C 12

```
   SSSSSSSSSSSS  MMM         MMM     GGGGGGGGGGGG  RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
   SSSSSSSSSSSS  MMM         MMM     GGGGGGGGGGGG  RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
   SSSSSSSSSSSS  MMM         MMM     GGGGGGGGGGGG  RRRRRRRRRRRR     TTTTTTTTTTTTTTT  LLL
SSS              MMMMMM   MMMMMM  GGG              RRR         RRR        TTT        LLL
SSS              MMMMMM   MMMMMM  GGG              RRR         RRR        TTT        LLL
SSS              MMMMMM   MMMMMM  GGG              RRR         RRR        TTT        LLL
SSS              MMM   MMM   MMM  GGG              RRR         RRR        TTT        LLL
SSS              MMM   MMM   MMM  GGG              RRR         RRR        TTT        LLL
SSS              MMM   MMM   MMM  GGG              RRR         RRR        TTT        LLL
   SSSSSSSSS     MMM         MMM  GGG              RRRRRRRRRRRR           TTT        LLL
   SSSSSSSSS     MMM         MMM  GGG              RRRRRRRRRRRR           TTT        LLL
   SSSSSSSSS     MMM         MMM  GGG              RRRRRRRRRRRR           TTT        LLL
            SSS  MMM         MMM  GGG   GGGGGGGGG  RRR   RRR              TTT        LLL
            SSS  MMM         MMM  GGG   GGGGGGGGG  RRR   RRR              TTT        LLL
            SSS  MMM         MMM  GGG   GGGGGGGGG  RRR   RRR              TTT        LLL
            SSS  MMM         MMM  GGG         GGG  RRR      RRR           TTT        LLL
            SSS  MMM         MMM  GGG         GGG  RRR      RRR           TTT        LLL
            SSS  MMM         MMM  GGG         GGG  RRR      RRR           TTT        LLL
SSSSSSSSSSSS     MMM         MMM     GGGGGGGGG     RRR         RRR        TTT        LLLLLLLLLLLLLLL
SSSSSSSSSSSS     MMM         MMM     GGGGGGGGG     RRR         RRR        TTT        LLLLLLLLLLLLLLL
SSSSSSSSSSSS     MMM         MMM     GGGGGGGGG     RRR         RRR        TTT        LLLLLLLLLLLLLLL
```

```
_$2

Val
---
001
001
001
001
001
001
001
001
7FF
7FF
7FF
7FF
7FF
7FF
7FF
7FF
7FF
```

FILEID**SMGDISLIN

J 11

```
  SSSSSSSS  MM      MM    GGGGGGGG  DDDDDDDD      IIIIII        SSSSSSSS  LL            IIIIII      NN      NN
  SSSSSSSS  MM      MM    GGGGGGGG  DDDDDDDD      IIIIII        SSSSSSSS  LL            IIIIII      NN      NN
SS          MMMM  MMMM  GG          DD      DD      II        SS          LL              II        NN      NN
SS          MMMM  MMMM  GG          DD      DD      II        SS          LL              II        NN      NN
SS          MM  MM  MM  GG          DD      DD      II        SS          LL              II        NNNN    NN
SS          MM  MM  MM  GG          DD      DD      II        SS          LL              II        NNNN    NN
  SSSSSS    MM      MM  GG          DD      DD      II          SSSSSS    LL              II        NN  NN  NN
  SSSSSS    MM      MM  GG          DD      DD      II          SSSSSS    LL              II        NN  NN  NN
        SS  MM      MM  GG  GGGGGG  DD      DD      II                SS  LL              II        NN    NNNN
        SS  MM      MM  GG  GGGGGG  DD      DD      II                SS  LL              II        NN    NNNN
        SS  MM      MM  GG      GG  DD      DD      II                SS  LL              II        NN      NN
        SS  MM      MM  GG      GG  DD      DD      II                SS  LL              II        NN      NN      ....
SSSSSSSS    MM      MM    GGGGGG    DDDDDDDD      IIIIII        SSSSSSSS  LLLLLLLLLL    IIIIII      NN      NN      ....
SSSSSSSS    MM      MM    GGGGGG    DDDDDDDD      IIIIII        SSSSSSSS  LLLLLLLLLL    IIIIII      NN      NN      ....

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

SM
1-

```
0 %TITLE 'SMG$DISPLAY_LINKS - Virtual Display Linkages'
0 MODULE SMG$DISPLAY_LINKS (
0                 IDENT = '1-096' ! File: SMGDISLIN.B32 Edit: STAN1096
0                 ) =
1 BEGIN
1 !
1 !****************************************************************************
1 !*                                                                          *
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1 !*                                                                          *
1 !****************************************************************************
1 !
1
1 !++
1 ! FACILITY:      Screen Management
1 !
1 ! ABSTRACT:
1 !       The procedures in this module are conerned only with the
1 ! allocation/deallocation of virtual displays, and with the pasting/
1 ! unpasting of these virtual displays to pasteboards.  The are not
1 ! concerned with their contents or output.
1 !
1 !       For the procedures which maintain and update the contents of
1 ! virtual displays, see the module SMG$DISPLAY_CHANGE.
1 !
1 !       For the procedures which actually do output from these virtual
1 ! displays, see the module SMG$DISPLAY_OUTPUT.
1 !
1 !       For procedures that support input operations, see the module
1 ! SMG$DISPLAY_INPUT.
1 !
1 ! ENVIRONMENT:  User mode, Shared library routines.
1 !
1 ! AUTHOR: R. Reichert, CREATION DATE: 26-Jan-1983
1 !
1 ! MODIFIED BY:
1 !
1 ! 1-096 - Don't allow paste or unpaste if display is batched.
1 !         STAN 27-Jun-1984.
1 ! 1-095 - Use symbolic names SMG$K_TOP, etc. in SMG$LABEL_BORDER.
```

```
;          1 !              Change error messages by SMG$SET_DISPLAY_SCROLLING_REGION.
;          1 !              STAN 3-Jun-1984.
;          1 ! 1-094 - Fix bug re borders occluding other borders. STAN 7-May-1984.
;          1 ! 1-001 - Original.  Skeleton for future code.  RKR 26-Jan-1983
;          1 !--
;    64         0063  1 %SBTTL 'Declarations'
;    65         0064  1 !
;    66         0065  1 ! SWITCHES:
;    67         0066  1 !
;    68         0067  1
;    69         0068  1 !
;    70         0069  1 ! LINKAGES:
;    71         0070  1 !
;    72         0071  1 !       NONE
;    73         0072  1 !
;    74         0073  1 ! INCLUDE FILES
;    75         0074  1 !
;    76         0075  1
;    77         0076  1 REQUIRE 'RTLIN:SMGPROLOG';              ! defines psects, macros, tcb,
;    78         0154  1                                         !  wcb, & terminal symbols
;    79         0155  1
;    80         0156  1 REQUIRE 'RTLIN:STRLNK';                 ! Linkages to string JSB
;    81         0341  1
;    82         0342  1 !
;    83         0343  1 ! TABLE OF CONTENTS:
;    84         0344  1 !
;    85         0345  1
;    86         0346  1 FORWARD ROUTINE
;    87         0347  1
;    88         0348  1 ! Public entry points
;    89         0349  1
;    90         0350  1     SMG$CHANGE_PBD_CHARACTERISTICS,     ! Change characteristics of
;    91         0351  1                                         ! physical terminal
;    92         0352  1
;    93         0353  1     SMG$CHANGE_VIRTUAL_DISPLAY,         ! Change characteristics of
;    94         0354  1                                         ! existing virtual display
;    95         0355  1
;    96         0356  1     SMG$CHECK_FOR_OCCLUSION,            ! Check to see if a virtual
;    97         0357  1                                         ! display is occluded.
;    98         0358  1
;    99         0359  1     SMG$CREATE_PASTEBOARD,              ! Create pasteboard
;   100         0360  1
;   101         0361  1     SMG$CREATE_VIRTUAL_DISPLAY,         ! Create virtual display
;   102         0362  1
;   103         0363  1     SMG$DELETE_PASTEBOARD,              ! Get rid of pasteboard, terminate
;   104         0364  1                                         ! all operations on this display
;   105         0365  1
;   106         0366  1     SMG$DELETE_VIRTUAL_DISPLAY,         ! Delete virtual display
;   107         0367  1
;   108         0368  1     SMG$GET_DISPLAY_ATTR,               ! Return current attributes of
;   109         0369  1                                         ! virtual display
;   110         0370  1
;   111         0371  1     SMG$LABEL_BORDER,                   ! Supply label for border
;   112         0372  1
;   113         0373  1     SMG$MOVE_VIRTUAL_DISPLAY,           ! Move position of virtual
;   114         0374  1                                         ! display on pasteboard
;   115         0375  1
;   116         0376  1     SMG$PASTE_VIRTUAL_DISPLAY,          ! Paste virtual display to
;   117         0377  1                                         ! pasteboard
;   118         0378  1
;   119         0379  1     SMG$POP_VIRTUAL_DISPLAY,            ! Pop off (and delete) all
;   120         0380  1                                         ! virtual displays from given
;  121       0381  1                                         ! to top of pasting stack.
;  122       0382  1
;  123       0383  1       SMG$REPASTE_VIRTUAL_DISPLAY,      ! Repaste virtual display to
;  124       0384  1                                         ! pasteboard in new position
;  125       0385  1
;  126       0386  1       SMG$RESTORE_PHYSICAL_SCREEN,      ! Restore screen to where it
;  127       0387  1                                         ! was after non-SMG user
;  128       0388  1                                         ! munged it.
;  129       0389  1
;  130       0390  1       SMG$SAVE_PHYSICAL_SCREEN,         ! Save physical screen before
;  131       0391  1                                         ! non-SMG user mungs its up.
;  132       0392  1
;  133       0393  1       SMG$SET_DISPLAY_SCROLL_REGION,    ! Set the scrolling region in
;  134       0394  1                                         ! a virtual display
;  135       0395  1
;  136       0396  1       SMG$UNPASTE_VIRTUAL_DISPLAY,      ! Unpaste virtual display from
;  137       0397  1                                         ! pasteboard.
;  138       0398  1
;  139       0399  1 ! Private entry points
;  140       0400  1
;  141       0401  1       SMG$$CALC_PASTE_TRANSF,           ! Calculate pasting
;  142       0402  1                                         ! transformation constants.
;  143       0403  1
;  144       0404  1       SMG$$CHECK_OCCLUSION,             ! Check current complement of
;  145       0405  1                                         ! pasted virtual displays to
;  146       0406  1                                         ! see who is occluded.
;  147       0407  1
;  148       0408  1       SMG$$CHECK_OCCLUSION_FIRST,       ! Check occlusion caused by
;  149       0409  1                                         ! highest pasted virtual display.
;  150       0410  1
;  151       0411  1       SMG$$CREATE_PASTEBOARD,           ! Create pasteboard
;  152       0412  1
;  153       0413  1       SMG$$CREATE_VIRTUAL_DISPLAY,      ! Inner-most Create Virtual
;  154       0414  1                                         ! Display routine
;  155       0415  1
;  156       0416  1       SMG$$CREATE_WCB,                  ! Create WCB and its buffers
;  157       0417  1
;  158       0418  1       SMG$$DEALLOCATE_WCB,              ! Get rid of WCB and its buffers.
;  159       0419  1
;  160       0420  1       SMG$$DUPL_VIRTUAL_DISPLAY,        ! Duplicate a virtual display
;  161       0421  1
;  162       0422  1       SMG$$LOCATE_PP,                   ! Locate PP which matches a
;  163       0423  1                                         ! DCB and a PBCB.
;  164       0424  1
;  165       0425  1       SMG$$PASTE_VIRTUAL_DISPLAY,       ! Inner-most Paste Virtual
;  166       0426  1                                         ! Display routine.
;  167       0427  1
;  168       0428  1       SMG$$RECALC_PP_FIELDS,            ! Recalculate pasting packet
;  169       0429  1                                         ! fields after virtual display
;  170       0430  1                                         ! batching ceases.
;  171       0431  1       SMG$$UNPASTE_VIRTUAL_DISPLAY;     ! Inner-most Unpaste Virtual
;  172       0432  1                                         ! Display routine.
;  173       0433  1
;  174       0434  1
;  175       0435  1                                         ! routines.
;  176       0436  1
;  177       0437  1 !
```

```
1 ! EXTERNAL REFERENCES
1 !
1 EXTERNAL ROUTINE
1     LIB$ANALYZE_SDESC_R2 : LIB$ANALYZE_SDESC_JSB_LINK,
1                                 ! Get length and address of a string
1
1     LIB$FREE_VM,                ! Deallocate heap storage
1
1     LIB$FREE_EF,                ! Free an event flag
1
1     LIB$GET_EF,                 ! Get an event flag
1
1     LIB$GET_VM,                 ! Allocate heap storage
1
1     LIB$SCOPY_DXDX,             ! String copy by descriptor
1
1     LIB$SFREE1_DD,              ! Free a dynamic string
1
1     SMG$$BEGIN_PASTEBOARD_UPDATE_R1 : SMG$$BEGIN_PBD_UPDATE$LNK,
1                                 ! Increase buffering level by 1
1
1     SMG$$END_PASTEBOARD_UPDATE_R2   : SMG$$END_PBD_UPDATE$LNK,
1                                 ! Decrease buffering level by 1
1
1     SMG$$ERASE_PASTEBOARD,      ! Erase the physical screen
1
1     SMG$$CHECK_FOR_OUTPUT_DCB,  ! Force output if now is the time
1
1     SMG$$CHECK_FOR_OUTPUT_PBCB, ! Force output
1
1     SMG$$FILL_WINDOW_BUFFER,    ! Move stuff from virt. display to
1                                 ! pasteboard buffer and output.
1
1     SMG$$FIND_MIN_CURSOR_POS,   ! Set cursor on physical screen
1     SMG$$FLUSH_BUFFER,          ! Flush output buffer
1
1     SMG$$FORCE_SCROLL_REG,      ! Force scrolling region on screen.
1
1     SMG$$OUTPUT,                ! Output a string to terminal
1
1     SMG$$OCCLUDE,               ! Check for how two rectangular areas
1                                 ! overlap.
1
1     SMG$$PBCB_EXIT_HANDLER,     ! Output exit handler
1
1     SMG$$SETUP_TERMINAL_TYPE;   ! Get device characteristics
1
1 EXTERNAL LITERAL
1
1     LIB$_EF_ALRFRE,       ! Event flag already free
1     SMG$_BATWAS_ON,       ! Batching was enabled
1     SMG$_FATERRLIB,       ! Fatal error in library
1     SMG$_INVARG,          ! Invalid argument
1     SMG$_ILLBATFNC,       ! Operation not legal to batched display
1     SMG$_INVDIS_ID,       ! Invalid virtual display id
1     SMG$_INVPAS_ID,       ! Invalid pasteboard id
1     SMG$_INVROW,          ! Invalid row
```

```
;  235          0495  1      SMG$_NOTPASTED,        ! Given display is not pasted to given
;  236          0496  1                             ! pasteboard
;  237          0497  1      SMG$_PASALREXI,        ! Pasteboard already exists for this device
;  238          0498  1      SMG$_TOOMANDIS,        ! Too many virtual displays requested
;  239          0499  1      SMG$_TOOMANPAS,        ! Too many pasteboards requested
;  240          0500  1      SMG$_WRONUMARG;        ! Wrong number of arguments
```

SMG
1-0

```
1 !+
1 ! Pasteboard Directory (PBD)
1 ! --------------------------
1 ! This data structure resides in OWN storage.  It is the primary vehicle
1 ! for getting from a pasteboard id to the associated pasteboard control
1 ! block.
1 !-
1
1 GLOBAL
1       PBD_L_COUNT : INITIAL (0),   ! No. of pasteboards we currently know
1                                    ! about.
1
1       PBD_A_PBCB : VECTOR  [PBD_K_MAX_PB, LONG]
1                    INITIAL (REP PBD_K_MAX_PB OF (0)),
1                            ! List of pasteboard addresses. Indexed by
1                            ! pasteboard id (PID) to find address of
1                            ! corresponding PBCB.
1
1       PBD_V_PB_AVAIL : BITVECTOR [PBD_K_MAX_PB]
1                        INITIAL ( BYTE (REP ((PBD_K_MAX_PB+7)/8) OF (0)));
1                            ! This is a bit-vector of pasteboard id's
1                            ! still available.  The next available number
1                            ! is found by doing a FFC instruction to find
1                            ! first bit which is a 0.  The bit position so
1                            ! computed is the next available PID.  The
1                            ! bit found is set to 1 to mark it as in use.
1                            ! (Presumably, a check has already been made to
1                            ! insure that PBD_L_COUNT is LSS PBD_K_MAX_PB.)
1
1 ! Some constants needed by reference for FFC instruction
1 OWN
1       ZERO                 : INITIAL ( 0 ),
1       PBD_K_MAX_PB_BY_REF  : INITIAL ( PBD_K_MAX_PB );
```

```
1 %SBTTL 'SMG$CHANGE_PBD_CHARACTERISTICS'
1 GLOBAL ROUTINE SMG$CHANGE_PBD_CHARACTERISTICS
1         (PBID,
1          P_DESIRED_WIDTH,
1          P_RESULTING_WIDTH,
1          P_DESIRED_HEIGHT,
1          P_RESULTING_HEIGHT,
1          P_DESIRED_BACKGROUND_COLOR,
1          P_RESULTING_BACKGROUND_COLOR
1         )=
1
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine lets you change the physical dimensions
1 !       of a pasteboard.  It also lets you change the background color.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$CHANGE_PBD_CHARACTERISTICS
1 !                                       ( PBID.rl.r
1 !                                       [,DESIRED_WIDTH.rl.r]
1 !                                       [,RESULTING_WIDTH.wl.r]
1 !                                       [,DESIRED_HEIGHT.rl.r]
1 !                                       [,RESULTING_HEIGHT.wl.r]
1 !                                       [,DESIRED_BACKGROUND_COLOR.rl.r]
1 !                                       [,RESULTING_BACKGROUND_COLOR.wl.r]
1 !                                       )
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       PBID.rl.r               Pasteboard id of pasteboard.
1 !
1 !       DESIRED_WIDTH.rl.r      New width desired for pasteboard.
1 !                               If omitted, the width is not changed.
1 !
1 !       RESULTING_WIDTH.wl.r    Physical width that resulted.  This may
1 !                               be larger than the width requested if the
1 !                               terminal width couldn't be set exactly to
1 !                               the desired width.  This may be smaller
1 !                               than the width requested if the terminal
1 !                               width couldn't be set that wide.
1 !                               In this case, the terminal was set to
1 !                               it's maximum width.
1 !
1 !                               Example:        (for VT100)
1 !
1 !                               Width Desired   Width resulting
1 !
1 !                               60              80
1 !                               110             132
1 !                               150             132
1 !
1 !                               If desired width was omitted, this
1 !                               argument receives the current pasteboard
1 !                               width.
1 !                               To find out what the pasteboard width is
```

```
!                                       (as opposed to the terminal width),
!                                       the caller should take the minimum
!                                       of his desired width and the resulting width.
!
!               DESIRED_HEIGHT.rl.r     New height desired for pasteboard.
!                                       If omitted, the height is not changed.
!
!               RESULTING_HEIGHT.wl.r   Physical height that resulted.  This may
!                                       be larger than the height requested if the
!                                       terminal height couldn't be set exactly to
!                                       the desired height.  This may be smaller
!                                       than the height requested if the terminal
!                                       height couldn't be set that high.
!                                       In this case, the terminal was set to
!                                       it's maximum height.
!
!                                       Example:        (for VT100)
!
!                                       Height Desired  Height resulting
!
!                                       15              24
!
!                                       35              24
!
!                                       To find out what the pasteboard height is
!                                       (as opposed to the terminal height),
!                                       the caller should take the minimum
!                                       of his desired height and the resulting height.
!
!               DESIRED_BACKGROUND_COLOR.rl.r   Symbolic name for the background
!                                               color wanted.  For example,
!                                               SMG$C_COLOR_WHITE.  These symbols
!                                               are defined in SMGDEF.SDL.
!                                               If omitted, the background color
!                                               is not changed.
!
!               RESULTING_BACKGROUND_COLOR.wl.r Receives the actual background color
!                                               that was chosen.  If the terminal
!                                               does not support the exact color
!                                               desired, the nearest approximation
!                                               will be chosen.  This is determined
!                                               by comparing the frequency of the
!                                               desired light wave against the
!                                               available frequencies.  For more
!                                               information about colorimetry,
!                                               consult National Bureau of Standards
!                                               Circular 553, The ISCC-NBS method of
!                                               designating Colors.
!
!                                               Example: (VT100)
!
!                                               Color desired   Resulting Color
!
!                                               yellowish pink  white
!
!                                               navy blue       black
!
```

```
;  390          0648  1 !                                               If the desired color is omitted,
;  391          0649  1 !                                               the value of this variable is not
;  392          0650  1 !                                               affected.
;  393          0651  1 !
;  394          0652  1 ! IMPLICIT INPUTS:
;  395          0653  1 !
;  396          0654  1 !       NONE
;  397          0655  1 !
;  398          0656  1 ! IMPLICIT OUTPUTS:
;  399          0657  1 !
;  400          0658  1 !       NONE
;  401          0659  1 !
;  402          0660  1 ! COMPLETION STATUS:
;  403          0661  1 !
;  404          0662  1 !       SS$_NORMAL        Normal successful completion
;  405          0663  1 !       SMG$_WRONUMARG    Wrong number of arguments.
;  406          0664  1 !       SMG$_PBDIN_USE    Can't change characteristics while buffering is on
;  407          0665  1 !       SMG$_INVWIDARG    Invalid width of 0 desired
;  408          0666  1 !       SMG$_INVPAGARG    Invalid height of 0 desired
;  409          0667  1 !       SMG$_INVCOLARG    Unknown background color specified
;  410          0668  1 !
;  411          0669  1 ! SIDE EFFECTS:
;  412          0670  1 !
;  413          0671  1 !       Physical width and background color of terminal may change.
;  414          0672  1 !--
;  416        0673  2 BEGIN
;  417        0674  2
;  418        0675  2 EXTERNAL ROUTINE
;  419        0676  2
;  420        0677  2         SMG$$CHECK_FOR_OUTPUT_PBCB,
;  421        0678  2         SMG$$CALC_PASTE_TRANSF,
;  422        0679  2         SMG$$CREATE_WCB,
;  423        0680  2         SMG$$DEALLOCATE_WCB,
;  424        0681  2         SMG$$ERASE_PASTEBOARD,
;  425        0682  2         SMG$$OUTPUT;
;  426        0683  2
;  427        0684  2 EXTERNAL LITERAL
;  428        0685  2
;  429        0686  2         SMG$_INVWIDARG,         ! width=0
;  430        0687  2         SMG$_INVPAGARG,         ! HEIGHT=0
;  431        0688  2         SMG$_INVCOLARG,         ! unknown color
;  432        0689  2         SMG$_PBDIN_USE;         ! pasteboard was batched
;  433        0690  2
;  434        0691  2 BUILTIN
;  435        0692  2
;  436        0693  2         NULLPARAMETER;
;  437        0694  2
;  438        0695  2 LOCAL
;  439        0696  2
;  440        0697  2         STATUS,                         ! Status of subroutine calls
;  441        0698  2         PASTING_PACKET_PANIC,           ! TRUE if we must adjust pasting packets
;  442        0699  2         CURR_PP : REF $PP_DECL,         ! Pasting packet pointer
;  443        0700  2
;  444        0701  2         PBCB    : REF $PBCB_DECL;       ! Address of pasteboard control block
;  446          0702  2 $SMG$VALIDATE_ARGCOUNT (1, 7);  ! Test for right no. of args
;  447          0703  2
;  448          0704  2 $SMG$GET_PBCB (.PBID,PBCB);      ! Get address of PBCB
;  449          0705  2
;  450          0706  2 PASTING_PACKET_PANIC=0;
;  451          0707  2
;  452          0708  2 !+
;  453          0709  2 ! If a desired width is specified, get it now.
;  454          0710  2 !-
;  455          0711  2
;  456          0712  2 IF NOT NULLPARAMETER(P_DESIRED_WIDTH)
;  457          0713  3   THEN  BEGIN   ! Change pasteboard width
;  458          0714  3         BIND    DESIRED_WIDTH=.P_DESIRED_WIDTH;
;  459          0715  3 !(a)    LOCAL   CURRENT_MAX, DESIRED_MAX;
;  460          0716  3         LOCAL   PREVIOUS_WIDTH;
;  461          0717  3         LOCAL   RESULTANT_WIDTH;
;  462          0718  3
;  463          0719  3         IF .DESIRED_WIDTH EQL 0
;  464          0720  3           THEN  RETURN  SMG$_INVWIDARG;
;  465          0721  3
;  466          0722  3         !+
;  467          0723  3         ! Determine the physical setting of the terminal by rounding
;  468          0724  3         ! up to 80 or 132 as necessary.  Do the same for the desired
;  469          0725  3         ! width.  Compare these two numbers to see if we must change
;  470          0726  3         ! the width.  This algorithm will have to change if we ever
;  471          0727  3         ! support terminals with widths other than 80 and 132.
;  472          0728  3         !-
;  473          0729  3
;  474          0730  3         IF .PBCB[PBCB_L_BATCH_LEVEL] NEQ 0
;  475          0731  3           THEN  RETURN  SMG$_PBDIN_USE;
;  476          0732  3 !(a)    IF .PBCB[PBCB_W_WIDTH] LEQU 80
;  477          0733  3 !(a)      THEN  CURRENT_MAX=80
;  478          0734  3 !(a)      ELSE  CURRENT_MAX=132;
;  479          0735  3 !(a)    IF .DESIRED_WIDTH LEQU 80
;  480          0736  3 !(a)      THEN  DESIRED_MAX=80
;  481          0737  3 !(a)      ELSE  DESIRED_MAX=132;
;  482          0738  3
;  483          0739  3 !(a)    !+
;  484          0740  3 !(a)    ! If the desired max is the same as the current max,
;  485          0741  3 !(a)    ! then no escape sequence need be sent to the terminal.
;  486          0742  3 !(a)    ! Just adjust our internal width in the PBCB.
;  487          0743  3 !(a)    !-
;  488          0744  3
;  489          0745  3 !(a)    IF .DESIRED_MAX NEQ .CURRENT_MAX
;  490          0746  3 !(a)      THEN
;  491          0747  3
;  492          0748  3 !+
;  493          0749  3 !
;  494          0750  3 !       Note: (a)
;  495          0751  3 !
;  496          0752  3 !       The lines marked !(a) could be added back in
;  497          0753  3 !       if you want to avoid outputting the escape sequence
;  498          0754  3 !       to change the terminal width if it isn't necessary.
;  499          0755  3 !       However, that will mean the screen doesn't physically
;  500          0756  3 !       blank and so extra code would have to be written to
;  501          0757  3 !       blank the right part of a screen when changing width
;  502          0758  3 !       (say) from 70 to 50 columns.
```

```
!-

                BEGIN   ! Change physical width

                LOCAL

                        NORMAL_WIDTH,
                        WIDE_WIDTH;

                !+
                ! First, clear the screen.
                !-

                $SMG$GET_TERM_DATA(ERASE_WHOLE_DISPLAY);
                IF .PBCB[PBCB_L_CAP_LENGTH] NEQ 0
                  THEN  BEGIN
                        STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
                                                .PBCB[PBCB_A_CAP_BUFFER]);
                        IF NOT .STATUS THEN RETURN .STATUS
                        END;

                !+
                ! Second, get the normal size.
                !-

                $SMG$GET_TERM_DATA(COLUMNS);
                IF .PBCB[PBCB_L_CAP_LENGTH] NEQ 0
                  THEN  BEGIN
                        BIND RESULT=.PBCB[PBCB_A_CAP_BUFFER];
                        STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
                                                .PBCB[PBCB_A_CAP_BUFFER]);
                        IF NOT .STATUS THEN RETURN .STATUS;
                        NORMAL_WIDTH=.RESULT
                        END
                  ELSE  NORMAL_WIDTH=80;

                !+
                ! Third, get the wide size.
                !-

                $SMG$GET_TERM_DATA(WIDTH_WIDE);
                IF .PBCB[PBCB_L_CAP_LENGTH] NEQ 0
                  THEN  BEGIN
                        BIND RESULT=.PBCB[PBCB_A_CAP_BUFFER];
                        STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
                                                .PBCB[PBCB_A_CAP_BUFFER]);
                        IF NOT .STATUS THEN RETURN .STATUS;
                        WIDE_WIDTH=.RESULT
                        END
                  ELSE  WIDE_WIDTH=80;

                !+
                ! Decide which sequence to send.
                !-

                IF .DESIRED_WIDTH LEQ .NORMAL_WIDTH
                  THEN  BEGIN
```

```
;   5                        $SMG$GET_TERM_DATA(WIDTH_NARROW);
;   5                        RESULTANT_WIDTH=.NORMAL_WIDTH
;   5                        END
;   5                  ELSE  BEGIN
;   5                        $SMG$GET_TERM_DATA(WIDTH_WIDE);
;   5                        RESULTANT_WIDTH=.WIDE_WIDTH
;   4                        END;
;   4
;   4                IF .PBCB[PBCB_L_CAP_LENGTH] NEQ 0
;   5                  THEN  BEGIN
;   5                        STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
;   5                                                  .PBCB[PBCB_A_CAP_BUFFER]);
;   5                        IF NOT .STATUS THEN RETURN .STATUS;
;   4                        END;
;   4
;   4                !+
;   4                ! If we asked for something smaller than the terminal
;   4                ! could handle (like a width of 60 on an 80-column terminal)
;   4                ! then we will software simulate the smaller width.
;   4                !-
;   4
;   4                RESULTANT_WIDTH=MINU(.RESULTANT_WIDTH,.DESIRED_WIDTH);
;   4
;   3                END;     ! Change physical width
;   3
;   3        !+
;   3        ! Should we go back to the old scheme whereby we
;   3        ! output the escape sequence only if the max width has
;   3        ! changed, then we need the following line:
;   3        !
;   3        !(a)  ELSE       RESULTANT_WIDTH=.DESIRED_WIDTH;
;   3        !-
;   3
;   3        !+
;   3        ! Save away new pasteboard width in the PBCB.
;   3        !-
;   3
;   3        PREVIOUS_WIDTH=.PBCB[PBCB_W_WIDTH];
;   3        PBCB[PBCB_W_WIDTH]=.RESULTANT_WIDTH;
;   3
;   3        !+
;   3        ! If the width changed, we must recalculate all the pasting
;   3        ! packet parameters pronto. Make a note.
;   3        !-
;   3
;   3 !      IF .PREVIOUS_WIDTH NEQ .RESULTANT_WIDTH
;   3 !        THEN  PASTING_PACKET_PANIC=1;
;   3        PASTING_PACKET_PANIC=1;
;   3
;   3        !+
;   3        ! At some point in the future, we might want to tell VMS
;   3        ! about this new width.  If so, we would add that code here.
;   3        ! There is probably no need to do that since we will restore
;   3        ! the original width when we delete this pasteboard.
;   3        !-
;   3
;   2        END;     ! Change pasteboard width
```

