AND IS THEN SET
0402   1016   ; TO THE VALUE SPECIFIED.
0402   1017   ;
0402   1018   ; CALLING SEQUENCE:
0402   1019   ;
0402   1020   ;       BSBW    MMG$CREPAG
0402   1021   ;
0402   1022   ; INPUT PARAMETERS:
0402   1023   ;
0402   1024   ;       R0 = MODE FOR CREATING NEW PAGE IN LOW BYTE
0402   1025   ;            MMG$V_CHGPAGFIL SET IF CHARGING PAGE FILE QUOTA FOR THIS PAGE
0402   1026   ;       R2 = VIRTUAL ADDRESS OF PAGE TO CREATE (LOW 9 BITS = 0)
0402   1027   ;       R4 = PCB ADDRESS
0402   1028   ;       R5 = PROCESS HEADER ADDRESS – P1 OR SYSTEM SPACE
0402   1029   ;       R6 = COUNT – 1 OF PAGES REMAINING TO PROCESS INCLUDING THIS ONE
0402   1030   ;       R7 = +^X200 IF GOING FORWARDS, –^X200 IF GOING BACKWARDS
0402   1031   ;       R8 = NEW CONTENTS OF PAGE TABLE ENTRY
0402   1032   ;
0402   1033   ;       THE CURRENT IPL MUST BE AT ASTDEL
0402   1034   ;
0402   1035   ; IMPLICIT INPUTS:
0402   1036   ;       NONE
0402   1037   ;
0402   1038   ; OUTPUT PARAMETERS:
0402   1039   ;
0402   1040   ;       R0 = ERROR STATUS CODE
0402   1041   ;       R2 PRESERVED
0402   1042   ;
0402   1043   ; IMPLICIT OUTPUTS:
0402   1044   ;
0402   1045   ;       PTE CORRESPONDING TO SPECIFIED VIRTUAL ADDRESS IS DELETED AND
0402   1046   ;       THE DESIRED PTE IS STORED
0402   1047   ;
0402   1048   ;       IF PAGE TABLE EXPANSION IS NECESSARY THEN THE FOLLOWING
0402   1049   ;       ARE AFFECTED:
0402   1050   ;
0402   1051   ;       PHD$L_FREP0VA OR PHD$L_FREP1VA   ;1ST FREE PAGE AT END OF P0/P1 PAGE TABLE
0402   1052   ;       PHD$L_POLRASTL OR PHD$L_P1LR     ;LENGTH OF PT IN HARDWARE PCB
0402   1053   ;       PR$_POLR OR PR$_P1LR             ;LENGTH OF PT IN PROCESSOR REG
0402   1054   ;       PHD$L_FREPTECNT                  ;FREE PTE COUNTER
0402   1055   ;
0402   1056   ; COMPLETION CODES:
0402   1057   ;
0402   1058   ;       SS$_NORMAL                       ;SUCCESSFUL COMPLETION
0402   1059   ;       SS$_VASFULL                      ;VIRTUAL ADDRESS SPACE FULL
0402   1060   ;
0402   1061   ; SIDE EFFECTS:
0402   1062   ;       NONE
0402   1063   ;
0402   1064   ;--
```

SYSCREDEL
V04-000

D 12
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 24
CREPAG - CREATE A SINGLE PAGE   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (16)

SYS
V04

```
                        0402  1066 ;
                        0402  1067 ; *********************************************************************
                        0402  1068 ;
                        0402  1069 ; *************** THE FOLLOWING CODE MAY BE PAGED ****************
                        0402  1070 ;
                    00000402  1071 ;         .PSECT  Y$EXEPAGED
                        0402  1072 ;
                        0402  1073 ; *********************************************************************
                        0402  1074 ;
                        0402  1075           .ENABL  LSB
                        0402  1076
                        0402  1077 ;
                        0402  1078 ; PAGE TABLE ENTRY IS NOT EMPTY, MUST DELETE THE PAGE FIRST
                        0402  1079 ;
                        0402  1080 DELETEFIRST:
          50    04 AE  9A  0402  1081          MOVZBL  4(SP),R0              ;ACCESS MODE
    00000141'EF      16  0406  1082          JSB     MMG$DELPAG            ;DELETE THE PAGE
             53 50   E9  040C  1083          BLBC    R0,35$               ;BRANCH IF ERROR
                C3   BA  040F  1084          POPR    #^M<R0,R1>           ;R1 = ACCESS MODE
          50   51   D0  0411  1085          MOVL    R1,R0                ;PLACE IT IN R0
                        0414  1086
                        0414  1087 ; FALL THROUGH TO CREPAG
                        0414  1088 ;
                        0414  1089 MMG$CREPAG::
                50   DD  0414  1090          PUSHL   R0                   ;SAVE ACCESS MODE
          17 52   1E  E1  0416  1091          BBC     #VA$V_P1,R2,20$      ;BRANCH IF P0 SPACE
                        041A  1092
                        041A  1093 ; P1 SPACE
                        041A  1094 ;
    53   00D0 C5   DE  041A  1095          MOVAL   PHD$L_P1BR(R5),R3    ;ADR OF POINTER TO P1PT
7E   30 A5   52   C3  041F  1096          SUBL3   R2,PHD$L_FREP1VA(R5),-(SP) ;BEYOND END OF REGION?
             4D   19  0424  1097          BLSS    80$                  ;BRANCH IF NOT
                        0426  1098
                        0426  1099 ; 0(SP) = NO. OF BYTES BEYOND P1VA (INTEGRAL NO. OF PAGES)
                        0426  1100 ;         NOTE THAT THIS IS ^X200 SHORT OF WHAT MUST BE ADDED TO REGION
                        0426  1101 ;
    51   56   57   C5  0426  1102          MULL3   R7,R6,R1             ;NO. OF BYTES LEFT TO PROCESS
                        042A  1103                                      ;+ IF GOING FORWARDS, - IF GOING BACKWARDS
             39   18  042A  1104          BGEQ    40$                  ;BRANCH IF EXPANSION IS NOT IN THE
                        042C  1105                                      ;NATURAL GROWTH DIRECTION OF THE REGION
          51   51   CE  042C  1106          MNEGL   R1,R1                ;NO. OF BYTES TO ADD TO SIZE OF REGION
             12   11  042F  1107          BRB     30$                  ;TRY TO EXPAND TO FIT LAST PAGE
                        0431  1108
                        0431  1109 ; P0 SPACE
                        0431  1110 ;
    53 00C8 C5   DE  0431  1111 20$:     MOVAL   PHD$L_P0BR(R5),R3    ;ADR OF POINTER TO P0PT
7E   52   28 A5   C3  0436  1112          SUBL3   PHD$L_FREP0VA(R5),R2,-(SP) ;BEYOND END OF REGION?
             36   19  043B  1113          BLSS    80$                  ;BRANCH IF NOT
                        043D  1114
                        043D  1115 ; 0(SP) = NO. OF BYTES BEYOND P0VA (INTEGRAL NO. OF PAGES)
                        043D  1116 ;         NOTE THAT THIS IS ^X200 SHORT OF WHAT MUST BE ADDED TO REGION
                        043D  1117 ;
    51   56   57   C5  043D  1118          MULL3   R7,R6,R1             ;NO. OF BYTE LEFT TO BE CREATED
                        0441  1119                                      ;+ IF GOING FORWARD, - IF GOING BACKWARDS
             22   15  0441  1120          BLEQ    40$                  ;BRANCH IF NOT FORWARD
                        0443  1121 ;
                        0443  1122 ; TRY EXPANDING REGION TO FIT LAST PAGE TO BE CREATED
```

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SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 25
V04-000   CREPAG - CREATE A SINGLE PAGE   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (16)

SYS
V04

```
                      0443  1123 ; CREATION IS IN THE DIRECTION OF THE EXPANDING REGION
                      0443  1124 ;
        51      6E CO 0443  1125 30$:    ADDL    (SP),R1                 ;AMOUNT EVENTUALLY NEEDED TO EXPAND BY
     51 0200 C1 DE   0446  1126         MOVAL   ^X200(R1),R1            ;
           0084  30  044B  1127         BSBW    EXPANDCHK               ;TRY EXPANDING BY THAT MUCH
          22 50  E8  044E  1128         BLBS    R0,80$                  ;BRANCH IF REGION EXPANDED
    0244 8F   50 B1  0451  1129         CMPW    R0,#SS$_VASFULL
             OD  12  0456  1130         BNEQ    40$                     ;NOT VIRTUAL ADDRESS SPACE FULL
                      0458  1131
                      0458  1132 ;
                      0458  1133 ; CAN'T EXPAND REGION BY THE FULL AMOUNT THAT WILL BE NEEDED
                      0458  1134 ; SO EXPAND BY WHAT IS LEFT UNLESS THAT'S NOT ENOUGH FOR THE CURRENT PAGE
                      0458  1135 ;
    51  2C A5  09 9C  0458  1136         ROTL    #9,PHD$L_FREPTECNT(R5),R1 ;SPACE LEFT FOR EXPANDING
          6E  51  D1  045D  1137         CMPL    R1,(SP)                 ;EXPAND BY SPACE REMAINING UNLESS
                      0460  1138                                         ;MORE IS NEEDED FOR THIS PAGE
             OB  14  0460  1139         BGTR    50$                     ;BRANCH IF THERE'S ENOUGH
           005C  31  0462  1140 35$:    BRW     90$                     ;OTHERWISE VIRTUAL ADR SPACE FULL
                      0465  1141 ;
                      0465  1142 ; JUST EXPAND FOR THIS PAGE
                      0465  1143 ;
 51  6E  00000200 8F C1 0465 1144 40$:  ADDL3   #^X200,(SP),R1          ;AMOUNT NEEDED FOR THIS PAGE
           0062  30  046D  1145 50$:    BSBW    EXPANDCHK               ;TRY EXPANDING BY THIS AMOUNT
          4E 50  E9  0470  1146         BLBC    R0,90$                  ;BRANCH IF NO ROOM
                      0473  1147 ;
                      0473  1148 ; 0(SP) = GARBAGE, 4(SP) = ACCESS MODE, 5(SP) NONZERO IF CHARGING PAGE FILE QUOTA
                      0473  1149 ; R2 = VA, R3 = ADDRESS OF POINTER TO APPROPRIATE PAGE TABLE
                      0473  1150 ;
    51  52  15  09 EF 0473  1151 80$:    EXTZV   #VA$V_VPN,#VA$S_VPN,R2,R1 ;VIRTUAL PAGE NUMBER
        00 B341  D5  0478  1152         TSTL    @(R3)[R1]               ;PTE EMPTY?
             84  12  047C  1153         BNEQ    DELETEFIRST             ;BRANCH IF NO, MUST DELETE IT
  0A 04 AE  08 E1   047F  1154         BBC     #MMG$V_CHGPAGFIL,4(SP),85$ ;BRANCH IF NOT CHARGING FOR PAGE FILE
     50  0080 C4  DO 0483  1155         MOVL    PCB$L_JIB(R4),R0        ;GET JIB ADDRESS
          3C A0  D7  0488  1156         DECL    JIB$L_PGFLCNT(R0)       ;CHARGE A PAGE FILE PAGE
             38  19  048B  1157         BLSS    100$                    ;BRANCH IF OVER QUOTA
                      048D  1158
        00 B341  58 DO 048D 1159 85$:   MOVL    R8,@(R3)[R1]            ;STORE NEW PTE
                      0492  1160
       28 58  1F  E1  0492  1161         BBC     #PTE$V_VALID,R8,87$     ;BR IF NOT WINDOW/MA780 GLOBAL PAGE
       OE 58  15  E0  0496  1162         BBS     #PTE$V_WINDOW,R8,86$    ;BR IF IT IS A WINDOW PAGE
 7E  58  15  00 EF  049A  1163         EXTZV   #PTE$V_PFN,#PTE$S_PFN,R8,-(SP) ;EXTRACT PFN
 00000000'GF  8E  D1 049F  1164         CMPL    (SP)+,G^MMG$GL_MAXMEM   ;IS THIS A MA780 GLOBAL PAGE?
             16  15  04A6  1165         BLEQ    87$                     ;BR IF NOT MA780 GLOBAL PAGE
       53  9341  DE  04A8  1166 86$:    MOVAL   @(R3)+[R1],R3           ;GET SVAPTE
          50  01  DO  04AC  1167         MOVL    #1,R0                  ;INDICATE ADDITIONAL LOCK
                      04AF  1168         DSBINT  #IPL$_SYNCH            ;RAISE TO SYNCH
   00000004'GF  16  04B5  1169         JSB     G^MMG$MOVPTLOCK         ;LOCK THE PAGE TABLE PAGE IN WS
                      04BB  1170         ENBINT                         ;RESTORE IPL
                      04BE  1171 87$:
          50  01  3C  04BE  1172         MOVZWL  #SS$_NORMAL,R0         ;INDICATE SUCCESSFUL COMPLETION
          5E  08  CO  04C1  1173 90$:    ADDL    #2*4,SP               ;CLEAN OFF STACK
                 05  04C4  1174         RSB
                      04C5  1175 ;
                      04C5  1176 ; EXCEEDED PAGE FILE QUOTA
                      04C5  1177 ;
       50  0080 C4  DO 04C5 1178 100$:  MOVL    PCB$L_JIB(R4),R0        ;GET JIB ADDRESS
          3C A0  D6  04CA  1179         INCL    JIB$L_PGFLCNT(R0)       ;RESTORE CORRECT COUNT
```

```
    50   1C   3C   04CD   1180         MOVZWL  #SS$_EXQUOTA,R0        ;EXCEEDED QUOTA
         EF   11   04D0   1181         BRB     90$                   ;RETURN THE ERROR
                   04D2   1182
                   04D2   1183         .DSABL  LSB
```

SYSCREDEL
V04-000

G 12
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Pa,: 27
MMG$MOVPTLOCK - Move WSLE for PT into lo 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (16)

SYS
V04