```
2
2 !+
2 ! If the user wants the pasteboard width, give it to him now.
2 !-
2
2 IF NOT NULLPARAMETER(P_RESULTING_WIDTH)
3   THEN  BEGIN     ! Return pasteboard width
3         BIND      RESULTING_WIDTH = .P_RESULTING_WIDTH;
3         RESULTING_WIDTH=.PBCB[PBCB_W_WIDTH]
2         END;      ! Return pasteboard width
2
2 !+
2 ! If the user wants to change his height, do that now.
2 ! If he specifies an illegal height, that's his problem;
2 ! we don't know what sort of funny terminal he might have.
2 ! This code will have to change if we ever support terminals
2 ! that can change height by sending them escape sequences.
2 !-
2
2 IF NOT NULLPARAMETER(P_DESIRED_HEIGHT)
3   THEN  BEGIN     ! Change pasteboard height
3         BIND      DESIRED_HEIGHT = .P_DESIRED_HEIGHT;
3         IF .PBCB[PBCB_L_BATCH_LEVEL] NEQ 0
3           THEN  RETURN  SMG$_PBDIN_USE;
3         IF .DESIRED_HEIGHT EQL 0
3           THEN  RETURN  SMG$_INVPAGARG;
3         IF .PBCB[PBCB_B_ROWS] NEQ .DESIRED_HEIGHT
4           THEN  BEGIN
4                 !+
4                 ! Blank screen if we are making screen smaller,
4                 ! so as to get rid of items after the bottom of
4                 ! the pasteboard.
4                 !-
4                 IF MINU(24,.DESIRED_HEIGHT) LSSU .PBCB[PBCB_B_ROWS]
5                   THEN  BEGIN
5                         STATUS=SMG$$ERASE_PASTEBOARD(.PBCB);
5                         IF NOT .STATUS THEN RETURN .STATUS
4                         END;
4                 !+
4                 ! All existing terminals have a maximum height of 24.
4                 !-
4                 PBCB[PBCB_B_ROWS]=MINU(24,.DESIRED_HEIGHT);
4                 PASTING_PACKET_PANIC=1
4                 END
2         END;      ! Change pasteboard height
2
2 !+
2 ! If the user wants the pasteboard height, give it to him now.
2 !-
2
2 IF NOT NULLPARAMETER(P_RESULTING_HEIGHT)
3   THEN  BEGIN     ! Return pasteboard height
3         BIND      RESULTING_HEIGHT=.P_RESULTING_HEIGHT;
3         RESULTING_HEIGHT=.PBCB[PBCB_B_ROWS]
2         END;      ! Return pasteboard height
2
2 !+
2 ! If we changed either the width or height of the pasteboard,
2 ! then we must go adjust all the pasting packets now.
2 ! We must also reallocate and reshape the buffers in the WCB.
2 !-
2
2 IF .PASTING_PACKET_PANIC
3    THEN  BEGIN   ! Update all pasting packets
3          LOCAL CURR_PP    : REF $PP_DECL;
3          !+
3          ! Deallocate the old WCB.
3          !-
3          STATUS=SMG$$DEALLOCATE_WCB(.PBCB[PBCB_A_WCB]);
3          IF NOT .STATUS THEN RETURN .STATUS;
3          !+
3          ! Allocate a new WCB.
3          !-
3          STATUS=SMG$$CREATE_WCB( %REF(.PBCB[PBCB_B_ROWS]),
3                                  %REF(.PBCB[PBCB_W_WIDTH]),
3                                  PBCB[PBCB_A_WCB]);
3          IF NOT .STATUS THEN RETURN .STATUS;
3          !+
3          ! Walk chain of DCB's for all displays currently pasted
3          ! to this pasteboard, and go update their pasting packet.
3          ! Start with first packet.
3          !-
3          CURR_PP=.PBCB[PBCB_A_PP_NEXT];
3          WHILE .CURR_PP NEQ PBCB[PBCB_A_PP_NEXT] DO
4                 BEGIN   ! Update a pasting packet
4                 LOCAL
4                      PP_BASE      : REF $PP_DECL;          ! Base addr of this PP
4
4                 PP_BASE = .CURR_PP - PP_PBCB_QUEUE_OFFSET;  ! Since queue header
4                                                             ! not at top of
4                                                             ! structure.
4                 STATUS=SMG$$CALC_PASTE_TRANSF(.PP_BASE);
4                 IF NOT .STATUS THEN RETURN .STATUS;
4                 CURR_PP = .PP_BASE [PP_A_NEXT_PBCB] ! Step to next PP
3                 END;     ! Update a pasting packet
3
3          !+
3          ! Force an update.
3          !-
3
3          STATUS=SMG$$CHECK_FOR_OUTPUT_PBCB(.PBCB);
3          IF NOT .STATUS THEN SIGNAL(.STATUS);
3
2          END;     ! Update all pasting packets
2
2 !+
2 ! If a new background color is desired, go do that now.
2 !-
2
2 IF NOT NULLPARAMETER(P_DESIRED_BACKGROUND_COLOR)
3    THEN  BEGIN   ! Change background color
3          BIND    DESIRED_COLOR=.P_DESIRED_BACKGROUND_COLOR;
3          BIND    RESULTING_COLOR=PBCB[PBCB_B_BACKGROUND_COLOR];
3
```

```
;      3              IF .DESIRED_COLOR EQL SMG$C_COLOR_WHITE
;      4                THEN  $SMG$GET_TERM_DATA(LIGHT_SCREEN)
;      3                ELSE  $SMG$GET_TERM_DATA(DARK_SCREEN);
;      3
;      3              IF .PBCB[PBCB_L_CAP_LENGTH] NEQ 0
;      4                THEN  BEGIN
;      4                      STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
;      4                                            .PBCB[PBCB_A_CAP_BUFFER]);
;      4                      IF NOT .STATUS THEN RETURN .STATUS
;      3                      END;
;      3
;      3              RESULTING_COLOR=.DESIRED_COLOR;
;      3
;      2              END;     ! Change terminal coror
;      2
;      2    !+
;      2    ! If the user wants the new background color, give it to him now.
;      2    !-
;      2
;      2    IF NOT NULLPARAMETER(P_RESULTING_BACKGROUND_COLOR)
;      3      THEN  BEGIN    ! Return background color
;      3            BIND     RESULTING_COLOR=.P_RESULTING_BACKGROUND_COLOR;
;      3            RESULTING_COLOR=.PBCB[PBCB_B_BACKGROUND_COLOR]
;      2            END;     ! Return background color
;      2
;      2    RETURN  SS$_NORMAL
;      2
;      1    END;                            ! Routine SMG$CHANGE_PBD_CHARACTERISTICS


                                                           .TITLE  SMG$DISPLAY_LINKS SMG$DISPLAY_LINKS - Virtual D
;                                                                                    isplay Linkages
                                                           .IDENT  \1-096\

                                                           .PSECT  _SMG$DATA,NOEXE,  PIC,2

                                  00000000  00000 PBD_L_COUNT::
                                                           .LONG   0                                          ;
                                  00000000# 00004 PBD_A_PBCB::
                                                           .LONG   0[16]                                      ;
                                        00# 00044 PBD_V_PB_AVAIL::
                                                           .BYTE   0[2]                                       ;
                                            00046          .BLKB   2
                                  00000000  00048 ZERO:    .LONG   0                                          ;
                                  00000010  0004C PBD_K_MAX_PB_BY_REF:
                                                           .LONG   16                                         ;

                                                           .EXTRN  LIB$ANALYZE_SDESC_R2
                                                           .EXTRN  LIB$FREE_VM, LIB$FREE_EF
                                                           .EXTRN  LIB$GET_EF, LIB$GET_VM
                                                           .EXTRN  LIB$SCOPY_DXDX, LIB$SFREE1_DD
                                                           .EXTRN  SMG$$BEGIN_PASTEBOARD_UPDATE_R1
                                                           .EXTRN  SMG$$END_PASTEBOARD_UPDATE_R2
                                                           .EXTRN  SMG$$ERASE_PASTEBOARD
                                                           .EXTRN  SMG$$CHECK_FOR_OUTPUT_DCB
                                                           .EXTRN  SMG$$CHECK_FOR_OUTPUT_PBCB
                                                           .EXTRN  SMG$$FILL_WINDOW_BUFFER
                                                           .EXTRN   SMG$$FIND_MIN_CURSOR_POS
                                                           .EXTRN   SMG$$FLUSH_BUFFER
                                                           .EXTRN   SMG$$FORCE_SCROLL_REG
                                                           .EXTRN   SMG$$OUTPUT, SMG$$OCCLUDE
                                                           .EXTRN   SMG$$PBCB_EXIT_HANDLER
                                                           .EXTRN   SMG$$SETUP_TERMINAL_TYPE
                                                           .EXTRN   LIB$_EF_ALRFRE, SMG$_BATWAS_ON
                                                           .EXTRN   SMG$_FATERRLIB, SMG$_INVARG
                                                           .EXTRN   SMG$_ILLBATFNC, SMG$_INVDIS_ID
                                                           .EXTRN   SMG$_INVPAS_ID, SMG$_INVROW
                                                           .EXTRN   SMG$_NOTPASTED, SMG$_PASALREXI
                                                           .EXTRN   SMG$_TOOMANDIS, SMG$_TOOMANPAS
                                                           .EXTRN   SMG$_WRONUMARG, SMG$$CALC_PASTE_TRANSF
                                                           .EXTRN   SMG$$CREATE_WCB
                                                           .EXTRN   SMG$$DEALLOCATE_WCB
                                                           .EXTRN   SMG$_INVWIDARG, SMG$_INVPAGARG
                                                           .EXTRN   SMG$_INVCOLARG, SMG$_PBDIN_USE
                                                           .EXTRN   SMG$GET_TERM_DATA

                                                           .PSECT   _SMG$CODE,NOWRT,  SHR,  PIC,2

                                     0FFC 00000            .ENTRY   SMG$CHANGE_PBD_CHARACTERISTICS, Save R2,R3,-; 0535
                                                                    R4,R5,R6,R7,R8,R9,R10,R11                   ;
                 5B 00000000G   00   9E 00002              MOVAB    SMG$$OUTPUT, R11                            ;
                 5A 00000000G   00   9E 00009              MOVAB    SMG$GET_TERM_DATA, R10                      ;
                 5E             14   C2 00010              SUBL2    #20, SP                                     ;
        50       6C             01   83 00013              SUBB3    #1, (AP), DIFF                              ; 0702
                 06             50   91 00017              CMPB     DIFF, #6                                    ;
                                08   1B 0001A              BLEQU    1$                                          ;
                 50 00000000G   8F   D0 0001C              MOVL     #SMG$_WRONUMARG, R0                         ;
                                     04 00023              RET                                                  ;
        50            04        BC   D0 00024 1$:          MOVL     @PBID, R0                                   ; 0704
                                11   19 00028              BLSS     2$                                          ;
           00000000'  EF        50   D1 0002A              CMPL     R0, PBD_L_COUNT                             ;
                                08   14 00031              BGTR     2$                                          ;
        08 00000000'  EF        50   E0 00033              BBS      R0, PBD_V_PB_AVAIL, 3$                      ;
                 50 00000000G   8F   D0 0003B 2$:          MOVL     #SMG$_INVPAS_ID, R0                         ;
                                     04 00042              RET                                                  ;
                 54 00000000'EF40    D0 00043 3$:          MOVL     PBD_A_PBCB[R0], PBCB                        ;
                                59   D4 0004B              CLRL     PASTING_PACKET_PANIC                        ; 0706
                 02             6C   91 0004D              CMPB     (AP), #2                                    ; 0712
                                03   1E 00050              BGEQU    5$                                          ;
                              0189   31 00052 4$:          BRW      33$                                         ;
                      08        AC   D5 00055 5$:          TSTL     8(AP)                                       ;
                                F8   13 00058              BEQL     4$                                          ;
                 58   08        BC   D0 0005A              MOVL     @P_DESIRED_WIDTH, R8                        ; 0719
                                08   12 0005E              BNEQ     6$                                          ;
                 50 00000000G   8F   D0 00060              MOVL     #SMG$_INVWIDARG, R0                         ; 0720
                                     04 00067              RET                                                  ;
                      00A4      C4   D5 00068 6$:          TSTL     164(PBCB)                                   ; 0730
                                03   13 0006C              BEQL     7$                                          ;
                              018C   31 0006E              BRW      35$                                         ;
                 53   0108      C4   9E 00071 7$:          MOVAB    264(PBCB), R3                               ; 0772
                 52   00FC      C4   9E 00076              MOVAB    252(PBCB), R2                               ;
                                62   D5 0007B              TSTL     (R2)                                        ;
                                04   12 0007D              BNEQ     8$                                          ;
                                63   D4 0007F              CLRL     (R3)                                        ;
                                21  11 00081          BRB     9$                              ;
                         08     AE  D4 00083 8$:      CLRL    INPUT_ARGS                      ;
                         08     AE  9F 00086          PUSHAB  INPUT_ARGS                      ;
                       0104     C4  DD 00089          PUSHL   260(PBCB)                       ;
                                53  DD 0008D          PUSHL   R3                              ;
                       0100     C4  9F 0008F          PUSHAB  256(PBCB)                       ;
         14     AE     01DA     8F  3C 00093          MOVZWL  #474, 20(SP)                    ;
                         14     AE  9F 00099          PUSHAB  20(SP)                          ;
                                52  DD 0009C          PUSHL   R2                              ;
                6A              06  FB 0009E          CALLS   #6, SMG$GET_TERM_DATA           ;
                3A              50  E9 000A1          BLBC    STATUS, 12$                     ;
                                63  D5 000A4 9$:      TSTL    (R3)                            ; 0773
                                11  13 000A6          BEQL    10$                             ;
                       0104     C4  DD 000A8          PUSHL   260(PBCB)                       ; 0776
                                63  DD 000AC          PUSHL   (R3)                            ; 0775
                                54  DD 000AE          PUSHL   PBCB                            ;
                6B              03  FB 000B0          CALLS   #3, SMG$$OUTPUT                 ;
                55              50  D0 000B3          MOVL    R0, STATUS                      ;
                3F              55  E9 000B6          BLBC    STATUS, 14$                     ; 0777
                                62  D5 000B9 10$:     TSTL    (R2)                            ; 0784
                                04  12 000BB          BNEQ    11$                             ;
                                63  D4 000BD          CLRL    (R3)                            ;
                                20  11 000BF          BRB     13$                             ;
                         08     AE  D4 000C1 11$:     CLRL    INPUT_ARGS                      ;
                         08     AE  9F 000C4          PUSHAB  INPUT_ARGS                      ;
                       0104     C4  DD 000C7          PUSHL   260(PBCB)                       ;
                                53  DD 000CB          PUSHL   R3                              ;
                       0100     C4  9F 000CD          PUSHAB  256(PBCB)                       ;
         14     AE       DD     8F  9A 000D1          MOVZBL  #221, 20(SP)                    ;
                         14     AE  9F 000D6          PUSHAB  20(SP)                          ;
                                52  DD 000D9          PUSHL   R2                              ;
                6A              06  FB 000DB          CALLS   #6, SMG$GET_TERM_DATA           ;
                49              50  E9 000DE 12$:     BLBC    STATUS, 18$                     ;
                                63  D5 000E1 13$:     TSTL    (R3)                            ; 0785
                                1B  13 000E3          BEQL    15$                             ;
                56     0104     C4  D0 000E5          MOVL    260(PBCB), R6                   ; 0787
                       0104     C4  DD 000EA          PUSHL   260(PBCB)                       ; 0789
                                63  DD 000EE          PUSHL   (R3)                            ; 0788
                                54  DD 000F0          PUSHL   PBCB                            ;
                6B              03  FB 000F2          CALLS   #3, SMG$$OUTPUT                 ;
                55              50  D0 000F5          MOVL    R0, STATUS                      ;
                49              55  E9 000F8 14$:     BLBC    STATUS, 20$                     ; 0790
                57              66  D0 000FB          MOVL    (R6), NORMAL_WIDTH              ; 0791
                                04  11 000FE          BRB     16$                             ;
                57       50     8F  9A 00100 15$:     MOVZBL  #80, NORMAL_WIDTH               ; 0793
                                62  D5 00104 16$:     TSTL    (R2)                            ; 0799
                                04  12 00106          BNEQ    17$                             ;
                                63  D4 00108          CLRL    (R3)                            ;
                                21  11 0010A          BRB     19$                             ;
                         08     AE  D4 0010C 17$:     CLRL    INPUT_ARGS                      ;
                         08     AE  9F 0010F          PUSHAB  INPUT_ARGS                      ;
                       0104     C4  DD 00112          PUSHL   260(PBCB)                       ;
                                53  DD 00116          PUSHL   R3                              ;
                       0100     C4  9F 00118          PUSHAB  256(PBCB)                       ;
         14     AE     0246     8F  3C 0011C          MOVZWL  #582, 20(SP)                    ;
                         14     AE  9F 00122          PUSHAB  20(SP)                          ;
                                52  DD 00125          PUSHL   R2                              ;
```

```
          6A         06  FB 00127        CALLS   #6, SMG$GET_TERM_DATA                    ;
          7C         50  E9 0012A 18$:   BLBC    STATUS, 27$                              ;
                     63  D5 0012D 19$:   TSTL    (R3)                                     ; 0800
                     1B  13 0012F        BEQL    21$                                      ;
          56   0104  C4  D0 00131        MOVL    260(PBCB), R6                            ; 0802
               0104  C4  DD 00136        PUSHL   260(PBCB)                                ; 0804
                     63  DD 0013A        PUSHL   (R3)                                     ; 0803
                     54  DD 0013C        PUSHL   PBCB                                     ;
          6B         03  FB 0013E        CALLS   #3, SMG$$OUTPUT                          ;
          55         50  D0 00141        MOVL    R0, STATUS                               ;
          7B         55  E9 00144 20$:   BLBC    STATUS, 30$                              ; 0805
          56         66  D0 00147        MOVL    (R6), WIDE_WIDTH                         ; 0806
                     04  11 0014A        BRB     22$                                      ;
          56     50  8F  9A 0014C 21$:   MOVZBL  #80, WIDE_WIDTH                          ; 0808
          57         58  D1 00150 22$:   CMPL    R8, NORMAL_WIDTH                         ; 0814
                     2E  14 00153        BGTR    25$                                      ;
                     62  D5 00155        TSTL    (R2)                                     ; 0816
                     04  12 00157        BNEQ    23$                                      ;
                     63  D4 00159        CLRL    (R3)                                     ;
                     21  11 0015B        BRB     24$                                      ;
                 08  AE  D4 0015D 23$:   CLRL    INPUT_ARGS                               ;
                 08  AE  9F 00160        PUSHAB  INPUT_ARGS                               ;
               0104  C4  DD 00163        PUSHL   260(PBCB)                                ;
                     53  DD 00167        PUSHL   R3                                       ;
               0100  C4  9F 00169        PUSHAB  256(PBCB)                                ;
      14  AE   0245  8F  3C 0016D        MOVZWL  #581, 20(SP)                             ;
                 14  AE  9F 00173        PUSHAB  20(SP)                                   ;
                     52  DD 00176        PUSHL   R2                                       ;
          6A         06  FB 00178        CALLS   #6, SMG$GET_TERM_DATA                    ;
          2B         50  E9 0017B        BLBC    STATUS, 27$                              ;
          52         57  D0 0017E 24$:   MOVL    NORMAL_WIDTH, RESULTANT_WIDTH            ; 0817
                     2D  11 00181        BRB     29$                                      ;
                     62  D5 00183 25$:   TSTL    (R2)                                     ; 0820
                     04  12 00185        BNEQ    26$                                      ;
                     63  D4 00187        CLRL    (R3)                                     ;
                     22  11 00189        BRB     28$                                      ;
                 08  AE  D4 0018B 26$:   CLRL    INPUT_ARGS                               ;
                 08  AE  9F 0018E        PUSHAB  INPUT_ARGS                               ;
               0104  C4  DD 00191        PUSHL   260(PBCB)                                ;
                     53  DD 00195        PUSHL   R3                                       ;
               0100  C4  9F 00197        PUSHAB  256(PBCB)                                ;
      14  AE   0246  8F  3C 0019B        MOVZWL  #582, 20(SP)                             ;
                 14  AE  9F 001A1        PUSHAB  20(SP)                                   ;
                     52  DD 001A4        PUSHL   R2                                       ;
          6A         06  FB 001A6        CALLS   #6, SMG$GET_TERM_DATA                    ;
          01         50  E8 001A9 27$:   BLBS    STATUS, 28$                              ;
                         04 001AC        RET                                              ;
          52         56  D0 001AD 28$:   MOVL    WIDE_WIDTH, RESULTANT_WIDTH              ; 0821
                     63  D5 001B0 29$:   TSTL    (R3)                                     ; 0824
                     11  13 001B2        BEQL    31$                                      ;
               0104  C4  DD 001B4        PUSHL   260(PBCB)                                ; 0827
                     63  DD 001B8        PUSHL   (R3)                                     ; 0826
                     54  DD 001BA        PUSHL   PBCB                                     ;
          6B         03  FB 001BC        CALLS   #3, SMG$$OUTPUT                          ;
          55         50  D0 001BF        MOVL    R0, STATUS                               ;
          72         55  E9 001C2 30$:   BLBC    STATUS, 39$                              ; 0828
          50         52  D0 001C5 31$:   MOVL    RESULTANT_WIDTH, R0                      ; 0837
```

```
                                                                       E 13
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages      16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742                  Page  21
1-096           SMG$CHANGE_PBD_CHARACTERISTICS                     14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1                (6)

                                        58            50  D1 001C8             CMPL    R0, R8                                           ;
                                                      03  1B 001CB             BLEQU   32$                                              ;
                                        50            58  D0 001CD             MOVL    R8, R0                                           ;
                                        52            50  D0 001D0 32$:        MOVL    R0, RESULTANT_WIDTH                              ;
                                        50       5A   A4  3C 001D3             MOVZWL  90(PBCB), PREVIOUS_WIDTH                         ; 0853
                                   5A   A4            52  B0 001D7             MOVW    RESULTANT_WIDTH, 90(PBCB)                        ; 0854
                                        59            01  D0 001DB             MOVL    #1, PASTING_PACKET_PANIC                         ; 0863
                                        03            6C  91 001DE 33$:        CMPB    (AP), #3                                         ; 0878
                                                      0A  1F 001E1             BLSSU   34$                                              ;
                                                 0C   AC  D5 001E3             TSTL    12(AP)                                           ;
                                                      05  13 001E6             BEQL    34$                                              ;
                                   0C   BC       5A   A4  3C 001E8             MOVZWL  90(PBCB), @P_RESULTING_WIDTH                     ; 0881
                                        04            6C  91 001ED 34$:        CMPB    (AP), #4                                         ; 0892
                                                      4F  1F 001F0             BLSSU   41$                                              ;
                                                 10   AC  D5 001F2             TSTL    16(AP)                                           ;
                                                      4A  13 001F5             BEQL    41$                                              ;
                                               00A4   C4  D5 001F7             TSTL    164(PBCB)                                        ; 0895
                                                      08  13 001FB             BEQL    36$                                              ;
                                        50 00000000G  8F  D0 001FD 35$:        MOVL    #SMG$_PBDIN_USE, R0                              ; 0896
                                                          04 00204             RET                                                      ;
                                        52       10   BC  D0 00205 36$:        MOVL    @P_DESIRED_HEIGHT, R2                            ; 0897
                                                      08  12 00209             BNEQ    37$                                              ;
                                        50 00000000G  8F  D0 0020B             MOVL    #SMG$_INVPAGARG, R0                              ; 0898
                                                          04 00212             RET                                                      ;
           52        5F   A4            08            00  ED 00213 37$:        CMPZV   #0, #8, 95(PBCB), R2                             ; 0899
                                                      26  13 00219             BEQL    41$                                              ;
                                        18            52  D1 0021B             CMPL    R2, #24                                          ; 0906
                                                      03  1B 0021E             BLEQU   38$                                              ;
                                        52            18  D0 00220             MOVL    #24, R2                                          ;
           52        5F   A4            08            00  ED 00223 38$:        CMPZV   #0, #8, 95(PBCB), R2                             ;
                                                      0F  1B 00229             BLEQU   40$                                              ;
                                                      54  DD 0022B             PUSHL   PBCB                                             ; 0908
                             00000000G  00            01  FB 0022D             CALLS   #1, SMG$$ERASE_PASTEBOARD                        ;
                                        55            50  D0 00234             MOVL    R0, STATUS                                       ;
                                        61            55  E9 00237 39$:        BLBC    STATUS, 44$                                      ; 0909
                                   5F   A4            52  90 0023A 40$:        MOVB    R2, 95(PBCB)                                     ; 0914
                                        59            01  D0 0023E             MOVL    #1, PASTING_PACKET_PANIC                         ; 0915
                                        05            6C  91 00241 41$:        CMPB    (AP), #5                                         ; 0923
                                                      0A  1F 00244             BLSSU   42$                                              ;
                                                 14   AC  D5 00246             TSTL    20(AP)                                           ;
                                                      05  13 00249             BEQL    42$                                              ;
                                   14   BC       5F   A4  9A 0024B             MOVZBL  95(PBCB), @P_RESULTING_HEIGHT                    ; 0926
                                        6C            59  E9 00250 42$:        BLBC    PASTING_PACKET_PANIC, 47$                        ; 0935
                                                 08   A4  DD 00253             PUSHL   8(PBCB)                                          ; 0941
                             00000000G  00            01  FB 00256             CALLS   #1, SMG$$DEALLOCATE_WCB                          ;
                                        55            50  D0 0025D             MOVL    R0, STATUS                                       ;
                                        38            55  E9 00260             BLBC    STATUS, 44$                                      ; 0942
                                                 08   A4  9F 00263             PUSHAB  8(PBCB)                                          ; 0948
                                   08   AE       5A   A4  3C 00266             MOVZWL  90(PBCB), 8(SP)                                  ; 0947
                                                 08   AE  9F 0026B             PUSHAB  8(SP)                                            ;
                                   08   AE       5F   A4  9A 0026E             MOVZBL  95(PBCB), 8(SP)                                  ; 0946
                                                 08   AE  9F 00273             PUSHAB  8(SP)                                            ;
                             00000000G  00            03  FB 00276             CALLS   #3, SMG$$CREATE_WCB                              ; 0948
                                        55            50  D0 0027D             MOVL    R0, STATUS                                       ;
                                        18            55  E9 00280             BLBC    STATUS, 44$                                      ; 0949
                                        53            64  D0 00283             MOVL    (PBCB), CURR_PP                                  ; 0955
                                        54            53  D1 00286 43$:        CMPL    CURR_PP, PBCB                                    ; 0956
```

```
                                 1C  13 00289          BEQL    46$                                         ;
                 52          F8  A3  9E 0028B          MOVAB   -8(R3), PP_BASE                             ; 0961
                                 52  DD 0028F          PUSHL   PP_BASE                                     ; 0964
        00000000G  00            01  FB 00291          CALLS   #1, SMG$$CALC_PASTE_TRANSF                  ;
                   55            50  D0 00298          MOVL    R0, STATUS                                  ;
                   03            55  E8 0029B 44$:     BLBS    STATUS, 45$                                 ; 0965
                               0092  31 0029E          BRW     53$                                         ;
                   53        08  A2  D0 002A1 45$:     MOVL    8(PP_BASE), CURR_PP                         ; 0966
                                 DF  11 002A5          BRB     43$                                         ;
                                 54  DD 002A7 46$:     PUSHL   PBCB                                        ; 0973
        00000000G  00            01  FB 002A9          CALLS   #1, SMG$$CHECK_FOR_OUTPUT_PBCB              ;
                   55            50  D0 002B0          MOVL    R0, STATUS                                  ;
                   09            55  E8 002B3          BLBS    STATUS, 47$                                 ; 0974
                                 55  DD 002B6          PUSHL   STATUS                                      ;
        00000000G  00            01  FB 002B8          CALLS   #1, LIB$SIGNAL                              ;
                   06            6C  91 002BF 47$:     CMPB    (AP), #6                                    ; 0982
                                 79  1F 002C2          BLSSU   55$                                         ;
                             18  AC  D5 002C4          TSTL    24(AP)                                      ;
                                 74  13 002C7          BEQL    55$                                         ;
                   50      00FC  C4  9E 002C9          MOVAB   252(PBCB), R0                               ; 0988
                   52      0108  C4  9E 002CE          MOVAB   264(PBCB), R2                               ;
                   01        18  BC  D1 002D3          CMPL    @P_DESIRED_BACKGROUND_COLOR, #1             ; 0987
                                 1C  12 002D7          BNEQ    48$                                         ;
                                 60  D5 002D9          TSTL    (R0)                                        ; 0988
                                 1C  13 002DB          BEQL    49$                                         ;
                             08  AE  D4 002DD          CLRL    INPUT_ARGS                                  ;
                             08  AE  9F 002E0          PUSHAB  INPUT_ARGS                                  ;
                           0104  C4  DD 002E3          PUSHL   260(PBCB)                                   ;
                                 52  DD 002E7          PUSHL   R2                                          ;
                           0100  C4  9F 002E9          PUSHAB  256(PBCB)                                   ;
             14    AE      0228  8F  3C 002ED          MOVZWL  #552, 20(SP)                                ;
                                 1E  11 002F3          BRB     51$                                         ;
                                 60  D5 002F5 48$:     TSTL    (R0)                                        ; 0989
                                 04  12 002F7          BNEQ    50$                                         ;
                                 62  D4 002F9 49$:     CLRL    (R2)                                        ;
                                 21  11 002FB          BRB     52$                                         ;
                             08  AE  D4 002FD 50$:     CLRL    INPUT_ARGS                                  ;
                             08  AE  9F 00300          PUSHAB  INPUT_ARGS                                  ;
                           0104  C4  DD 00303          PUSHL   260(PBCB)                                   ;
                                 52  DD 00307          PUSHL   R2                                          ;
                           0100  C4  9F 00309          PUSHAB  256(PBCB)                                   ;
             14    AE      01C8  8F  3C 0030D          MOVZWL  #456, 20(SP)                                ;
                             14  AE  9F 00313 51$:     PUSHAB  20(SP)                                      ;
                                 50  DD 00316          PUSHL   R0                                          ;
                   6A            06  FB 00318          CALLS   #6, SMG$GET_TERM_DATA                       ;
                   32            50  E9 0031B          BLBC    STATUS, 57$                                 ;
                                 62  D5 0031E 52$:     TSTL    (R2)                                        ; 0991
                                 15  13 00320          BEQL    54$                                         ;
                           0104  C4  DD 00322          PUSHL   260(PBCB)                                   ; 0994
                                 62  DD 00326          PUSHL   (R2)                                        ; 0993
                                 54  DD 00328          PUSHL   PBCB                                        ;
                   6B            03  FB 0032A          CALLS   #3, SMG$$OUTPUT                             ;
                   55            50  D0 0032D          MOVL    R0, STATUS                                  ;
                   04            55  E8 00330          BLBS    STATUS, 54$                                 ; 0995
                   50            55  D0 00333 53$:     MOVL    STATUS, R0                                  ;
                                     04 00336          RET                                                 ;
           00F9    C4        18  BC  D0 00337 54$:     MOVL    @P_DESIRED_BACKGROUND_COLOR, 249(PBCB)      ; 0998
```