```
                        04D2  1185              .SBTTL  MMG$MOVPTLOCK - Move WSLE for PT into locked portion of WS
                        04D2  1186  ;
                        04D2  1187  ; FUNCTIONAL DESCRIPTION:
                        04D2  1188  ;
                        04D2  1189  ;       This routine is used to lock in the working set those page table pages
                        04D2  1190  ;       that contain WINDOW PTEs and PTEs mapping MA780 global section pages.
                        04D2  1191  ;       This is needed because PFNMAP and MA780 pages do not have working set
                        04D2  1192  ;       list entries, which would allow the user to control locking in the
                        04D2  1193  ;       working set.
                        04D2  1194  ;
                        04D2  1195  ;       The page table pages are moved into the locked portion of the working
                        04D2  1196  ;       set, instead of just turning on the locked bit in the WSLE for two
                        04D2  1197  ;       reasons.  First, there would be no way to outswap the process header if
                        04D2  1198  ;       the normal locking was done by incrementing the PFN database SHRCNT,
                        04D2  1199  ;       unless the swapper was taught about the PTWSLELCK array.  Second,
                        04D2  1200  ;       moving a WSLE that cannot be replaced, out of the way of the working
                        04D2  1201  ;       set scan routine, optimizes the scan -- as is done for normal P0/P1
                        04D2  1202  ;       pages that an user locks in the working set.
                        04D2  1203  ;
                        04D2  1204  ;
                        04D2  1205  ; INPUTS:
                        04D2  1206  ;
                        04D2  1207  ;       R0 = Indicator of whether to increment or decrement the
                        04D2  1208  ;            page table page WSLE lock array (+1 or -1)
                        04D2  1209  ;       R3 = SVAPTE for some virtual address in P0 or P1
                        04D2  1210  ;       R4 = PCB of process
                        04D2  1211  ;       R5 = PHD of process
                        04D2  1212  ;
                        04D2  1213  ;       IPL = SYNCH
                        04D2  1214  ;
                        04D2  1215  ; For MMG$MOVPTLOCK1 only:
                        04D2  1216  ;
                        04D2  1217  ;       R2 = Adr of count byte for # locked WSLEs in this page table page
                        04D2  1218  ;
                        04D2  1219  ; OUTPUTS:
                        04D2  1220  ;
                        04D2  1221  ;       All registers unchanged.
                        04D2  1222  ;
                        04D2  1223  ;       The working set list entry for the page table page that contains
                        04D2  1224  ;       the PTE pointed to by R3, may be moved in or out of the locked portion
                        04D2  1225  ;       of the working set.  The page table page WSLE lock array is altered as
                        04D2  1226  ;       appropriate as is the count of locked page table pages.
                        04D2  1227  ;
                    00000000  1228              .PSECT  $MMGCOD
                        0000  1229              .ENABL  LSB
                        0000  1230  MMG$MOVPTLOCK1::
                 0F  BB  0000  1231              PUSHR   #^M<R0,R1,R2,R3>        ;Save registers
                 15  11  0002  1232              BRB     10$                    ;Continue in common code
                        0004  1233  MMG$MOVPTLOCK::                             ;Called for PFNMAP/MA780 global pages
                 0F  BB  0004  1234              PUSHR   #^M<R0,R1,R2,R3>        ;Save registers
                        0006  1235
     52  53  00C8 C5  C3  0006  1236              SUBL3   PHD$L_P0BR(R5),R3,R2   ;Byte offset of PTE
        51  52  F7 8F  78  000C  1237              ASHL    #-9,R2,R1              ;Byte index of containing page table
        52  55  64 A5  C1  0011  1238              ADDL3   PHD$L_PTWSLELCK(R5),R5,R2 ;Locked working set list entries
              52  51  C0  0016  1239              ADDL2   R1,R2                  ;Address of count byte for # of locked
                        0019  1240                                              ; WSLE's in the page table
                        0019  1241  10$:
```

SYSCREDEL
V04-000

H 12
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 28
MMG$MOVPTLOCK - Move WSLE for PT into lo   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (16)

SYS
V04

```
             50    D5   0019   1242          TSTL    R0                       ;Is this an increment or decrement?
             09    19   001B   1243          BLSS    20$                      ;Br if it is a decrement
             62    96   001D   1244          INCB    (R2)                     ;Add one for WINDOW/MA780 global page
             0C    14   001F   1245          BGTR    40$                      ;Branch if not the first in this PT
       6C A5  B6   0021   1246          INCW    PHD$W_PTCNTLCK(R5)       ;Another page table with locked WSLE's
             07    11   0024   1247          BRB     40$                      ;Continue in common code
             62    97   0026   1248  20$:    DECB    (R2)                     ;One less reason to lock page table page
             42    18   0028   1249          BGEQ    100$                     ;Br if PT page should remain locked
       6C A5  B7   002A   1250          DECW    PHD$W_PTCNTLCK(R5)       ;One less page table with locked WSLE's
                   002D   1251  40$:
                   002D   1252  ;
                   002D   1253  ; Must move page table page into/out of locked portion of working set.
                   002D   1254  ; The WSL$M_WSLOCK bit is not used for locking because there is no count
                   002D   1255  ; that tells the system when it can be cleared.
                   002D   1256  ;
       52   0E A5  3C   002D   1257          MOVZWL  PHD$W_WSDYN(R5),R2       ;Index to second working set list slot
 51   53  15    09  EF   0031   1258          EXTZV   #VA$V_VPN,#VA$S_VPN,R3,R1 ;Page # of PT containing this PTE
    51   0000'DF41  D0   0036   1259          MOVL    @W^MMG$GL_SPTBASE[R1],R1 ;PTE for this page table page
 50   51  15    00  EF   003C   1260          EXTZV   #PTE$V_PFN,#PTE$S_PFN,R1,R0 ;PFN for this page table page
                   0041   1261          .list MEB
                   0041   1262          PFN_REFERENCE -          ;Get the WSLX
                   0041   1263          MOVZWL  <@W^PFN$Ax_WSLX[R0],R1>,-
                   0041   1264                  LONG_OPCODE=MOVL,-
                   0041   1265                  IMAGE=SYS_NONPAGED
                   0041          .SAVE_PSECT      LOCAL_BLOCK
             00000000          .PSECT  Z$INIT$PFN_FIXUP_TABLE
       00000041' 0000          .ADDRESS        ...PFN
             3C   0004          .BYTE   OP$_MOVZWL
             D0   0005          .BYTE   OP$_MOVL
             00000041          .RESTORE_PSECT
 51   0000'DF40  3C   0041          MOVZWL  @W^PFN$Ax_WSLX[R0],R1
             6E    D5   0047   1266          TSTL    (SP)                     ;Is this an lock or an unlock?
             07    19   0049   1267          BLSS    80$                      ;Br if it is an unlock
       52    51  D1   004B   1268          CMPL    R1,R2                    ;Is WSLE already in locked portion?
             1C    19   004E   1269          BLSS    100$                     ;Br if already there
             0D    11   0050   1270          BRB     90$                      ;Go swap WSLE into locked portion
       52    51  D1   0052   1271  80$:    CMPL    R1,R2                    ;Is WSLE in locked portion?
             15    18   0055   1272          BGEQ    100$                     ;Br if in dynamic portion
    0C A5  51  B1   0057   1273          CMPW    R1,PHD$W_WSLOCK(R5)      ;Is it in permanent part of WS
             0F    1F   005B   1274          BLSSU   100$                     ;Yes - leave it there
             52    D7   005F   1275          DECL    R2                       ;Swapping WSLE with last locked entry
                   005F   1276  ;
                   005F   1277  ; R0 = PFN of first WSL slot
                   005F   1278  ; R1 = Index to first WSL slot
                   005F   1279  ; R2 = Index to second WSL slot
                   005F   1280  ; R4 = PCB address
                   005F   1281  ; R5 = PHD address - P1 or system space
                   005F   1282  ;
                   005F   1283  ; IPL = SYNCH
                   005F   1284  ;
    00000000'EF   16   005F   1285  90$:    JSB     MMG$SWAPWSLE
    0E A5   6E   A0   0065   1286          ADDW    (SP),PHD$W_WSDYN(R5)     ;Adjust last locked slot in dynamic WS
       FF94'   30   0069   1287          BSBW    MMG$EXTRADYNWS           ;Re-compute extra dynamic working set
             0F    BA   006C   1288  100$:   POPR    #^M<R0,R1,R2,R3>         ;Restore registers
             05    006E   1289          RSB                              ;PT is now in locked portion of WS
                   006F   1290
                   006F   1291          .DSABL  LSB
```

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I 12
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 29
EXPANDCHK - EXPAND REGION CHECKING FOR S   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (17)

SYS
V04

```
                        006F  1293                .SBTTL  EXPANDCHK - EXPAND REGION CHECKING FOR SPACE AVAILABLE
                        006F  1294
                        006F  1295  ;
                        006F  1296  ; INPUTS:
                        006F  1297  ;
                        006F  1298  ;       R1 = NO. OF BYTES TO EXPAND BY (INTEGRAL NO. OF PAGES)
                        006F  1299  ;       R2 = VIRTUAL ADDRESS (PROVIDING THE P0/P1 SPACE INDICATOR)
                        006F  1300  ;       R5 = PROCESS HEADER ADDRESS
                        006F  1301  ;
                        006F  1302  ; OUTPUTS:
                        006F  1303  ;
                        006F  1304  ;       R0 = STATUS CODE
                        006F  1305  ;            SS$_NORMAL FOR SUCCESSFUL
                        006F  1306  ;            SS$_VASFULL FOR VIRTUAL ADDRESS SPACE FULL
                        006F  1307  ;            SS$_INSFWSL FOR INSUFFICIENT WORKING SET LIMIT
                        006F  1308  ;       R2, R3 PRESERVED
                        006F  1309  ;
                        006F  1310  ;
                        006F  1311  ; *****************************************************************
                        006F  1312  ;
                        006F  1313  ; *************** THE FOLLOWING CODE MAY BE PAGED ***************
                        006F  1314  ;
                    000004D2  1315        .PSECT  Y$EXEPAGED
                        04D2  1316  ;
                        04D2  1317  ; *****************************************************************
                        04D2  1318  ;
                        04D2  1319  EXPANDCHK:
  50    51  F7 8F    78  04D2  1320        ASHL    #-9,R1,R0               ;NUMBER OF PAGES REQUIRED
     2C A5    50  C2  04D7  1321        SUBL    R0,PHD$L_FREPTECNT(R5)   ;ENOUGH FREE PAGE TABLE ENTRIES
              2C  19  04DB  1322        BLSS    40$                     ;BRANCH IF NOT
        10 52 1E  E0  04DD  1323        BBS     #VA$V_P1,R2,20$         ;BRANCH IF P1 SPACE ADDRESS
                        04E1  1324  ;
                        04E1  1325  ; P0 SPACE ADDRESS
                        04E1  1326  ;
  00CC C5    50  C0  04E1  1327        ADDL    R0,PHD$L_POLRASTL(R5)   ;ADJUST LENGTH OF REGION
     28 A5    51  C0  04E6  1328        ADDL    R1,PHD$L_FREP0VA(R5)    ;AND NEXT FREE P0 VIRTUAL ADDRESS
                        04EA  1329        LDPOLR  PHD$L_POLRASTL(R5)      ;ADJUST HARDWARE LENGTH REGISTER
     09  00CC C5  DA  04EA              MTPR    PHD$L_POLRASTL(R5),S^#PR$_POLR
              0E  11  04EF  1330        BRB     30$                    ;EXIT THROUGH COMMON CODE
                        04F1  1331  ;
                        04F1  1332  ; P1 SPACE ADDRESS
                        04F1  1333  ;
  00D4 C5    50  C2  04F1  1334  20$:  SUBL    R0,PHD$L_P1LR(R5)       ;ADJUST LENGTH OF REGION
     30 A5    51  C2  04F6  1335        SUBL    R1,PHD$L_FREP1VA(R5)    ;AND NEXT FREE P1 VIRTUAL ADR
                        04FA  1336        LDP1LR  PHD$L_P1LR(R5)         ;AND HARDWARE LENGTH REGISTER
     0B  00D4 C5  DA  04FA              MTPR    PHD$L_P1LR(R5),S^#PR$_P1LR
              48  10  04FF  1337  30$:  BSBB    UPDATPTCNT             ;UPDATE MAX PAGE TABLE COUNT
              51  B5  0501  1338        TSTW    R1                    ;IF NOT ENOUGH DYNAMIC WSLE'S LEFT
              0E  13  0503  1339        BEQL    50$                   ;THEN TOO MUCH VA SPACE FOR WS LIMIT
        50    01  3C  0505  1340        MOVZWL  #SS$_NORMAL,R0        ;SUCCESSFUL COMPLETION CODE
              05  0508  1341        RSB
                        0509  1342  ;
                        0509  1343  ; NOT ENOUGH ROOM IN VIRTUAL ADDRESS SPACE FOR SPECFIED EXPANSION
                        0509  1344  ;
     2C A5    50  C0  0509  1345  40$:  ADDL    R0,PHD$L_FREPTECNT(R5)  ;FIX UP FREE PAGE TABLE ENTRY COUNTER
  50  0244 8F    3C  050D  1346        MOVZWL  #SS$_VASFULL,R0        ;RETURN 'VIRTUAL ADDRESS SPACE FULL'
              05  0512  1347        RSB
```

SYSCREDEL
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J 12
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 30
EXPANDCHK - EXPAND REGION CHECKING FOR S 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (17)

```
                              0513  1348 :
                              0513  1349 : ADDITION OF DESIRED VIRTUAL ADDRESS SPACE WILL RESULT IN TOO FEW
                              0513  1350 : DYNAMIC PAGES IN THE WORKING SET LIST.  REFUSE TO ADD THE SPACE UNLESS
                              0513  1351 : WE ARE BELOW QUOTA.
                              0513  1352 :
 50    18 A5    08 A5   A3    0513  1353 50$:    SUBW3    PHD$W_WSLIST(R5),PHD$W_WSQUOTA(R5),R0
                   50   B6    0519  1354         INCW     R0                      ;GET QUOTA
         50 A5    50   B1    051B  1355         CMPW     R0,PHD$W_WSSIZE(R5)     ;ARE WE BELOW QUOTA
                   1B   1B    051F  1356         BLEQU    55$                     ;NO
                   51   DD    0521  1357         PUSHL    R1                      ;SAVE VOLIATILE REGISTER
         7E    50 A5   3C    0523  1358         MOVZWL   PHD$W_WSSIZE(R5),-(SP)  ;SAVE CURRENT WSSIZE
                   00   DD    0527  1359         PUSHL    #0                      ;NO ADDRESS FOR PREVIOUS VALUE
         7E    7F 8F   9A    0529  1360         MOVZBL   #127,-(SP)              ;AUGMENT WS BY 127 PAGES
    00000000'EF   02   FB    052D  1361         CALLS    #2,EXE$ADJWSL           ;CALL INTERNAL ADJUST WS ROUTINE
                   03   BA    0534  1362         POPR     #^M<R0,R1>              ;RESTORE SAVED WSSIZE, R1
         50    50 A5   B1    0536  1363         CMPW     PHD$W_WSSIZE(R5),R0     ;DID WS GROW AT ALL?
                   C3   12    053A  1364         BNEQ     30$                     ;YES, GO TRY AGAIN
                   53   DD    053C  1365 55$:    PUSHL    R3
              002C   30    053E  1366         BSBW     MMG$CONTRACT            ;GO CLEAN UP
                   08   BA    0541  1367         POPR     #^M<R3>
    50    011C 8F   3C    0543  1368         MOVZWL   #SS$_INSFWSL,R0         ;INSUFFICIENT WORKING SET LIMIT
                   05    0548  1369         RSB
```

```
                          0549  1371              .SBTTL  UPDATPTCNT - UPDATE (MAX) PAGE TABLE COUNT
                          0549  1372
                          0549  1373 ; FUNCTIONAL DESCRIPTION:
                          0549  1374 ;
                          0549  1375 ;        THIS ROUTINE CALCULATES THE MAXIMUM NUMBER OF PAGE TABLES THAT
                          0549  1376 ; MAY BE REQUIRED TO SUPPORT THE VIRTUAL ADDRESS SPACE CURRENTLY CREATED.
                          0549  1377 ; THE CALCULATION IS BASED SOLELY ON THE CURRENT SETTINGS FOR THE ENDS
                          0549  1378 ; OF P0 AND P1 SPACE, HOLES IN THE ADDRESS SPACE ARE NOT DEALT WITH.
                          0549  1379 ;
                          0549  1380 ; INPUTS:
                          0549  1381 ;
                          0549  1382 ;        R5 = PROCESS HEADER ADDRESS (P1 SPACE IF PROCESS)
                          0549  1383 ;
                          0549  1384 ; OUTPUTS:
                          0549  1385 ;
                          0549  1386 ;        R1 = WORD CONTAINING EXTRA DYNAMIC WORKING SET LIST ENTRY COUNT
                          0549  1387 ;        R2,R3 PRESERVED
                          0549  1388 ;
                          0549  1389 ; ******************************************************************************
                          0549  1390 ;
                          0549  1391 ; **************** THE FOLLOWING CODE MAY BE PAGED *****************
                          0549  1392 ;
                      00000549  1393              .PSECT  Y$EXEPAGED
                          0549  1394 ;
                          0549  1395 ; ******************************************************************************
                          0549  1396 ;
                          0549  1397 UPDATPTCNT:
    50    00CC C5   07   00   EF   0549  1398              EXTZV   #0,#7,PHD$L_POLRASTL(R5),R0 ;NO. OF ENTRIES TO FILL LAST POPT
          50   2C A5   50   C3   0550  1399              SUBL3   R0,PHD$L_FREPTECNT(R5),R0 ;NO. OF FREE PTE'S STARTING
                          0555  1400                                                    ;AT THE NEXT PAGE TABLE BOUNDARY
          50   50   F9 8F   78   0555  1401              ASHL    #-7,R0,R0             ;TRUNCATED DIVIDE BY 128 YIELDS
                          055A  1402                                                    ;COUNT OF EMPTY PAGE TABLES
                    02   18   055A  1403              BGEQ    10$                   ;BRANCH IF SOME EMPTY PAGE TABLES
                    50   D4   055C  1404              CLRL    R0                    ;NO EMPTY PAGE TABLES
 72 A5   00000000'EF   50   A3   055E  1405 10$:         SUBW3   R0,SGN$GL_PTPAGCNT,PHD$W_PTCNTMAX(R5) ;SET MAX PAGE TABLE COUNT
         00000000'EF   17   0567  1406              JMP     MMG$EXTRADYNWS        ;COMPUTE AND RETURN EXTRA DYNAMIC WSLE COUNT
```

SYSCREDEL
V04-000

L 12
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 32
DELPAG - DELETE A SINGLE PAGE   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (19)

SY
V0

```
056D  1408                    .SBTTL  DELPAG - DELETE A SINGLE PAGE
056D  1409  ;++
056D  1410  ; FUNCTIONAL DESCRIPTION:
056D  1411  ;
056D  1412  ;        THIS ROUTINE DELETES THE PAGE SPECIFIED, CLEARING ITS PAGE TABLE
056D  1413  ; ENTRY.  IF THIS IS THE LAST PAGE OF THE RANGE TO BE DELETED OR IF
056D  1414  ; IT RESULTS IN A LENGTH VIOLATION, THEN THE CONTRACT REGION LOGIC IS CALLED.
056D  1415  ;
056D  1416  ; CALLING SEQUENCE:
056D  1417  ;
056D  1418  ;        BSBW    MMG$DELPAG
056D  1419  ;
056D  1420  ;
056D  1421  ; INPUT PARAMETERS:
056D  1422  ;
056D  1423  ;        R0 = ACCESS MODE TO CHECK AGAINST PAGE OWNER
056D  1424  ;            MMG$V_DELGBLDON SET IF ALREADY HAVE DONE A PURGE OF THE GLOBAL
056D  1425  ;                 PAGES IN THE SPECIFIED ADDRESS RANGE
056D  1426  ;            MMG$V_NOWAIT_IPL0 SET TO RETURN SS$_ABORT RATHER THAN WAITING
056D  1427  ;                 FOR I/O COMPLETION AT IPL 0
056D  1428  ;        R2 = VIRTUAL ADDRESS (LOW 9 BITS = 0)
056D  1429  ;        R4 = PCB ADDRESS
056D  1430  ;        R5 = PROCESS HEADER ADDRESS - P1 OR SYSTEM SPACE
056D  1431  ;        R6 = COUNT - 1 OF PAGES REMAINING TO  BE DELETED INCLUDING THIS ONE
056D  1432  ;        R7 = +^X200 IF GOING FORWARD IN ADDRESS SPACE
056D  1433  ;           = -^X200 IF GOING BACKWARDS IN ADDRESS SPACE
056D  1434  ;        IPL = ASTLVL
056D  1435  ;
056D  1436  ; IMPLICIT INPUTS:
056D  1437  ;        NONE
056D  1438  ;
056D  1439  ; OUTPUT PARAMETERS:
056D  1440  ;
056D  1441  ;        R0 = STATUS CODE
056D  1442  ;        R2 PRESERVED
056D  1443  ;
056D  1444  ; IMPLICIT OUTPUTS:
056D  1445  ;        NONE
056D  1446  ;
056D  1447  ; COMPLETION CODES:
056D  1448  ;
056D  1449  ;        SS$_NORMAL                          ;SUCCESSFUL RETURN
056D  1450  ;        SS$_PAGOWNVIO                       ;PAGE OWNER VIOLATION
056D  1451  ;
056D  1452  ; SIDE EFFECTS:
056D  1453  ;
056D  1454  ;        R1,R3 - DESTROYED
056D  1455  ;
056D  1456  ;        CAUTION - MAY WAIT AT IPL 0
056D  1457  ;
056D  1458  ;--
```

```
                              056D  1460  ;
                              056D  1461  ; *************************************************************
                              056D  1462  ;
                              056D  1463  ; ***************** THE FOLLOWING CODE MUST BE RESIDENT ****************
                              056D  1464  ;
                          0000006F  1465        .PSECT  $MMGCOD
                              006F  1466  ;
                              006F  1467  ; *************************************************************
                              006F  1468  ;
                              006F  1469  ;
                              006F  1470  ; DELETE A PAGE MAPPED BY PFN
                              006F  1471  ;
                              006F  1472  PFNMAPDEL:
                              006F  1473        INVALID R2                              ;INVALIDATE THE TRANSLATION BUFFER
  3E A4   40 A4    B1        0072  1474        CMPW    PCBSW_DIOLM(R4),PCBSW_DIOCNT(R4) ;ANY DIRECT I/O FOR PROCESS?
           03      1B        0077  1475        BLEQU   10$                             ;BR ON NO, NO I/O COMPLETION TO WAIT FOR
         0188      31        0079  1476        BRW     DELPAGASTWAIT                   ;GO WAIT FOR I/O TO COMPLETE
  16 50    15      E5        007C  1477  10$:   BBCC    #PTE$V_WINDOW,R0,SHMPAGDEL       ;BR IF SHARED MEMORY GLOBAL PAGE
00000000'EF  50    D1        0080  1478        CMPL    R0,MMG$GL_MAXMEM                ;IS THE PAGE SHARED BY BOTH CPU'S OF MP
           04      1B        0087  1479        BLEQU   DELPTE1                         ;YES - DON'T DECREMENT INHIBIT COUNT
         0104 C5    D7        0089  1480        DECL    PHD$L_MPINHIBIT(R5)             ;REMOVE ONE REASON THAT PROCESS MUST
                              008D  1481                                               ;BE LOCKED ON PRIMARY PROCESSOR
                              008D  1482  DELPTE1:
  50      01      CE        008D  1483        MNEGL   #1,R0                           ;INDICATE DECREMENT OF PTWSLELCK ARRAY
         FF71      30        0090  1484        BSBW    MMG$MOVPTLOCK                   ;ONE LESS REASON PT PAGE MUST BE LOCKED
         034A      31        0093  1485        BRW     DELPTE                         ;OK TO DELETE PAGE NOW
                              0096  1486  ;
                              0096  1487  ;
                              0096  1488  ; DELETE PTE TO A SHARED MEMORY GLOBAL SECTION PAGE.
                              0096  1489  ;
                              0096  1490  SHMPAGDEL:
  0052 8F  BB        0096  1491        PUSHR   #^M<R1,R4,R6>                   ;SAVE REGISTERS
  51      01      9A        009A  1492        MOVZBL  #1,R1                           ;COUNT TO DECREMENT PTE REFERENCE BY
         FF60'     30        009D  1493        BSBW    MMG$FINDGSDPFN                  ;FIND SHARED MEMORY GSD FOR THIS PFN
  0052 8F  BA        00A0  1494        POPR    #^M<R1,R4,R6>                   ;RESTORE REGISTERS
                              00A4  1495  ;
                              00A4  1496  ; AT SOME TIME, A SEND MESSAGE TO THE ERROR LOGGER COULD BE ADDED HERE.
                              00A4  1497  ;
  E6 50    E8        00A4  1498        BLBS    R0,DELPTE1                      ;BR ON GSD FOUND, GO DELETE PTE
                              00A7  1499        BUG_CHECK NOSHMGSD,FATAL                ;FATAL ERROR IF NOT ASSOCIATED WITH GS
                              00AB  1500  ;
                              00AB  1501  ; PURGE WORKING SET SCAN GOT A RESOURCE ERROR
                              00AB  1502  ; 0(SP) = SAVED R8
                              00AB  1503  ;
                              00AB  1504  WSSCNWAIT:
  51      58      D0        00AB  1505        MOVL    R8,R1                           ;RESOURCE TO WAIT FOR
  58      8E      D0        00AE  1506        MOVL    (SP)+,R8                        ;RESTORE R8
           7E      DC        00B1  1507        MOVPSL  -(SP)                           ;RESOURCE WAIT ROUTINE NEEDS THIS
  5E      04      C0        00B3  1508        ADDL2   #4,SP                           ;JUNK WORD
           50      DD        00B6  1509        PUSHL   R0                              ;ACCESS MODE
                              00B8  1510        DSBINT  #IPL$_SYNCH
         015B      31        00BE  1511        BRW     DELPAGRESWAIT
                              00C1  1512  ;
                              00C1  1513  ; PAGE LOCKED IN WORKING SET
                              00C1  1514  ;
                              00C1  1515  DELPAGLOCKED:
  0C A5    51      B1        00C1  1516        CMPW    R1,PHD$W_WSLOCK(R5)             ;IF PERMANENT PAGE, SUCCESSFUL NOP
```