```
          07                 6C  91 0033D 55$:    CMPB    (AP), #7                                     ; 1006
                             0B  1F 00340         BLSSU   56$                                          ;
                      1C     AC  D5 00342         TSTL    28(AP)                                       ;
                             06  13 00345         BEQL    56$                                          ;
     1C   BC        00F9     C4  9A 00347         MOVZBL  249(PBCB), @P_RESULTING_BACKGROUND_COLOR     ; 1009
          50                 01  D0 0034D 56$:    MOVL    #1, R0                                       ; 1012
                                 04 00350 57$:    RET                                                  ; 1014

; Routine Size:  849 bytes,    Routine Base:  _SMG$CODE + 0000
```

```
1 %SBTTL 'SMG$CHANGE_VIRTUAL_DISPLAY - Change Virtual Display'
1 GLOBAL ROUTINE SMG$CHANGE_VIRTUAL_DISPLAY (
1                                               DISPLAY_ID,
1                                               NUM_ROWS,
1                                               NUM_COLS,
1                                               DISPLAY_ATTRIBUTES,
1                                               VIDEO_ATTRIBUTES,
1                                               CHAR_SET
1                                              ) =
1 !++
1 ! FUNCTIONAL DESCRIPTIOM:
1 !
1 !       This routine changes the size or default attributes of an
1 !       existing virtual display.  The text which is currently in this
1 !       virtual display is remapped to fit the new dimensions starting
1 !       at row 1 column 1.  Resulting cursor position will be at row 1
1 !       column 1.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$CHANGE_VIRTUAL_DISPLAY (
1 !                               DISPLAY_ID.rl.r,
1 !                               [,NUM_ROWS.rl.r]
1 !                               [,NUM_COLS.rl.r]
1 !                               [,DISPLAY_ATTRIBUTES.rl.r]
1 !                               [,VIDEO_ATTRIBUTES.rl.r]
1 !                               [,CHAR_SET.rl.r])
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r Display id of virtual display to be changed.
1 !
1 !       NUM_ROWS.rl.r   Number of rows in new virtual display.
1 !                       If omitted, the number of rows remains the same.
1 !
1 !       NUM_COLS.rl.r   Number of columns in new virtual display.
1 !                       If omitted, the number of columns remains the same.
1 !
1 !       DISPLAY_ATTRIBUTES.rl.r The default display attributes:
1 !
1 !                       SMG$M_BORDER if virtual display is to be
1 !                               displayed with a border.
1 !
1 !                       SMG$M_TRUNC_ICON if an icon should be displayed
1 !                               when text overflows the display bounds.
1 !
1 !                       SMG$M_DISPLAY_CONTROLS if carriage controls (CR, LF,
1 !                               FF, VT, HT) should be displayed instead
1 !                               of executed.
1 !
1 !                       If omitted, the default display attributes
1 !                       currently associated with the display will be
1 !                       retained.
1 !
1 !       VIDEO_ATTRIBUTES.rl.r   The default rendition code to be
1 !                       applied to all output to this display unless
1 !                       overridden on a particular output call.
```

```
!                               If omitted, the current video attributes are
!                               retained.
!
!                               Values:
!
!                               SMG$M_BLINK       displays characters blinking.
!
!                               SMG$M_BOLD        displays characters in
!                                                 higher-than-normal intensity.
!
!                               SMG$M_REVERSE     displays characters in reverse
!                                                 video -- that is, using the
!                                                 opposite default rendition of
!                                                 the virtual display.
!
!                               SMG$M_UNDERLINE displays characters underlined.
!
!       CHAR_SET.rl.r           The default character set for all text
!                               associated with this display.
!                               Recognized values are:
!                                                 SMG$C_UNITED_KINGDOM
!                                                 SMG$C_ASCII (default)
!                                                 SMG$C_SPEC_GRAPHICS
!                                                 SMG$C_ALT_CHAR
!                                                 SMG$C_ALT_GRAPHICS
!
! IMPLICIT INPUTS:
!
!       NONE
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! COMPLETION STATUS:
!
!       SS$_NORMAL              Normal successful completion
!       LIB$_INSVIRMEM          Insufficient virtual memory to reallocate needed
!                               buffers.
!       SMG$_INVARG             Unrecognized Video Attributes
!                            or Unrecognized Display Attributes
!       SMG$_WRONUMARG          Wrong number of arguments.
!
! SIDE EFFECTS:
!
!       Cursor for virtual display will be forced to row 1 column 1 if
!       display is redimensioned.
!       If a labeled border applies and does not fit newly redimensioned
!       display, the label will be deleted.
!--
    BEGIN
    BUILTIN
        NULLPARAMETER;

    LOCAL
        STATUS,                 ! Status of subroutine calls
        PP  : REF $PP_DECL,     ! Addr. of a pasting packet
```

```
            NEW_ROWS,                   ! New number of rows
            NEW_COLS,                   ! New number of columns
            DCB : REF $DCB_DECL,        ! Addr of display control block
            NEW_SIZE;                   ! New rows * columns

        $SMG$VALIDATE_ARGCOUNT (1, 6);          ! Test for right no. of args

        $SMG$GET_DCB (.DISPLAY_ID, DCB);        ! Get address of virtual display
                                                ! control block.

    !+
    ! Determine size of new buffer we need.
    !-
        IF NOT NULLPARAMETER (NUM_ROWS)         ! If new number of rows specified
        THEN
            NEW_ROWS = ..NUM_ROWS
        ELSE
            NEW_ROWS = .DCB [DCB_W_NO_ROWS];

        IF NOT NULLPARAMETER (NUM_COLS)         ! If new number of columns specified
        THEN
            NEW_COLS = ..NUM_COLS
        ELSE
            NEW_COLS = .DCB [DCB_W_NO_COLS];

        NEW_SIZE = .NEW_ROWS * .NEW_COLS;

    !+
    ! Adjust default display, video attributes and default character set if
    ! they are specified.
    !-
        IF NOT NULLPARAMETER (DISPLAY_ATTRIBUTES)     ! If display attributes specified
        THEN
            DCB [DCB_B_DEF_DISPLAY_ATTR] = ..DISPLAY_ATTRIBUTES;

        IF NOT NULLPARAMETER (VIDEO_ATTRIBUTES)       ! If video attributes specified
        THEN
            DCB [DCB_B_DEF_VIDEO_ATTR] = ..VIDEO_ATTRIBUTES;

        IF NOT NULLPARAMETER (CHAR_SET)         ! If char set specified
        THEN
            DCB [DCB_B_DEF_CHAR_SET] = ..CHAR_SET;

    !+
    ! If the dimensions of the old buffer and the new buffers are different,
    ! we will have to allocate new buffer space and copy existing text into
    ! new buffers.
    !-
        IF .DCB [DCB_L_BUFSIZE] NEQ .NEW_SIZE           OR
            .DCB [DCB_W_NO_ROWS] NEQ .NEW_ROWS          OR
            .DCB [DCB_W_NO_COLS] NEQ .NEW_COLS
        THEN
            BEGIN   ! Redimensioning required
            LOCAL
                STATUS,                         ! Status of subroutine calls
                ROWS_TO_MOVE,           ! No of rows that will be moved from
                                        ! old buffer to new.
```

```
          COLS_TO_MOVE,            ! No of columns that will be moved from
                                   ! old to new.
          NEW_TEXT_BUF : REF VECTOR [,BYTE],    ! Addr of new text
                                                ! buffer
          NEW_ATTR_BUF : REF VECTOR [,BYTE],    ! Addr of new attr
                                                ! buffer
          NEW_CHAR_BUF : REF VECTOR [,BYTE],    ! Addr of new char_set
                                                ! buffer
          TEXT_PTR : REF VECTOR [, BYTE],       ! Address of current
                                                ! text buffer in DCB.

          ATTR_PTR : REF VECTOR [,BYTE],        ! Address of current
                                                ! attr buffer in DCB

          CHAR_PTR : REF VECTOR [,BYTE];        ! Address of current
                                                ! char_set buffer in
                                                ! DCB

     !+
     ! Get space for two new, properly-dimensioned buffers.
     !-
     IF NOT (STATUS = LIB$GET_VM (%REF (2 * .NEW_SIZE),
                                  NEW_TEXT_BUF))
     THEN
          RETURN (.STATUS);

     NEW_ATTR_BUF = .NEW_TEXT_BUF + .NEW_SIZE;

     !+
     ! Now need to copy text and attribute information from
     ! .DCB [DCB_A_TEXT_BUF] and .DCB [DCB_A_ATTR_BUF] to
     ! .NEW_TEST_BUF and .NEW_ATTR_BUF, preserving the line context.
     !        First pre-blank new text_buffer and attribute buffer in
     !  case old do not cover new area.
     !-
     CH$FILL ( %C' ',                           .NEW_SIZE, .NEW_TEXT_BUF);
     CH$FILL ( .DCB [DCB_B_DEF_VIDEO_ATTR], .NEW_SIZE, .NEW_ATTR_BUF);

     TEXT_PTR = .DCB [DCB_A_TEXT_BUF];
     ATTR_PTR = .DCB [DCB_A_ATTR_BUF];
     CHAR_PTR = .DCB [DCB_A_CHAR_SET_BUF];

     ROWS_TO_MOVE = MIN (.DCB [DCB_W_NO_ROWS], .NEW_ROWS);
     COLS_TO_MOVE = MIN (.DCB [DCB_W_NO_COLS], .NEW_COLS);

     INCR I FROM 1 TO .ROWS_TO_MOVE
     DO
          BEGIN          ! Move text and attrib. to new buffers.
          LOCAL
               SOURCE_INDEX,
               DEST_INDEX;

          SOURCE_INDEX = (.I -1) * .DCB [DCB_W_NO_COLS] ;
          DEST_INDEX   = (.I -1) * ..NUM_COLS            ;

          CH$MOVE ( .COLS_TO_MOVE,                       ! No of chars.
;       4                         TEXT_PTR [.SOURCE_INDEX],          ! From
;       4                         NEW_TEXT_BUF [.DEST_INDEX]);       ! To
;       4
;       4               CH$MOVE ( .COLS_TO_MOVE,                     ! No. of chars.
;       4                         ATTR_PTR [.SOURCE_INDEX],          ! From
;       4                         NEW_ATTR_BUF [.DEST_INDEX]);       ! To
;       4
;       4
;       3               END;          ! Move text and attrib to new buffers.
;       3
;       3           !+
;       3           ! Deal with alternate character set buffers if they exist.
;       3           !-
;       3           IF .DCB [DCB_A_CHAR_SET_BUF] NEQ 0
;       3           THEN
;       4               BEGIN         ! Alt. char set buffer exists
;       4               !+
;       4               ! Allocate a new alternate character set buffer and init. it
;       4               !-
;       5               IF NOT (STATUS = LIB$GET_VM (NEW_SIZE, NEW_CHAR_BUF))
;       4               THEN
;       5                   BEGIN
;       5                   LIB$FREE_VM (%REF (2* .NEW_SIZE), NEW_TEXT_BUF);
;       5                   RETURN (.STATUS); ! Return LIB$_INSVIRMEM from GET call
;       4                   END;
;       4
;       4               CH$FILL ( .DCB [DCB_B_DEF_CHAR_SET], .NEW_SIZE,
;       4                         .NEW_CHAR_BUF);
;       4
;       4               !+
;       4               ! Move current contents row by row
;       4               !-
;       4               INCR I FROM 1 TO .ROWS_TO_MOVE
;       4               DO
;       5                   BEGIN   ! Move loop
;       5                   LOCAL
;       5                       SOURCE_INDEX,
;       5                       DEST_INDEX;
;       5
;       5                   SOURCE_INDEX = (.I-1) * .DCB [DCB_W_NO_COLS] ;
;       5                   DEST_INDEX   = (.I-1) * ..NUM_COLS ;
;       5                   CH$MOVE ( .COLS_TO_MOVE,                 ! No of chars
;       5                             CHAR_PTR [.SOURCE_INDEX],      ! From
;       5                             NEW_CHAR_BUF [.DEST_INDEX]);   ! To
;       4                   END;    ! Move loop
;       4
;       4               !+
;       4               ! Free old alternate char. set buffer and plug in new addr.
;       4               !-
;       5               IF NOT (STATUS = LIB$FREE_VM ( DCB [DCB_L_BUFSIZE],
;       5                                              DCB [DCB_A_CHAR_SET_BUF]))
;       4               THEN
;       4                   RETURN (.STATUS);
;       4
;       4               DCB [DCB_A_CHAR_SET_BUF] = .NEW_CHAR_BUF;
;       4
;       3               END;          ! Alt. char set buffer exists
```

```
3
3    !+
3    ! Now that the text and attributes are safe in their
3    ! new buffers, we release the old buffers and put the addresses
3    ! of the new buffers in the DCB.
3    !-
4    IF NOT (STATUS = LIB$FREE_VM (%REF ( 2 * .DCB [DCB_L_BUFSIZE]),
4                                  DCB [DCB_A_TEXT_BUF]))
3    THEN
3        RETURN (.STATUS);
3
3    DCB [DCB_A_TEXT_BUF] = .NEW_TEXT_BUF;    ! Plug in new addresses
3    DCB [DCB_A_ATTR_BUF] = .NEW_ATTR_BUF;
3
3    !+
3    ! If the number of rows changed, we need to reallocate the
3    ! line characteristics vector and copy over as much of it as
3    ! fits.
3    !-
3    IF .DCB [DCB_W_NO_ROWS] NEQ .NEW_ROWS
3    THEN
4        BEGIN      ! No. of rows changed
4        LOCAL
4            NEW_LINE_CHAR : REF VECTOR [,BYTE],       ! Addr of a new
4                                                      ! line Char.
4                                                      ! vector
4
4            LINE_CHAR_PTR : REF VECTOR [,BYTE];       ! Addr of curr.
4                                                      ! line Char.
4                                                      ! vector
4
4        LINE_CHAR_PTR = .DCB [DCB_A_LINE_CHAR];
4
4        !+
4        ! Allocate a new line characteristics vector of the right
4        ! length.  Quit if we can't get it.
4        !-
5        IF NOT (STATUS = LIB$GET_VM ( %REF (.NEW_ROWS + 1),
5                                      NEW_LINE_CHAR))
4        THEN
5            BEGIN   ! Error path
5            !+
5            ! Give back all space acquired on this transaction,
5            ! ignoring further errors, and quit.
5            !-
5            LIB$FREE_VM ( %REF (2 * .NEW_SIZE), NEW_TEXT_BUF);
5            RETURN ( .STATUS );
4            END;    ! Error path
4
4        !+
4        ! Clear entire allocated vector to zero
4        !-
4        CH$FILL ( 0, .NEW_ROWS+1, .NEW_LINE_CHAR);
4
4        !+
4        ! Copy over as much of old line characteristics vector as
4        ! will fit.
```

```
4                       !-
4                       CH$MOVE ( .ROWS_TO_MOVE,
4                                 LINE_CHAR_PTR [1],
4                                 NEW_LINE_CHAR [1]);
4
4                       !+
4                       ! Free former line characteristics vector.
4                       !-
5                       IF NOT (STATUS = LIB$FREE_VM (
5                                           %REF (.DCB [DCB_W_NO_ROWS] +1),
5                                           DCB [DCB_A_LINE_CHAR]))
4                       THEN
4                           RETURN (.STATUS);
4
4                       !+
4                       ! Store address of new line characteristics vector in DCB
4                       !-
4                       DCB [DCB_A_LINE_CHAR] = .NEW_LINE_CHAR;
3                       END;            ! No. of rows changed
3
3                   !+
3                   ! Adjust the no. of rows and no. of cols. recorded in the DCB.
3                   !-
3                   DCB [DCB_W_NO_ROWS] = .NEW_ROWS;          ! Adjust row/column size
3                   DCB [DCB_W_NO_COLS] = .NEW_COLS;
3                   DCB [DCB_L_BUFSIZE] = .NEW_SIZE;
3
3                   !+
3                   ! Force cursor to home.
3                   !-
3                   DCB [DCB_W_CURSOR_ROW] = 1;
3                   DCB [DCB_W_CURSOR_COL] = 1;
3
3                   !+
3                   ! Knock down flags that indicate we are at end of a row and that
3                   ! we are in last line.
3                   !-
3                   DCB [DCB_V_FULL]   = 0;
3                   DCB [DCB_V_COL_80] = 0;
3
3                   !+
3                   ! Reset the scrolling region within the redimensioned virtual
3                   ! display to be the whole display.
3                   !-
3                   DCB [DCB_W_TOP_OF_SCRREG]    = 1;
3                   DCB [DCB_W_BOTTOM_OF_SCRREG] = .NEW_ROWS;
3
3                   !+
3                   ! Now deal with border data, if any exists.
3                   !-
3                   IF .DCB [DCB_V_BORDERED]
3                   THEN
4                       BEGIN           ! Bordered
4                       LOCAL
4                           DESC : REF BLOCK [8,BYTE]; ! Pointer to dynamic string
4                                                      ! desc. for border label
4
```

```
4                 DESC = DCB [DCB_Q_LABEL_DESC];
4                 IF .DESC [DSC$A_POINTER] NEQ 0       ! If label exists
4                 THEN
5                     BEGIN   ! Label exists
5                     LOCAL
5                         TEMP;
5                     TEMP = .DCB [DCB_W_LABEL_UNITS];
5
5                     !+
5                     ! Try to reapply our existing border label on this
5                     ! redimensioned virtual display.  If it now doesn't
5                     ! fit because of the new dimensions, delete the label.
5                     !-
6                     IF NOT (SMG$LABEL_BORDER (
6                                     .DISPLAY_ID,
6                                     .DESC,
6                                     %REF (.DCB [DCB_B_LABEL_POS]),
6                                     !+
6                                     ! Conditionalize UNITS parameter to
6                                     ! LABEL_BORDER depending on whether
6                                     ! caller originally specified
6                                     ! "centering" or gave us specific units.
6                                     !-
7                                     (IF .DCB [DCB_V_LABEL_CENTER] THEN 0
6                                                                ELSE TEMP),
6                                     %REF ( .DCB [DCB_B_LABEL_REND])
6                                     ))
5                     THEN
5                         LIB$SFREE1_DD ( .DESC);       ! Delete label
4                     END;        ! Label exists
3                 END;            ! Bordered
2             END;    ! Redimensioning required
2
2 !+
2 ! Since the dimension of the virtual display may have changed, or we
2 ! may have added or deleted a border,  we need to recalculate the
2 ! transformation constants that occur in each pasting packet we are
2 ! involved in.
2 ! Check to see if we can do it now or must wait because we are batched.
2 !-
2         IF .DCB [DCB_L_BATCH_LEVEL] EQL 0
2         THEN
3             BEGIN   ! Can do it now
3             LOCAL
3                 CURR_PP : REF $PP_DECL;       ! Addr of a pasting packet
3
4             IF NOT (STATUS = SMG$$RECALC_PP_FIELDS ( .DCB))
3             THEN
3                 RETURN (.STATUS) ;
3
3             !+
3             ! Remap all pasteboard buffers to which we are pasted, from the
3             ! bottom outward.
3             !-
3             CURR_PP = .DCB [DCB_A_PP_NEXT];
3             WHILE .CURR_PP NEQ DCB [DCB_A_PP_NEXT]
3             DO
```

```
; 1216          1471  4             BEGIN       ! Remap all pasteboards
; 1217          1472  4             LOCAL
; 1218          1473  4                 PBCB : REF $PBCB_DECL;  ! Addr of a pasteboard control
; 1219          1474  4                                         ! block
; 1220          1475  4             PBCB = .CURR_PP [PP_A_PBCB_ADDR];
; 1221          1476  5             IF NOT (STATUS = SMG$$CHECK_FOR_OUTPUT_PBCB ( .PBCB))
; 1222          1477  4             THEN
; 1223          1478  4                 RETURN ( .STATUS);          ! Quit if any one of them fails
; 1224          1479  4
; 1225          1480  4             CURR_PP = .CURR_PP [PP_A_NEXT_DCB]; ! To next pasting packet
; 1226          1481  3             END;        ! Remap all pasteboards
; 1227          1482  3
; 1228          1483  3         RETURN ( SS$_NORMAL);
; 1229          1484  3         END     ! Can do it now
; 1230          1485  3
; 1231          1486  2     ELSE
; 1232          1487  2
; 1233          1488  3         BEGIN   ! Must delay until end_display_batch
; 1234          1489  3         DCB [DCB_V_PP_MISMATCH] = 1;    ! Mark it for later update
; 1235          1490  2         END;    ! Must delay until end_display_batch
; 1236          1491  2
; 1237          1492  2     RETURN ( SS$_NORMAL);
; 1238          1493  1     END;                            ! Routine SMG$CHANGE_VIRTUAL_DISPLAY