```
          22    1F  00C5  1517          BLSSU    BRDELPAGSUCCESS              ;ALLOWING SWAPPER TO USE DELTVA
      50   6E    9A  00C7  1518          MOVZBL   (SP),R0                     ;RECOVER ACCESS MODE
                      00CA  1519          ENBINT   4(SP)                       ;RESTORE IPL TO THAT OF CALLER
          58    DD  00CE  1520          PUSHL    R8                          ;SAVE R8 AROUND THE FOLLOWING CALL
 58  00090030 8F    D0  00D0  1521          MOVL     #<SS$_WASSET @16 !-         ;SET PARAMETER TO UNLOCK THE
                      00D7  1522                   WSL$M_WSLOCK ! WSL$M_PFNLOCK>,R8 ;WORKING SET LIST ENTRY
       FF26'  30  00D7  1523          BSBW     MMG$LCKULKPAG               ;UNLOCK THE PAGE FROM THE WORKING SET
      0100 8F  BA  00DA  1524          POPR     #^M<R8>                     ;RESTORE R8
        0B 50  E9  00DE  1525          BLBC     R0,BRDELPAGRET             ;BRANCH IF ERROR
        01CC  31  00E1  1526          BRW      DELAGAIN                    ;GO RESTART DELPAG FROM THE TOP
                      00E4  1527
                      00E4  1528  ;
                      00E4  1529  ; LENGTH VIOLATION FOR THIS VIRTUAL ADDRESS
                      00E4  1530  ;
                      00E4  1531  DELPAGLENVIO:
          56    D4  00E4  1532          CLRL     R6                          ;OTHERWISE, FAKE RANGE COMPLETED
        0308  31  00E6  1533          BRW      DELPAGLAST                  ;CONTRACT THE REGION IF POSSIBLE
                      00E9  1534                                              ;CHECK FOR LAST IN RANGE
                      00E9  1535  BRDELPAGSUCCESS:
        02FA  31  00E9  1536          BRW      DELPAGSUCCESS
        C3EC       1537  BRDELPAGRET:
        02FA  31  00EC  1538          BRW      DELPAGRET
                      00EF  1539
                      00EF  1540  ;
                      00EF  1541  ; R1 = PAGE TYPE AND IS KNOWN NOT TO BE ZERO
                      00EF  1542  ;
                      00EF  1543
                      00EF  1544  DELPAGNOTPROCES:
                      00EF  1545          ASSUME   PFN$C_SYSTEM EQ 1
                      00EF  1546          ASSUME   PFN$C_PPGTBL EQ 4          ;NEGATIVE FIELD VALUE
          51    D7  00EF  1547          DECL     R1                          ;IF 1 OR NEGATIVE
          F6    15  00F1  1548          BLEQ     BRDELPAGSUCCESS            ;THEN, SUCCESSFUL NOP
                      00F3  1549                                              ;ALLOWING SWAPPER TO USE DELTVA
                      00F3  1550  ;
                      00F3  1551  ; CHECK FOR A RESIDENT GLOBAL SECTION PAGE
                      00F3  1552  ;
    51   0000'DF40  D0  00F3  1553          MOVL     @W^PFN$AL_BAK[R0],R1       ;GET BACKING STORE
      2E 51   16  E1  00F9  1554          BBC      #PTE$V_TYP0,R1,DELGBLRDINPROG ;MUST BE PAGE-FILE
          51    51  32  00FD  1555          CVTWL    R1,R1                       ;ISOLATE GLOBAL SECTION TABLE INDEX
 50  00000000'EF  D0  0100  1556          MOVL     MMG$GL_SYSPHD,R0           ;ADDRESS OF SYSTEM HEADER
      50   20 A0  C0  0107  1557          ADDL     PHD$L_PSTBASOFF(R0),R0     ;GET SECTION TABLE BASE
      50   6041  DE  010B  1558          MOVAL    (R0)[R1],R0                 ;GET THE CORRECT SECTION TABLE ENTRY
    17 14 A0   0D  E1  010F  1559          BBC      #SEC$V_RESIDENT,SEC$W_FLAGS(R0),DELGBLRDINPROG
          24    BB  0114  1560          PUSHR    #^M<R2,R5>
 55  00000000'EF  D0  0116  1561          MOVL     MMG$GL_SYSPHD,R5          ;SYSTEM HEADER
        FEE0'  30  011D  1562          BSBW     MMG$DECSECREF               ;ONE LESS REFERENCE
          24    BA  0120  1563          POPR     #^M<R2,R5>
      50   01  CE  0122  1564          MNEGL    #1,R0                        ;UNLOCK INDICATOR
        FEDC  30  0125  1565          BSBW     MMG$MOVPTLOCK               ;ONE LESS REASON TO LOCK THE PAGE TABLE
        02B5  31  0128  1566          BRW      DELPTE                      ;FINISH DELETING THE PAGE TABLE ENTRY
                      012B  1567  ;
                      012B  1568  DELGBLRDINPROG:
          0B    BA  012B  1569          POPR     #^M<R0,R1,R3>              ;R0=ACCESS MODE, R1=SAVED IPL
                      012D  1570                                              ;CLEAN OFF SAVED PSL INTO R3
                      012D  1571          ENBINT   R1                          ;BACK TO CALLER'S IPL
          58    DD  0130  1572          PUSHL    R8                          ;SAVE THIS REGISTER
          58    D4  0132  1573          CLRL     R8                          ;SCANNING FOR GLOBAL PAGES
```

SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 35
V04-000   DELPAG - DELETE A SINGLE PAGE   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (20)

B 13

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              FEC9'  30  0134  1574          BSBW    MMG$PURGWSSCN               ;DELETE GLOBAL PAGES IN THE ADDRESS RANGE
                         0137  1575                                             ;FROM THE WORKING SET LIST
                 58  D5  0137  1576          TSTL    R8                         ;CHECK FOR ERROR
                 03  13  0139  1577          BEQL    10$
              FF6D  31  013B  1578          BRW     WSSCNWAIT                   ;GO WAIT FOR A RESOURCE
          58  8E  D0  013E  1579  10$:       MOVL    (SP)+,R8                   ;RESTORE R8
                         0141  1580  ;
                         0141  1581  ; FALL THROUGH TO DELPAG
                         0141  1582  ;
                         0141  1583
                         0141  1584          .ENABL  LSB
                         0141  1585
                         0141  1586  MMG$DELPAG::
                 7E  DC  0141  1587          MOVPSL  -(SP)                      ;SAVE PSL
                         0143  1588          SAVIPL                             ;PUSH CALLER'S IPL
                 50  DD  0146  1589          PUSHL   R0                         ;SAVE ACCESS MODE
              FEB5'  30  0148  1590  DELP1:   BSBW    MMG$PTEREF                 ;REFERENCE PTE, RETURN SVAPTE
                         014B  1591                                             ;RETURNS AT IPL=SYNCH
          96  50  E9  014B  1592          BLBC    R0,DELPAGLENVIO            ;BRANCH IF LENGTH VIOLATION
                         014E  1593  ;
                         014E  1594  ; R3 = SYSTEM VIRTUAL ADDRESS OF PAGE TABLE ENTRY
                         014E  1595  ;
          51  63  D0  014E  1596          MOVL    (R3),R1                    ;FETCH PAGE TABLE ENTRY
                 96  13  0151  1597          BEQL    BRDELPAGSUCCESS            ;BRANCH IF ALREADY DELETED
          50  6E  9A  0153  1598          MOVZBL  (SP),R0                    ;ACCESS MODE
              02F0  30  0156  1599          BSBW    MMG$PAGETYPE               ;CHECK ACCESS, RETURN PAGE TYPE
          90  50  E9  0159  1600          BLBC    R0,BRDELPAGRET            ;BRANCH IF PAGE OWNER VIOLATION
                         015C  1601  ;
                         015C  1602  ; R1 <0:7> PAGE TYPE TO CASE ON (TYP0*2 + TYP1)
                         015C  1603  ; R2 = VA, R3 = SVAPTE, IPL = SYNCH
                         015C  1604  ; 0(SP) = ACCESS MODE, 4(SP) = SAVED IPL, 8(SP) = SAVED PSL
                         015C  1605  ;
     50  63  16  00  EF  015C  1606          EXTZV   #PTE$V_PGFLVB,#PTE$S_PGFLVB,(R3),R0 ;PFN, PGFLVB, GPTX, OR SECTION
                         0161  1607          CASE    TYPE=B, SRC=R1, DISPLIST=<- ;DISPATCH ON THE PTE TYPE
                         0161  1608                  DELTRANS,-                 ;PAGE IN TRANSITION (OR DZRO)
                         0161  1609                  DELPAGFIL,-                ;PAGING FILE
                         0161  1610                  DELGLOBAL,-                ;GLOBAL PAGE
                         0161  1611                  DELSTX-                    ;SECTION TABLE INDEX
                         0161  1612          >
                         016D  1613  ;
                         016D  1614  ; FALL THROUGH THE CASE STATEMENT FOR VALID PAGE TABLE ENTRY
                         016D  1615  ;
                         016D  1616  DELVALID:
                         016D  1617          ASSUME PTE$V_WINDOW LE PTE$S_PGFLVB
      45  50  15  E0  016D  1618          BBS     #PTE$V_WINDOW,R0,50$       ;BR IF PFNMAP-ED PAGE
 00000000'EF  50  D1  0171  1619          CMPL    R0,MMG$GL_MAXMEM           ;IS PFN IN SHARED MEMORY?
                 3C  1A  0178  1620          BGTRU   50$                       ;BR ON YES, GO ALTER SHM GSD REF CNT
 0000'DF40  03  00  EE  017A  1621          EXTV    #PFN$V_PAGTYP,#PFN$S_PAGTYP, - ;GET PAGE TYPE
                 51      0181  1622                  @W^PFN$AB_TYPE[R0],R1
                         0182  1623          ASSUME PFN$C_PROCESS EQ 0
                 03  13  0182  1624          BEQL    10$
              FF68  31  0184  1625          BRW     DELPAGNOTPROCES ;BRANCH IF NOT PROCESS PAGE
                         0187  1626  10$:
                         0187  1627  ;
                         0187  1628  ; CHECK TO SEE THAT PAGE IS NOT LOCKED IN THE WORKING SET
                         0187  1629  ;
                         0187  1630          PFN_REFERENCE   -
```

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                           0187   1631          MOVZWL  <@W^PFN$Ax_WSLX[R0],R1>,-          ;INDEX TO WORKING SET LIST ENTRY
                           0187   1632                  LONG_OPCODE=MOVL,-
                           0187   1633                  IMAGE=SYS_NONPAGED
          6541   30   D3   018D   1634          BITL    #<WSL$M_WSLOCK ! WSL$M_PFNLOCK>,(R5)[R1] ;LOCKED OR PERMANENT PAGE?
                 26   12   0191   1635          BNEQ    57$                               ;BRANCH IF YES
     01   0000'DF40   B1   0193   1636          CMPW    @W^PFN$AW_REFCNT[R0],#1           ;MUST WAIT IF REFERENCE COUNT IS UP
                 67   14   0199   1637          BGTR    90$                               ;INDICATING I/O IN PROGRESS
        07 63   1A   E0   019B   1638          BBS     #PTE$V_MODIFY,(R3),40$            ;BRANCH IF PAGE MODIFIED
   16 0000'DF40   07   E1   019F   1639          BBC     #PFN$V_MODIFY,@W^PFN$AB_STATE[R0],60$ ;BRANCH IF PAGE NOT MODIFIED
   51 0000'DF40   09   9C   01A6   1640   40$:   ROTL    #<31-PTE$V_TYP0>,@W^PFN$AL_BAK[R0],R1 ;SECTION BACKING STORE?
                 0D   18   01AD   1641          BGEQ    60$                               ;BRANCH IF NOT
        09 51   1E   E0   01AF   1642          BBS     #<31-<PTE$V_TYP0-PTE$V_CHKPNT>>,R1,60$ ;IS IT MARKED CHECKPOINTED
                 0246   31   01B3   1643          BRW     DELPAG_WRTBAK                     ;MUST WRITE THIS PAGE BACK
                 FEB6   31   01B6   1644   50$:   BRW     PFNMAPDEL                         ;BR TO DELETE PFNMAP-ED PAGE
                 FF05   31   01B9   1645   57$:   BRW     DELPAGLOCKED                      ;BR TO DELETE LOCKED PAGE
                           01BC   1646   DELPAG_WRTDONE:
   51 0000'DF40   80 8F   8B   01BC   1647   60$:   BICB3   #PFN$M_MODIFY,@W^PFN$AB_STATE[R0],R1 ;FETCH ALL BUT MODIFY BIT
   0000'DF40   51   10   89   01C4   1648          BISB3   #PFN$M_DELCON,R1,@W^PFN$AB_STATE[R0] ;SET DELCON, CLEAR MODIFY
        03 A3   84 8F   8A   01CB   1649          BICB    #<PTE$M_VALID ! PTE$M_MODIFY>@-24,3(R3) ;MAKE PTE INTO TRANSITION FO
                           01D0   1650          INVALID R2                                ;AND INVALIDATE THE TRANSLATION BUFFER
                 52   DD   01D3   1651          PUSHL   R2                                ;SAVE VA
                           01D5   1652          PFN_REFERENCE  -
                           01D5   1653          MOVZWL  <@W^PFN$Ax_WSLX[R0],R1>,-          ;GET WORKING SET LIST INDEX
                           01D5   1654                  LONG_OPCODE=MOVL,-
                           01D5   1655                  IMAGE=SYS_NONPAGED
        53   6541   52   CD   01DB   1656          XORL3   R2,(R5)[R1],R3                    ;HIGH VA BITS MUST AGREE
        53   53   F7 8F   78   01E0   1657          ASHL    #-VA$S_BYTE,R3,R3                 ;SHIFT OUT THE ONES THAT MAY DIFFER
                 15   12   01E5   1658          BNEQ    WSLXVANOMAT                       ;AND BRANCH IF HIGH BITS DISAGREE
                 FE16'   30   01E7   1659          BSBW    MMG$DELWSLEPPG                     ;DELETE WORKING SET LIST ENTRY
                           01EA   1660                                                    ;FOR PRCESS PAGE
                           01EA   1661   ;
                           01EA   1662   ; IF THE PAGE WAS QUEUED FOR WRITING, THEN THE REFERENCE COUNT WILL BE UP
                           01EA   1663   ;
                           01EA   1664          DECREF  GTR=80$                           ;ONE LESS REF WITH WSLE RELEASED
                 FE07'   30   01F6   1665          BSBW    MMG$RELPFN                        ;WILL RESULT IN PTE CONTAINING ITS
                           01F9   1666                                                    ;BACKING STORE FORMAT
                 008D   31   01F9   1667          BRW     DELAGAIN1                         ;GO DELETE THE PTE
                           01FC   1668   ;
                           01FC   1669   ; WORKING SET LIST ENTRY AND VIRTUAL ADDRESS DISAGREE
                           01FC   1670   ;
                           01FC   1671   WSLXVANOMAT:
                           01FC   1672          BUG_CHECK WSLXVANMAT,FATAL
                           0200   1673   ;
                           0200   1674   ; I/O IN PROGRESS ON THIS PAGE, MUST WAIT
                           0200   1675   ;
                 04   BA   0200   1676   80$:   POPR    #^M<R2>                           ;RESTORE SAVED VA
                 29   11   0202   1677   90$:   BRB     DELPAGIOWAIT                      ;WAIT FOR I/O COMPLETION
                           0204   1678
                           0204   1679          .DSABL  LSB
                           0204   1680   ;
                           0204   1681   ; WAIT FOR I/O TO COMPLETE OR RESOURCE TO BECOME AVAILABLE
                           0204   1682   ; 0(SP) = SAVED ACCESS MODE, TO BE RESTORED TO R0
                           0204   1683   ; 8(SP) = PSL AT ENTRY TO DELPAG
                           0204   1684   ; R2, R4, R5, R6, R7, R8 AS THEY WERE ON ENTRY TO DELPAG
                           0204   1685   ; R1 = RESOURCE TO WAIT FOR
                           0204   1686   ;
                           0204   1687   DELPAGASTWAIT:
```

D 13

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              0A    E0  0204  1688           BBS      #MMG$V_NOWAIT_IPL0,-        ;RETURN SS$_ABORT
           24 FC AD      0206  1689                    MMG$L_MAXACMODE(FP),DELPAGIOWAIT
           51   01  9A  0209  1690           MOVZBL   #RSN$_ASTWAIT,R1           ;WAIT ON AST'S
              52    DD  020C  1691           PUSHL    R2                         ;SAVE VIRTUAL ADDRESS
           FDEF'  30  020E  1692           BSBW     MMG$RESRCWAIT              ;SET UP TO WAIT FOR THE RESOURCE
53  0C AE  001F0000 8F  CB  0211  1693           BICL3    #PSL$M_IPL,12(SP),R3      ;THIS WILL BE IPL 0 WAIT
              36    11  021A  1694           BRB      DELPAGIOWAIT4
                       021C  1695  ;
                       021C  1696  DELPAGRESWAIT:
              52    DD  021C  1697           PUSHL    R2                         ;SAVE VIRTUAL ADDRESS
           FDDF'  30  021E  1698           BSBW     MMG$RESRCWAIT              ;SET UP TO WAIT FOR THE RESOURCE
              04    BA  0221  1699           POPR     #^M<R2>                    ;RESTORE SAVED VIRTUAL ADDRESS
              01    BA  0223  1700           POPR     #^M<R0>                    ;R0 = SAVED ACCESS MODE
           6E  FF18 CF  DE  0225  1701           MOVAL    W^MMG$DELPAG,(SP)          ;STORE PC TO RESTART AT
           FDD3'  31  022A  1702           BRW      MMG$SVPCTX                 ;AND EXIT TO SCHEDULER
                       022D  1703
                       022D  1704  ;
                       022D  1705  ; R0 = PAGE FRAME NUMBER
                       022D  1706  ;
                       022D  1707  DELPAGIOWAIT:
53  08 AE  001F0000 8F  CB  022D  1708           BICL3    #PSL$M_IPL,8(SP),R3       ;THIS WILL BE IPL 0 WAIT
              0A    E1  0236  1709           BBC      #MMG$V_NOWAIT_IPL0,-       ;OK TO WAIT AT IPL 0
           06 FC AD      0238  1710                    MMG$L_MAXACMODE(FP),DELPAGIOWAIT2
           50   2C  3C  023B  1711           MOVZWL   #SS$_ABORT,R0
           01A8  31  023E  1712           BRW      DELPAGRET
                       0241  1713  ;
                       0241  1714  DELPAGIOWAIT2:
        0000'DF40  40 8F  88  0241  1715           BISB     #PFN$M_RPTEVT,@W^PFN$AB_TYPE[R0] ;WAKE THIS PROCESS ON I/O COMPLETE
                       0248  1716                                             ;DELCONPFN WILL CLEAR THIS BIT
              52    DD  0248  1717           PUSHL    R2                         ;SAVE VIRTUAL ADDRESS
           50  0000'CF  7E  024A  1718           MOVAQ    W^SCH$GQ_PFWQ,R0          ;PAGE FAULT WAIT QUEUE HEAD
           FDAE'  30  024F  1719           BSBW     MMG$PGFL_WAIT             ;SET UP TO WAIT ON PAGE FAULT WAIT QUEUE
                       0252  1720  DELPAGIOWAIT4:
              04    BA  0252  1721           POPR     #^M<R2>                    ;RESTORE SAVED VIRTUAL ADDRESS
              53    DD  0254  1722           PUSHL    R3                         ;WAIT AT SPECIFIED IPL - NOTE THAT
                       0256  1723                                             ;AST'S MAY OCCUR AT ANY TIME IF IPL 0
        00000000'EF  16  0256  1724           JSB      MMG$SVPCTX                 ;AND CALL SCHEDULER
                       025C  1725           SETIPL   #IPL$_ASTDEL             ;RAISE BACK TO ASTDEL
           FEE6  31  025F  1726           BRW      DELP1                      ;TRY TO DELETE THE PAGE AGAIN
                       0262  1727  ;
                       0262  1728  DELPAGIOWAIT3:
           53   08 AE  D0  0262  1729           MOVL     8(SP),R3                  ;WAIT AT IPL OF CALLER
              D9    11  0266  1730           BRB      DELPAGIOWAIT2             ;GO WAIT
                       0268  1731  ;
                       0268  1732  ; TRANSITION PAGE ON FREE, MODIFIED OR BAD PAGE LIST
                       0268  1733  ; R0 = PFN, R1 = LIST ID
                       0268  1734  ;
                       0268  1735  MFY_OR_FRELST:
              52    DD  0268  1736           PUSHL    R2                         ;SAVE VA
           52   51  D0  026A  1737           MOVL     R1,R2                     ;GET LIST ID
              17    13  026D  1738           BEQL     20$                       ;BRANCH IF FREE LIST
           0D 52  E9  026F  1739           BLBC     R2,10$                    ;BRANCH IF BAD PAGE LIST
51  0000'DF40  09  9C  0272  1740           ROTL     #<31-PTE$V_TYP0>,@W^PFN$AL_BAK[R0],R1 ;TYP0 BIT TO SIGN BIT
              04    18  0279  1741           BGEQ     10$                       ;BRANCH IF NOT SECTION PAGE (TYP0=0)
              04    BA  027B  1742           POPR     #^M<R2>                    ;RECOVER SAVED VA
              2B    11  027D  1743           BRB      DELFAULT                  ;AND FAULT THE SECTION PAGE
        0000'DF40  80 8F  8A  027F  1744  10$:       BICB     #PFN$M_MODIFY,@W^PFN$AB_STATE[R0] ;OTHERWISE SKIP THE WRITE
```

SYSCREDEL
V04-000

E 13
- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 38
DELPAG - DELETE A SINGLE PAGE   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (20)