                                            0FFC 00000          .ENTRY  SMG$CHANGE_VIRTUAL_DISPLAY, Save R2,R3,R4,- ; 1016
                                                                        R5,R6,R7,R8,R9,R10,R11                      ;
                        5E          30  C2 00002                SUBL2   #48, SP                                     ;
           50           6C          01  83 00005                SUBB3   #1, (AP), DIFF                              ; 1134
                        05          50  91 00009                CMPB    DIFF, #5                                    ;
                                    08  1B 0000C                BLEQU   1$                                          ;
                        50 00000000G    8F  D0 0000E            MOVL    #SMG$_WRONUMARG, R0                         ;
                                        04 00015                RET                                                 ;
                        50          04  BC  D0 00016 1$:        MOVL    @DISPLAY_ID, R0                             ; 1136
                  04    BC          38  A0  D1 0001A            CMPL    56(R0), @DISPLAY_ID                         ;
                                    06  12 0001F                BNEQ    2$                                          ;
                        11          44  A0  91 00021            CMPB    68(R0), #17                                 ;
                                    08  13 00025                BEQL    3$                                          ;
                        50 00000000G    8F  D0 00027 2$:        MOVL    #SMG$_INVDIS_ID, R0                         ;
                                        04 0002E                RET                                                 ;
                        56          04  BC  D0 0002F 3$:        MOVL    @DISPLAY_ID, DCB                            ;
                        02              6C  91 00033            CMPB    (AP), #2                                    ; 1142
                                        0B  1F 00036            BLSSU   4$                                          ;
                                    08  AC  D5 00038            TSTL    8(AP)                                       ;
                                        06  13 0003B            BEQL    4$                                          ;
                        58          08  BC  D0 0003D            MOVL    @NUM_ROWS, NEW_ROWS                         ; 1144
                                        04  11 00041            BRB     5$                                          ;
                        58          02  A6  3C 00043 4$:        MOVZWL  2(DCB), NEW_ROWS                            ; 1146
                        03              6C  91 00047 5$:        CMPB    (AP), #3                                    ; 1148
                                        0C  1F 0004A            BLSSU   6$                                          ;
                                    0C  AC  D5 0004C            TSTL    12(AP)                                      ;
                                        07  13 0004F            BEQL    6$                                          ;
                  18    AE          0C  BC  D0 00051            MOVL    @NUM_COLS, NEW_COLS                         ; 1150
                                        05  11 00056            BRB     7$                                          ;
```

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                                                                   D 14
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages      16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742              Page  33
1-096           SMG$CHANGE_VIRTUAL_DISPLAY - Change Virtual Dis 14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1                (7)

                              18     AE      06    A6   3C 00058 6$:    MOVZWL  6(DCB), NEW_COLS                                 ; 1152
               20     AE             58      18    AE   C5 0005D 7$:    MULL3   NEW_COLS, NEW_ROWS, NEW_SIZE                     ; 1154
                                     04            6C   91 00063        CMPB    (AP), #4                                         ; 1160
                                                   0A   1F 00066        BLSSU   8$                                               ;
                                             10    AC   D5 00068        TSTL    16(AP)                                           ;
                                                   05   13 0006B        BEQL    8$                                               ;
                              2F     A6      10    BC   90 0006D        MOVB    @DISPLAY_ATTRIBUTES, 47(DCB)                     ; 1162
                                     05            6C   91 00072 8$:    CMPB    (AP), #5                                         ; 1164
                                                   0A   1F 00075        BLSSU   9$                                               ;
                                             14    AC   D5 00077        TSTL    20(AP)                                           ;
                                                   05   13 0007A        BEQL    9$                                               ;
                              2E     A6      14    BC   90 0007C        MOVB    @VIDEO_ATTRIBUTES, 46(DCB)                       ; 1166
                                     06            6C   91 00081 9$:    CMPB    (AP), #6                                         ; 1168
                                                   0A   1F 00084        BLSSU   10$                                              ;
                                             18    AC   D5 00086        TSTL    24(AP)                                           ;
                                                   05   13 00089        BEQL    10$                                              ;
                              30     A6      18    BC   90 0008B        MOVB    @CHAR_SET, 48(DCB)                               ; 1170
                                     57      20    AE   D0 00090 10$:   MOVL    NEW_SIZE, R7                                     ; 1177
                                     57      3C    A6   D1 00094        CMPL    60(DCB), R7                                      ;
                                                   14   12 00098        BNEQ    11$                                              ;
          58       02     A6         10            00   ED 0009A        CMPZV   #0, #16, 2(DCB), NEW_ROWS                        ; 1178
                                                   0C   12 000A0        BNEQ    11$                                              ;
    18    AE       06     A6         10            00   ED 000A2        CMPZV   #0, #16, 6(DCB), NEW_COLS                        ; 1179
                                                   03   12 000A9        BNEQ    11$                                              ;
                                                 01F7   31 000AB        BRW     29$                                              ;
                                             28    AE   9F 000AE 11$:   PUSHAB  NEW_TEXT_BUF                                     ; 1208
               18     AE             57            01   78 000B1        ASHL    #1, R7, 24(SP)                                   ;
                                             18    AE   9F 000B6        PUSHAB  24(SP)                                           ;
                       00000000G     00            02   FB 000B9        CALLS   #2, LIB$GET_VM                                   ;
                                     6E            50   D0 000C0        MOVL    R0, STATUS                                       ;
                                     03            6E   E8 000C3        BLBS    STATUS, 12$                                      ;
                                                 016B   31 000C6        BRW     24$                                              ;
                              0C     AE      28  BE47   9E 000C9 12$:   MOVAB   @NEW_TEXT_BUF[R7], NEW_ATTR_BUF                  ; 1213
          57              20         6E            00   2C 000CF        MOVC5   #0, (SP), #32, R7, @NEW_TEXT_BUF                 ; 1222
                                             28    BE      000D4                                                                 ;
          57       2E     A6         6E            00   2C 000D6        MOVC5   #0, (SP), 46(DCB), R7, @NEW_ATTR_BUF             ; 1223
                                             0C    BE      000DC                                                                 ;
                                     5B      10    A6   D0 000DE        MOVL    16(DCB), TEXT_PTR                                ; 1225
                                     5A      14    A6   D0 000E2        MOVL    20(DCB), ATTR_PTR                                ; 1226
                              04     AE      18    A6   D0 000E6        MOVL    24(DCB), CHAR_PTR                                ; 1227
                                     52      02    A6   3C 000EB        MOVZWL  2(DCB), R2                                       ; 1229
                                     58            52   D1 000EF        CMPL    R2, NEW_ROWS                                     ;
                                                   03   15 000F2        BLEQ    13$                                              ;
                                     52            58   D0 000F4        MOVL    NEW_ROWS, R2                                     ;
                              14     AE            52   D0 000F7 13$:   MOVL    R2, ROWS_TO_MOVE                                 ;
                                     52      06    A6   3C 000FB        MOVZWL  6(DCB), R2                                       ; 1230
                              18     AE            52   D1 000FF        CMPL    R2, NEW_COLS                                     ;
                                                   04   15 00103        BLEQ    14$                                              ;
                                     52      18    AE   D0 00105        MOVL    NEW_COLS, R2                                     ;
                              10     AE            52   D0 00109 14$:   MOVL    R2, COLS_TO_MOVE                                 ;
                                                   57   D4 0010D        CLRL    I                                                ; 1247
                                                   26   11 0010F        BRB     16$                                              ;
                                     50      FF    A7   9E 00111 15$:   MOVAB   -1(R7), R0                                       ; 1239
                                     51      06    A6   3C 00115        MOVZWL  6(DCB), R1                                       ;
               08     AE             50            51   C5 00119        MULL3   R1, R0, SOURCE_INDEX                             ;
                      59             50      0C    BC   C5 0011E        MULL3   @NUM_COLS, R0, DEST_INDEX                        ; 1240
               28 BE49          08 BE4B      10    AE   28 00123        MOVC3   COLS_TO_MOVE, @SOURCE_INDEX[TEXT_PTR], -         ; 1244
```

```
                                                                          @NEW_TEXT_BUF[DEST_INDEX]                   ;
                                     0C BE49  9F 0012C         PUSHAB  @NEW_ATTR_BUF[R9]                              ; 1248
              9E        0C BE4A      14   AE  28 00130         MOVC3   COLS_TO_MOVE, @SOURCE_INDEX[ATTR_PTR], -       ;
                                                                       @(SP)+                                         ;
              D5             57      14   AE  F3 00137 16$:    AOBLEQ  ROWS_TO_MOVE, I, 15$                           ; 1232
                                     18   A6  D5 0013C         TSTL    24(DCB)                                        ; 1256
                                          6E  13 0013F         BEQL    22$                                            ;
                                     1C   AE  9F 00141         PUSHAB  NEW_CHAR_BUF                                   ; 1262
                                     24   AE  9F 00144         PUSHAB  NEW_SIZE                                       ;
                   00000000G         00   02  FB 00147         CALLS   #2, LIB$GET_VM                                 ;
                                     6E   50  D0 0014E         MOVL    R0, STATUS                                     ;
                                     16   6E  E8 00151         BLBS    STATUS, 19$                                    ;
                                     28   AE  9F 00154         PUSHAB  NEW_TEXT_BUF                                   ; 1265
         0C   AE        24   AE           01  78 00157         ASHL    #1, NEW_SIZE, 12(SP)                           ;
                                     0C   AE  9F 0015D         PUSHAB  12(SP)                                         ;
                   00000000G         00   02  FB 00160 17$:    CALLS   #2, LIB$FREE_VM                                ;
                                        00CA  31 00167 18$:    BRW     24$                                            ; 1266
    20   AE    30   A6             6E     00  2C 0016A 19$:    MOVC5   #0, (SP), 48(DCB), NEW_SIZE, @NEW_CHAR_BUF     ; 1270
                                     1C   BE     00171                                                                ;
                                          59  D4 00173         CLRL    I                                              ; 1285
                                          1B  11 00175         BRB     21$                                            ;
                                50   FF   A9  9E 00177 20$:    MOVAB   -1(R9), R0                                     ; 1282
                                51   06   A6  3C 0017B         MOVZWL  6(DCB), SOURCE_INDEX                           ;
                                51        50  C4 0017F         MULL2   R0, SOURCE_INDEX                               ;
                                50   0C   BC  C4 00182         MULL2   @NUM_COLS, DEST_INDEX                          ; 1283
                                57   04   AE  D0 00186         MOVL    CHAR_PTR, R7                                   ; 1286
           1C BE40            6147   10   AE  28 0018A         MOVC3   COLS_TO_MOVE, (SOURCE_INDEX)[R7], -            ;
                                                                       @NEW_CHAR_BUF[DEST_INDEX]                      ;
              E0             59      14   AE  F3 00192 21$:    AOBLEQ  ROWS_TO_MOVE, I, 20$                           ; 1275
                                     18   A6  9F 00197         PUSHAB  24(DCB)                                        ; 1293
                                     3C   A6  9F 0019A         PUSHAB  60(DCB)                                        ; 1292
                   00000000G         00   02  FB 0019D         CALLS   #2, LIB$FREE_VM                                ; 1293
                                     6E   50  D0 001A4         MOVL    R0, STATUS                                     ;
                                     BD   6E  E9 001A7         BLBC    STATUS, 18$                                    ;
                        18   A6      1C   AE  D0 001AA         MOVL    NEW_CHAR_BUF, 24(DCB)                          ; 1297
                                     10   A6  9F 001AF 22$:    PUSHAB  16(DCB)                                        ; 1307
         14   AE        3C   A6           01  78 001B2         ASHL    #1, 60(DCB), 20(SP)                            ; 1306
                                     14   AE  9F 001B8         PUSHAB  20(SP)                                         ;
                   00000000G         00   02  FB 001BB         CALLS   #2, LIB$FREE_VM                                ; 1307
                                     6E   50  D0 001C2         MOVL    R0, STATUS                                     ;
                                     6C   6E  E9 001C5         BLBC    STATUS, 24$                                    ;
                        10   A6      28   AE  D0 001C8         MOVL    NEW_TEXT_BUF, 16(DCB)                          ; 1311
                        14   A6      0C   AE  D0 001CD         MOVL    NEW_ATTR_BUF, 20(DCB)                          ; 1312
         58        02   A6   10           00  ED 001D2         CMPZV   #0, #16, 2(DCB), NEW_ROWS                      ; 1319
                                          62  13 001D8         BEQL    26$                                            ;
                             59      4C   A6  D0 001DA         MOVL    76(DCB), LINE_CHAR_PTR                         ; 1331
                                     24   AE  9F 001DE         PUSHAB  NEW_LINE_CHAR                                  ; 1337
                             52      01   A8  9E 001E1         MOVAB   1(R8), R2                                      ;
                        14   AE           52  D0 001E5         MOVL    R2, 20(SP)                                     ;
                                     14   AE  9F 001E9         PUSHAB  20(SP)                                         ;
                   00000000G         00   02  FB 001EC         CALLS   #2, LIB$GET_VM                                 ;
                                     6E   50  D0 001F3         MOVL    R0, STATUS                                     ;
                                     0F   6E  E8 001F6         BLBS    STATUS, 23$                                    ;
                                     28   AE  9F 001F9         PUSHAB  NEW_TEXT_BUF                                   ; 1345
         14   AE        24   AE           01  78 001FC         ASHL    #1, NEW_SIZE, 20(SP)                           ;
                                     14   AE  9F 00202         PUSHAB  20(SP)                                         ;
                                        FF58  31 00205         BRW     17$                                            ;
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                                                                        F 14
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages      16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742          Page  35
1-096           SMG$CHANGE_VIRTUAL_DISPLAY - Change Virtual Dis 14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1             (7)

                                       5A          24     AE  D0 00208 23$:   MOVL    NEW_LINE_CHAR, R10                        ; 1352
         52             00             6E                 00  2C 0020C        MOVC5   #0, (SP), #0, R2, (R10)                   ;
                                                          6A     00211                                                          ;
                  01    AA       01    A9          14     AE  28 00212        MOVC3   ROWS_TO_MOVE, 1(LINE_CHAR_PTR), 1(R10)   ; 1360
                                                   4C     A6  9F 00219        PUSHAB  76(DCB)                                   ; 1367
                                 18    AE          02     A6  3C 0021C        MOVZWL  2(DCB), 24(SP)                            ; 1366
                                                   18     AE  D6 00221        INCL    24(SP)                                    ;
                                                   18     AE  9F 00224        PUSHAB  24(SP)                                    ;
                        00000000G  00                     02  FB 00227        CALLS   #2, LIB$FREE_VM                           ; 1367
                                   6E                     50  D0 0022E        MOVL    R0, STATUS                                ;
                                   04                     6E  E8 00231        BLBS    STATUS, 25$                               ;
                                   50                     6E  D0 00234 24$:   MOVL    STATUS, R0                                ; 1369
                                                              04 00237        RET                                               ;
                                 4C    A6                 5A  D0 00238 25$:   MOVL    R10, 76(DCB)                              ; 1374
                                 02    A6                 58  B0 0023C 26$:   MOVW    NEW_ROWS, 2(DCB)                          ; 1380
                                 06    A6          18     AE  B0 00240        MOVW    NEW_COLS, 6(DCB)                          ; 1381
                                 3C    A6          20     AE  D0 00245        MOVL    NEW_SIZE, 60(DCB)                         ; 1382
                                 28    A6 00010001        8F  D0 0024A        MOVL    #65537, 40(DCB)                           ; 1387
                                 34    A6                 03  8A 00252        BICB2   #3, 52(DCB)                               ; 1395
                                 48    A6                 01  B0 00256        MOVW    #1, 72(DCB)                               ; 1401
                                 4A    A6                 58  B0 0025A        MOVW    NEW_ROWS, 74(DCB)                         ; 1402
                                       43          2F     A6  E9 0025E        BLBC    47(DCB), 29$                              ; 1407
                                       52          08     A6  9E 00262        MOVAB   8(R6), DESC                               ; 1414
                                                   04     A2  D5 00266        TSTL    4(DESC)                                   ; 1415
                                                          3A  13 00269        BEQL    29$                                       ;
                                 2C    AE          2C     A6  3C 0026B        MOVZWL  44(DCB), TEMP                             ; 1420
                                 18    AE          33     A6  9A 00270        MOVZBL  51(DCB), 24(SP)                           ; 1439
                                                   18     AE  9F 00275        PUSHAB  24(SP)                                    ;
                        04       34    A6                 02  E1 00278        BBC     #2, 52(DCB), 27$                          ; 1437
                                                          7E  D4 0027D        CLRL    -(SP)                                     ;
                                                          06  11 0027F        BRB     28$                                       ;
                                       50          30     AE  9E 00281 27$:   MOVAB   TEMP, R0                                  ;
                                                          50  DD 00285        PUSHL   R0                                        ;
                                 1C    AE          31     A6  9A 00287 28$:   MOVZBL  49(DCB), 28(SP)                           ; 1430
                                                   1C     AE  9F 0028C        PUSHAB  28(SP)                                    ;
                                                          52  DD 0028F        PUSHL   DESC                                      ; 1429
                                                   04     AC  DD 00291        PUSHL   DISPLAY_ID                                ; 1428
                            0000V  CF                     05  FB 00294        CALLS   #5, SMG$LABEL_BORDER                      ;
                                   09                     50  E8 00299        BLBS    R0, 29$                                   ;
                                                          52  DD 0029C        PUSHL   DESC                                      ; 1442
                        00000000G  00                     01  FB 0029E        CALLS   #1, LIB$SFREE1_DD                         ;
                                                   1C     A6  D5 002A5 29$:   TSTL    28(DCB)                                   ; 1454
                                                          2C  12 002A8        BNEQ    31$                                       ;
                                                          56  DD 002AA        PUSHL   DCB                                       ; 1460
                            0000V  CF                     01  FB 002AC        CALLS   #1, SMG$$RECALC_PP_FIELDS                 ;
                                   29                     50  E9 002B1        BLBC    STATUS, 33$                               ;
                                   52              20     A6  D0 002B4        MOVL    32(DCB), CURR_PP                          ; 1468
                                   51              20     A6  9E 002B8 30$:   MOVAB   32(DCB), R1                               ; 1469
                                   51                     52  D1 002BC        CMPL    CURR_PP, R1                               ;
                                                          19  13 002BF        BEQL    32$                                       ;
                                   51              14     A2  D0 002C1        MOVL    20(CURR_PP), PBCB                         ; 1475
                                                          51  DD 002C5        PUSHL   PBCB                                      ; 1476
                        00000000G  00                     01  FB 002C7        CALLS   #1, SMG$$CHECK_FOR_OUTPUT_PBCB            ;
                                   0C                     50  E9 002CE        BLBC    STATUS, 33$                               ;
                                   52                     62  D0 002D1        MOVL    (CURR_PP), CURR_PP                        ; 1480
                                                          E2  11 002D4        BRB     30$                                       ; 1469
                                 34    A6                 08  88 002D6 31$:   BISB2   #8, 52(DCB)                               ; 1489
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                          50          01  D0 002DA 32$:    MOVL    #1, R0                                           ; 1492
                                          04 002DD 33$:    RET                                                       ; 1493

; Routine Size:  734 bytes,    Routine Base:  _SMG$CODE + 0351


; 1239           1494  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$CHECK_FOR_OCCLUSION - Check to see if display is occluded'
GLOBAL ROUTINE SMG$CHECK_FOR_OCCLUSION (
                                        DISPLAY_ID,
                                        PASTEBOARD_ID,
                                        OCCLUSION_STATE
                                       ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       This procedure determines if the given virtual display, as
!       pasted to the given pasteboard, is occluded by another virtual
!       display.  The OCCLUSION state is set to:
!
!                       1       : if virtual display is occluded
!                       0       : if virtual display is not occluded.
!               not meaningfull : if status is not SS$_NORMAL.
!
!       The returned status reflects whether the question could be
!       answered at all.
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$CHECK_FOR_OCCLUSION (
!                                       DISPLAY_ID.rl.r,
!                                       PASTEBOARD_ID.rl.r,
!                                       OCCLUSION_STATE.wl.r)
! FORMAL PARAMETERS:
!
!       DISPLAY_ID.rl.r         Address of a display id.
!
!       PASTEBOARD_ID.rl.r      Address of a pasteboard id.
!
!       OCCLUSION_STATE.wl.r    Set to          1  if occluded
!                                               0  if not occluded
!
!
! IMPLICIT INPUTS:
!
!       NONE
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! COMPLETION STATUS:
!
!       SS$_NORMAL      Normal success.  OCCLUSION_STATE calculated.
!
!       SMG$_NOTPASTED  Given virtual display is not pasted to given
!                       pasteboard.
!
!       SMG$_INVPAS_ID  Invalid pasteboard id.
!
!       SMG$_INVDIS_ID  Invalid display id.
!
! SIDE EFFECTS:
!
```

```
; 1298          1552  1 !       NONE
; 1299          1553  1 !--
; 1300          1554  1
; 1301          1555  2     BEGIN
; 1302          1556  2     LOCAL
; 1303          1557  2         STATUS,                 ! Status of subroutine calls
; 1304          1558  2
; 1305          1559  2         PP : REF $PP_DECL,      ! Address of relevant pasting packet
; 1306          1560  2
; 1307          1561  2         PBCB: REF $PBCB_DECL,   ! Address of Pasteboard Control Block
; 1308          1562  2
; 1309          1563  2         DCB : REF $DCB_DECL;    ! Address of Display Control Block
; 1310          1564  2
; 1311          1565  2 !+
; 1312          1566  2 ! Validate number of arguments.
; 1313          1567  2 !-
; 1314          1568  2     $SMG$VALIDATE_ARGCOUNT (3, 3);
; 1315          1569  2
; 1316          1570  2 !+
; 1317          1571  2 ! Get DCB and PBCB addresses that go with these display ids and
; 1318          1572  2 ! pasteboard ids.
; 1319          1573  2 !-
; 1320          1574  2     $SMG$GET_DCB (.DISPLAY_ID, DCB);
; 1321          1575  2     $SMG$GET_PBCB (.PASTEBOARD_ID, PBCB);
; 1322          1576  2
; 1323          1577  2 !+
; 1324          1578  2 ! Try to find the pasting packet that binds these two.  Return
; 1325          1579  2 ! SMG$_NOTPASTED it can't be located.
; 1326          1580  2 !-
; 1327          1581  3     IF NOT (STATUS = SMG$$LOCATE_PP ( .DCB, .PBCB, PP))
; 1328          1582  2     THEN
; 1329          1583  2         RETURN (.STATUS);
; 1330          1584  2
; 1331          1585  2 !+
; 1332          1586  2 ! Check to see if occluded and return appropriate OCCLUSION_STATE.
; 1333          1587  2 !-
; 1334          1588  3     .OCCLUSION_STATE = ( IF .PP [PP_V_OCCLUDED] THEN 1     ! Occluded
; 1335          1589  2                                                ELSE 0);  ! Not occluded
; 1336          1590  2
; 1337          1591  2     RETURN SS$_NORMAL;
; 1338          1592  1     END;                    ! End of routine SMG$CHECK_FOR_OCCLUSION



                                          0004 00000          .ENTRY  SMG$CHECK_FOR_OCCLUSION, Save R2                ; 1496
                     52 00000000'   EF   9E 00002          MOVAB   PBD_L_COUNT, R2                                  ;
                     5E             04   C2 00009          SUBL2   #4, SP                                           ;
                     03             6C   91 0000C          CMPB    (AP), #3                                         ; 1568
                                    08   13 0000F          BEQL    1$                                               ;
                     50 00000000G   8F   D0 00011          MOVL    #SMG$_WRONUMARG, R0                              ;
                                         04 00018          RET                                                      ;
                     50         04  BC   D0 00019 1$:      MOVL    @DISPLAY_ID, R0                                  ; 1574
               04    BC         38  A0   D1 0001D          CMPL    56(R0), @DISPLAY_ID                              ;
                                    06   12 00022          BNEQ    2$                                               ;
                     11         44  A0   91 00024          CMPB    68(R0), #17                                      ;
```

```
                                  08  13 00028        BEQL    3$                                  ;
                  50 00000000G    8F  D0 0002A 2$:    MOVL    #SMG$_INVDIS_ID, R0                 ;
                                      04 00031        RET                                         ;
                  51        04    BC  D0 00032 3$:    MOVL    @DISPLAY_ID, DCB                    ;
                  50        08    BC  D0 00036        MOVL    @PASTEBOARD_ID, R0                  ; 1575
                                  0A  19 0003A        BLSS    4$                                  ;
                  62              50  D1 0003C        CMPL    R0, PBD_L_COUNT                     ;
                                  05  14 0003F        BGTR    4$                                  ;
         08       44    A2        50  E0 00041        BBS     R0, PBD_V_PB_AVAIL, 5$              ;
                  50 00000000G    8F  D0 00046 4$:    MOVL    #SMG$_INVPAS_ID, R0                 ;
                                      04 0004D        RET                                         ;
                  50        04 A240   D0 0004E 5$:    MOVL    PBD_A_PBCB[R0], PBCB                ;
                          4001    8F  BB 00053        PUSHR   #^M<R0,SP>                          ; 1581
                                  51  DD 00057        PUSHL   DCB                                 ;
               0000V   CF         03  FB 00059        CALLS   #3, SMG$$LOCATE_PP                  ;
                  15              50  E9 0005E        BLBC    STATUS, 8$                          ;
                  50              6E  D0 00061        MOVL    PP, R0                              ; 1588
                  05        2A    A0  E9 00064        BLBC    42(R0), 6$                          ;
                  50              01  D0 00068        MOVL    #1, R0                              ;
                                  02  11 0006B        BRB     7$                                  ;
                                  50  D4 0006D 6$:    CLRL    R0                                  ;
               0C   BC            50  D0 0006F 7$:    MOVL    R0, @OCCLUSION_STATE                ;
                  50              01  D0 00073        MOVL    #1, R0                              ; 1591
                                      04 00076 8$:    RET                                         ; 1592

; Routine Size:  119 bytes,    Routine Base:  _SMG$CODE + 062F


; 1339         1593  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$CREATE_PASTEBOARD - Create Pasteboard'
GLOBAL ROUTINE SMG$CREATE_PASTEBOARD (
                                NEW_PBID,
                                OUT_DEVICE,
                                PB_ROWS,
                                PB_COLS,
                                PRESERVE_SCREEN_FLAG
                                        ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       This routine creates a new pasteboard -- returning its assigned
!       pasteboard_id.  OUT_DEVICE is the device upon which this
!       pasteboard is to be written.  If not supplied, output will flow
!       to SYS$OUTPUT.
!
!       If PB_ROWS and/or PB_COLS are provided, they are filled in with
!       the number of rows and number of columns on the physical device.
!
!       If called upon to create a 2nd pasteboard on a device that
!       already has a pasteboard associated with it, we simply return
!       the id of the already-existing pasteboard and the qualified
!       success SMG$_PASALREXI.
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$CREATE_PASTEBOARD (
!                               NEW_PBID.wl.r
!                               [,OUT_DEVICE.rt.dx]
!                               [,PB_ROWS.wl.r]
!                               [,PB_COLS.wl.r]
!                               [,PRESERVE_SCREEN_FLAG.rl.r])
!
! FORMAL PARAMETERS:
!
!       NEW_PBID.wl.r       Pasteboard id of newly-created pasteboard.
!
!       OUT_DEVICE.rt.dx            [Optional].  If supplied, this parameter
!                                   is the file specification or logical
!                                   name upon which the output associated
!                                   with this pasteboard will be written.
!                                   If omitted, output goes to SYS$OUTPUT.
!
!       PB_ROWS             [Optional].  If provided, it is filled in with
!                           the number of rows on the physical device.
!
!       PB_COLS             [Optional].  If provided, it is filled in with
!                           the number of columns on the physical device.
!
!       PRESERVE_SCREEN_FLAG        [Optional].  If provided, and if has a
!                                   value of 1, then the screen will not
!                                   be initially cleared.
!
!
! IMPLICIT INPUTS:
!
!       NONE
```

```
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !      NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !      SS$_NORMAL       Normal successful completion
1 !      LIB$_INSVIRMEM   Insufficient virtual memory to allocate needed
1 !                       buffer.
1 !      SMG$_PASALREXI   Pasteboard already exists for this device
1 !      SMG$_WRONUMARG   Wrong number of arguments.
1 !
1 ! SIDE EFFECTS:
1 !
1 !      NONE
1 !--
```

```
    BEGIN

    BUILTIN
        NULLPARAMETER;

    LOCAL
        FS_LEN : WORD INITIAL (0),      ! Length of filespec name to use.

        FS_ADDR,                        ! Address of filespec name to use.

        STATUS,                         ! Status of subroutine calls

        TERM_TYPE,                      ! terminal type

        CLEAR_FLAG,                     ! TRUE means clear screen

        PBID,                           ! Id of pasteboard being created.

        PBCB : REF $PBCB_DECL;          ! Address of pasteboard control block
                                        ! being created.

    EXTERNAL ROUTINE

        SMG$$ERASE_PASTEBOARD,
        SMG$$OUT_OF_BAND_HANDLER;

    $SMG$VALIDATE_ARGCOUNT (1, 5);      ! Test for right no. of args

    $SMG$GET_NEXT_PID ( PBID);  ! Allocate a new PBID

!+
! Decide what output device is to receive the the output of this
! pasteboard.
!-
    FS_LEN  = %CHARCOUNT  ('SYS$OUTPUT');       ! Assume default
    FS_ADDR = UPLIT (BYTE ('SYS$OUTPUT'));

    IF NOT NULLPARAMETER (OUT_DEVICE)
    THEN
        BEGIN   ! User-supplied filespec
        IF NOT (STATUS = LIB$ANALYZE_SDESC_R2 ( .OUT_DEVICE ;
                                               FS_LEN, FS_ADDR))
        THEN
            RETURN ( .STATUS);
        END;    ! User-supplied filespec

!+
! Create a PBCB.  Allocate buffers, etc.
! Extract the necessary device attributes and store in PBCB.
!-
    STATUS = SMG$$SETUP_TERMINAL_TYPE (
                .FS_ADDR,                       ! filespec addr