SY
Ta

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        FD77'   30  0286  1745 20$:      BSBW     MMG$DELPFNLST           ;REMOVE PAGE FROM LIST AND DELETE CONTENTS
                    0289  1746 DELAGAIN1:
          04   BA  0289  1747           POPR     #^M<R2>                ;RECOVER SAVED VA
          23   11  028B  1748           BRB      DELAGAIN
                    028D  1749 ;
                    028D  1750 ; THIS IS A PAGE IN TRANSITION OR A DEMAND ZERO PAGE
                    028D  1751 ; R0 = PFN, R2 = VA, R3 = SVAPTE
                    028D  1752 ;
                    028D  1753 DELTRANS:
          50   D5  028D  1754           TSTL     R0                     ;ZERO PFN INDICATES DEMAND ZERO PAGE
          39   13  028F  1755           BEQL     BRBINCPGFLCNT          ;BRANCH IF IT IS
                    0291  1756
                    0291  1757           ASSUME   PFN$C_FREPAGLST EQ 0
                    0291  1758           ASSUME   PFN$C_MFYPAGLST EQ 1
                    0291  1759           ASSUME   PFN$C_BADPAGLST EQ 2
                    0291  1760           ASSUME   PFN$C_RELPEND   EQ 3
                    0291  1761           ASSUME   PFN$C_RDERR     EQ 4   ;-4
                    0291  1762           ASSUME   PFN$C_WRTINPROG EQ 5   ;-3
                    0291  1763           ASSUME   PFN$C_RDINPROG  EQ 6   ;-2
                    0291  1764           ASSUME   PFN$C_ACTIVE    EQ 7   ;-1
                    0291  1765
        03   00  EE  0291  1766           EXTV     #PFN$V_LOC,#PFN$S_LOC,- ;GET PAGE'S LOCATION
  51  0000'DF40       0294  1767                    @W^PFN$AB_STATE[R0],R1
                    0299  1768           CASE     R1,<-
                    0299  1769                    DELPAGIOWAIT3,-        ;-3 = 5 = WRITE IN PROGRESS
                    0299  1770                    DELFAULT,-            ;-2 = 6 = READ IN PROGRESS
                    0299  1771                    DELVALID,-            ;-1 = 7 = ACTIVE
                    0299  1772                    MFY_OR_FRELST,-       ;FREE PAGE LIST
                    0299  1773                    MFY_OR_FRELST,-       ;MODIFIED PAGE LIST
                    0299  1774                    MFY_OR_FRELST-        ;BAD PAGE LIST
                    0299  1775                    >,TYPE=B,LIMIT=#-3
                    02AA  1776 DELFAULT:
                    02AA  1777           ENBINT   4(SP)                  ;OTHERWISE RESTORE IPL
                    02AE  1778 ;
                    02AE  1779 ; FAULT THE PAGE OUT OF THE TRANSITION STATE
                    02AE  1780 ;
          62   95  02AE  1781           TSTB     (R2)                   ;REFERENCE THE PAGE
                    02B0  1782 DELAGAIN:
          01   BA  02B0  1783           POPR     #^M<R0>                ;RESTORE R0 = ACCESS MODE
                    02B2  1784           ENBINT                         ;POP AND RESTORE SAVED IPL
        5E   04  C0  02B5  1785           ADDL     #4,SP                 ;CLEAN OFF SAVED PSL
          FE86   31  02B8  1786           BRW      MMG$DELPAG            ;RESTART THE ROUTINE FROM THE TOP
                    02BB  1787 ;
                    02BB  1788 ; THIS IS A PAGE FILE PTE
                    02BB  1789 ; R0 = PAGE FILE VBN
                    02BB  1790 ;
                    02BB  1791 DELPAGFIL:
          50   D5  02BB  1792           TSTL     R0                     ;NULL PAGE FILE VBN?
          0B   13  02BD  1793           BEQL     BRBINCPGFLCNT          ;BRANCH IF YES
          0C   BB  02BF  1794           PUSHR    #^M<R2,R3>             ;SAVE VA, SVAPTE
    53  1F A5  9A  02C1  1795           MOVZBL   PHD$B_PAGFIL(R5),R3    ;PAGE FILE INDEX IN R1
        FD38'   30  02C5  1796           BSBW     MMG$DALCPAGFIL        ;DEALLOCATE THE PAGING FILE VBN
          0C   BA  02C8  1797           POPR     #^M<R2,R3>             ;RESTORE R2 = VA, R3 = SVAPTE
                    02CA  1798 BRBINCPGFLCNT:
          010B   31  02CA  1799           BRW      INCPGFLCNT            ;GO DELETE THE PTE
                    02CD  1800 ;
                    02CD  1801 ; THIS IS A GLOBAL PTE
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                                    02CD  1802  ; R0 = GLOBAL PAGE TABLE INDEX
                                    02CD  1803  ;
                                    02CD  1804  DELGLOBAL:
                                    02CD  1805          .ENABL LSB
51   0000'DF40    7B800000 8F   CB  02CD  1806          BICL3  #^C<PTE$M_VALID ! -       ;VALID BIT
                                    02D8  1807                 PTE$M_TYPT ! PTE$M_TYP0 ! - ;PAGE TYPE BITS
                                    02D8  1808                 PTE$M_PGFLVB>,@W^MMG$GL_GPTBASE[R0],R1 ;ETC, FROM MASTER PTE
        50   51   15   00   EF     02D8  1809          EXTZV  #PTE$V_PFN,#PTE$S_PFN,R1,R0 ;PFN FROM VALID OR TRANSITION PTE
                      10   13     02DD  1810          BEQL   12$                       ;PFN OF 0 SHOULD ONLY BE DZERO
                  22 51   1F   E0  02DF  1811          BBS    #PTE$V_VALID,R1,20$       ;BRANCH IF MASTER PTE IS VALID
                  3E 51   1A   E0  02E3  1812          BBS    #PTE$V_TYP1,R1,30$        ;BRANCH IF NOT TRANSITION PAGE
                  0A 51   16   E1  02E7  1813          BBC    #PTE$V_TYP0,R1,15$        ;BRANCH IF TRANSITION PTE
                                    02EB  1814  10$:    BUG_CHECK IVGB[TYP,FATAL         ;INVALID GLOBAL MASTER PTE TYPE
                                    02EF  1815
                      51   D5     02EF  1816  12$:    TSTL   R1                        ;MAKE SURE IT IS DZERO
                      71   13     02F1  1817          BEQL   70$                       ;GO DELETE IT
                      F6   11     02F3  1818          BRB    10$
                                    02F5  1819  ;
                                    02F5  1820  ; TRANSITION PAGE TABLE ENTRY
                                    02F5  1821  ;
                  03   00   EE     02F5  1822  15$:    EXTV   #PFN$V_LOC,#PFN$S_LOC,-   ;IF PAGE IS READ IN PROGRESS
51   0000'DF40                     02F8  1823                 @W^PFN$AB_STATE[R0],R1   ;READ ERROR, OR ACTIVE BUT NOT VALID
                                    02FD  1824                                          ;THEN MUST SEE IF THERE IS A WSLE
                      06   18     02FD  1825          BGEQ   20$                       ;BRANCH IF ON PFN LIST OR RELPEND
                  51 FD 8F   91   02FF  1826          CMPB   #<PFN$C_WRTINPROG ! <<-1>@PFN$S_LOC>>,R1 ; IF NOT WRITE IN PROGRESS
                      48   12     0303  1827          BNEQ   40$                       ;THEN READ IN PROG, READ ERR, ACTIVE
                                    0305  1828  ;
                                    0305  1829  ; SEE IF I/O IS IN PROGRESS ON THIS PAGE
                                    0305  1830  ;
                      51   D4     0305  1831  20$:    CLRL   R1                        ;COMPARE REFCNT AGAINST 0
                                    0307  1832                 PFN_REFERENCE   -
                                    0307  1833          TSTW   <@W^PFN$Ax_SHRCNT[R0]>,-         ;IF SHRCNT IS 0
                                    0307  1834                 LONG_OPCODE=TSTL,-
                                    0307  1835                 IMAGE=SYS_NONPAGED
                      02   13     030C  1836          BEQL   22$
                      51   D6     030E  1837          INCL   R1                        ;OTHERWISE COMPARE REFCNT AGAINST 1
51   0000'DF40    B1  0310  1838  22$:    CMPW   @W^PFN$AW_REFCNT[R0],R1 ;I/O IN PROGRESS ON THIS PAGE?
                      07   15     0316  1839          BLEQ   26$                       ;BRANCH IF NOT
        3E A4   40 A4  B1  0318  1840          CMPW   PCB$W_DIOLM(R4),PCB$W_DIOCNT(R4) ;ANY DIRECT I/O'S FOR THIS PROCESS?
                      38   1A     031D  1841          BGTRU  50$                       ;BRANCH IF YES
51   0000'DF40    D0  031F  1842  26$:    MOVL   @W^PFN$AL_BAK[R0],R1     ;BACKING STORE ADDRESS
                  34 51   16   E1  0325  1843  30$:    BBC    #PTE$V_TYP0,R1,60$        ;BRANCH IF NOT SECTION TABLE
                  27 51   11   E0  0329  1844          BBS    #PTE$V_DZRO,R1,DELFAULT1  ;FAULT IF DEMAND ZERO
                  08 51   10   E1  032D  1845          BBC    #PTE$V_CRF,R1,35$        ;BRANCH IF NOT COPY ON REFERENCE SECTION
        50   0080 C4   D0  0331  1846          MOVL   PCB$L_JIB(R4),R0         ;GET JIB ADDRESS
                  3C A0   D6     0336  1847          INCL   JIB$L_PGFLCNT(R0)       ;ONE LESS PAGE FILE PAGE CHARGED
                  51   51   32     0339  1848  35$:    CVTWL  R1,R1                     ;ISOLATE GLOBAL SECTION TABLE INDEX
                      24   BB     033C  1849          PUSHR  #^M<R2,R5>              ;SAVE THESE
        55   00000000'FF   DE  033E  1850          MOVAL  @L^MMG$GL_SYSPHD,R5     ;ADDRESS OF SYSTEM HEADER
                  FCB8'   30     0345  1851          BSBW   MMG$DECSECREF           ;COUNT ONE LESS SECTION REFERENCE
                      24   BA     0348  1852          POPR   #^M<R2,R5>              ;RESTORE SAVED REGISTERS
                  0093   31     034A  1853          BRW    DELPTE                   ;FINISH DELETING THE PAGE TABLE ENTRY
        B4 6E   09   E2  034D  1854  40$:    BBSS   #MMG$V_DELGBLDON,(SP),20$ ;IF ALREADY DELETED THESE GLOBAL
                                    0351  1855                                          ;WSLE'S, THEN DON'T DO IT AGAIN
                  FDD7   31     0351  1856          BRW    DELGBLRDINPROG          ;GO DO THE DELGBL SCAN
                                    0354  1857
                                    0354  1858  DELFAULT1:
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                   FF53   31  0354  1859          BRW     DELFAULT                    ;BR TO FAULT PAGE
                          0357  1860
                          0357  1861  :
                          0357  1862  ; THIS GLOBAL PAGE HAS I/O OUTSTANDING AND THIS PROCESS HAS SOME
                          0357  1863  ; DIRECT I/O'S IN PROGRESS.  JUST IN CASE HE IS RESPONSIBLE FOR THE
                          0357  1864  ; I/O REQUEST ON THIS PAGE, MAKE HIM WAIT FOR ALL HIS DIRECT I/O
                          0357  1865  ; REQUESTS TO COMPLETE.
                          0357  1866  :
            51    01   3C 0357  1867 50$:     MOVZWL  #RSN$_ASTWAIT,R1            ;WAIT FOR AN AST TO OCCUR
                 FEBF   31 035A  1868          BRW     DELPAGRESWAIT
                          035D  1869
                          035D  1870  :
                          035D  1871  ; HANDLE THE POSSIBILITY OF A GLOBAL SECTION WITH PAGE FILE BACKING STORE
                          035D  1872  :
                          035D  1873 60$:
      00  51  02  16   ED 035D  1874          CMPZV   #PTE$V_TYP0,#2,R1,#0        ;CHECK FOR PAGE FILE
                 87   12 0362  1875          BNEQ    10$
                 02   10 0364  1876 70$:     BSB     FNDGBLSECTBL                ;FIND SECTION REF COUNT & DECREMENT IT
                 78   11 0366  1877          BRB     DELPTE
                          0368  1878
                          0368  1879          .DSABL  LSB
                          0368  1880  :
                          0368  1881  ; FIND THE GLOBAL SECTION TABLE FOR A GIVEN GPTX
                          0368  1882  ; DECREMENT THE REFERENCE COUNT
                          0368  1883  :
                          0368  1884 FNDGBLSECTBL:
            00E4 8F   BB 0368  1885          PUSHR   #^M<R2,R5,R6,R7>
      55  00000000'FF   DE 036C  1886          MOVAL   @L^MMG$GL_SYSPHD,R5         ;ADDRESS OF SYSTEM HEADER
   56  63  16  00   EF 0373  1887          EXTZV   #PTE$V_PGFLVB,#PTE$S_PGFLVB,(R3),R6  ;GET THE GPT INDEX
   50  55  20 A5   C1 0378  1888          ADDL3   PHD$L_PSTBASOFF(R5),R5,R0   ;BASE OF SECTION TABLE
   51  00000000'EF   D0 037D  1889          MOVL    MMG$GL_GBLSECFND,R1        ;DO WE HAVE A PREVIOUS MATCH TO START WITH
                 04   12 0384  1890          BNEQ    10$                        ;YES
            51  24 A5   32 0386  1891 5$:      CVTWL   PHD$W_PSTLAST(R5),R1       ;INDEX TO LAST SECTION
            52  6041   DE 038A  1892 10$:     MOVAL   (R0)[R1],R2               ;SECTION ADDRESS
                 18 A2   D5 038E  1893          TSTL    SEC$L_REFCNT(R2)          ;IGNORE IF NEGATIVE REF COUNT
                 19   15 0391  1894          BLEQ    20$
            16  00   EF 0393  1895          EXTZV   #SEC$V_VPX,#SEC$S_VPX,-
            57  08 A2      0396  1896                  SEC$L_VPXPFC(R2),R7       ;BASE FOR THIS SECTION
            57  56   D1 0399  1897          CMPL    R6,R7
                 0E   19 039C  1898          BLSS    20$                        ;WRONG ONE
            57  1C A2   C0 039E  1899          ADDL2   SEC$L_PAGCNT(R2),R7
            57  56   D1 03A2  1900          CMPL    R6,R7
                 05   18 03A5  1901          BGEQ    20$                        ;WRONG ONE
            FC56'   30 03A7  1902          BSBW    MMG$DECSECREF              ;GO DEC THE REF COUNT
                 15   11 03AA  1903          BRB     30$
      00000000'EF   D5 03AC  1904 20$:     TSTL    MMG$GL_GBLSECFND          ;IS THIS THE FIRST LOOP
                 08   13 03B2  1905          BEQL    25$                        ;NO
      00000000'EF   D4 03B4  1906          CLRL    MMG$GL_GBLSECFND
                 CA   11 03BA  1907          BRB     5$
            51  08   C0 03BC  1908 25$:     ADDL2   #SEC$C_LENGTH@-2,R1       ;NEXT SECTION
                 C9   19 03BF  1909          BLSS    10$
            00E4 8F   BA 03C1  1910 30$:     POPR    #^M<R2,R5,R6,R7>
                 05      03C5  1911          RSB
                          03C6  1912  :
                          03C6  1913  ; THIS IS A PROCESS SECTION PAGE
                          03C6  1914  ; R0 = SECTION INDEX AND FLAGS
                          03C6  1915  :
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                     03C6  1916 DELSTX:                                        ;PROCESS SECTION PAGE
        8A 50   11   E0  03C6  1917         BBS     #PTE$V_DZRO,R0,DELFAULT1 ;FAULT IF DEMAND ZERO
           51   50   32  03CA  1918         CVTWL   R0,R1                     ;SECTION INDEX
                52   DD  03CD  1919         PUSHL   R2                        ;SAVE VA
             FC2E'   30  03CF  1920         BSBW    MMG$DECSECREF             ;DECREASE SECTION REFERENCE COUNT
                04   BA  03D2  1921         POPR    #^M<R2>                   ;RECOVER SAVED VA
        08 50   10   E1  03D4  1922         BBC     #PTE$V_CRF,R0,DELPTE      ;BRANCH IF NOT CRF SECTION
                     03D8  1923 INCPGFLCNT:
        50  0080 C4  D0  03D8  1924         MOVL    PCB$L_JIB(R4),R0          ;GET JIB ADDRESS
           3C A0      D6  03DD  1925         INCL    JIB$L_PGFLCNT(R0)        ;ONE LESS PAGE FILE PAGE CHARGED
                     03E0  1926 ;
                     03E0  1927 ; FALL THROUGH TO DELPTE
                     03E0  1928 ;
                     03E0  1929 DELPTE:
                63   D4  03E0  1930         CLRL    (R3)                     ;JUST ZERO THE PTE
                56   D5  03E2  1931         TSTL    R6                       ;LAST PAGE OF THE RANGE?
                0B   13  03E4  1932         BEQL    DELPAGLAST               ;YES, GO CONTRACT THE REGION
                     03E6  1933
                     03E6  1934 DELPAGSUCCESS:
        50   01   3C  03E6  1935         MOVZWL  #SS$_NORMAL,R0          ;SUCCESS RETURN
                     03E9  1936 ;
                     03E9  1937 ; 0(SP) = ACCESS MODE, 4(SP) = IPL TO RESTORE, 8(SP) = SAVED PSL
                     03E9  1938 ;
                     03E9  1939 DELPAGRET:
                     03E9  1940         ENBINT  4(SP)                    ;RESTORE SAVED IPL
        5E   0C   C0  03ED  1941         ADDL    #12,SP                   ;ADJUST THE STACK
                05  03F0  1942         RSB                              ;AND RETURN
                     03F1  1943 ;
                     03F1  1944 ; LAST PAGE OF THE DELETE RANGE
                     03F1  1945 ;
                     03F1  1946 DELPAGLAST:
                     03F1  1947         SETIPL  #IPL$_ASTDEL             ;NO NEED FOR SYNCH HERE
      0000056D'EF   16  03F4  1948         JSB     MMG$CONTRACT             ;CONTRACT REGION IF POSSIBLE
                EA   11  03FA  1949         BRB     DELPAGSUCCESS           ;AND EXIT SUCCESSFULLY
                     03FC  1950 ;
                     03FC  1951 ; MUST WRITE SECTION PAGE BACK TO DISK BEFORE DELETE
                     03FC  1952 ; 0(SP) = SAVED ACCESS MODE
                     03FC  1953 ; 8(SP) = SAVED PSL AT ENTRY TO DELPAG
                     03FC  1954 ;
                     03FC  1955 DELPAG_WRTBAK:
                0D   BB  03FC  1956         PUSHR   #^M<R0,R2,R3>           ;SAVE SOME REGISTERS
             3E A4   B5  03FE  1957         TSTW    PCB$W_DIOCNT(R4)       ;EXHAUSTED DIRECT I/O QUOTA?
                3E   13  0401  1958         BEQL    40$                    ;BRANCH IF YES, WAIT FOR SOME TO COMPLETE
        52  0000'DF   0F  0403  1959         REMQUE  @W^IOC$GL_IRPFL,R2     ;GET AN I/O PACKET FROM THE SIDE LIST
                0D   1C  0408  1960         BVC     20$                    ;BRANCH IF GOT ONE
           51 C4 8F   9A  040A  1961         MOVZBL  #IRP$C_LENGTH,R1       ;SIZE OF PACKET TO ALLOCATE
             FBEF'   30  040E  1962         BSBW    EXE$ALONONPAGED        ;ALLOCATE IT FROM NON-PAGED POOL
           51   03   9A  0411  1963         MOVZBL  #RSN$_NPDYNMEM,R1      ;IN ANTICIPATION OF ALLOCATION FAILURE
             2D 50   E9  0414  1964         BLBC    R0,60$                 ;BRANCH IF MUST WAIT FOR A PACKET
           51   52   D0  0417  1965 20$:    MOVL    R2,R1                  ;I/O PACKET ADDRESS TO R1
                0D   BA  041A  1966         POPR    #^M<R0,R2,R3>          ;R0=PFN, R2=VA, R3=SVAPTE
        08 A1 C4 8F   9B  041C  1967         MOVZBW  #IRP$C_LENGTH,IRP$W_SIZE(R1) ;SET SIZE FIELD
                     0421  1968                                          ;TYPE FIELD FILLED IN BY WRTPGSBAK
        0B A1   6E   90  0421  1969         MOVB    (SP),IRP$B_RMOD(R1)    ;REQUESTING MODE FROM ACCESS MODE PARAM
        48 A1   52   D0  0425  1970         MOVL    R2,IRP$L_SEGVBN(R1)    ;SAVE STARTING VA FOR SCAN
                0D   BB  0429  1971         PUSHR   #^M<R0,R2,R3>          ;PRESERVE THESE ACROSS THE CALL
        52  0000'DF40   D0  042B  1972         MOVL    @W^PFN$AL_BAK[R0],R2   ;BACKING STORE ADDRESS IN R2
```

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SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 42
V04-000   DELPAG - DELETE A SINGLE PAGE   5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (20)

```
        FBCC'  30  0431  1973          BSBW    MMG$WRTPGSBAK              ;WRITE A CLUSTER OF PAGES BACK
           OD  BA  0434  1974          POPR    #^M<R0,R2,R3>             ;RESTORE SAVED REGISTERS
 03  00    05  F0  0436  1975          INSV    #PFN$C_WRTINPROG,#PFN$V_LOC,#PFN$S_LOC,-
    0000'DF40      043A  1976                  @W^PFN$AB_STATE[R0]       ;FORCE THIS PAGE TO WRITE IN PROGRESS
        FD7B  31  043E  1977          BRW     DELPAG_WRTDONE
                  0441  1978  :
                  0441  1979  : DIRECT I/O QUOTA EXCEEDED, MUST WAIT FOR A DIRECT I/O TO COMPLETE
                  0441  1980  :
     51    01  9A  0441  1981  40$:    MOVZBL  #RSN$_ASTWAIT,R1          ;WAIT FOR AN AST TO OCCUR
                  0444  1982  :
                  0444  1983  : UNABLE TO WRITE SECTION PAGE BACK, MUST WAIT FOR RESOURCE IN R1
                  0444  1984  :
           OD  BA  0444  1985  60$:    POPR    #^M<R0,R2,R3>            ;R0=PFN, R2=VA, R3=SVAPTE
        FDD3  31  0446  1986          BRW     DELPAGRESWAIT            ;GO WAIT FOR THE RESOURCE
```

SYSCREDEL
V04-000

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- SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03 VAX/VMS Macro V04-00   Page 43
CONTRACT - ADJUST THE LENGTH OF THE SPEC 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1   (21)

```
                          0449   1988              .SBTTL   CONTRACT - ADJUST THE LENGTH OF THE SPECIFIED REGION
                          0449   1989
                          0449   1990  ;
                          0449   1991  ; INPUTS:
                          0449   1992  ;
                          0449   1993  ;         R2 = VIRTUAL ADDRESS (USED ONLY TO SPECIFY P0/P1 SPACE)
                          0449   1994  ;         R4 = PROCESS CONTROL BLOCK ADDRESS
                          0449   1995  ;         R5 = PROCESS HEADER ADDRESS (P1 SPACE REQUIRED)
                          0449   1996  ;         IPL = ASTDEL
                          0449   1997  ;
                          0449   1998  ; OUTPUTS:
                          0449   1999  ;
                          0449   2000  ;         R2 PRESERVED
                          0449   2001  ;
                          0449   2002  ;
                          0449   2003  ; ****************************************************************
                          0449   2004  ;
                          0449   2005  ; *************** THE FOLLOWING CODE MAY BE PAGED ****************
                          0449   2006  ;
                      0000056D   2007              .PSECT   Y$EXEPAGED
                          056D   2008  ;
                          056D   2009  ; ****************************************************************
                          056D   2010  ;
                          056D   2011  MMG$CONTRACT:
                52  DD    056D   2012              PUSHL    R2                          ;SAVE VIRTUAL ADDRESS
            FA8E' 30     056F   2013              BSBW     MMG$DALCSTXSCN              ;SEE IF ANY SECTIONS TO DEALLOCATE
                04  BA    0572   2014              POPR     #^M<R2>                     ;RESTORE VIRTUAL ADDRESS
             50  01  CE   0574   2015              MNEGL    #1,R0                       ;INITIAL COUNT OF PAGES TO REDUCE THE REGION
          14  52  1E  E0  0577   2016              BBS      #VA$V_P1,R2,40$             ;BRANCH IF P1 SPACE
                          057B   2017  ;
                          057B   2018  ; P0 SPACE
                          057B   2019  ;
          16   09  EE     057B   2020              EXTV     #VA$V_VPN,#VA$S_VPN+1,-     ;GET VIRTUAL PAGE NUMBER
          53   28  A5     057E   2021                       PHD$L_FREP0VA(R5),R3        ;OF FIRST FREE PAGE IN P0 SPACE
      53  00000000'EF CO  0581   2022              ADDL     SGN$GL_PHDLWCNT,R3          ;AND FORM PAGE TABLE INDEX
                50  DD    0588   2023              PUSHL    R0                          ;-1 FOR GOING BACKWARDS THROUGH PTE'S
             51  09  DB   058A   2024              MFPR     #PR$_P0LR,R1                ;NUMBER OF PAGES IN P0 SPACE
                21  11    058D   2025              BRB      70$                         ;START SCAN OF ZERO PTE'S
                          058F   2026  ;
                          058F   2027  ; P1 SPACE
                          058F   2028  ;
          16   09  EE     058F   2029  40$:         EXTV     #VA$V_VPN,#VA$S_VPN+1,-     ;VIRTUAL PAGE NO.
          53   30  A5     0592   2030                       PHD$L_FREP1VA(R5),R3        ;OF FIRST FREE PAGE IN P1 SPACE
      53  00000000'EF CO  0595   2031              ADDL     SGN$GL_P1LWCNT,R3          ;FORM PT INDEX
                01  DD    059C   2032              PUSHL    #1                          ;+1 FOR GOING FORWARD THROUGH PTE'S
  51  00200000 8F  00D4 C5 C3 059E 2033            SUBL3    PHD$L_P1LR(R5),#1@21,R1    ;NO. OF PAGES IN P1 SPACE
                06  11    05A8   2034              BRB      70$                         ;START SCANNING FOR ZERO PTE'S
                          05AA   2035  ;
                          05AA   2036  ; 0(SP) = +1 IF GOING FORWARD IN PTE'S (P1 SPACE)
                          05AA   2037  ;       = -1 IF GOING BACKWARDS IN PTE'S (P0 SPACE)
                          05AA   2038  ; R0 = -1 WITH LOOP ENTERED AT 70$
                          05AA   2039  ; R1 = MAX NUMBER OF PAGE TABLE ENTRIES TO SCAN (POSSIBLY 0)
                          05AA   2040  ; R3 = PTE INDEX FOR THE FIRST NON-EXISTING PAGE IN THE REGION
                          05AA   2041  ;
          6C B443  D5     05AA   2042  60$:         TSTL     @PCB$L_PHD(R4)[R3]         ;DELETED PAGE TABLE ENTRY?
                07  12    05AE   2043              BNEQ     80$                         ;BRANCH IF NOT
             53  6E  CO   05B0   2044  70$:         ADDL     (SP),R3                     ;NEXT PAGE TABLE INDEX
```

```
      F3 50   51  F2   05B3  2045              AOBLSS  R1,R0,60$                  ;TEST NEXT PTE
                       05B7  2046  :
                       05B7  2047  : R0 = NUMBER OF PAGES TO CONTRACT THE REGION BY, POSSIBLY 0
                       05B7  2048  :
      2C A5   50  C0   05B7  2049  80$:     ADDL    R0,PHD$L_FREPTECNT(R5)   ;THAT MANY MORE FREE PAGE TABLE ENTRIES
      51 50   09  9C   05BB  2050           ROTL    #9,R0,R1                 ;NO. OF BYTES TO CONTRACT REGION BY
              8E  D5   05BF  2051           TSTL    (SP)+                    ;CLEAN OFF PTE SCAN DIRECTION
              12  14   05C1  2052           BGTR    90$                      ;BRANCH IF P1 SPACE
                       05C3  2053  :
                       05C3  2054  : P0 SPACE
                       05C3  2055  :
   00CC C5    50  C2   05C3  2056           SUBL    R0,PHD$L_POLRASTL(R5)    ;ADJUST NO. OF PAGES
      28 A5   51  C2   05C8  2057           SUBL    R1,PHD$L_FREP0VA(R5)     ;ADJUST FIRST FREE P0 SPACE VIRT ADR
              1B  19   05CC  2058           BLSS    120$                     ;ERROR IF NOT STILL P0 SPACE
                       05CE  2059           LDP0LR  PHD$L_POLRASTL(R5)       ;LOAD HARDWARE P0 SPACE LENGTH REGISTER
   09   00CC C5   DA   05CE                 MTPR    PHD$L_POLRASTL(R5),S^#PR$_P0LR
              10  11   05D3  2060           BRB     100$
                       05D5  2061  :
                       05D5  2062  : P1 SPACE
                       05D5  2063  :
   00D4 C5    50  C0   05D5  2064  90$:     ADDL    R0,PHD$L_P1LR(R5)        ;UPDATE P1 LENGTH
      30 A5   51  C0   05DA  2065           ADDL    R1,PHD$L_FREP1VA(R5)     ;AND FIRST FREE P1 VIRT ADR
              09  19   05DE  2066           BLSS    120$                     ;ERROR IF NOT STILL P1 SPACE
                       05E0  2067           LDP1LR  PHD$L_P1LR(R5)           ;UPDATE HARDWARE P1 LENGTH REGISTER
   0B   00D4 C5   DA   05E0                 MTPR    PHD$L_P1LR(R5),S^#PR$_P1LR
              FF61 30  05E5  2068  100$:    BSBW    UPDATPTCNT               ;UPDATE MAX PAGE TABLE COUNT
                   05   05E8  2069           RSB
                       05E9  2070  :
                       05E9  2071  : FREE P0/P1 VIRTUAL ADDRESS IS FOULED UP
                       05E9  2072  :
                       05E9  2073  120$:    BUG_CHECK CONTRACT,FATAL         ;BAD FREP0VA OR FREP1VA
```