                .FS_LEN,                        ! Len of filespec
                 TERM_TYPE,                     ! Gets terminal type
                 PBCB);                         ! Address to receive address of PBCB

     IF NOT .STATUS
```

```
2       THEN
3           BEGIN
3           PBD_V_PB_AVAIL [.PBID] = 0;      ! Release PBID number
4           RETURN (.STATUS)
2           END;
2
2   !+
2   ! Decide whether we want to handle this output device ourselves
2   ! or use RMS to handle it.  We use RMS if the output device is
2   ! not a terminal.  We also use RMS if the output device is a terminal,
2   ! but one we can't handle, such as a hardcopy terminal.
2   !-
2
2   PBCB [PBCB_V_RMS] = (.PBCB[PBCB_B_CLASS]   NEQ DC$_TERM ) OR
2                       (.PBCB[PBCB_B_DEVTYPE] EQL UNKNOWN  ) OR
2                       (.PBCB[PBCB_B_DEVTYPE] EQL HARDCOPY );
2
2   !+
2   ! Loop through all the pasteboards we currently have trying to find
2   ! one whose associated resultant name string is the same as the one we
2   ! just created.
2   ! If we can find one, we have just created a 2nd pasteboard for the same
2   ! physical device and we want to get rid of the pasteboard we just
2   ! created and return to the caller the id of the pasteboard that already
2   ! exists for this device.
2   ! We do this only if the output device is a terminal.
2   ! If the output device is a file, we assume that the user wants
2   ! to create a new file for each pasteboard he creates.
2   !-
2
2   IF NOT .PBCB [PBCB_V_RMS]
2   THEN
2       INCR I FROM 0 TO .PBD_L_COUNT -1
2       DO
3           BEGIN   ! Loop thru pasteboards
3           LOCAL
3               SEARCH_PBCB : REF $PBCB_DECL;           ! Addr of pasteboard
3                                                       ! control blocks that
3                                                       ! we are inspecting.
3
3           IF (SEARCH_PBCB = .PBD_A_PBCB [.I]) NEQ 0
3           THEN
4               BEGIN       ! A valid pasteboard address
4               IF .SEARCH_PBCB [PBCB_W_DEVNAM_LEN] EQL
4                  .PBCB        [PBCB_W_DEVNAM_LEN]
4               THEN
5                   BEGIN ! Lengths match
5                   IF CH$EQL ( .SEARCH_PBCB [PBCB_W_DEVNAM_LEN],   ! length
5                                SEARCH_PBCB [PBCB_T_DEVNAM],       ! addr
5                               .PBCB [PBCB_W_DEVNAM_LEN],          ! length
5                                PBCB [PBCB_T_DEVNAM])              ! addr
5                   THEN
6                       BEGIN       ! Match found
6                       LOCAL
6                           STATUS;         ! Local status of subr. calls
6
6                       !+
; 1530          1782  6                         ! This physical device already has a pasteboard
; 1531          1783  6                         ! associated with it.
; 1532          1784  6                         ! Get rid of the one we just created.
; 1533          1785  6                         ! First return PBID number we consumed -- we won't
; 1534          1786  6                         ! be using it.
; 1535          1787  6                         !-
; 1536          1788  6                         PBD_V_PB_AVAIL [.PBID] = 0;
; 1537          1789  6
; 1538          1790  6                         !+
; 1539          1791  6                         ! Second deallocate the WCB that got allocated.
; 1540          1792  6                         !-
; 1541          1793  6                         IF .PBCB [PBCB_A_WCB] NEQ 0
; 1542          1794  6                         THEN
; 1543          1795  7                             IF NOT (STATUS = SMG$$DEALLOCATE_WCB (
; 1544          1796  7                                             .PBCB [PBCB_A_WCB]) )
; 1545          1797  6                             THEN
; 1546          1798  6                                 RETURN (.STATUS);
; 1547          1799  6
; 1548          1800  6                         !+
; 1549          1801  6                         ! Next release output buffer.
; 1550          1802  6                         !-
; 1551          1803  6                         IF .PBCB [PBCB_A_OUTPUT_BUFFER] NEQ 0
; 1552          1804  6                         THEN
; 1553          1805  7                             IF NOT ( STATUS = LIB$FREE_VM (
; 1554          1806  7                                     %REF (.PBCB [PBCB_W_OUTPUT_BUFSIZ]),
; 1555          1807  7                                     PBCB [PBCB_A_OUTPUT_BUFFER]))
; 1556          1808  6                             THEN
; 1557          1809  6                                 RETURN (.STATUS);
; 1558          1810  6
; 1559          1811  6                         !+
; 1560          1812  6                         ! Finally release the PBCB itself.
; 1561          1813  6                         !-
; 1562          1814  7                         IF NOT (STATUS = LIB$FREE_VM ( %REF (PBCB_K_SIZE),
; 1563          1815  7                                                         PBCB))
; 1564          1816  6                         THEN
; 1565          1817  6                             RETURN (.STATUS);
; 1566          1818  6
; 1567          1819  6                         !+
; 1568          1820  6                         ! Return as an id the id of the one that already
; 1569          1821  6                         ! exists.
; 1570          1822  6                         !-
; 1571          1823  6                         .NEW_PBID = .SEARCH_PBCB [PBCB_L_PBID];
; 1572          1824  6
; 1573          1825  6                         !+
; 1574          1826  6                         ! If caller requested number of rows and columns on
; 1575          1827  6                         ! device, tell him.
; 1576          1828  6                         !-
; 1577          1829  6                         IF NOT NULLPARAMETER (PB_ROWS)
; 1578          1830  6                         THEN .PB_ROWS = .SEARCH_PBCB [PBCB_B_ROWS];
; 1579          1831  6
; 1580          1832  6                         IF NOT NULLPARAMETER (PB_COLS)
; 1581          1833  6                         THEN .PB_COLS = .SEARCH_PBCB [PBCB_W_WIDTH];
; 1582          1834  6
; 1583          1835  6                         RETURN ( SMG$_PASALREXI );
; 1584          1836  5                         END;            ! Match found
; 1585          1837  4                     END;  ! Lengths match
; 1586          1838  3                 END;          ! A valid pasteboard address
```

```
            END;    ! Loop thru pasteboards

    !+
    ! If we fall out of loop, none of our current pasteboards are pasted to
    ! the same device.  Continue with the creation process.
    ! Store pasteboard id in the PBCB itself.
    !-
        PBCB [PBCB_L_PBID] = .PBID;

    !+
    ! Store the original name (that the user specified) for this device
    ! in the PBCB.  This name may include a filename as well as a
    ! device name.
    ! First we allocate virtual memory for this buffer and
    ! then we store the length and address in the PBCB for future reference.
    !-

        STATUS=LIB$GET_VM(%REF(.FS_LEN), PBCB[PBCB_A_OUTNAM]);
        IF NOT .STATUS THEN RETURN (.STATUS);
        PBCB[PBCB_W_OUTNAM_LEN]=.FS_LEN;
        CH$MOVE(.FS_LEN,.FS_ADDR,.PBCB[PBCB_A_OUTNAM]);

    !+
    ! If device is a terminal, assign a channel to it.
    ! If the device is not a terminal, allocate a FAB and RAB
    ! and open the file for output using RMS.
    !-

IF .PBCB[PBCB_V_RMS]
  THEN  BEGIN   ! use RMS to open output

            !+
            ! Allocate a FAB and RAB to be used to talk to this file.
            !-

            STATUS=LIB$GET_VM(%REF(FAB$C_BLN),PBCB[PBCB_A_FAB]);
            IF NOT .STATUS THEN RETURN .STATUS;

            STATUS=LIB$GET_VM(%REF(RAB$C_BLN),PBCB[PBCB_A_RAB]);
            IF NOT .STATUS THEN RETURN .STATUS;

            !+
            ! Allocate a record buffer.
            ! This will be one byte larger than the width of
            ! the pasteboard because sometimes we will prepend
            ! a formfeed to the record.
            !-

            STATUS=LIB$GET_VM(%REF(.PBCB[PBCB_W_WIDTH]+1),PBCB[PBCB_A_RBF]);
            IF NOT .STATUS THEN RETURN .STATUS;

            !+
            ! Initialize the FAB and RAB.
            !-

            $FAB_INIT(      FAB     = .PBCB[PBCB_A_FAB],
                            DNM     = 'SMGOUTPUT.LIS',      ! default filename
P 3                                    CTX    = .PBCB,            ! why not? pass the PBCB as user context
P 3                                    FAC    = PUT,              ! write access only
P 3                                    FNA    = .FS_ADDR,
P 3                                    FNS    = .FS_LEN,
P 3                                    ORG    = SEQ,              ! sequential file
P 3                                    FOP    = SQO,              ! sequential operations only
P 3                                    RAT    = CR,               ! carriage control
P 3                                    RFM    = VAR,              ! variable length records
  3                                    MRS    = .PBCB[PBCB_W_WIDTH]+1); ! max record size
  3
P 3                  $RAB_INIT(        RAB    = .PBCB[PBCB_A_RAB],
P 3                                    CTX    = .PBCB,            ! pass the PBCB as user context
P 3                                    FAB    = .PBCB[PBCB_A_FAB],
P 3                                    RBF    = .PBCB[PBCB_A_RBF],
  3                                    RAC    = SEQ);             ! sequential output
  3
  3                  !+
  3                  ! Open the file for output.
  3                  !-
  3
  3                  STATUS=$CREATE( FAB      = .PBCB[PBCB_A_FAB]);
  3                  IF NOT .STATUS THEN RETURN .STATUS;
  3
  3                  !+
  3                  ! Connect a record stream to the file.
  3                  !-
  3
  3                  STATUS=$CONNECT( RAB     = .PBCB[PBCB_A_RAB]);
  3                  IF NOT .STATUS THEN RETURN .STATUS;
  3
  3                  END      ! use RMS to open output
  3             ELSE BEGIN    ! assigning channel
  3
  3                  LOCAL    NAME_DESC         : VECTOR[2],        ! Fixed length descriptor
  3                           ASYNC_EFN         : LONG,             ! Longword to hold efn
  3                           TTIOSB            : VECTOR[4,WORD],! IOSB for SENSE MODE
  3                           CHARBUF           : BLOCK[12,BYTE];! 12-byte characteristics buffer
  3
  3                  !+
  3                  ! Create a fixed length descriptor for our device name string
  3                  ! for use by $ASSIGN.
  3                  !-
  3
  3                  NAME_DESC[0]=.PBCB[PBCB_W_DEVNAM_LEN];
  3                  NAME_DESC[1]= PBCB[PBCB_T_DEVNAM];
  3
  3                  !+
  3                  ! Assign the channel.
  3                  ! Put the resulting channel number in PBCB[PBCB_W_CHAN].
  3                  !-
  3
P 3                  STATUS=$ASSIGN( DEVNAM  = NAME_DESC,
  3                                  CHAN    = PBCB[PBCB_W_CHAN]);
  3                  IF NOT .STATUS THEN RETURN .STATUS;
  3
  3                  !+
  3                  ! Assign an asynchronous event flag.
```

```
            !-

            STATUS=LIB$GET_EF(ASYNC_EFN);
            IF NOT .STATUS THEN RETURN .STATUS;

            !+
            ! Store the value into a byte in the PBCB.
            !-

            PBCB [PBCB_B_ASYNC_EFN] = .ASYNC_EFN;

            !+
            ! Do a SENSE MODE QIO to get additional characteristics
            ! of interest.
            ! Ignore everything returned in the characteristics buffer.
            ! (We already got that stuff.)
            ! The I/O status block has neat things of interest.
            !-

            STATUS=$QIOW(   CHAN    = .PBCB[PBCB_W_CHAN],
                            FUNC    = IO$_SENSEMODE,
                            IOSB    = TTIOSB,
                            P1      = CHARBUF,
                            P2      = 12);
            IF NOT .STATUS THEN RETURN .STATUS;
            IF NOT .TTIOSB[0] THEN RETURN .TTIOSB[0];

            PBCB [PBCB_W_SPEED]  = .TTIOSB[1];
            PBCB [PBCB_W_FILL]   = .TTIOSB[2];
            PBCB [PBCB_B_PARITY] = .TTIOSB[3]

            END;    ! assigning channel

    !+
    ! Set up our exit block which is contained within the PBCB.
    ! This exit block is used to establish an exit handler for
    ! this terminal. When the exit handler is called,
    ! it will flush the output buffers.
    ! This guarantees that the user will see all his output even if
    ! his program exits and he doesn't manually flush the buffers.
    !-

        PBCB [PBCB_A_EXIT_ADDR] = SMG$$PBCB_EXIT_HANDLER;
                                        ! Address of our exit handler
        PBCB [PBCB_B_EXIT_ARGCNT] = 2;  ! Our exit handler gets called with
                                        ! two arguments.
        PBCB [PBCB_A_EXIT_RSN] = PBCB [PBCB_L_EXIT_REASON];
                                        ! The first argument is the address
                                        ! of the longword to receive the
                                        ! exit reason.  This longword appears
                                        ! elsewhere in the PBCB (not in
                                        ! the exit block).
        PBCB [PBCB_A_EXIT_PBCB] = .PBCB;    ! The second argument is the address
                                        ! of this PBCB.  This is needed
                                        ! because there are many PBCBs and
                                        ! one exit routine serves them all.
                                        ! There is a separate exit block for
```

```
2                                                   ! each pasteboard.
2
2   !+
2   ! Establish the exit handler, using the exit block just created.
2   !-
2
2       STATUS=$DCLEXH(DESBLK=PBCB [PBCB_R_EXIT_BLOCK]);
2       IF NOT .STATUS THEN RETURN .STATUS;
2
2   !+
2   ! Now we do an incredible strange thing.
2   ! We build a 10-byte routine in the PBCB to service out-of-band ASTs.
2   ! The routine has the form:
2   !
2   !       0000    entry mask
2   !         FA    CALLG
2   !         6C    (AP)
2   !         9F    absolute addressing
2   !    address    longword address of SMG$$OUT_OF_BAND_HANDLER
2   !         04    RET
2   !
2   ! Symbolically, the routine looks as follows:
2   !
2   !    ROUTINE BAND_HANDLER =
2   !       BEGIN
2   !       EXTERNAL ROUTINE SMG$$OUT_OF_BAND_HANDER : ADDRESSING_MODE(ABSOLUTE);
2   !       BUILTIN AP,CALLG;
2   !       RETURN CALLG(.AP,SMG$$OUT_OF_BAND_HANDLER);
2   !       END;
2   !
2   ! However, we don't actually create this routine in BLISS and then
2   ! move it into our structure, because we can't be guaranteed that
2   ! BLISS will continue to generate the same code in future releases.
2   ! Thus we create the entire routine ourselves.
2   ! This code would have to change if we ever tried to run this
2   ! on a machine with a new arhitecture.
2   !-
2
2       PBCB[PBCB_W_ENTRY_MASK]      = %X'0000';
2       PBCB[PBCB_B_CALLG]           = %X  'FA';
2       PBCB[PBCB_B_REG_AP]          = %X  '6C';
2       PBCB[PBCB_B_ABS]             = %X  '9F';
2       PBCB[PBCB_A_BAND_HANDLER]    = SMG$$OUT_OF_BAND_HANDLER;
2       PBCB[PBCB_B_RET]             = %X  '04';
2
2   !+
2   ! Since all went well, we can now adjust the count of how many PBCB's
2   ! we have and plug its address into the pasteboard directory.
2   !-
2       PBD_L_COUNT = .PBD_L_COUNT + 1;
2
2       PBD_A_PBCB [.PBID] = .PBCB;
2
2   !+
2   ! Initially clear the screen (unless we are asked to preserve it).
2   !-
2
```

```
2       CLEAR_FLAG=1;
2       IF NOT NULLPARAMETER(PRESERVE_SCREEN_FLAG)
2       THEN  CLEAR_FLAG=NOT ..PRESERVE_SCREEN_FLAG;
2
2       IF .CLEAR_FLAG
2       THEN
3           BEGIN
3           STATUS=SMG$$ERASE_PASTEBOARD(.PBCB);
3           IF NOT .STATUS THEN RETURN .STATUS;
3           END
2       ELSE
3           BEGIN   ! Just pretend we cleared the screen.
3           LOCAL   WCB     : REF $WCB_DECL;
3           WCB=.PBCB[PBCB_A_WCB];
3
3           CH$FILL(%C' ',.WCB[WCB_L_BUFSIZE],.WCB[WCB_A_TEXT_BUF]);
3           CH$FILL(%C' ',.WCB[WCB_L_BUFSIZE],.WCB[WCB_A_SCR_TEXT_BUF]);
3           CH$FILL(0,     .WCB[WCB_L_BUFSIZE],.WCB[WCB_A_ATTR_BUF]);
3           CH$FILL(0,     .WCB[WCB_L_BUFSIZE],.WCB[WCB_A_SCR_ATTR_BUF]);
3
3           IF .WCB[WCB_A_CHAR_SET_BUF] NEQ 0
3           THEN
4                   BEGIN
4                   CH$FILL(0,.WCB[WCB_L_BUFSIZE],.WCB[WCB_A_CHAR_SET_BUF]);
3                   END;
3
3           IF .WCB[WCB_A_SCR_CHAR_SET_BUF] NEQ 0
3           THEN
4                   BEGIN
4                   CH$FILL(0,.WCB[WCB_L_BUFSIZE],.WCB[WCB_A_SCR_CHAR_SET_BUF]);
3                   END;
3
3           !+
3           ! The physical cursor moves to (1,1).
3           !-
3
3           ! WCB[WCB_W_CURR_CUR_ROW]=1;
3           ! WCB[WCB_W_OLD_CUR_ROW] =1;
3           ! WCB[WCB_W_CURR_CUR_COL]=1;
3           ! WCB[WCB_W_OLD_CUR_COL] =1;
3
3           !+
3           ! The line characteristics get set back to 0.
3           !-
3
3           CH$FILL(0,.WCB[WCB_W_NO_ROWS]+1,.WCB[WCB_A_LINE_CHAR]);
3           CH$FILL(0,.WCB[WCB_W_NO_ROWS]+1,.WCB[WCB_A_SCR_LINE_CHAR]);
3
2           END;     ! Just pretend we cleared the screen
2
2   !+
2   ! If caller is interested in number of rows and columns on device, tell
2   ! him.
2   !-
2       IF NOT NULLPARAMETER(PB_ROWS) THEN .PB_ROWS = .PBCB [PBCB_B_ROWS];
2       IF NOT NULLPARAMETER(PB_COLS) THEN .PB_COLS = .PBCB [PBCB_W_WIDTH];
2
```

```
; 1872          2124  2  !+
; 1873          2125  2  ! Return the new pasteboard id to caller
; 1874          2126  2  !-
; 1875          2127  2       .NEW_PBID = .PBID;
; 1876          2128  2
; 1877          2129  3       RETURN (SS$_NORMAL)
; 1878          2130  1       END;                              ! Routine SMG$CREATE_PASTEBOARD


                                                       006A6          .BLKB    2
                      54  55  50  54  55  4F  24  53  59  53  006A8 P.AAA:  .ASCII   \SYS$OUTPUT\                                 ;
          53  49  4C  2E  54  55  50  54  55  4F  47  4D  53  006B2 P.AAB:  .ASCII   \SMGOUTPUT.LIS\                              ;

                                                                      .EXTRN   SMG$$OUT_OF_BAND_HANDLER
                                                                      .EXTRN   SYS$CREATE, SYS$CONNECT
                                                                      .EXTRN   SYS$ASSIGN, SYS$QIOW
                                                                      .EXTRN   SYS$DCLEXH

                                               0FFC 00000             .ENTRY   SMG$CREATE_PASTEBOARD, Save R2,R3,R4,R5,R6,-; 1595
                                                                               R7,R8,R9,R10,R11                             ;
                              5E                 2C  C2 00002         SUBL2    #44, SP                                      ;
                                                 58  B4 00005         CLRW     FS_LEN                                       ; 1668
                      50      6C                 01  83 00007         SUBB3    #1, (AP), DIFF                               ; 1694
                              04                 50  91 0000B         CMPB     DIFF, #4                                     ;
                              08                 1B  0000E            BLEQU    1$                                           ;
                              50 00000000G       8F  D0 00010         MOVL     #SMG$_WRONUMARG, R0                          ;
                                                     04 00017         RET                                                   ;
                      50 00000000'  EF           01  C1 00018 1$:     ADDL3    #1, PBD_L_COUNT, R0                          ; 1696
                                    10           50  D1 00020         CMPL     R0, #16                                      ;
                                    08           15  00023            BLEQ     2$                                           ;
                              50 00000000G       8F  D0 00025         MOVL     #SMG$_TOOMANPAS, R0                          ;
                                                     04 0002C         RET                                                   ;
          5A 00000000'  EF 00000000'  EF 00000000'  EF  EB 0002D 2$:  FFC      ZERO, PBD_K_MAX_PB_BY_REF, PBD_V_PB_AVAIL, -;
                                                                               PBID                                         ;
                      00 00000000'  EF           5A  E2 0003E         BBSS     PBID, PBD_V_PB_AVAIL, 3$                     ;
                                    58           0A  B0 00046 3$:     MOVW     #10, FS_LEN                                  ; 1702
                                    5B      9D   AF  9E 00049         MOVAB    P.AAA, FS_ADDR                               ; 1703
                                    02           6C  91 0004D         CMPB     (AP), #2                                     ; 1705
                                                 1B  1F 00050         BLSSU    4$                                           ;
                                            08   AC  D5 00052         TSTL     8(AP)                                        ;
                                                 16  13 00055         BEQL     4$                                           ;
                                    50      08   AC  D0 00057         MOVL     OUT_DEVICE, R0                               ; 1708
                                      00000000G  00  16 0005B         JSB      LIB$ANALYZE_SDESC_R2                         ;
                                    59           50  D0 00061         MOVL     R0, STATUS                                   ;
                                    5B           52  D0 00064         MOVL     R2, R11                                      ;
                                    58           51  D0 00067         MOVL     R1, FS_LEN                                   ;
                                    20           59  E9 0006A         BLBC     STATUS, 5$                                   ;
                                            08   AE  9F 0006D 4$:     PUSHAB   PBCB                                         ; 1718
                                            08   AE  9F 00070         PUSHAB   TERM_TYPE                                    ;
                                    7E           58  3C 00073         MOVZWL   FS_LEN, -(SP)                                ; 1720
                                                 5B  DD 00076         PUSHL    FS_ADDR                                      ; 1719
                         00000000G  00           04  FB 00078         CALLS    #4, SMG$$SETUP_TERMINAL_TYPE                 ;
                                    59           50  D0 0007F         MOVL     R0, STATUS                                   ;
                                    0B           59  E8 00082         BLBS     STATUS, 6$                                   ; 1724
                      00 00000000'  EF           5A  E5 00085         BBCC     PBID, PBD_V_PB_AVAIL, 5$                     ; 1727
                                               02CC  31 0008D 5$:     BRW      31$                                          ; 1728
```

```
                                50           08  AE  D0 00090 6$:     MOVL    PBCB, R0                                    ; 1738
                                                 51  D4 00094         CLRL    R1                                          ;
                          42    8F           58  A0  91 00096         CMPB    88(R0), #66                                 ;
                                                 02  13 0009B         BEQL    7$                                          ;
                                                 51  D6 0009D         INCL    R1                                          ;
                                                 52  D4 0009F 7$:     CLRL    R2                                          ; 1739
                                             10  A0  95 000A1         TSTB    16(R0)                                      ;
                                                 02  12 000A4         BNEQ    8$                                          ;
                                                 52  D6 000A6         INCL    R2                                          ;
                                52               51  C8 000A8 8$:     BISL2   R1, R2                                      ;
                                                 51  D4 000AB         CLRL    R1                                          ; 1740
                                05           10  A0  91 000AD         CMPB    16(R0), #5                                  ;
                                                 02  12 000B1         BNEQ    9$                                          ;
                                                 51  D6 000B3         INCL    R1                                          ;
                    53          51               52  89 000B5 9$:     BISB3   R2, R1, R3                                  ;
   00D0   C0        01          03               53  F0 000B9         INSV    R3, #3, #1, 208(R0)                         ;
                    03    00D0  C0               03  E1 000C0         BBC     #3, 208(R0), 10$                            ; 1755
                                               00AB  31 000C6         BRW     22$                                         ;
                                57 00000000'     EF  D0 000C9 10$:    MOVL    PBD_L_COUNT, R7                             ; 1757
                                56               01  CE 000D0         MNEGL   #1, I                                       ;
                                               0095  31 000D3 11$:    BRW     20$                                         ;
                                55 00000000'EF46     D0 000D6 12$:    MOVL    PBD_A_PBCB[I], SEARCH_PBCB                  ; 1765
                                                 F3  13 000DE         BEQL    11$                                         ;
                                54           08  AE  D0 000E0         MOVL    PBCB, R4                                    ; 1769
                          12    A4           12  A5  B1 000E4         CMPW    18(SEARCH_PBCB), 18(R4)                     ;
                                                 E8  12 000E9         BNEQ    11$                                         ;
     12   A4        00    18    A5           12  A5  2D 000EB         CMPC5   18(SEARCH_PBCB), 24(SEARCH_PBCB), #0, -     ; 1775
                                             18  A4     000F3                 18(R4), 24(R4)                              ;
                                                 74  12 000F5         BNEQ    20$                                         ;
                    00 00000000'  EF             5A  E5 000F7         BBCC    PBID, PBD_V_PB_AVAIL, 13$                   ; 1788
                                             08  A4  D5 000FF 13$:    TSTL    8(R4)                                       ; 1793
                                                 0B  13 00102         BEQL    14$                                         ;
                                             08  A4  DD 00104         PUSHL   8(R4)                                       ; 1796
                          0000V CF               01  FB 00107         CALLS   #1, SMG$$DEALLOCATE_WCB                     ;
                                2D               50  E9 0010C         BLBC    STATUS, 16$                                 ; 1795
                                             6C  A4  D5 0010F 14$:    TSTL    108(R4)                                     ; 1803
                                                 15  13 00112         BEQL    15$                                         ;
                                             6C  A4  9F 00114         PUSHAB  108(R4)                                     ; 1807
                          04    AE           70  A4  3C 00117         MOVZWL  112(R4), 4(SP)                              ; 1806
                                             04  AE  9F 0011C         PUSHAB  4(SP)                                       ;
                     00000000G  00               02  FB 0011F         CALLS   #2, LIB$FREE_VM                             ; 1807
                                13               50  E9 00126         BLBC    STATUS, 16$                                 ;
                                             08  AE  9F 00129 15$:    PUSHAB  PBCB                                        ; 1814
                          04    AE         014C  8F  3C 0012C         MOVZWL  #332, 4(SP)                                 ;
                                             04  AE  9F 00132         PUSHAB  4(SP)                                       ;
                     00000000G  00               02  FB 00135         CALLS   #2, LIB$FREE_VM                             ;
                                01               50  E8 0013C 16$:    BLBS    STATUS, 17$                                 ;
                                                     04 0013F         RET                                                 ;
                          04    BC           14  A5  D0 00140 17$:    MOVL    20(SEARCH_PBCB), @NEW_PBID                  ; 1823
                                03               6C  91 00145         CMPB    (AP), #3                                    ; 1829
                                                 0A  1F 00148         BLSSU   18$                                         ;
                                             0C  AC  D5 0014A         TSTL    12(AP)                                      ;
                                                 05  13 0014D         BEQL    18$                                         ;
                          0C    BC           5F  A5  9A 0014F         MOVZBL  95(SEARCH_PBCB), @PB_ROWS                   ; 1830
                                04               6C  91 00154 18$:    CMPB    (AP), #4                                    ; 1832
                                                 0A  1F 00157         BLSSU   19$                                         ;
                                             10  AC  D5 00159         TSTL    16(AP)                                      ;
```

```
                                          05   13 0015C          BEQL     19$                                          ;
                     10   BC        5A    A5   3C 0015E          MOVZWL   90(SEARCH_PBCB), @PB_COLS                    ; 1833
                          50 00000000G    8F   D0 00163  19$:    MOVL     #SMG$_PASALREXI, R0                          ; 1835
                                          04      0016A          RET                                                   ;
                 02       56              57   F2 0016B  20$:    AOBLSS   R7, I, 21$                                   ; 1757
                                          03   11 0016F          BRB      22$                                          ;
                                        FF62   31 00171  21$:    BRW      12$                                          ;
                          57        08    AE   D0 00174  22$:    MOVL     PBCB, R7                                     ; 1846
                     14   A7              5A   D0 00178          MOVL     PBID, 20(R7)                                 ;
                                  00B0    C7   9F 0017C          PUSHAB   176(R7)                                      ; 1856
                     04   AE              58   3C 00180          MOVZWL   FS_LEN, 4(SP)                                ;
                                    04    AE   9F 00184          PUSHAB   4(SP)                                        ;
              00000000G   00              02   FB 00187          CALLS    #2, LIB$GET_VM                               ;
                          59              50   D0 0018E          MOVL     R0, STATUS                                   ;
                          5F              59   E9 00191          BLBC     STATUS, 24$                                  ; 1857
                   00E4   C7              58   B0 00194          MOVW     FS_LEN, 228(R7)                              ; 1858
         00B0   D7        6B              58   28 00199          MOVC3    FS_LEN, (FS_ADDR), @176(R7)                  ; 1859
                 03     00D0    C7        03   E0 0019F          BBS      #3, 208(R7), 23$                             ; 1867
                                        00D3   31 001A5          BRW      27$                                          ;
                                  00E8    C7   9F 001A8  23$:    PUSHAB   232(R7)                                      ; 1874
                     04   AE        50    8F   9A 001AC          MOVZBL   #80, 4(SP)                                   ;
                                    04    AE   9F 001B1          PUSHAB   4(SP)                                        ;
              00000000G   00              02   FB 001B4          CALLS    #2, LIB$GET_VM                               ;
                          59              50   D0 001BB          MOVL     R0, STATUS                                   ;
                          32              59   E9 001BE          BLBC     STATUS, 24$                                  ; 1875
                                  00EC    C7   9F 001C1          PUSHAB   236(R7)                                      ; 1877
                     04   AE        44    8F   9A 001C5          MOVZBL   #68, 4(SP)                                   ;
                                    04    AE   9F 001CA          PUSHAB   4(SP)                                        ;
              00000000G   00              02   FB 001CD          CALLS    #2, LIB$GET_VM                               ;
                          59              50   D0 001D4          MOVL     R0, STATUS                                   ;
                          19              59   E9 001D7          BLBC     STATUS, 24$                                  ; 1878
                                  00F0    C7   9F 001DA          PUSHAB   240(R7)                                      ; 1887
                     04   AE        5A    A7   3C 001DE          MOVZWL   90(R7), 4(SP)                                ;
                                    04    AE   D6 001E3          INCL     4(SP)                                        ;
                                    04    AE   9F 001E6          PUSHAB   4(SP)                                        ;
              00000000G   00              02   FB 001E9          CALLS    #2, LIB$GET_VM                               ;
                          59              50   D0 001F0          MOVL     R0, STATUS                                   ;
                          70              59   E9 001F3  24$:    BLBC     STATUS, 25$                                  ; 1888
                          56      00E8    C7   D0 001F6          MOVL     232(R7), R6                                  ; 1904
   0050    8F        00   6E              00   2C 001FB          MOVC5    #0, (SP), #0, #80, (R6)                      ;
                                          66      00202                                                        ;
                          66      5003    8F   B0 00203          MOVW     #20483, (R6)                                 ;
                     04   A6        40    8F   9A 00208          MOVZBL   #64, 4(R6)                                   ;
                     16   A6              01   90 0020D          MOVB     #1, 22(R6)                                   ;
                     18   A6              57   D0 00211          MOVL     R7, 24(R6)                                   ;
                     1D   A6      0200    8F   B0 00215          MOVW     #512, 29(R6)                                 ;
                     1F   A6              02   90 0021B          MOVB     #2, 31(R6)                                   ;
                     2C   A6              5B   D0 0021F          MOVL     FS_ADDR, 44(R6)                              ;
                     30   A6      FDCC    CF   9E 00223          MOVAB    P.AAB, 48(R6)                                ;
                     34   A6              58   90 00229          MOVB     FS_LEN, 52(R6)                               ;
                     35   A6              0D   90 0022D          MOVB     #13, 53(R6)                                  ;
             36    A6     5A    A7        01   A1 00231          ADDW3    #1, 90(R7), 54(R6)                           ;
                          58      00EC    C7   D0 00237          MOVL     236(R7), R8                                  ; 1910
   0044    8F        00   6E              00   2C 0023C          MOVC5    #0, (SP), #0, #68, (R8)                      ;
                                          68      00243                                                        ;
                          68      4401    8F   B0 00244          MOVW     #17409, (R8)                                 ;
                     18   A8              57   D0 00249          MOVL     R7, 24(R8)                                   ;
```

```
                           1E   A8  94 0024D            CLRB    30(R8)                                   ;
            28   A8      00F0   C7  D0 00250            MOVL    240(R7), 40(R8)                          ;
            3C   A8            56   D0 00256            MOVL    R6, 60(R8)                               ;
                               56   DD 0025A            PUSHL   R6                                       ; 1916
     00000000G   00            01   FB 0025C            CALLS   #1, SYS$CREATE                           ;
                 59            50   D0 00263            MOVL    R0, STATUS                               ;
                 0F            59   E9 00266 25$:       BLBC    STATUS, 26$                              ; 1917
                               58   DD 00269            PUSHL   R8                                       ; 1923
     00000000G   00            01   FB 0026B            CALLS   #1, SYS$CONNECT                          ;
                 59            50   D0 00272            MOVL    R0, STATUS                               ;
                 6E            59   E8 00275            BLBS    STATUS, 29$                              ; 1924
                             00E1   31 00278 26$:       BRW     31$                                      ;
            24   AE        12   A7  3C 0027B 27$:       MOVZWL  18(R7), NAME_DESC                        ; 1939
            28   AE        18   A7  9E 00280            MOVAB   24(R7), NAME_DESC+4                      ; 1940
                               7E   7C 00285            CLRQ    -(SP)                                    ; 1948
                           64   A7  9F 00287            PUSHAB  100(R7)                                  ;
                           30   AE  9F 0028A            PUSHAB  NAME_DESC                                ;
     00000000G   00            04   FB 0028D            CALLS   #4, SYS$ASSIGN                           ;
                 59            50   D0 00294            MOVL    R0, STATUS                               ;
                 DE            59   E9 00297            BLBC    STATUS, 26$                              ; 1949
                           0C   AE  9F 0029A            PUSHAB  ASYNC_EFN                                ; 1955
     00000000G   00            01   FB 0029D            CALLS   #1, LIB$GET_EF                           ;
                 59            50   D0 002A4            MOVL    R0, STATUS                               ;
                 CE            59   E9 002A7            BLBC    STATUS, 26$                              ; 1956
            67   A7        0C   AE  90 002AA            MOVB    ASYNC_EFN, 103(R7)                       ; 1962
                               7E   7C 002AF            CLRQ    -(SP)                                    ; 1976
                               7E   7C 002B1            CLRQ    -(SP)                                    ;
                               0C   DD 002B3            PUSHL   #12                                      ;
                           24   AE  9F 002B5            PUSHAB  CHARBUF                                  ;
                               7E   7C 002B8            CLRQ    -(SP)                                    ;
                           3C   AE  9F 002BA            PUSHAB  TTIOSB                                   ;
                               27   DD 002BD            PUSHL   #39                                      ;
                 7E        64   A7  3C 002BF            MOVZWL  100(R7), -(SP)                           ;
                               7E   D4 002C3            CLRL    -(SP)                                    ;
     00000000G   00            0C   FB 002C5            CALLS   #12, SYS$QIOW                            ;
                 59            50   D0 002CC            MOVL    R0, STATUS                               ;
                 A6            59   E9 002CF            BLBC    STATUS, 26$                              ; 1977
                 05        1C   AE  E8 002D2            BLBS    TTIOSB, 28$                              ; 1978
                 50        1C   AE  3C 002D6            MOVZWL  TTIOSB, R0                               ;
                                    04 002DA            RET                                              ;
          00B4   C7        1E   AE  D0 002DB 28$:       MOVL    TTIOSB+2, 180(R7)                        ; 1980
            11   A7        22   AE  90 002E1            MOVB    TTIOSB+6, 17(R7)                         ; 1982
            78   A7 00000000G   00  9E 002E6 29$:       MOVAB   SMG$$PBCB_EXIT_HANDLER, 120(R7)          ; 1995
            7C   A7            02   90 002EE            MOVB    #2, 124(R7)                              ; 1997
          0080   C7      0088   C7  9E 002F2            MOVAB   136(R7), 128(R7)                         ; 1999
          0084   C7            57   D0 002F9            MOVL    R7, 132(R7)                              ; 2005
                           74   A7  9F 002FE            PUSHAB  116(R7)                                  ; 2016
     00000000G   00            01   FB 00301            CALLS   #1, SYS$DCLEXH                           ;
                 59            50   D0 00308            MOVL    R0, STATUS                               ;
                 4E            59   E9 0030B            BLBC    STATUS, 31$                              ; 2017
          008C   C7 6CFA0000   8F   D0 0030E            MOVL    #1828323328, 140(R7)                     ; 2048
          0090   C7        9F   8F  90 00317            MOVB    #-97, 144(R7)                            ; 2051
          0091   C7 00000000G   00  9E 0031D            MOVAB   SMG$$OUT_OF_BAND_HANDLER, 145(R7)        ; 2052
          0095   C7            04   90 00326            MOVB    #4, 149(R7)                              ; 2053
                    00000000'  EF   D6 0032B            INCL    PBD_L_COUNT                              ; 2059
     00000000'EF4A             57   D0 00331            MOVL    R7, PBD_A_PBCB[PBID]                     ; 2061
                 50            01   D0 00339            MOVL    #1, CLEAR_FLAG                           ; 2067
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                                05         6C  91 0033C         CMPB    (AP), #5                                  ; 2068
                                09         1F  0033F            BLSSU   30$                                       ;
                                     14    AC  D5 00341         TSTL    20(AP)                                    ;
                                04         13  00344            BEQL    30$                                       ;
                                50   14    BC  D2 00346         MCOML   @PRESERVE_SCREEN_FLAG, CLEAR_FLAG         ; 2069
                                13         50  E9 0034A 30$:    BLBC    CLEAR_FLAG, 32$                           ; 2071
                                           57  DD 0034D         PUSHL   R7                                        ; 2074
                    00000000G   00         01  FB 0034F         CALLS   #1, SMG$$ERASE_PASTEBOARD                 ;
                                59         50  D0 00356         MOVL    R0, STATUS                                ;
                                54         59  E8 00359         BLBS    STATUS, 35$                               ; 2075
                                50         59  D0 0035C 31$:    MOVL    STATUS, R0                                ;
                                               04 0035F         RET                                               ;
                                59   08    A7  D0 00360 32$:    MOVL    8(R7), WCB                                ; 2080
                                56   28    A9  D0 00364         MOVL    40(WCB), R6                               ; 2082
      56          20            6E         00  2C 00368         MOVC5   #0, (SP), #32, R6, @8(WCB)                ;
                                     08    B9     0036D                                                           ;
      56          20            6E         00  2C 0036F         MOVC5   #0, (SP), #32, R6, @20(WCB)               ; 2083
                                     14    B9     00374                                                           ;
      56          00            6E         00  2C 00376         MOVC5   #0, (SP), #0, R6, @12(WCB)                ; 2084
                                     0C    B9     0037B                                                           ;
      56          00            6E         00  2C 0037D         MOVC5   #0, (SP), #0, R6, @24(WCB)                ; 2085
                                     18    B9     00382                                                           ;
                                     10    A9  D5 00384         TSTL    16(WCB)                                   ; 2087
                                           07  13 00387         BEQL    33$                                       ;
      56          00            6E         00  2C 00389         MOVC5   #0, (SP), #0, R6, @16(WCB)                ; 2090
                                     10    B9     0038E                                                           ;
                                     1C    A9  D5 00390 33$:    TSTL    28(WCB)                                   ; 2093
                                           07  13 00393         BEQL    34$                                       ;
      56          00            6E         00  2C 00395         MOVC5   #0, (SP), #0, R6, @28(WCB)                ; 2096
                                     1C    B9     0039A                                                           ;
                                56   02    A9  3C 0039C 34$:    MOVZWL  2(WCB), R6                                ; 2112
                                           56  D6 003A0         INCL    R6                                        ;
      56          00            6E         00  2C 003A2         MOVC5   #0, (SP), #0, R6, @44(WCB)                ;
                                     2C    B9     003A7                                                           ;
      56          00            6E         00  2C 003A9         MOVC5   #0, (SP), #0, R6, @48(WCB)                ; 2113
                                     30    B9     003AE                                                           ;
                                03         6C  91 003B0 35$:    CMPB    (AP), #3                                  ; 2121
                                           0A  1F 003B3         BLSSU   36$                                       ;
                                     0C    AC  D5 003B5         TSTL    12(AP)                                    ;
                                           05  13 003B8         BEQL    36$                                       ;
                          0C    BC   5F    A7  9A 003BA         MOVZBL  95(R7), @PB_ROWS                          ;
                                04         6C  91 003BF 36$:    CMPB    (AP), #4                                  ; 2122
                                           0A  1F 003C2         BLSSU   37$                                       ;
                                     10    AC  D5 003C4         TSTL    16(AP)                                    ;
                                           05  13 003C7         BEQL    37$                                       ;
                          10    BC   5A    A7  3C 003C9         MOVZWL  90(R7), @PB_COLS                          ;
                          04    BC         5A  D0 003CE 37$:    MOVL    PBID, @NEW_PBID                           ; 2127
                                50         01  D0 003D2         MOVL    #1, R0                                    ; 2129
                                               04 003D5         RET                                               ; 2130

; Routine Size:  982 bytes,    Routine Base:  _SMG$CODE + 06BF


; 1879          2131   1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$DELETE_PASTEBOARD - Delete Pasteboard'
1 GLOBAL ROUTINE SMG$DELETE_PASTEBOARD ( PBID, CLEAR_SCREEN_FLAG ) =
1
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine terminates all use of a given physical display.
1 !       It deallocates the pasteboard control block and all its
1 !       substructures.  It gets rid of the event flag and the channel
1 !       number.  It removes any associated exit handler.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$DELETE_PASTEBOARD ( PBID.rl.r
1 !                                                  [,CLEAR_SCREEN_FLAG.rl.r])
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       PBID.rl.r                 Pasteboard id of pasteboard.
1 !
1 !       CLEAR_SCREEN_FLAG.rl.r  Set to 1 to clear the screen,
1 !                               0 to keep it as is.
1 !                               The default is to clear the screen.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_WRONUMARG  Wrong number of arguments.
1 !       SS$_xyz         errors from $DASSGN
1 !       LIB$_xyz        errors from LIB$FREE_VM or LIB$FREE_EF
1 !       SMG$_xyz        errors from SMG$$FLUSH_BUFFER
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
```

```
2 BEGIN
2
2 BUILTIN
2         NULLPARAMETER;
2
2 LOCAL
2
2         STATUS,                         ! Status of subroutine calls
2
2         CURR_PP : REF $PP_DECL,         ! Pasting packet pointer
2
2         WCB     : REF $WCB_DECL,        ! Window control block.
2
2         PBCB    : REF $PBCB_DECL;       ! Address of pasteboard control
2                                         ! block
2
2 EXTERNAL ROUTINE
2
2         SMG$$FORCE_SCROLL_REG,
2         SMG$$ERASE_PASTEBOARD,
2         SMG$$FLUSH_BUFFER,
2         SMG$CHANGE_PBD_CHARACTERISTICS;
2
2 $SMG$VALIDATE_ARGCOUNT (1, 2);  ! Test for right no. of args
2
2 $SMG$GET_PBCB (.PBID,PBCB);      ! Get address of PBCB
2
2 !+
2 ! Batch up the unpastes, so that the whole screen disappears at once.
2 !-
3     IF NOT (STATUS = SMG$$BEGIN_PASTEBOARD_UPDATE_R1(.PBCB))
2     THEN
2         RETURN (.STATUS);
2
2 !+
2 ! Walk chain of all DCB's pasted to this pasteboard and unpaste each.
2 !-
2     CURR_PP = .PBCB [PBCB_A_PP_PREV];
2     WHILE .CURR_PP NEQ PBCB [PBCB_A_PP_NEXT]
2     DO
3         BEGIN   ! Walk chain
3         LOCAL
3             DCB         : REF $DCB_DECL,        ! Address of DCB involved
3             PP_BASE     : REF $PP_DECL;         ! Base addr of this PP
3
3         PP_BASE = .CURR_PP - PP_PBCB_QUEUE_OFFSET;  ! Since queue header
3                                                     ! not at top of
3                                                     ! structure.
3         DCB = .PP_BASE [PP_A_DCB_ADDR];
4         IF NOT (STATUS = SMG$$UNPASTE_VIRTUAL_DISPLAY (
4                                 .DCB,                   ! DCB involved
4                                 .PBCB))                 ! PBCB involved
3         THEN
3             RETURN (.STATUS);
3
3         CURR_PP = .PP_BASE [PP_A_PREV_PBCB]; ! Step to next PP
2         END;    ! Walk chain
```

```
2
2       PBCB[PBCB_L_BATCH_LEVEL]=0;
2
2 !+
2 ! If the user asked for the screen to be erased, then
2 ! release lock on pasteboard, force output of now-blank screen, and
2 ! flush it out.
2 !-
2       IF NULLPARAMETER(CLEAR_SCREEN_FLAG)
3       OR (NOT NULLPARAMETER(CLEAR_SCREEN_FLAG) AND ..CLEAR_SCREEN_FLAG)
2       THEN
3           BEGIN   ! clear screen
3
3 !(b)      IF NOT (STATUS = SMG$$END_PASTEBOARD_UPDATE_R2(.PBCB))
3 !(b)      THEN
3 !(b)          RETURN (.STATUS);
3
3 !(b)      IF NOT ( STATUS = SMG$$CHECK_FOR_OUTPUT_PBCB(.PBCB))
3 !(b)      THEN
3 !(b)          RETURN (.STATUS);
3
3 !(b)      IF NOT (STATUS = SMG$$FLUSH_BUFFER(.PBCB))
3 !(b)      THEN
3 !(b)          RETURN (.STATUS);
3
3 ! Note (b): Erase pasteboard should clear the screen and
3 !              we can bypass flushing since the user is deleting his
3 !              pasteboard anyhow.
3
3           PBCB[PBCB_V_BUF_ENABLED]=0;
3
4           IF NOT (STATUS = SMG$$ERASE_PASTEBOARD(.PBCB))
3           THEN
3               RETURN (.STATUS);
3
3           !+
3           ! Set terminal back to it's orignal width.
3           ! This requires batching to be off.
3           !-
3
3           IF .PBCB[PBCB_W_WIDTH] NEQ .PBCB[PBCB_W_ORIG_WIDTH]
4             THEN  BEGIN
4                   STATUS=SMG$CHANGE_PBD_CHARACTERISTICS(.PBID,
4                                   %REF(.PBCB[PBCB_W_ORIG_WIDTH]));
4                   IF NOT .STATUS THEN RETURN .STATUS;
4                   STATUS=SMG$$FLUSH_BUFFER(.PBCB);
4                   IF NOT .STATUS THEN RETURN .STATUS
3                   END;
3
3           END     ! clear screen
2       ELSE
3           BEGIN
3           SMG$$FLUSH_BUFFER(.PBCB);
3           PBCB[PBCB_V_BUF_ENABLED]=0;
2           END;
2
2 WCB=.PBCB[PBCB_A_WCB];
```

```
  2
  2 !+
  2 ! If a scrolling region is set (other than the full screen),
  2 ! then reset it now, being careful to leave the cursor alone
  2 ! even though SET SCROLLING REGION may move it.
  2 ! Note that if we never established any scrolling regions,
  2 ! the TOP_SCROLL line will be 0.
  2 !-
  2
  2 IF    .PBCB[PBCB_W_TOP_SCROLL_LINE] NEQ 0
  3 AND  (.PBCB[PBCB_W_TOP_SCROLL_LINE] NEQ 1   OR
  3       .PBCB[PBCB_W_BOT_SCROLL_LINE] NEQ .WCB[WCB_W_NO_ROWS])
  2 THEN
  3     BEGIN       ! Remove scrolling regions
  3
  3     LOCAL
  3
  3         FINAL_ROW,      ! Final cursor row
  3         FINAL_COL;      ! Final cursor column
  3
  3     !+
  3     ! Construct escape sequence (possibly null if not a supporting terminal)
  3     ! to set the hardware scroll region to the full height of the screen.
  3     !-
  3
P 3     $SMG$GET_TERM_DATA(SET_SCROLL_REGION,
P 3                        1,
  3                        .WCB [WCB_W_NO_ROWS]);
  3
  3     !+
  3     ! Output BUFFER.
  3     !-
  3
  3     IF .PBCB[PBCB_L_CAP_LENGTH] NEQ 0
  3     THEN
  4         BEGIN   ! Issue the reset
  4
  4         !+
  4         ! Remember where the user left the physical cursor, since
  4         ! changing scrolling regions might upset this.
  4         !-
  4
  4         FINAL_ROW=.WCB[WCB_W_CURR_CUR_ROW];
  4         FINAL_COL=.WCB[WCB_W_CURR_CUR_COL];
  4
  4         STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
  4                                    .PBCB[PBCB_A_CAP_BUFFER]);
  4         IF NOT .STATUS THEN RETURN .STATUS;
  4
  4         !+
  4         ! Move the cursor back to where it was.
  4         !-
  4
  4         IF NOT NULLPARAMETER(CLEAR_SCREEN_FLAG)
  4         AND NOT ..CLEAR_SCREEN_FLAG
  5           THEN  BEGIN   ! Restore final cursor position
  5
```

```
5                   $SMG$GET_TERM_DATA(SET_CURSOR_ABS,.FINAL_ROW,.FINAL_COL);
5
5                   STATUS = SMG$$OUTPUT(.PBCB,.PBCB[PBCB_L_CAP_LENGTH],
5                                        .PBCB[PBCB_A_CAP_BUFFER]);
5                   IF NOT .STATUS THEN RETURN .STATUS
5
5                   END     ! Restore final cursor position
5
4           END     ! Issue the reset
4
2       END;        ! Remove scrolling regions
2
2 !+
2 ! Get rid of our exit handler.  Ignore a no handler found error.
2 !-
2
2 STATUS=$CANEXH(DESBLK=PBCB[PBCB_R_EXIT_BLOCK]);
3 IF (NOT .STATUS) AND (.STATUS NEQ SS$_NOHANDLER)
2   THEN  RETURN  .STATUS;
2
2 !+
2 ! Deallocate the WCB if there is one.
2 !-
2
2 IF .PBCB[PBCB_A_WCB] NEQ 0
3   THEN  BEGIN   ! getting rid of WCB
3
3         STATUS=SMG$$DEALLOCATE_WCB(.PBCB[PBCB_A_WCB]);
3         PBCB[PBCB_A_WCB]=0;                                  ! safety
3         IF NOT .STATUS THEN RETURN .STATUS
3
2         END;    ! getting rid of WCB
2
2 !+
2 ! If there is a channel assigned, deassign it now.
2 ! This automatically cancels any I/O on the channel.
2 ! In particular, it removes any out-of-band ASTs that
2 ! were enabled.
2 !-
2
2 IF .PBCB[PBCB_W_CHAN] NEQ 0
3   THEN  BEGIN   ! deassigning channel
3
3         STATUS=$DASSGN(CHAN=.PBCB[PBCB_W_CHAN]);
3         PBCB[PBCB_W_CHAN]=0;                        ! just in case we get called
3                                                     ! again after returning an error
3         IF NOT .STATUS THEN RETURN .STATUS
3
2         END;    ! deassigning channel
2
2 !+
2 ! Free the event flags now.
2 ! Ignore error if it was already free.
2 !-
2
2 IF .PBCB[PBCB_B_EFN] NEQ 0
3   THEN  BEGIN
```

```
3              STATUS=LIB$FREE_EF( %REF(.PBCB[PBCB_B_EFN]) );
4              IF (NOT .STATUS) AND (.STATUS NEQ LIB$_EF_ALRFRE)
3                THEN  RETURN .STATUS;
3              PBCB[PBCB_B_EFN]=0
2              END;
2
2   IF .PBCB[PBCB_B_ASYNC_EFN] NEQ 0
3     THEN  BEGIN
3              STATUS=LIB$FREE_EF( %REF(.PBCB[PBCB_B_ASYNC_EFN]) );
4              IF (NOT .STATUS) AND (.STATUS NEQ LIB$_EF_ALRFRE)
3                THEN  RETURN .STATUS;
3              PBCB[PBCB_B_ASYNC_EFN]=0
2              END;
2
2   !+
2   ! Free the output buffer now.
2   !-
2
2   IF .PBCB[PBCB_A_OUTPUT_BUFFER] NEQ 0
3     THEN  BEGIN    ! freeing output buffer
3
3              STATUS=LIB$FREE_VM(%REF (.PBCB[PBCB_W_OUTPUT_BUFSIZ] ),
3                                       PBCB[PBCB_A_OUTPUT_BUFFER] );
3              PBCB[PBCB_A_OUTPUT_BUFFER]=0;
3              IF NOT .STATUS THEN RETURN .STATUS
3
2              END;      ! freeing output buffer
2
2   !+
2   ! Free the output filename.
2   !-
2
2   IF .PBCB[PBCB_W_OUTNAM_LEN] NEQ 0
3     THEN  BEGIN    ! freeing outname
3              STATUS=LIB$FREE_VM(%REF (.PBCB[PBCB_W_OUTNAM_LEN] ),
3                                       PBCB[PBCB_A_OUTNAM] );
3              PBCB[PBCB_W_OUTNAM_LEN]=0;
3              IF NOT .STATUS THEN RETURN .STATUS
2              END;      ! freeing outname
2
2   !+
2   ! Close the output file, if there was one.
2   !-
2
2   IF .PBCB[PBCB_A_FAB] NEQ 0
3     THEN  BEGIN    ! Close output file
3              STATUS=$CLOSE(  FAB = .PBCB[PBCB_A_FAB]);
3              IF NOT .STATUS THEN RETURN .STATUS
2              END;     ! Close output file
2
2   !+
2   ! Free the record buffer, if there was one.
2   !-
2
2   IF .PBCB[PBCB_A_RBF] NEQ 0
3     THEN  BEGIN
3              STATUS=LIB$GET_VM(%REF(.PBCB[PBCB_W_WIDTH]+1),PBCB[PBCB_A_RBF]);
```

```
3               PBCB[PBCB_A_RBF]=0;
3               IF NOT .STATUS THEN RETURN .STATUS;
2               END;
2
2 !+
2 ! Free any FAB or RAB that was created.
2 !-
2
2 IF .PBCB[PBCB_A_FAB] NEQ 0
3   THEN  BEGIN   ! freeing FAB
3               STATUS=LIB$FREE_VM(%REF (FAB$C_BLN),
3                                   PBCB[PBCB_A_FAB] );
3               PBCB[PBCB_A_FAB]=0;
3               IF NOT .STATUS THEN RETURN .STATUS
2               END;    ! freeing FAB
2
2 IF .PBCB[PBCB_A_RAB] NEQ 0
3   THEN  BEGIN   ! freeing RAB
3               STATUS=LIB$FREE_VM(%REF (RAB$C_BLN),
3                                   PBCB[PBCB_A_RAB] );
3               PBCB[PBCB_A_RAB]=0;
3               IF NOT .STATUS THEN RETURN .STATUS
2               END;    ! freeing RAB
2
2 !+
2 ! Now go free the PBCB itself.
2 !-
2
3 IF NOT (STATUS=LIB$FREE_VM (%REF (PBCB_K_SIZE), PBCB))
2 THEN
2     RETURN (.STATUS);
2
2 !+
2 ! Since all went well, we can now adjust the count of how many PBCB's
2 ! we have and remove its address from the pasteboard directory.
2 !-
2
2 PBD_V_PB_AVAIL [..PBID] = 0;
2
2 PBD_L_COUNT = .PBD_L_COUNT - 1;
2
2 PBD_A_PBCB [..PBID] = 0;
2
2 RETURN  SS$_NORMAL
2
1 END;                          ! Routine SMG$DELETE_PASTEBOARD


                                                         .EXTRN   SYS$CANEXH, SYS$DASSGN
                                                         .EXTRN   SYS$CLOSE

                                     0FFC 00000          .ENTRY   SMG$DELETE_PASTEBOARD, Save R2,R3,R4,R5,R6,-; 2133
                                                                  R7,R8,R9,R10,R11
                  5B 00000000G   00   9E 00002          MOVAB    LIB$FREE_VM, R11                             ;
                  5A 00000000'   EF   9E 00009          MOVAB    PBD_L_COUNT, R10                             ;
                  5E             14   C2 00010          SUBL2    #20, SP                                      ;
```

```
                50              6C         01 83 00013        SUBB3   #1, (AP), DIFF                        : 2199
                                01         50 91 00017        CMPB    DIFF, #1                              :
                                08         1B 00001A          BLEQU   1$                                    :
                                50 00000000G 8F D0 0001C      MOVL    #SMG$_WRONUMARG, R0                   :
                                              04 00023        RET                                           :
                                59       04 AC D0 00024 1$:   MOVL    PBID, R9                              : 2201
                                50          69 D0 00028       MOVL    (R9), R0                              :
                                            0A 19 0002B       BLSS    2$                                    :
                                6A          50 D1 0002D       CMPL    R0, PBD_L_COUNT                       :
                                            05 14 00030       BGTR    2$                                    :
                08       44     AA          50 E0 00032       BBS     R0, PBD_V_PB_AVAIL, 3$                :
                                50 00000000G 8F D0 00037 2$:  MOVL    #SMG$_INVPAS_ID, R0                   :
                                              04 0003E        RET                                           :
                         04     AE       04 AA40 D0 0003F 3$: MOVL    PBD_A_PBCB[R0], PBCB                  :
                                54       04 AE D0 00045       MOVL    PBCB, R4                              : 2206
                                50          54 D0 00049       MOVL    R4, R0                                :
                                   00000000G 00 16 0004C      JSB     SMG$$BEGIN_PASTEBOARD_UPDATE_R1       :
                                55          50 D0 00052       MOVL    R0, STATUS                            :
                                6E          55 E9 00055       BLBC    STATUS, 7$                            :
                                53       04 A4 D0 00058       MOVL    4(R4), CURR_PP                        : 2213
                                54          53 D1 0005C 4$:   CMPL    CURR_PP, R4                           : 2214
                                            1B 13 0005F       BEQL    5$                                    :
                                52       F8 A3 9E 00061       MOVAB   -8(R3), PP_BASE                       : 2221
                                50       10 A2 D0 00065       MOVL    16(PP_BASE), DCB                      : 2224
                                            11 BB 00069       PUSHR   #^M<R0,R4>                            : 2226
                       0000V    CF          02 FB 0006B       CALLS   #2, SMG$$UNPASTE_VIRTUAL_DISPLAY      :
                                55          50 D0 00070       MOVL    R0, STATUS                            :
                                62          55 E9 00073       BLBC    STATUS, 8$                            : 2225
                                53       0C A2 D0 00076       MOVL    12(PP_BASE), CURR_PP                  : 2231
                                            E0 11 0007A       BRB     4$                                    : 2214
                                   00A4  C4 D4 0007C 5$:      CLRL    164(R4)                               : 2234
                                02          6C 91 00080       CMPB    (AP), #2                              : 2241
                                            13 1F 00083       BLSSU   6$                                    :
                                         08 AC D5 00085       TSTL    8(AP)                                 :
                                            0E 13 00088       BEQL    6$                                    :
                                02          6C 91 0008A       CMPB    (AP), #2                              : 2242
                                            4C 1F 0008D       BLSSU   9$                                    :
                                         08 AC D5 0008F       TSTL    8(AP)                                 :
                                            47 13 00092       BEQL    9$                                    :
                                43       08 BC E9 00094       BLBC    @CLEAR_SCREEN_FLAG, 9$                :
                         0C     A4          01 8A 00098 6$:   BICB2   #1, 12(R4)                            : 2262
                                            54 DD 0009C       PUSHL   R4                                    : 2264
                   00000000G    00          01 FB 0009E       CALLS   #1, SMG$$ERASE_PASTEBOARD             :
                                55          50 D0 000A5       MOVL    R0, STATUS                            :
                                2D          55 E9 000A8       BLBC    STATUS, 8$                            :
                       00E6     C4       5A A4 B1 000AB       CMPW    90(R4), 230(R4)                       : 2273
                                            35 13 000B1       BEQL    10$                                   :
                                6E     00E6 C4 3C 000B3       MOVZWL  230(R4), (SP)                         : 2276
                                       4200 8F BB 000B8       PUSHR   #^M<R9,SP>                            : 2275
                   00000000G    00          02 FB 000BC       CALLS   #2, SMG$CHANGE_PBD_CHARACTERISTICS    :
                                55          50 D0 000C3       MOVL    R0, STATUS                            :
                                0F          55 E9 000C6 7$:   BLBC    STATUS, 8$                            : 2277
                                            54 DD 000C9       PUSHL   R4                                    : 2278
                   00000000G    00          01 FB 000CB       CALLS   #1, SMG$$FLUSH_BUFFER                 :
                                55          50 D0 000D2       MOVL    R0, STATUS                            :
                                10          55 E8 000D5       BLBS    STATUS, 10$                           : 2279
                                       023D 31 000D8 8$:      BRW     38$                                   :
                                          54 DD 000DB 9$:     PUSHL   R4                                      ; 2285
              00000000G  00               01 FB 000DD         CALLS   #1, SMG$$FLUSH_BUFFER                   ;
                     0C  A4               01 8A 000E4         BICB2   #1, 12(R4)                              ; 2286
                         53         08    A4 D0 000E8 10$:    MOVL    8(R4), WCB                              ; 2289
                         50       00F4    C4 3C 000EC         MOVZWL  244(R4), R0                             ; 2299
                                          7A 13 000F1         BEQL    14$                                     ;
                         01               50 B1 000F3         CMPW    R0, #1                                  ; 2300
                                          08 12 000F6         BNEQ    11$                                     ;
                     02  A3       00F6    C4 B1 000F8         CMPW    246(R4), 2(WCB)                         ; 2301
                                          6D 13 000FE         BEQL    14$                                     ;
                         52       0108    C4 9E 00100 11$:    MOVAB   264(R4), R2                             ; 2317
                         56       00FC    C4 9E 00105         MOVAB   252(R4), R6                             ;
                                          66 D5 0010A         TSTL    (R6)                                    ;
                                          04 12 0010C         BNEQ    12$                                     ;
                                          62 D4 0010E         CLRL    (R2)                                    ;
                                          2F 11 00110         BRB     13$                                     ;
                     08  AE               02 D0 00112 12$:    MOVL    #2, INPUT_ARGS                          ;
                     0C  AE               01 D0 00116         MOVL    #1, INPUT_ARGS+4                        ;
                     10  AE         02    A3 3C 0011A         MOVZWL  2(WCB), INPUT_ARGS+8                    ;
                                    08    AE 9F 0011F         PUSHAB  INPUT_ARGS                              ;
                                  0104    C4 DD 00122         PUSHL   260(R4)                                 ;
                                          52 DD 00126         PUSHL   R2                                      ;
                                  0100    C4 9F 00128         PUSHAB  256(R4)                                 ;
                     10  AE       023C    8F 3C 0012C         MOVZWL  #572, 16(SP)                            ;
                                    10    AE 9F 00132         PUSHAB  16(SP)                                  ;
                                          56 DD 00135         PUSHL   R6                                      ;
              00000000G  00               06 FB 00137         CALLS   #6, SMG$GET_TERM_DATA                   ;
                         63               50 E9 0013E         BLBC    STATUS, 16$                             ;
                                          62 D5 00141 13$:    TSTL    (R2)                                    ; 2323
                                          76 13 00143         BEQL    19$                                     ;
                         58         20    A3 32 00145         CVTWL   32(WCB), FINAL_ROW                      ; 2332
                         57         22    A3 32 00149         CVTWL   34(WCB), FINAL_COL                      ; 2333
                         53       0104    C4 9E 0014D         MOVAB   260(R4), R3                             ; 2336
                                          63 DD 00152         PUSHL   (R3)                                    ;
                                          62 DD 00154         PUSHL   (R2)                                    ; 2335
                                          54 DD 00156         PUSHL   R4                                      ;
              00000000G  00               03 FB 00158         CALLS   #3, SMG$$OUTPUT                         ;
                         55               50 D0 0015F         MOVL    R0, STATUS                              ;
                         53               55 E9 00162         BLBC    STATUS, 18$                             ; 2337
                         02               6C 91 00165         CMPB    (AP), #2                                ; 2343
                                          51 1F 00168         BLSSU   19$                                     ;
                                    08    AC D5 0016A         TSTL    8(AP)                                   ;
                                          4C 13 0016D 14$:    BEQL    19$                                     ;
                         48         08    BC E8 0016F         BLBS    @CLEAR_SCREEN_FLAG, 19$                 ; 2344
                                          66 D5 00173         TSTL    (R6)                                    ; 2347
                                          04 12 00175         BNEQ    15$                                     ;
                                          62 D4 00177         CLRL    (R2)                                    ;
                                          2D 11 00179         BRB     17$                                     ;
                     08  AE               02 D0 0017B 15$:    MOVL    #2, INPUT_ARGS                          ;
                     0C  AE               58 D0 0017F         MOVL    FINAL_ROW, INPUT_ARGS+4                 ;
                     10  AE               57 D0 00183         MOVL    FINAL_COL, INPUT_ARGS+8                 ;
                                    08    AE 9F 00187         PUSHAB  INPUT_ARGS                              ;
                                          63 DD 0018A         PUSHL   (R3)                                    ;
                                          52 DD 0018C         PUSHL   R2                                      ;
                                  0100    C4 9F 0018E         PUSHAB  256(R4)                                 ;
                     10  AE       023A    8F 3C 00192         MOVZWL  #570, 16(SP)                            ;
                                    10    AE 9F 00198         PUSHAB  16(SP)                                  ;
```

```
                                 56  DD 0019B           PUSHL   R6                                  ;
           00000000G  00         06  FB 0019D           CALLS   #6, SMG$GET_TERM_DATA               ;
                      01         50  E8 001A4 16$:      BLBS    STATUS, 17$                         ;
                                 04     001A7           RET                                         ;
                                 63  DD 001A8 17$:      PUSHL   (R3)                                ; 2350
                                 62  DD 001AA           PUSHL   (R2)                                ; 2349
                                 54  DD 001AC           PUSHL   R4                                  ;
           00000000G  00         03  FB 001AE           CALLS   #3, SMG$$OUTPUT                     ;
                      55         50  D0 001B5           MOVL    R0, STATUS                          ;
                      48         55  E9 001B8 18$:      BLBC    STATUS, 22$                         ; 2351
                            74   A4  9F 001BB 19$:      PUSHAB  116(R4)                             ; 2363
           00000000G  00         01  FB 001BE           CALLS   #1, SYS$CANEXH                      ;
                      55         50  D0 001C5           MOVL    R0, STATUS                          ;
                      09         55  E8 001C8           BLBS    STATUS, 20$                         ; 2364
           000008F8   8F         55  D1 001CB           CMPL    STATUS, #2296                       ;
                                 78  12 001D2           BNEQ    26$                                 ;
                            08   A4  D5 001D4 20$:      TSTL    8(R4)                               ; 2371
                                 14  13 001D7           BEQL    21$                                 ;
                            08   A4  DD 001D9           PUSHL   8(R4)                               ; 2374
               0000V  CF         01  FB 001DC           CALLS   #1, SMG$$DEALLOCATE_WCB             ;
                      55         50  D0 001E1           MOVL    R0, STATUS                          ;
                            08   A4  D4 001E4           CLRL    8(R4)                               ; 2375
                      03         55  E8 001E7           BLBS    STATUS, 21$                         ; 2376
                               0080  31 001EA           BRW     30$                                 ;
                            64   A4  B5 001ED 21$:      TSTW    100(R4)                             ; 2387
                                 17  13 001F0           BEQL    23$                                 ;