```
                              05ED   2075               .SBTTL  PAGETYPE - CALCULATE PAGE TYPE
                              05ED   2076
                              05ED   2077 ;
                              05ED   2078 ; INPUTS:
                              05ED   2079 ;
                              05ED   2080 ;          R0 = ACCESS MODE FOR PAGE OWNER CHECK
                              05ED   2081 ;          R1 = PAGE TABLE ENTRY CONTENTS (NOT 0)
                              05ED   2082 ;
                              05ED   2083 ; OUTPUTS:
                              05ED   2084 ;
                              05ED   2085 ;          R0 = STATUS CODE
                              05ED   2086 ;                    SS$_NORMAL IF SUCCESSFUL
                              05ED   2087 ;                    SS$_PAGOWNVIO IF CAN'T OPERATE ON THIS PAGE
                              05ED   2088 ;          R1 = PAGE TYPE CODE IN LOW BYTE
                              05ED   2089 ;                    0 = TRANSITION
                              05ED   2090 ;                    1 = PAGE FILE
                              05ED   2091 ;                    2 = GLOBAL
                              05ED   2092 ;                    3 = SECTION INDEX
                              05ED   2093 ;                    4 = VALID
                              05ED   2094 ;
                              05ED   2095 ;
                              05ED   2096 ; *****************************************************************
                              05ED   2097 ;
                              05ED   2098 ; *************** THE FOLLOWING CODE MUST BE RESIDENT **************
                              05ED   2099 ;
                          00000449   2100               .PSECT  $MMGCOD
                              0449   2101 ;
                              0449   2102 ; *****************************************************************
                              0449   2103 ;
                              0449   2104 MMG$PAGETYPE::
50  51  02  17   ED          0449   2105               CMPZV   #PTE$V_OWN,#PTE$S_OWN,R1,R0 ;PAGE OWNER OK?
            19   19          044E   2106               BLSS    20$                         ;BRANCH IF NO
        50  01   3C          0450   2107               MOVZWL  #SS$_NORMAL,R0              ;SUCCESSFUL COMPLETION
    04  51  1F   E1          0453   2108               BBC     #PTE$V_VALID,R1,10$        ;BRANCH IF PAGE NOT VALID
        51  04   D0          0457   2109               MOVL    #4,R1                       ;CODE FOR VALID PAGE
            05              045A   2110               RSB
51  51  05  16   EE          045B   2111 10$:          EXTV    #PTE$V_TYP0,#<PTE$V_TYP1+1-PTE$V_TYP0>,R1,R1
                              0460   2112 ;
                              0460   2113 ; LOW BIT = TYP0, SIGN BIT = TYP1
                              0460   2114 ;
51  51  01   9C              0460   2115               ROTL    #1,R1,R1                    ;BIT 0 = TYP1, BIT 1 = TYP0
    51  FC  8F   8A          0464   2116               BICB    #^C<3>,R1                   ;CLEAR REST OF THE BYTE
            05              0468   2117               RSB                                  ;AND RETURN THE PAGE TYPE
                              0469   2118 ;
                              0469   2119 ; PAGE OWNER VIOLATION
                              0469   2120 ;
50  01EC  8F   3C            0469   2121 20$:          MOVZWL  #SS$_PAGOWNVIO,R0           ;PAGE OWNER VIOLATION
            05              046E   2122               RSB
                              046F   2123
                              046F   2124
                              046F   2125
                              046F   2126               .END
```

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SYSCREDEL   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 46   SY
Symbol table   5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (22)   VO

Symbol	Value			Symbol	Value		
...PFN	= 00000307	R	03	IPL$_SYNCH	= 00000008		
ACCVIORET	000002D5	R	02	IRP$B_RMOD	= 0000000B		
ACMODE	= 0000000C			IRP$C_LENGTH	= 000000C4		
BRBINCPGFLCNT	000002CA	R	03	IRP$L_SEGVBN	= 00000048		
BRDELPAGRET	000000EC	R	03	IRP$W_SIZE	= 00000008		
BRDELPAGSUCCESS	000000E9	R	03	JIB$L_PGFLCNT	= 0000003C		
BUG$_CONTRACT	*** ****	X	02	JIB$L_PGFLQUOTA	= 00000038		
BUG$_IVGBLTYP	***.****	X	03	MFY_OR_FRELST	00000268	R	03
BUG$_NOSHMGSD	********	X	03	MMG$AB_DZRO	00000174	R	02
BUG$_WSLXVANMAT	********	X	03	MMG$CONTRACT	0000056D	R	02
CRECOM_DONE	000003A8	R	02	MMG$CREDEL	00000347	RG	02
CRECOM_INIT	0000036B	R	02	MMG$CREPAG	00000414	RG	02
CTL$GL_IPAGEFL	********	X	02	MMG$CREPAGINI	0000015C	R	02
CTL$GL_PHD	********	X	02	MMG$CRETVA	0000017F	RG	02
CTL$GL_VIRTPEAK	********	X	02	MMG$C_LENGTH	= FFFFFFE4		
DELAGAIN	000002B0	R	03	MMG$DALCPAGFIL	********	X	03
DELAGAIN1	00000289	R	03	MMG$DALCSTXSCN	********	X	02
DELCOM	00000322	R	02	MMG$DECSECREF	********	X	03
DELETEFIRST	00000402	R	02	MMG$DELPAG	00000141	RG	03
DELFAULT	000002AA	R	03	MMG$DELPFNLST	********	X	03
DELFAULT1	00000354	R	03	MMG$DELWSLEPPG	********	X	03
DELGBLRDINPROG	0000012B	R	03	MMG$EXPREG	00000000	RG	02
DELGLOBAL	000002CD	R	03	MMG$EXTRADYNWS	********	X	03
DELP1	00000148	R	03	MMG$FAST_CREATE	000000DD	RG	02
DELPAGASTWAIT	00000204	R	03	MMG$FINDGSDPFN	********	X	03
DELPAGFIL	000002BB	R	03	MMG$GL_GBLSECFND	********	X	03
DELPAGIOWAIT	0000022D	R	03	MMG$GL_GPTBASE	********	X	03
DELPAGIOWAIT2	00000241	R	03	MMG$GL_MAXMEM	********	X	02
DELPAGIOWAIT3	00000262	R	03	MMG$GL_SPTBASE	********	X	03
DELPAGIOWAIT4	00000252	R	03	MMG$GL_SYSPHD	********	X	03
DELPAGLAST	000003F1	R	03	MMG$INADRINI	00000297	RG	02
DELPAGLENVIO	000000E4	R	03	MMG$IN_REGION	000001DF	RG	02
DELPAGLOCKED	000000C1	R	03	MMG$LCKULKPAG	********	X	03
DELPAGNOTPROCES	000000EF	R	03	MMG$L_CALLEDIPL	= FFFFFFF8		
DELPAGRESWAIT	0000021C	R	03	MMG$L_MAXACMODE	= FFFFFFFC		
DELPAGRET	000003E9	R	03	MMG$L_PAGESUBR	= FFFFFFF0		
DELPAGSUCCESS	000003E6	R	03	MMG$L_SAVRETADR	= FFFFFFF4		
DELPAG_WRTBAK	000003FC	R	03	MMG$L_SVSTARTVA	= FFFFFFEC		
DELPAG_WRTDONE	000001BC	R	03	MMG$MOVPTLOCK	00000004	RG	03
DELPTE	000003E0	R	03	MMG$MOVPTLOCK1	00000000	RG	03
DELPTE1	0000008D	R	03	MMG$PAGETYPE	00000449	RG	03
DELSTX	000003C6	R	03	MMG$PGFLTWAIT	********	X	03
DELTRANS	0000028D	R	03	MMG$PTEREF	********	X	03
DELVALID	0000016D	R	03	MMG$PURGWSSCN	********	X	03
EXE$ADJWSL	********	X	02	MMG$REFCNTNEG	********	X	03
EXE$ALONONPAGED	********	X	03	MMG$RELPFN	********	X	03
EXE$CNTREG	00000248	RG	02	MMG$RESRCWAIT	********	X	03
EXE$CRETVA	00000187	RG	02	MMG$RETADRINI	000002A6	RG	02
EXE$DELTVA	000002D9	RG	02	MMG$RETRANGE	000002C2	RG	02
EXE$EXPREG	0000000E	RG	02	MMG$SVPCTX	********	X	03
EXE$MAXACMODE	********	X	02	MMG$SWAPWSLE	********	X	03
EXPANDCHK	000004D2	R	02	MMG$TRY_ALL	0000008D	RG	02
FNDGBLSECTBL	00000368	R	03	MMG$V_CHGPAGFIL	= 00000008		
INADR	= 00000004			MMG$V_DELGBLDON	= 00000009		
INCPGFLCNT	000003D8	R	03	MMG$V_NOWAIT_IPLO	= 0000000A		
IOC$GL_IRPFL	********	X	03	MMG$WRTPGSBAK	********	X	03
IPL$_ASTDEL	= 00000002			OP$_MOVL	= 000000D0		

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SYSCREDEL - SYSTEM SERVICE CREATE & DELETE PAGE 16-SEP-1984 01:49:03 VAX/VMS Macro V04-00 Page 47
Symbol table 5-SEP-1984 03:49:40 [SYS.SRC]SYSCREDEL.MAR;1 (22)

```
OPS_MOVZWL        = 0000003C            PSLSM_IPL         = 001F0000
OPS_TSTL          = 000000D5            PTESC_EOWN        = 00800000
OPS_TSTW          = 000000B5            PTESC_EW          = 28000000
PAGCNT            = 00000004            PTESC_KOWN        = 00000000
PCBSL_JIB         = 00000080            PTESC_KW          = 10000000
PCBSL_PHD         = 0000006C            PTESC_SOWN        = 01000000
PCBSW_DIOCNT      = 0000003E            PTESC_SW          = 40000000
PCBSW_DIOLM       = 00000040            PTESC_UOWN        = 01800000
PFNSAB_STATE      = ********  X  03     PTESC_UW          = 20000000
PFNSAB_TYPE       = ********  X  03     PTESM_MODIFY      = 04000000
PFNSAL_BAK        = ********  X  03     PTESM_PGFLVB      = 003FFFFF
PFNSAW_REFCNT     = ********  X  03     PTESM_TYP0        = 00400000
PFNSAX_SHRCNT     = ********  X  03     PTESM_TYP1        = 04000000
PFNSAX_WSLX       = ********  X  03     PTESM_VALID       = 80000000
PFNSC_ACTIVE      = 00000007            PTESS_OWN         = 00000002
PFNSC_BADPAGLST   = 00000002            PTESS_PFN         = 00000015
PFNSC_FREPAGLST   = 00000000            PTESS_PGFLVB      = 00000016
PFNSC_MFYPAGLST   = 00000001            PTESS_PROT        = 00000004
PFNSC_PPGTBL      = 00000004            PTESV_CHKPNT      = 00000015
PFNSC_PROCESS     = 00000000            PTESV_CRF         = 00000010
PFNSC_RDERR       = 00000004            PTESV_DZRO        = 00000011
PFNSC_RDINPROG    = 00000006            PTESV_MODIFY      = 0000001A
PFNSC_RELPEND     = 00000003            PTESV_OWN         = 00000017
PFNSC_SYSTEM      = 00000001            PTESV_PFN         = 00000000
PFNSC_WRTINPROG   = 00000005            PTESV_PGFLVB      = 00000000
PFNSM_DELCON      = 00000010            PTESV_PROT        = 0000001B
PFNSM_MODIFY      = 00000080            PTESV_TYP0        = 00000016
PFNSM_RPTEVT      = 00000040            PTESV_TYP1        = 0000001A
PFNSS_LOC         = 00000003            PTESV_VALID       = 0000001F
PFNSS_PAGTYP      = 00000003            PTESV_WINDOW      = 00000015
PFNSV_LOC         = 00000000            REGION            = 00000010
PFNSV_MODIFY      = 00000007            RETADR            = 00000008
PFNSV_PAGTYP      = 00000000            RSNS_ASTWAIT      = 000000C1
PFNMAPDEL           0000006F R    03    RSNS_NPDYNMEM     = 00000003
PHDSB_PAGFIL      = 0000001F            SCHSGL_CURPCB     = ********  X  02
PHDSL_FREPOVA     = 00000028            SCHSGQ_PFWQ       = ********  X  03
PHDSL_FREP1VA     = 00000030            SECSC_LENGTH      = 00000020
PHDSL_FREPTECNT   = 0000002C            SECSL_PAGCNT      = 0000001C
PHDSL_MPINHIBIT   = 00000104            SECSL_REFCNT      = 00000018
PHDSL_POBR        = 000000C8            SECSL_VPXPFC      = 00000008
PHDSL_POLRASTL    = 000000CC            SECSS_VPX         = 00000016
PHDSL_P1BR        = 000000D0            SECSV_RESIDENT    = 0000000D
PHDSL_P1LR        = 000000D4            SECSV_VPX         = 00000000
PHDSL_PSTBASOFF   = 00000020            SECSW_FLAGS       = 00000014
PHDSL_PTWSLELCK   = 00000064            SGNSGL_P1LWCNT    = ********  X  02
PHDSW_PSTLAST     = 00000024            SGNSGL_PHDLWCNT   = ********  X  02
PHDSW_PTCNTLCK    = 0000005C            SGNSGL_PTPAGCNT   = ********  X  02
PHDSW_PTCNTMAX    = 00000072            SHMPAGDEL           00000096 R    03
PHDSW_WSDYN       = 0000000E            SSS_ABORT         = 0000002C
PHDSW_WSLIST      = 00000008            SSS_ACCVIO        = 0000000C
PHDSW_WSLOCK      = 0000000C            SSS_EXQUOTA       = 0000001C
PHDSW_WSQUOTA     = 00000018            SSS_ILLPAGCNT     = 000000FC
PHDSW_WSSIZE      = 00000050            SSS_INSFWSL       = 0000011C
PRS_IPL           = 00000012            SSS_NOPRIV        = 00000024
PRS_POLR          = 00000009            SSS_NORMAL        = 00000001
PRS_P1LR          = 0000000B            SSS_PAGOWNVIO     = 000001EC
PRS_TBIS          = 0000003A            SSS_VASFULL       = 00000244
```

SYSCREDEL   B 14
Symbol table   - SYSTEM SERVICE CREATE & DELETE PAGE   16-SEP-1984 01:49:03   VAX/VMS Macro V04-00   Page 48   SYS
                                                         5-SEP-1984 03:49:40   [SYS.SRC]SYSCREDEL.MAR;1   (22)   V04

```
SS$_WASSET                 = 00000009
TMP...                     = 00000001
UPDATPTCNT                   00000549 R      02
VA$M_P1                    = 40000000
VA$M_SYSTEM                = 80000000
VA$M_VPG                   = FFFFFE00
VA$S_BYTE                  = 00000009
VA$S_VPN                   = 00000015
VA$V_P1                    = 0000001E
VA$V_VPN                   = 00000009
WSL$M_PFNLOCK              = 00000010
WSL$M_WSLOCK               = 00000020
WSLXVANOMAT                  000001FC R      03
WSSCNWAIT                    000000AB R      03
```

```
                        +-------------------+
                        ! Psect synopsis !
                        +-------------------+
```

PSECT name	Allocation	PSECT No.	Attributes											
. ABS .	00000000 (0.)	00 (0.)	NOPIC	USR	CON	ABS	LCL	NOSHR	NOEXE	NORD	NOWRT	NOVEC	BYTE
ABS	00000000 (0.)	01 (1.)	NOPIC	USR	CON	ABS	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE
Y$EXEPAGED	000005ED (1517.)	02 (2.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE
$MMGCOD	0000046F (1135.)	03 (3.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE
Z$INIT$PFN_FIXUP_TABLE	00000018 (24.)	04 (4.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE

```
                    +-------------------------+
                    ! Performance indicators !
                    +-------------------------+
```

Phase	Page faults	CPU Time	Elapsed Time
Initialization	35	00:00:00.07	00:00:01.27
Command processing	127	00:00:00.52	00:00:06.91
Pass 1	476	00:00:18.55	00:01:02.77
Symbol table sort	0	00:00:02.78	00:00:07.93
Pass 2	364	00:00:05.74	00:00:18.28
Symbol table output	29	00:00:00.22	00:00:00.46
Psect synopsis output	2	00:00:00.01	00:00:00.03
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	1035	00:00:27.90	00:01:37.66

The working set limit was 2100 pages.
115412 bytes (226 pages) of virtual memory were used to buffer the intermediate code.
There were 90 pages of symbol table space allocated to hold 1669 non-local and 125 local symbols.
2126 source lines were read in Pass 1, producing 38 object records in Pass 2.
38 pages of virtual memory were used to define 36 macros.

```
                              +----------------------------+
                              ! Macro library statistics !
                              +----------------------------+

Macro library name                        Macros defined
------------------                        --------------
_$255$DUA28:[SYS.OBJ]LIB.MLB;1                  24
_$255$DUA28:[SYSLIB]STARLET.MLB;2                9
TOTALS (all libraries)                          33
```

1811 GETS were required to define 33 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS$:SYSCREDEL/OBJ=OBJ$:SYSCREDEL MSRC$:SYSCREDEL/UPDATE=(ENH$:SYSCREDEL)+EXECML$/LIB

SYSCANEVT
LIS

SYSCREPRC
LIS

SYSCHKPRO
LIS

SYSCREDEL
LIS

SYSCANCEL
LIS

SYSCOMMON
LIS

SYSCHGMOD
LIS