                      7E    64   A4  3C 001F2           MOVZWL  100(R4), -(SP)                      ; 2390
           00000000G  00         01  FB 001F6           CALLS   #1, SYS$DASSGN                      ;
                      55         50  D0 001FD           MOVL    R0, STATUS                          ;
                            64   A4  B4 00200           CLRW    100(R4)                             ; 2391
                      03         55  E8 00203 22$:      BLBS    STATUS, 23$                         ; 2393
                               0083  31 00206           BRW     32$                                 ;
                            66   A4  95 00209 23$:      TSTB    102(R4)                             ; 2402
                                 1F  13 0020C           BEQL    25$                                 ;
                      6E    66   A4  9A 0020E           MOVZBL  102(R4), (SP)                       ; 2404
                                 5E  DD 00212           PUSHL   SP                                  ;
           00000000G  00         01  FB 00214           CALLS   #1, LIB$FREE_EF                     ;
                      55         50  D0 0021B           MOVL    R0, STATUS                          ;
                      09         55  E8 0021E           BLBS    STATUS, 24$                         ; 2405
           00000000G  8F         55  D1 00221           CMPL    STATUS, #LIB$_EF_ALRFRE             ;
                                 22  12 00228           BNEQ    26$                                 ;
                            66   A4  94 0022A 24$:      CLRB    102(R4)                             ; 2407
                            67   A4  95 0022D 25$:      TSTB    103(R4)                             ; 2410
                                 22  13 00230           BEQL    29$                                 ;
                      6E    67   A4  9A 00232           MOVZBL  103(R4), (SP)                       ; 2412
                                 5E  DD 00236           PUSHL   SP                                  ;
           00000000G  00         01  FB 00238           CALLS   #1, LIB$FREE_EF                     ;
                      55         50  D0 0023F           MOVL    R0, STATUS                          ;
                      0C         55  E8 00242           BLBS    STATUS, 28$                         ; 2413
           00000000G  8F         55  D1 00245           CMPL    STATUS, #LIB$_EF_ALRFRE             ;
                                 03  13 0024C 26$:      BEQL    28$                                 ;
                               00C7  31 0024E 27$:      BRW     38$                                 ;
                            67   A4  94 00251 28$:      CLRB    103(R4)                             ; 2415
                            6C   A4  D5 00254 29$:      TSTL    108(R4)                             ; 2422
                                 17  13 00257           BEQL    31$                                 ;
                            6C   A4  9F 00259           PUSHAB  108(R4)                             ; 2426
                  04  AE    70   A4  3C 0025C           MOVZWL  112(R4), 4(SP)                      ; 2425
```

```
                          04   AE  9F 00261       PUSHAB  4(SP)                        ;
               6B              02  FB 00264       CALLS   #2, LIB$FREE_VM              ; 2426
               55              50  D0 00267       MOVL    R0, STATUS                   ;
                          6C   A4  D4 0026A       CLRL    108(R4)                      ; 2427
               DE              55  E9 0026D 30$:  BLBC    STATUS, 27$                  ; 2428
               50       00E4   C4  3C 00270 31$:  MOVZWL  228(R4), R0                  ; 2436
                               18  13 00275       BEQL    33$                          ;
                        00B0   C4  9F 00277       PUSHAB  176(R4)                      ; 2439
          04   AE              50  D0 0027B       MOVL    R0, 4(SP)                    ; 2438
                          04   AE  9F 0027F       PUSHAB  4(SP)                        ;
               6B              02  FB 00282       CALLS   #2, LIB$FREE_VM              ; 2439
               55              50  D0 00285       MOVL    R0, STATUS                   ;
                        00E4   C4  B4 00288       CLRW    228(R4)                      ; 2440
               BF              55  E9 0028C 32$:  BLBC    STATUS, 27$                  ; 2441
               53       00E8   C4  9E 0028F 33$:  MOVAB   232(R4), R3                  ; 2448
                               63  D5 00294       TSTL    (R3)                         ;
                               0F  13 00296       BEQL    34$                          ;
                               63  DD 00298       PUSHL   (R3)                         ; 2450
     00000000G 00              01  FB 0029A       CALLS   #1, SYS$CLOSE                ;
               55              50  D0 002A1       MOVL    R0, STATUS                   ;
               71              55  E9 002A4       BLBC    STATUS, 38$                  ; 2451
               52       00F0   C4  9E 002A7 34$:  MOVAB   240(R4), R2                  ; 2458
                               62  D5 002AC       TSTL    (R2)                         ;
                               1C  13 002AE       BEQL    35$                          ;
                               52  DD 002B0       PUSHL   R2                           ; 2460
          04   AE         5A   A4  3C 002B2       MOVZWL  90(R4), 4(SP)                ;
                          04   AE  D6 002B7       INCL    4(SP)                        ;
                          04   AE  9F 002BA       PUSHAB  4(SP)                        ;
     00000000G 00              02  FB 002BD       CALLS   #2, LIB$GET_VM               ;
               55              50  D0 002C4       MOVL    R0, STATUS                   ;
                               62  D4 002C7       CLRL    (R2)                         ; 2461
               4C              55  E9 002C9       BLBC    STATUS, 38$                  ; 2462
                               63  D5 002CC 35$:  TSTL    (R3)                         ; 2469
                               15  13 002CE       BEQL    36$                          ;
                               53  DD 002D0       PUSHL   R3                           ; 2472
          04   AE         50   8F  9A 002D2       MOVZBL  #80, 4(SP)                   ; 2471
                          04   AE  9F 002D7       PUSHAB  4(SP)                        ;
               6B              02  FB 002DA       CALLS   #2, LIB$FREE_VM              ; 2472
               55              50  D0 002DD       MOVL    R0, STATUS                   ;
                               63  D4 002E0       CLRL    (R3)                         ; 2473
               33              55  E9 002E2       BLBC    STATUS, 38$                  ; 2474
               52       00EC   C4  9E 002E5 36$:  MOVAB   236(R4), R2                  ; 2477
                               62  D5 002EA       TSTL    (R2)                         ;
                               15  13 002EC       BEQL    37$                          ;
                               52  DD 002EE       PUSHL   R2                           ; 2480
          04   AE         44   8F  9A 002F0       MOVZBL  #68, 4(SP)                   ; 2479
                          04   AE  9F 002F5       PUSHAB  4(SP)                        ;
               6B              02  FB 002F8       CALLS   #2, LIB$FREE_VM              ; 2480
               55              50  D0 002FB       MOVL    R0, STATUS                   ;
                               62  D4 002FE       CLRL    (R2)                         ; 2481
               15              55  E9 00300       BLBC    STATUS, 38$                  ; 2482
                          04   AE  9F 00303 37$:  PUSHAB  PBCB                         ; 2489
          04   AE       014C   8F  3C 00306       MOVZWL  #332, 4(SP)                  ;
                          04   AE  9F 0030C       PUSHAB  4(SP)                        ;
               6B              02  FB 0030F       CALLS   #2, LIB$FREE_VM              ;
               55              50  D0 00312       MOVL    R0, STATUS                   ;
               04              55  E8 00315       BLBS    STATUS, 39$                  ;
```

```
                                 50           55  D0 00318 38$:      MOVL    STATUS, R0                                       ; 2491
                                                  04 0031B           RET                                                      ;
                                 50           69  D0 0031C 39$:      MOVL    (R9), R0                                         ; 2498
                      00      44 AA           50  E5 0031F           BBCC    R0, PBD_V_PB_AVAIL, 40$                          ;
                                              6A  D7 00324 40$:      DECL    PBD_L_COUNT                                      ; 2500
                                       04 AA40    D4 00326           CLRL    PBD_A_PBCB[R0]                                   ; 2502
                                 50           01  D0 0032A           MOVL    #1, R0                                           ; 2504
                                                  04 0032D           RET                                                      ; 2506

; Routine Size:  814 bytes,    Routine Base:  _SMG$CODE + 0A95

; 2257          2507  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$CREATE_VIRTUAL_DISPLAY - Create Virtual Display'
GLOBAL ROUTINE SMG$CREATE_VIRTUAL_DISPLAY (
                                            NUM_ROWS,      ! height
                                            NUM_COLS,      ! width
                                            NEW_DISPLAY_ID,
                                            DISPLAY_ATTRIBUTES,
                                            VIDEO_ATTRIBUTES,
                                            CHAR_SET
                                           ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       This routine creates a new virtual display -- returning its
!       assigned display_id.  Its initial contents are blanks with
!       video attributes set to those specified or zero.  The cursor
!       will be at row 1 column 1.
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$CREATE_VIRTUAL_DISPLAY (
!                               NUM_ROWS.rl.r,          ! Height
!                               NUM_COLS.rl.r,          ! Width
!                               NEW_DISPLAY_ID.wl.r
!                               [,DISPLAY_ATTRIBUTES.rl.r]
!                               [,VIDEO_ATTRIBUTES.rl.r]
!                               [,CHAR_SET.rl.r])
!
! FORMAL PARAMETERS:
!
!       NUM_ROWS.rl.r    Number of rows in new virtual display.
!
!       NUM_COLS.rl.r    Number of columns in new virtual display.
!
!       NEW_DISPLAY_ID.wl.r     Virtual display id of newly-created
!                               virtual display.
!
!       DISPLAY_ATTRIBUTES.rl.r The default display attributes.
!
!                       SMG$M_BORDER if virtual display is to be
!                               displayed with a border.
!
!                       SMG$M_TRUNC_ICON if an icon should be displayed
!                               when text overflows the display bounds.
!
!                       SMG$M_DISPLAY_CONTROLS if carriage controls (CR, LF,
!                               FF, VT, HT) should be displayed instead
!                               of executed.
!                       If omitted, none of the attributes will be set.
!
!       VIDEO_ATTRIBUTES.rl.r   The default rendition code to be
!                       applied to all output to this display unless
!                       overridden on a particular output call.
!                       If not supplied, default will be all zero (no
!                       attributes).
!
!                       Values:
!
```

```
1 !                             SMG$M_BLINK     displays characters blinking.
1 !
1 !                             SMG$M_BOLD      displays characters in
1 !                                             higher-than-normal intensity.
1 !
1 !                             SMG$M_REVERSE   displays characters in reverse
1 !                                             video -- that is, using the
1 !                                             opposite default rendition of
1 !                                             the virtual display.
1 !
1 !                             SMG$M_UNDERLINE displays characters underlined.
1 !
1 !             CHAR_SET.rb.r   [Optional].  If provided, specifies the default
1 !                             character set to be used for this display.
1 !                             Recognized values are:
1 !                                             SMG$C_UNITED_KINGDOM
1 !                                             SMG$C_ASCII (default)
1 !                                             SMG$C_SPEC_GRAPHICS
1 !                                             SMG$C_ALT_CHAR
1 !                                             SMG$C_ALT_GRAPHICS
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       LIB$_INSVIRMEM  Insufficient virtual memory to allocate needed
1 !                       buffer.
1 !       SMG$_INVARG     Unrecognized Video Attributes
1 !                    or Unrecognized Display Attributes
1 !       SMG$_WRONUMARG  Wrong number of arguments.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2   BEGIN
2   BUILTIN
2       NULLPARAMETER;
2
2   $SMG$VALIDATE_ARGCOUNT (3, 6);        ! Test for right no. of args
2
3   RETURN (SMG$$CREATE_VIRTUAL_DISPLAY(
3               .NUM_ROWS,
3               .NUM_COLS,
3               .NEW_DISPLAY_ID,        ! Gets the DCB address for the display created
4               (IF NOT NULLPARAMETER(DISPLAY_ATTRIBUTES)
4                 THEN  .DISPLAY_ATTRIBUTES
3                 ELSE  UPLIT(0) ),
4               (IF NOT NULLPARAMETER(VIDEO_ATTRIBUTES)
4                 THEN  .VIDEO_ATTRIBUTES
```

```
                                                                 B  1
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages    16-Sep-1984 00:29:22     VAX-11 Bliss-32 V4.0-742              Page  69
1-096           SMG$CREATE_VIRTUAL_DISPLAY - Create Virtual Dis 14-Sep-1984 13:09:43     [SMGRTL.SRC]SMGDISLIN.B32;1                (13)

; 2373          2622  3                      ELSE  UPLIT(0) ),
; 2374          2623  4                    (IF NOT NULLPARAMETER(CHAR_SET)
; 2375          2624  4                      THEN  .CHAR_SET
; 2376          2625  2                      ELSE  UPLIT(0) ) ) );
; 2377          2626  2
; 2378          2627  1       END;                              ! Routine SMG$CREATE_VIRTUAL_DISPLAY


                                                  00DC3          .BLKB    1
                                        00000000  00DC4 P.AAC:   .LONG    0                                      ;
                                        00000000  00DC8 P.AAD:   .LONG    0                                      ;
                                        00000000  00DCC P.AAE:   .LONG    0                                      ;


                                             0000 00000          .ENTRY  SMG$CREATE_VIRTUAL_DISPLAY, Save nothing   ; 2509
                     50            6C          03   83 00002          SUBB3   #3, (AP), DIFF                        ; 2611
                                   03          50   91 00006          CMPB    DIFF, #3                              ;
                                               08   1B 00009          BLEQU   1$                                    ;
                                   50 00000000G  8F   D0 0000B          MOVL    #SMG$_WRONUMARG, R0                   ;
                                                    04 00012          RET                                           ;
                                   06          6C   91 00013 1$:      CMPB    (AP), #6                              ; 2623
                                               0A   1F 00016          BLSSU   2$                                    ;
                                         18    AC   D5 00018          TSTL    24(AP)                                ;
                                               05   13 0001B          BEQL    2$                                    ;
                                         18    AC   DD 0001D          PUSHL   CHAR_SET                              ; 2624
                                               06   11 00020          BRB     3$                                    ;
                                   50    D7    AF   9E 00022 2$:      MOVAB   P.AAE, R0                             ; 2625
                                               50   DD 00026          PUSHL   R0                                    ;
                                   05          6C   91 00028 3$:      CMPB    (AP), #5                              ; 2620
                                               0A   1F 0002B          BLSSU   4$                                    ;
                                         14    AC   D5 0002D          TSTL    20(AP)                                ;
                                               05   13 00030          BEQL    4$                                    ;
                                         14    AC   DD 00032          PUSHL   VIDEO_ATTRIBUTES                      ; 2621
                                               06   11 00035          BRB     5$                                    ;
                                   50    BE    AF   9E 00037 4$:      MOVAB   P.AAD, R0                             ; 2622
                                               50   DD 0003B          PUSHL   R0                                    ;
                                   04          6C   91 0003D 5$:      CMPB    (AP), #4                              ; 2617
                                               0A   1F 00040          BLSSU   6$                                    ;
                                         10    AC   D5 00042          TSTL    16(AP)                                ;
                                               05   13 00045          BEQL    6$                                    ;
                                         10    AC   DD 00047          PUSHL   DISPLAY_ATTRIBUTES                    ; 2618
                                               06   11 0004A          BRB     7$                                    ;
                                   50    A5    AF   9E 0004C 6$:      MOVAB   P.AAC, R0                             ; 2619
                                               50   DD 00050          PUSHL   R0                                    ;
                                   7E    08    AC   7D 00052 7$:      MOVQ    NUM_COLS, -(SP)                       ; 2615
                                         04    AC   DD 00056          PUSHL   NUM_ROWS                              ; 2614
                            0000V  CF          06   FB 00059          CALLS   #6, SMG$$CREATE_VIRTUAL_DISPLAY        ;
                                                    04 0005E          RET                                           ; 2627

; Routine Size:  95 bytes,    Routine Base:  _SMG$CODE + 0DD0


; 2379          2628  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$DELETE_VIRTUAL_DISPLAY - Delete virtual display'
1 GLOBAL ROUTINE SMG$DELETE_VIRTUAL_DISPLAY ( DISPLAY_ID ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine deletes a virtual display.  It is automatically
1 !       "unpasted" from any pasteboards on which it is pasted and
1 !       its associated buffer space is deallocated.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$DELETE_VIRTUAL_DISPLAY (DISPLAY_ID.rl.r )
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r         Id of virtual display to be deleted.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL        Normal successful completion
1 !       SMG$_INVDIS_ID    Invalid display id.
1 !       SMG$_WRONUMARG    Wrong number of arguments.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2         STATUS,                         ! Status of subroutine calls
2         CURR_PP : REF $PP_DECL,         ! Addr of current pasting packet
2         DCB     : REF $DCB_DECL;        ! Addr of display control block
2
2     $SMG$VALIDATE_ARGCOUNT (1, 1);      ! Test for right no. of args
2
2     $SMG$GET_DCB ( .DISPLAY_ID, DCB);   ! Get DCB address
2
2     CURR_PP = .DCB [DCB_A_PP_NEXT];
2
2 !+
2 ! Loop through all pasteboards we're pasted to, undoing our linkage to
2 ! each.
2 !-
2
2     WHILE .CURR_PP NEQ DCB [DCB_A_PP_NEXT] ! While any remain...
2     DO
3         BEGIN   ! Overall loop
3         LOCAL
3             PBCB : REF $PBCB_DECL;      ! Addr of pasteboard control blk
```

```
3
3          PBCB = .CURR_PP [PP_A_PBCB_ADDR];
3
3          !+
3          ! Update pasting packet pointer to next pasting packet, before
3          ! the unpaste operation makes current on go away.
3          !-
3          CURR_PP = .CURR_PP [PP_A_NEXT_DCB];
3
3          !+
3          ! Now we can unpaste this linkage.
3          !-
4          IF NOT (STATUS = SMG$$UNPASTE_VIRTUAL_DISPLAY (
4                                                      .DCB,
4                                                      .PBCB ))
3          THEN
3              RETURN (.STATUS);
3
2          END;     ! Overall loop
2
2  !+
2  ! Having successfully severed our linkage with all the pasteboards to
2  ! to which we were pasted, we can now get rid of the DCB itself.
2  ! Before we can delete this DCB we must check to see if there is a
2  ! backup DCB in existance.  If so, call outselves recursively to delete
2  ! the backup DCB first.
2      IF .DCB [DCB_A_BACKUP_DCB] NEQ 0
2      THEN
3          IF NOT ( STATUS =SMG$DELETE_VIRTUAL_DISPLAY (
3                                          DCB [DCB_A_BACKUP_DCB]))
2          THEN
2              RETURN (.STATUS);
2
2  ! One remaining chore is to first release the buffer areas whose
2  ! addresses are in the DCB.  Recall that the two buffer (text and
2  ! attr) were initially allocated as a double-size buffer and split in
2  ! two.  This means we can return both at once by supplying the address
2  ! of the the text buffer and a length equal to twice its size.
2  !-
3      IF NOT (STATUS = LIB$FREE_VM ( %REF (2* .DCB [DCB_L_BUFSIZE]),
3                                     DCB [DCB_A_TEXT_BUF]))
2      THEN
2          RETURN (.STATUS);
2
2  !+
2  ! Free the line characteristics vector
2  !-
3      IF NOT (STATUS = LIB$FREE_VM (%REF ( .DCB [DCB_W_NO_ROWS] +1),
3                                    DCB [DCB_A_LINE_CHAR]))
2      THEN
2          RETURN ( .STATUS);
2
2  !+
2  ! Free the char_set buffer if there is one.
2  !-
2      IF .DCB [DCB_A_CHAR_SET_BUF] NEQ 0
2      THEN
```

```
; 2495         2743  3             IF NOT (STATUS = LIB$FREE_VM ( DCB [DCB_L_BUFSIZE],
; 2496         2744  3                                            DCB [DCB_A_CHAR_SET_BUF]))
; 2497         2745  2             THEN
; 2498         2746  2                 RETURN (.STATUS);
; 2499         2747  2
; 2500         2748  2   !+
; 2501         2749  2   ! If we have a dynamic string containing a border label, free the string
; 2502         2750  2   !-
; 2503         2751  2         IF .DCB [DCB_V_BORDERED]
; 2504         2752  2         THEN
; 2505         2753  3             BEGIN    ! Bordered
; 2506         2754  3             LOCAL
; 2507         2755  3                 DESC : REF BLOCK [8,BYTE];  ! Pointer to dynamic string
; 2508         2756  3                                             ! descriptor in DCB
; 2509         2757  3             DESC = DCB [DCB_Q_LABEL_DESC];
; 2510         2758  3             IF .DESC [DSC$A_POINTER] NEQ 0
; 2511         2759  3             THEN
; 2512         2760  4                 IF NOT (STATUS = LIB$SFREE1_DD ( .DESC))
; 2513         2761  3                 THEN
; 2514         2762  3                     RETURN (.STATUS);
; 2515         2763  2             END;     ! Bordered
; 2516         2764  2   !+
; 2517         2765  2   ! Now the DCB itself...
; 2518         2766  2   ! Before freeing this area, we clobber the byte that makes it
; 2519         2767  2   ! recognizable as a DCB.  That way, if someone inadvertantly tries to
; 2520         2768  2   ! pass us this DCB address as a DCB after having deleted the virtual
; 2521         2769  2   ! display, we can tell that it no longer is a valid DCB.
; 2522         2770  2   !-
; 2523         2771  2         DCB [DCB_B_STRUCT_TYPE] = 0;
; 2524         2772  2         RETURN (LIB$FREE_VM (%REF ( DCB_K_SIZE), DCB ));
; 2525         2773  2
; 2526         2774  1         END;                        ! Routine SMG$DELETE_VIRTUAL_DISPLAY



                                    001C 00000          .ENTRY  SMG$DELETE_VIRTUAL_DISPLAY, Save R2,R3,R4      ; 2630
               54 00000000G    00    9E 00002          MOVAB   LIB$FREE_VM, R4                                 ;
               5E              08    C2 00009          SUBL2   #8, SP                                          ;
               01              6C    91 0000C          CMPB    (AP), #1                                        ; 2670
                               08    13 0000F          BEQL    1$                                              ;
               50 00000000G    8F    D0 00011          MOVL    #SMG$_WRONUMARG, R0                             ;
                               04       00018          RET                                                     ;
               50       04     BC    D0 00019 1$:      MOVL    @DISPLAY_ID, R0                                 ; 2672
          04   BC       38     A0    D1 0001D          CMPL    56(R0), @DISPLAY_ID                             ;
                               06    12 00022          BNEQ    2$                                              ;
               11       44     A0    91 00024          CMPB    68(R0), #17                                     ;
                               08    13 00028          BEQL    3$                                              ;
               50 00000000G    8F    D0 0002A 2$:      MOVL    #SMG$_INVDIS_ID, R0                             ;
                               04       00031          RET                                                     ;
          04   AE       04     BC    D0 00032 3$:      MOVL    @DISPLAY_ID, DCB                                ;
               52       04     AE    D0 00037          MOVL    DCB, R2                                         ; 2674
               53       20     A2    D0 0003B          MOVL    32(R2), CURR_PP                                 ;
               51       20     A2    9E 0003F 4$:      MOVAB   32(R2), R1                                      ; 2681
               51              53    D1 00043          CMPL    CURR_PP, R1                                     ;
                               14    13 00046          BEQL    5$                                              ;
```

```
                            51        14   A3  D0 00048        MOVL    20(CURR_PP), PBCB                          ; 2687
                            53             63  D0 0004C        MOVL    (CURR_PP), CURR_PP                         ; 2693
                                           51  DD 0004F        PUSHL   PBCB                                       ; 2700
                                           52  DD 00051        PUSHL   R2                                         ; 2699
                    0000V   CF             02  FB 00053        CALLS   #2, SMG$$UNPASTE_VIRTUAL_DISPLAY           ;
                            E4             50  E8 00058        BLBS    STATUS, 4$                                 ; 2698
                                               04 0005B        RET                                                ; 2702
                                  40   A2  D5 0005C 5$:    TSTL    64(R2)                                     ; 2712
                                       0A  13 0005F        BEQL    6$                                         ;
                                  40   A2  9F 00061        PUSHAB  64(R2)                                     ; 2715
                       98   AF             01  FB 00064        CALLS   #1, SMG$DELETE_VIRTUAL_DISPLAY             ;
                            61             50  E9 00068        BLBC    STATUS, 9$                                 ;
                                  10   A2  9F 0006B 6$:    PUSHAB  16(R2)                                     ; 2726
     04     AE         3C   A2             01  78 0006E        ASHL    #1, 60(R2), 4(SP)                          ; 2725
                                  04   AE  9F 00074        PUSHAB  4(SP)                                      ;
                            64             02  FB 00077        CALLS   #2, LIB$FREE_VM                            ; 2726
                            4F             50  E9 0007A        BLBC    STATUS, 9$                                 ;
                                  4C   A2  9F 0007D        PUSHAB  76(R2)                                     ; 2734
                       04   AE    02   A2  3C 00080        MOVZWL  2(R2), 4(SP)                               ; 2733
                                  04   AE  D6 00085        INCL    4(SP)                                      ;
                                  04   AE  9F 00088        PUSHAB  4(SP)                                      ;
                            64             02  FB 0008B        CALLS   #2, LIB$FREE_VM                            ; 2734
                            3B             50  E9 0008E        BLBC    STATUS, 9$                                 ;
                                  18   A2  D5 00091        TSTL    24(R2)                                     ; 2741
                                       0C  13 00094        BEQL    7$                                         ;
                                  18   A2  9F 00096        PUSHAB  24(R2)                                     ; 2744
                                  3C   A2  9F 00099        PUSHAB  60(R2)                                     ; 2743
                            64             02  FB 0009C        CALLS   #2, LIB$FREE_VM                            ; 2744
                            2A             50  E9 0009F        BLBC    STATUS, 9$                                 ;
                            15    2F   A2  E9 000A2 7$:    BLBC    47(R2), 8$                                 ; 2751
                            51    08   A2  9E 000A6        MOVAB   8(R2), DESC                                ; 2757
                                  04   A1  D5 000AA        TSTL    4(DESC)                                    ; 2758
                                       0C  13 000AD        BEQL    8$                                         ;
                                           51  DD 000AF        PUSHL   DESC                                       ; 2760
                00000000G   00             01  FB 000B1        CALLS   #1, LIB$SFREE1_DD                          ;
                            11             50  E9 000B8        BLBC    STATUS, 9$                                 ;
                                  44   A2  94 000BB 8$:    CLRB    68(R2)                                     ; 2771
                                  04   AE  9F 000BE        PUSHAB  DCB                                        ; 2772
                       04   AE    70   8F  9A 000C1        MOVZBL  #112, 4(SP)                                ;
                                  04   AE  9F 000C6        PUSHAB  4(SP)                                      ;
                            64             02  FB 000C9        CALLS   #2, LIB$FREE_VM                            ;
                                               04 000CC 9$:    RET                                                ; 2774

; Routine Size:  205 bytes,    Routine Base:  _SMG$CODE + 0E2F


; 2527          2775  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$GET_DISPLAY_ATTR - Get  display attributes'
1 GLOBAL ROUTINE SMG$GET_DISPLAY_ATTR (
1                                   DISPLAY_ID,
1                                   HEIGHT,
1                                   WIDTH,
1                                   DISPLAY_ATTRIBUTES,
1                                   VIDEO_ATTRIBUTES,
1                                   CHAR_SET
1                                           ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !      This routine returns attributes of the virtual display.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !      ret_status.wlc.v = SMG$GET_DISPLAY_ATTR (
1 !                                   DISPLAY_ID.rl.r,
1 !                                   HEIGHT.wl.r,
1 !                                   WIDTH.wl.r,
1 !                                   [,DISPLAY_ATTRIBUTES.wl.r]
1 !                                   [,VIDEO_ATTRIBUTES.wl.r]
1 !                                   [,CHAR_SET.wl.r])
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !      DISPLAY_ID.rl.r             The id of the display for which the
1 !                                  information is requested.
1 !
1 !      HEIGHT.wl.r                 Height of display in rows
1 !
1 !      WIDTH.wl.r                  Width of display in columns
1 !
1 !      DISPLAY_ATTRIBUTES.wl.r Optional.  If provided, the current
1 !                         default display attributes will be returned.
1 !                         These may be:
1 !
1 !                         SMG$M_BORDER if display is displayed with a
1 !                         border.
1 !
1 !      VIDEO_ATTRIBUTES.wl.r   Optional.   If provided, the current
1 !                         default video attributes are returned.  These
1 !                         values may be:
1 !
1 !                         SMG$M_BLINK      displays characters blinking.
1 !
1 !                         SMG$M_BOLD       displays characters in
1 !                                          higher-than-normal intensity.
1 !
1 !                         SMG$M_REVERSE    displays characters in reverse
1 !                                          video -- that is, using the
1 !                                          opposite default rendition of
1 !                                          the virtual display.
1 !
1 !                         SMG$M_UNDERLINE displays characters underlined.
1 !
1 !      CHAR_SET.wb.r   Optional.  If provided, the current default
```

```
; 2586          2833  1 !                           character set code is returned.
; 2587          2834  1 !                           Possible values are:
; 2588          2835  1 !                                           SMG$C_UNITED_KINGDOM
; 2589          2836  1 !                                           SMG$C_ASCII (default)
; 2590          2837  1 !                                           SMG$C_SPEC_GRAPHICS
; 2591          2838  1 !                                           SMG$C_ALT_CHAR
; 2592          2839  1 !                                           SMG$C_ALT_GRAPHICS
; 2593          2840  1 !
; 2594          2841  1 ! IMPLICIT INPUTS:
; 2595          2842  1 !
; 2596          2843  1 !       NONE
; 2597          2844  1 !
; 2598          2845  1 ! IMPLICIT OUTPUTS:
; 2599          2846  1 !
; 2600          2847  1 !       NONE
; 2601          2848  1 !
; 2602          2849  1 ! COMPLETION STATUS:
; 2603          2850  1 !
; 2604          2851  1 !       SS$_NORMAL        Normal successful completion
; 2605          2852  1 !       SMG$_WRONUMARG    Wrong number of arguments
; 2606          2853  1 !
; 2607          2854  1 ! SIDE EFFECTS:
; 2608          2855  1 !
; 2609          2856  1 !       NONE
; 2610          2857  1 !--
; 2611          2858  2     BEGIN
; 2612          2859  2     BUILTIN
; 2613          2860  2         NULLPARAMETER;
; 2614          2861  2
; 2615          2862  2     LOCAL
; 2616          2863  2         DCB : REF $DCB_DECL;                ! Addr of display control block
; 2617          2864  2
; 2618          2865  2     $SMG$VALIDATE_ARGCOUNT (3, 6);          ! Test for right no. of args
; 2619          2866  2
; 2620          2867  2     $SMG$GET_DCB ( .DISPLAY_ID, DCB);       ! Get DCB address
; 2621          2868  2
; 2622          2869  2     .HEIGHT = .DCB [DCB_W_NO_ROWS];
; 2623          2870  2     .WIDTH  = .DCB [DCB_W_NO_COLS];
; 2624          2871  2
; 2625          2872  2     IF NOT NULLPARAMETER (DISPLAY_ATTRIBUTES)
; 2626          2873  2     THEN .DISPLAY_ATTRIBUTES = .DCB [DCB_B_DEF_DISPLAY_ATTR];
; 2627          2874  2
; 2628          2875  2     IF NOT NULLPARAMETER (VIDEO_ATTRIBUTES)
; 2629          2876  2     THEN .VIDEO_ATTRIBUTES   = .DCB [DCB_B_DEF_VIDEO_ATTR];
; 2630          2877  2
; 2631          2878  2     IF NOT NULLPARAMETER (CHAR_SET)
; 2632          2879  2     THEN .CHAR_SET = .DCB [DCB_B_DEF_CHAR_SET];
; 2633          2880  2
; 2634          2881  2     RETURN (SS$_NORMAL);
; 2635          2882  1     END;                            ! Routine SMG$GET_DISPLAY_ATTR



                                              0000 00000          .ENTRY  SMG$GET_DISPLAY_ATTR, Save nothing                   ; 2777
                 50           6C           03  83 00002           SUBB3   #3, (AP), DIFF                                       ; 2865
```

```
                   03            50  91 00006           CMPB    DIFF, #3                                  ;
                                 08  1B 00009           BLEQU   1$                                        ;
                   50 00000000G  8F  D0 0000B           MOVL    #SMG$_WRONUMARG, R0                       ;
                                     04 00012           RET                                               ;
                   50       04   BC  D0 00013 1$:       MOVL    @DISPLAY_ID, R0                           ; 2867
            04     BC       38   A0  D1 00017           CMPL    56(R0), @DISPLAY_ID                       ;
                                 06  12 0001C           BNEQ    2$                                        ;
                   11       44   A0  91 0001E           CMPB    68(R0), #17                               ;
                                 08  13 00022           BEQL    3$                                        ;
                   50 00000000G  8F  D0 00024 2$:       MOVL    #SMG$_INVDIS_ID, R0                       ;
                                     04 0002B           RET                                               ;
                   50       04   BC  D0 0002C 3$:       MOVL    @DISPLAY_ID, DCB                          ;
            08     BC       02   A0  3C 00030           MOVZWL  2(DCB), @HEIGHT                           ; 2869
            0C     BC       06   A0  3C 00035           MOVZWL  6(DCB), @WIDTH                            ; 2870
                   04            6C  91 0003A           CMPB    (AP), #4                                  ; 2872
                                 0A  1F 0003D           BLSSU   4$                                        ;
                            10   AC  D5 0003F           TSTL    16(AP)                                    ;
                                 05  13 00042           BEQL    4$                                        ;
            10     BC       2F   A0  9A 00044           MOVZBL  47(DCB), @DISPLAY_ATTRIBUTES              ; 2873
                   05            6C  91 00049 4$:       CMPB    (AP), #5                                  ; 2875
                                 0A  1F 0004C           BLSSU   5$                                        ;
                            14   AC  D5 0004E           TSTL    20(AP)                                    ;
                                 05  13 00051           BEQL    5$                                        ;
            14     BC       2E   A0  9A 00053           MOVZBL  46(DCB), @VIDEO_ATTRIBUTES                ; 2876
                   06            6C  91 00058 5$:       CMPB    (AP), #6                                  ; 2878
                                 0A  1F 0005B           BLSSU   6$                                        ;
                            18   AC  D5 0005D           TSTL    24(AP)                                    ;
                                 05  13 00060           BEQL    6$                                        ;
            18     BC       30   A0  9A 00062           MOVZBL  48(DCB), @CHAR_SET                        ; 2879
                   50            01  D0 00067 6$:       MOVL    #1, R0                                    ; 2881
                                     04 0006A           RET                                               ; 2882

; Routine Size:  107 bytes,    Routine Base:  _SMG$CODE + 0EFC


; 2636          2883  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$LABEL_BORDER - Specify label for border'
1 GLOBAL ROUTINE SMG$LABEL_BORDER (
1                                   DISPLAY_ID,
1                                   LABEL_TEXT,
1                                   POSITION,
1                                   UNITS,
1                                   RENDITION_SET,
1                                   RENDITION_COMPLEMENT,
1                                   CHAR_SET
1                                 ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine allows the caller to specify what label text is to
1 !       be used with this display.  If the specified DISPLAY_ID does not
1 !       have the display attribute of SMG$M_BORDER, this attribute is
1 !       forced.
1 !
1 !       If the text parameter is not supplied, this virtual display
1 !       no longer has a border text associated with it -- it becomes
1 !       an unlabeled border.  If a valid text string is provided, it
1 !       replaces the current label text for this border.
1 !       If the text (as positioned within the border) does not fit
1 !       fully within the border, SMG$_INVARG is returned.
1 !       E.g.
1 !               +-------LABEL
1 !               !         !
1 !               +---------+
1 !
1 !
1 !       POSITION and UNITS as a pair specify the starting position of
1 !       the label text within the border.
1 !       If POSITION is omitted, the top border is assumed.  If UNITS is
1 !       omitted, a starting position will be chosen so as to center the
1 !       text either horizontally or vertically -- depending on implicit
1 !       or explicit POSITION.
1 !       If both are omitted, the text will be centered in the top border
1 !       line.
1 !
1 !       The following encoding is used:
1 !
1 !       POSITION                        UNITS                   SYMBOLIC
1 !       --------                        -----                   --------
1 !       0 = Top border line             Starting column number  SMG$K_TOP
1 !       1 = Bottom border line          Starting column number  SMG$K_BOTTOM
1 !       2 = Left border line            Starting row number     SMG$K_LEFT
1 !       3 = Right border line           Starting row number     SMG$K_RIGHT
1 !
1 !       Examples:
1 !
1 !       POSITION=0, UNITS=4             POSITION=1, UNITS=4
1 !
1 !       +--LABEL----------------+       +-----------------------+
1 !       !                       !       !                       !
1 !       !                       !       !                       !
1 !       !                       !       !                       !
1 !       !                       !       !                       !
```

```
!       |                          |        |                          |
!       |                          |        |                          |
!       +--------------------------+        +--LABEL-------------------+
!
!
!       POSITION=2, UNITS=3                 POSITION=3, UNITS=3
!
!       +--------------------------+        +--------------------------+
!       |                          |        |                          |
!       L                          |        |                          L
!       A                          |        |                          A
!       B                          |        |                          B
!       E                          |        |                          E
!       L                          |        |                          L
!       |                          |        |                          |
!       +--------------------------+        +--------------------------+
!
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$LABEL_BORDER (
!                                           DISPLAY_ID.rl.r
!                                           [,LABEL_TEXT.rt.dx]
!                                           [,POSITION.rl.r]
!                                           [,UNITS.rl.r]
!                                           [,RENDITION_SET.rl.r]
!                                           [,RENDITION_COMPLEMENT.rlr.]
!                                           [,CHAR_SET.rl.r])
!
! FORMAL PARAMETERS:
!
!       DISPLAY_ID.rl.r The display id of the virtual display whose
!                       border is to be labeled.  This display must have
!                       the display attribute of SMG$M_BORDER.
!
!       LABEL_TEXT.rt.dx          [Optional].  If supplied becomes the new
!                                 label for this display's border.  If
!                                 omitted, display becomes unlabeled.
!
!       POSITION.rl.r   [Optional].
!                       Specifies which border will contain label.
!                       If omitted, default to top border.
!
!       UNITS.rl.r      [Optional].
!                       Specifies where within the border the text label
!                       will start.
!                       If omitted, center in line indicated by POSITION
!
!       RENDITION_SET.rl.r        [Optional].
!                                 Each 1 bit attribute in this parameter
!                                 causes the corresponding attribute to
!                                 be set in the display.  (See below for
!                                 list of settable attributes.)
!
!       RENDITION_COMPLEMENT.rl.r         [Optional].
!                                 Each 1 bit attribute in this parameter
!                                 causes the corresponding attribute to
```

```
1 !                                          be complemented in the display.  (See
1 !                                          below for list of complementable
1 !                                          attributes.)
1 !
1 !      If the same bit is specified in both the RENDITION_SET parameter
1 !      and in the RENDITION_COMPLEMENT parameter, the application is
1 !      RENDITION_SET followed by RENDITION complement.  Using these two
1 !      parameters together the caller can exercise arbitrary and
1 !      independent control over each attribute on a single call.  On an
1 !      attribute by attribute basis he can cause the following
1 !      transformations:
1 !
1 !              SET      COMPLEMENT       Action
1 !              ---      ----------       ------
1 !              0        0                Attribute unchanged.
1 !              1        0                Attribute set to "on"
1 !              0        1                Attribute set to complement of
1 !                                        current setting.
1 !              1        1                Attribute set to "off".
1 !
1 !
1 !      Attributes which can be manipulated in this manner are:
1 !
1 !      SMG$M_BLINK  displays characters blinking.
1 !      SMG$M_BOLD  displays characters in higher-than-normal
1 !                 intensity.
1 !      SMG$M_REVERSE  displays characters in reverse video -- that is,
1 !                 using the opposite default rendition of the
1 !                 virtual display.
1 !      SMG$M_UNDERLINE  displays characters underlined.
1 !
1 !      CHAR_SET.rl.r    [Optional].  If provided, the character set to
1 !                       be used in displaying the label.
1 !                       Recognized values are:
1 !                                        SMG$C_UNITED_KINGDOM
1 !                                        SMG$C_ASCII (default)
1 !                                        SMG$C_SPEC_GRAPHICS
1 !                                        SMG$C_ALT_CHAR
1 !                                        SMG$C_ALT_GRAPHICS
1 !
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !      None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !      None
1 !
1 ! COMPLETION STATUS:
1 !
1 !      SS$_NORMAL       Normal successful completion
1 !      SMG$_INVDIS_ID   Invalid virtual display id.
1 !      SMG$_INVARG      Positioning and/or units when considered with
1 !                       length of text results in a position that is
1 !                       outside of the border area.
1 !      SMG$_WRONUMARG   Wrong number of arguments.
```

```
1 !
1 ! SIDE EFFECTS:
1 !
1 !      NONE
1 !--
2     BEGIN
2
2     LITERAL
2          K_SET_ARG = 5,
2          K_COMP_ARG= 6;
2
2     BUILTIN
2          NULLPARAMETER;
2
2     LOCAL
2          LUNITS,                              ! Implicit or explicit UNITS
2          LPOS,                                ! Implicit or explicit POSITION
2          REND_CODE,                           ! Rendition to be applied to
2                                               ! border label
2          STATUS,                              ! Status of subroutine calls
2          DESC : REF BLOCK [,BYTE],            ! Pointer to dynamic string
2                                               ! descriptor in DCB for border
2                                               ! label.
2          DCB : REF $DCB_DECL;                 ! Addr. of display control block
2
2     $SMG$VALIDATE_ARGCOUNT (1, 7);            ! Test for right no. of args
2
2     $SMG$GET_DCB ( .DISPLAY_ID, DCB);         ! Get addr of DCB
2
2 !+
2 ! Get a copy of the label.
2 !-
2     DESC = DCB [DCB_Q_LABEL_DESC];
2
2     IF NULLPARAMETER (LABEL_TEXT)
2     THEN
3          BEGIN    ! No text specified
3          RETURN (LIB$SFREE1_DD ( .DESC));
2          END;     ! No text specified
2
3     IF NOT (STATUS = LIB$SCOPY_DXDX (.LABEL_TEXT, .DESC))
2     THEN
2          RETURN (.STATUS);
2
2 !+
2 ! Check to see if combination of POSITION and UNITS fit.
2 !-
3     LPOS = ( IF NOT NULLPARAMETER (POSITION) THEN ..POSITION
2                                      ELSE 0);  ! Default to top row
2
2     CASE .LPOS FROM SMG$K_TOP TO SMG$K_RIGHT OF
2     SET
2          [SMG$K_TOP,SMG$K_BOTTOM]:            ! Top or bottom row
3               BEGIN
4               LUNITS = ( IF NOT NULLPARAMETER (UNITS)
4                         THEN ..UNITS
4                         ELSE     ! Center horizontally
6                             ((.DCB[DCB_W_NO_COLS] -.DESC [DSC$W_LENGTH])
3                               / 2) + 2 );
3
3             IF .LUNITS LEQ 0               OR
3                 .LUNITS + .DESC[DSC$W_LENGTH] GTR .DCB [DCB_W_NO_COLS] +2
3             THEN
4                 BEGIN
4                 LIB$SFREE1_DD (.DESC) ; ! Release our dynamic string
4                 RETURN (SMG$_INVARG);
3                 END;
2             END;
2
2         [SMG$K_LEFT,SMG$K_RIGHT]:          ! Left or right column
3             BEGIN
4             LUNITS = ( IF NOT NULLPARAMETER (UNITS)
4                         THEN ..UNITS
4                         ELSE      ! Center vertically
6                             ((.DCB[DCB_W_NO_ROWS] -.DESC[DSC$W_LENGTH])
3                               / 2) + 2 );
3
3             IF .LUNITS LEQ 0               OR
3                 .LUNITS + .DESC[DSC$W_LENGTH] GTR .DCB [DCB_W_NO_ROWS] +2
3             THEN
4                 BEGIN
4                 LIB$SFREE1_DD (.DESC) ; ! Release our dynamic string
4                 RETURN (SMG$_INVARG);
3                 END;
2             END;
2
2         [OUTRANGE]:
2             RETURN (SMG$_INVARG);
2     TES;
2
2     DCB [DCB_B_LABEL_POS] = .LPOS;
2     DCB [DCB_W_LABEL_UNITS] = .LUNITS;
2
2 !+
2 ! If UNITS parameter was omitted we centered the label.  Make a note of
2 ! this fact so that if he later does a CHANGE_VIRTUAL_DISPLAY we can
2 ! again center it in its new "center".
2     DCB [DCB_V_LABEL_CENTER] = 0;
2     IF NULLPARAMETER (UNITS)
2     THEN
2         DCB [DCB_V_LABEL_CENTER] = 1;
2
2 !+
2 ! Calc. REND_CODE as a function of callers rendition arguments and
2 ! the default rendition in the DCB.
2 !-
2     $SMG$SET_REND_CODE (K_SET_ARG, K_COMP_ARG);
2                                 ! macro to use caller's args if present
2
2     DCB [DCB_B_LABEL_REND] = .REND_CODE;
2
2 !+
2 ! Deal with alternate character set.
2 !-
```

```
; 2923          3169  2       IF NOT NULLPARAMETER(CHAR_SET)
; 2924          3170  2       THEN
; 2925          3171  3           BEGIN
; 2926          3172  3           CASE ..CHAR_SET FROM SMG$C_UNITED_KINGDOM
; 2927          3173  3                           TO SMG$C_ALT_GRAPHICS OF
; 2928          3174  3           SET
; 2929          3175  3               [SMG$C_UNITED_KINGDOM,
; 2930          3176  3                SMG$C_ASCII,
; 2931          3177  3                SMG$C_SPEC_GRAPHICS,
; 2932          3178  3                SMG$C_ALT_CHAR,
; 2933          3179  3                SMG$C_ALT_GRAPHICS]:
; 2934          3180  3                               DCB [DCB_B_LABEL_CHAR_SET] = ..CHAR_SET;
; 2935          3181  3
; 2936          3182  3           [INRANGE, OUTRANGE]:
; 2937          3183  3                               RETURN (SMG$_INVARG);
; 2938          3184  3           TES;
; 2939          3185  3           END
; 2940          3186  2       ELSE        ! Use default for virtual display
; 2941          3187  2           DCB [DCB_B_LABEL_CHAR_SET] = .DCB [DCB_B_DEF_CHAR_SET];
; 2942          3188  2
; 2943          3189  2       DCB [DCB_V_BORDERED] = 1;     ! Force bordered attribute in case it
; 2944          3190  2                                     ! wasn't previously.
; 2945          3191  2 !+
; 2946          3192  2 ! We now need to recalculate the constants in the pasting packet.
; 2947          3193  2 ! We may be making the transition from unbordered to bordered, so
; 2948          3194  2 ! this virtual display now has a bigger footprint in the pasteboard
; 2949          3195  2 ! buffer, and some display which previously was not occluded may now be.
; 2950          3196  2 ! Even if we were previously bordered, the size and position of our
; 2951          3197  2 ! label may have changed.
; 2952          3198  2 ! If we are not batched at the display level, recalc. pasting packet
; 2953          3199  2 ! constants and initiate output.  Else, just remember that we need to do
; 2954          3200  2 ! it later when batch level drops to zero.
; 2955          3201  2 !-
; 2956          3202  2       IF .DCB [DCB_L_BATCH_LEVEL] EQL 0
; 2957          3203  2       THEN
; 2958          3204  3           BEGIN   ! Do it now
; 2959          3205  4           IF NOT (STATUS = SMG$$RECALC_PP_FIELDS ( .DCB))
; 2960          3206  3           THEN
; 2961          3207  3               RETURN (.STATUS);
; 2962          3208  3
; 2963          3209  3           RETURN ( SMG$$CHECK_FOR_OUTPUT_DCB ( .DCB, SMG$C_LABEL_BORDER));
; 2964          3210  3           END     ! Do it now
; 2965          3211  3
; 2966          3212  2       ELSE
; 2967          3213  2
; 2968          3214  3           BEGIN   ! Defer the action
; 2969          3215  3           DCB [DCB_V_PP_MISMATCH] =1; ! Remember for later
; 2970          3216  2           END;    ! Defer the action
; 2971          3217  2
; 2972          3218  2       RETURN (SS$_NORMAL);
; 2973          3219  1       END;                            ! Routine SMG$LABEL_BORDER


                                      00FC 00000         .ENTRY  SMG$LABEL_BORDER, Save R2,R3,R4,R5,R6,R7     ; 2885
```

```
                                57 00000000G   00   9E 00002          MOVAB   LIB$SFREE1_DD, R7                     :
                 50             6C             01   83 00009          SUBB3   #1, (AP), DIFF                        : 3080
                                06             50   91 0000D          CMPB    DIFF, #6                              :
                                               08   1B 00010          BLEQU   1$                                    :
                                50 00000000G   8F   D0 00012          MOVL    #SMG$_WRONUMARG, R0                   :
                                                    04 00019          RET                                           :
                                50         04  BC   D0 0001A 1$:      MOVL    @DISPLAY_ID, R0                       : 3082
                       04       BC         38  A0   D1 0001E          CMPL    56(R0), @DISPLAY_ID                   :
                                               06   12 00023          BNEQ    2$                                    :
                                11         44  A0   91 00025          CMPB    68(R0), #17                           :
                                               08   13 00029          BEQL    3$                                    :
                                50 00000000G   8F   D0 0002B 2$:      MOVL    #SMG$_INVDIS_ID, R0                   :
                                                    04 00032          RET                                           :
                                52         04  BC   D0 00033 3$:      MOVL    @DISPLAY_ID, DCB                      :
                                54         08  A2   9E 00037          MOVAB   8(R2), DESC                           : 3087
                                02             6C   91 0003B          CMPB    (AP), #2                              : 3089
                                               05   1F 0003E          BLSSU   4$                                    :
                                           08  AC   D5 00040          TSTL    8(AP)                                 :
                                               06   12 00043          BNEQ    5$                                    :
                                               54   DD 00045 4$:      PUSHL   DESC                                  : 3092
                                67             01   FB 00047          CALLS   #1, LIB$SFREE1_DD                     :
                                                    04 0004A          RET                                           :
                                               54   DD 0004B 5$:      PUSHL   DESC                                  : 3095
                                           08  AC   DD 0004D          PUSHL   LABEL_TEXT                            :
                         00000000G  00             02   FB 00050          CALLS   #2, LIB$SCOPY_DXDX                    :
                                56             50   D0 00057          MOVL    R0, STATUS                            :
                                03             56   E8 0005A          BLBS    STATUS, 6$                            :
                                             010B   31 0005D          BRW     29$                                   :
                                03             6C   91 00060 6$:      CMPB    (AP), #3                              : 3102
                                               0B   1F 00063          BLSSU   7$                                    :
                                           0C  AC   D5 00065          TSTL    12(AP)                                :
                                               06   13 00068          BEQL    7$                                    :
                                55         0C  BC   D0 0006A          MOVL    @POSITION, LPOS                       :
                                               02   11 0006E          BRB     8$                                    :
                                               55   D4 00070 7$:      CLRL    LPOS                                  :
                       03       00             55   CF 00072 8$:      CASEL   LPOS, #0, #3                          : 3105
      0039           0039      000A          000A      00076 9$:      .WORD   10$-9$,-                              :
                                                                              10$-9$,-                              :
                                                                              13$-9$,-                              :
                                                                              13$-9$                                :
                                               68   11 0007E          BRB     18$                                   : 3142
                                04             6C   91 00080 10$:     CMPB    (AP), #4                              : 3109
                                               0B   1F 00083          BLSSU   11$                                   :
                                           10  AC   D5 00085          TSTL    16(AP)                                :
                                               06   13 00088          BEQL    11$                                   :
                                53         10  BC   D0 0008A          MOVL    @UNITS, LUNITS                        : 3110
                                               11   11 0008E          BRB     12$                                   :
                                50         06  A2   3C 00090 11$:     MOVZWL  6(DCB), R0                            : 3112
                                51             64   3C 00094          MOVZWL  (DESC), R1                            :
                                50             51   C2 00097          SUBL2   R1, R0                                :
                                50             02   C6 0009A          DIVL2   #2, R0                                : 3113
                                53         02  A0   9E 0009D          MOVAB   2(R0), LUNITS                         :
                                               40   15 000A1 12$:     BLEQ    17$                                   : 3115
                                51             64   3C 000A3          MOVZWL  (DESC), R1                            : 3116
                                51             53   C0 000A6          ADDL2   LUNITS, R1                            :
                                50         06  A2   3C 000A9          MOVZWL  6(DCB), R0                            :
                                               2C   11 000AD          BRB     16$                                   :
```

```
                            04          6C  91 000AF 13$:     CMPB    (AP), #4                              ; 3126
                                        0B  1F 000B2          BLSSU   14$                                   ;
                                  10    AC  D5 000B4          TSTL    16(AP)                                ;
                                        06  13 000B7          BEQL    14$                                   ;
                            53    10    BC  D0 000B9          MOVL    @UNITS, LUNITS                        ; 3127
                                        10  11 000BD          BRB     15$                                   ;
                            53    02    A2  3C 000BF 14$:     MOVZWL  2(DCB), R3                            ; 3129
                            50          64  3C 000C3          MOVZWL  (DESC), R0                            ;
                            53          50  C2 000C6          SUBL2   R0, R3                                ;
                            53          02  C6 000C9          DIVL2   #2, R3                                ; 3130
                            53          02  C0 000CC          ADDL2   #2, LUNITS                            ;
                                        12  15 000CF 15$:     BLEQ    17$                                   ; 3132
                            51          64  3C 000D1          MOVZWL  (DESC), R1                            ; 3133
                            51          53  C0 000D4          ADDL2   LUNITS, R1                            ;
                            50    02    A2  3C 000D7          MOVZWL  2(DCB), R0                            ;
                            50          02  C0 000DB 16$:     ADDL2   #2, R0                                ;
                            50          51  D1 000DE          CMPL    R1, R0                                ;
                                        07  15 000E1          BLEQ    19$                                   ;
                                        54  DD 000E3 17$:     PUSHL   DESC                                  ; 3136
                            67          01  FB 000E5          CALLS   #1, LIB$SFREE1_DD                     ;
                                        57  11 000E8 18$:     BRB     25$                                   ; 3137
                     31     A2          55  90 000EA 19$:     MOVB    LPOS, 49(DCB)                         ; 3145
                     2C     A2          53  B0 000EE          MOVW    LUNITS, 44(DCB)                       ; 3146
                     34     A2          04  8A 000F2          BICB2   #4, 52(DCB)                           ; 3152
                            04          6C  91 000F6          CMPB    (AP), #4                              ; 3153
                                        05  1F 000F9          BLSSU   20$                                   ;
                                  10    AC  D5 000FB          TSTL    16(AP)                                ;
                                        04  12 000FE          BNEQ    21$                                   ;
                     34     A2          04  88 00100 20$:     BISB2   #4, 52(DCB)                           ; 3155
                            50    2E    A2  9A 00104 21$:     MOVZBL  46(DCB), REND_CODE                    ; 3161
                            05          6C  91 00108          CMPB    (AP), #5                              ;
                                        09  1F 0010B          BLSSU   22$                                   ;
                                  14    AC  D5 0010D          TSTL    20(AP)                                ;
                                        04  13 00110          BEQL    22$                                   ;
                            50    14    BC  C8 00112          BISL2   @RENDITION_SET, REND_CODE             ;
                            06          6C  91 00116 22$:     CMPB    (AP), #6                              ;
                                        09  1F 00119          BLSSU   23$                                   ;
                                  18    AC  D5 0011B          TSTL    24(AP)                                ;
                                        04  13 0011E          BEQL    23$                                   ;
                            50    18    BC  CC 00120          XORL2   @RENDITION_COMPLEMENT, REND_CODE      ;
                     33     A2          50  90 00124 23$:     MOVB    REND_CODE, 51(DCB)                    ; 3164
                            07          6C  91 00128          CMPB    (AP), #7                              ; 3169
                                        23  1F 0012B          BLSSU   27$                                   ;
                                  1C    AC  D5 0012D          TSTL    28(AP)                                ;
                                        1E  13 00130          BEQL    27$                                   ;
                  04        00    1C    BC  CF 00132          CASEL   @CHAR_SET, #0, #4                     ; 3172
     0012       0012      0012        0012     00137 24$:     .WORD   26$-24$,-                             ;
                                      0012     0013F                  26$-24$,-                             ;
                                                                      26$-24$,-                             ;
                                                                      26$-24$,-                             ;
                                                                      26$-24$                               ;
                            50 00000000G  8F  D0 00141 25$:   MOVL    #SMG$_INVARG, R0                      ; 3183
                                        04 00148              RET                                           ;
                     32     A2    1C    BC  90 00149 26$:     MOVB    @CHAR_SET, 50(DCB)                    ; 3180
                                        05  11 0014E          BRB     28$                                   ; 3169
                     32     A2    30    A2  90 00150 27$:     MOVB    48(DCB), 50(DCB)                      ; 3187
                     2F     A2          01  88 00155 28$:     BISB2   #1, 47(DCB)                           ; 3189
```

```
                              1C    A2  D5 00159         TSTL    28(DCB)                                  ; 3202
                                    1D  12 0015C         BNEQ    31$                                      ;
                                    52  DD 0015E         PUSHL   DCB                                      ; 3205
                    0000V   CF      01  FB 00160         CALLS   #1, SMG$$RECALC_PP_FIELDS                ;
                            56      50  D0 00165         MOVL    R0, STATUS                               ;
                            04      56  E8 00168         BLBS    STATUS, 30$                              ;
                            50      56  D0 0016B 29$:    MOVL    STATUS, R0                               ; 3207
                                        04 0016E         RET                                              ;
                                    1C  DD 0016F 30$:    PUSHL   #28                                      ; 3209
                                    52  DD 00171         PUSHL   DCB                                      ;
                0000000G    00      02  FB 00173         CALLS   #2, SMG$$CHECK_FOR_OUTPUT_DCB            ;
                                        04 0017A         RET                                              ;
                       34   A2      08  88 0017B 31$:    BISB2   #8, 52(DCB)                              ; 3215
                            50      01  D0 0017F         MOVL    #1, R0                                   ; 3218
                                        04 00182         RET                                              ; 3219

; Routine Size:  387 bytes,    Routine Base:  _SMG$CODE + 0F67


; 2974          3220  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$MOVE_VIRTUAL_DISPLAY - Move previously pasted virtual display'
1 GLOBAL ROUTINE SMG$MOVE_VIRTUAL_DISPLAY (
1                                               DISPLAY_ID,
1                                               PASTEBOARD_ID,
1                                               PASTEBOARD_ROW,
1                                               PASTEBOARD_COL
1                                             ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       The specified virtual display is moved with respect to the
1 !       position where it is currently pasted to the specified pasteboard
1 !       preserving the pasting order.  If the display is not currently
1 !       pasted, it is pasted at the top of the pasting order in the
1 !       position specified.
1 !       This call is not permitted while display batching is in effect.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$MOVE_VIRTUAL_DISPLAY (
1 !                                               DISPLAY_ID.rl.r,
1 !                                               PASTEBOARD_ID.rl.r,
1 !                                               PASTEBOARD_ROW.rl.r,
1 !                                               PASTEBOARD_COL.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r         Id of virtual display to be moved.
1 !
1 !       PASTEBOARD_ID.rl.r      The pasteboard id of the pasteboard on
1 !                               which the movement is to take place.
1 !
1 !       PASTEBOARD_ROW.rl.r     Row on pasteboard which is to contain
1 !                               row 1 of the specified virtual display.
1 !
1 !       PASTEBOARD_COL.rl.r     Column on pasteboard which is to contain
1 !                               column 1 of the specified virtual
1 !                               display.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL       Normal successful completion
1 !       SMG$_INVDIS_ID   Invalid virtual display id.
1 !       SMG$_INVPAS_ID   Invalid pasteboard id.
1 !       SMG$_WRONUMARG   Wrong number of arguments.
1 !       SMG$_ILLBATFNC   Display is being batched, this operation is illegal.
1 !
1 ! SIDE EFFECTS:
1 !
```

```
!       NONE
!--
    BEGIN
    BUILTIN
        AP,
        CALLG;

    LOCAL
        STATUS,                                 ! Status of subroutine calls

        PP      : REF $PP_DECL,                 ! Addr of the pasting packet
        DCB     : REF $DCB_DECL,                ! Addr. of display control block
        PBCB    : REF $PBCB_DECL;               ! Addr of pasteboard control block

    $SMG$VALIDATE_ARGCOUNT (4, 4);              ! Test for right no. of args

!+
! Get addresses of associated virtual display control block and
! pasteboard control block, validating both the display id and the
! pasteboard id.
!-
    $SMG$GET_DCB ( .DISPLAY_ID, DCB);                   ! Get addr of DCB
    $SMG$GET_PBCB ( .PASTEBOARD_ID, PBCB);              ! Get addr of PBCB

!+
! Give an error if the display is batched.
!-

    IF .DCB[DCB_L_BATCH_LEVEL] NEQ 0
    THEN
        RETURN  SMG$_ILLBATFNC;

!+
! Determine if this virtual display is already pasted to this
! pasteboard.  If it is we can do the MOVE.  If it isn't we'll do a
! PASTE at the specified position.
!-
    IF NOT SMG$$LOCATE_PP( .DCB, .PBCB, PP)
    THEN
        RETURN SMG$$PASTE_VIRTUAL_DISPLAY(.DCB,.PBCB,
                        .PASTEBOARD_ROW,.PASTEBOARD_COL);

!+
! Set new row and column into pasting packet
!-
    PP [PP_W_ROW]       = ..PASTEBOARD_ROW;
    PP [PP_W_COL]       = ..PASTEBOARD_COL;

!+
! Recalc. occlusions.
!-
    IF NOT ( STATUS = SMG$$CHECK_OCCLUSION ( .PBCB))
    THEN
        RETURN (.STATUS);

!+
! Recalculate the transformation constants needed to copy this display's
```

```
; 3090          3335  2 | buffers into the associated window's buffers.
; 3091          3336  2 !-
; 3092          3337  3     IF NOT ( STATUS = SMG$$CALC_PASTE_TRANSF (.PP))
; 3093          3338  2     THEN
; 3094          3339  2         RETURN (.STATUS);
; 3095          3340  2
; 3096          3341  2     RETURN (SMG$$CHECK_FOR_OUTPUT_PBCB (.PBCB));
; 3097          3342  2
; 3098          3343  1     END;                            ! Routine SMG$MOVE_VIRTUAL_DISPLAY



                                      001C 00000         .ENTRY  SMG$MOVE_VIRTUAL_DISPLAY, Save R2,R3,R4      ; 3222
                  54 00000000'    EF   9E 00002         MOVAB   PBD_L_COUNT, R4                               ;
                  5E              04   C2 00009         SUBL2   #4, SP                                        ;
                  04              6C   91 0000C         CMPB    (AP), #4                                      ; 3292
                                  08   13 0000F         BEQL    1$                                            ;
                  50 00000000G    8F   D0 00011         MOVL    #SMG$_WRONUMARG, R0                           ;
                                  04      00018         RET                                                   ;
                  50         04   BC   D0 00019 1$:     MOVL    @DISPLAY_ID, R0                               ; 3299
            04    BC         38   A0   D1 0001D         CMPL    56(R0), @DISPLAY_ID                           ;
                                  06   12 00022         BNEQ    2$                                            ;
                  11         44   A0   91 00024         CMPB    68(R0), #17                                   ;
                                  08   13 00028         BEQL    3$                                            ;
                  50 00000000G    8F   D0 0002A 2$:     MOVL    #SMG$_INVDIS_ID, R0                           ;
                                  04      00031         RET                                                   ;
                  52         04   BC   D0 00032 3$:     MOVL    @DISPLAY_ID, DCB                              ;
                  50         08   BC   D0 00036         MOVL    @PASTEBOARD_ID, R0                            ; 3300
                                  0A   19 0003A         BLSS    4$                                            ;
                  64              50   D1 0003C         CMPL    R0, PBD_L_COUNT                               ;
                                  05   14 0003F         BGTR    4$                                            ;
      08    44    A4              50   E0 00041         BBS     R0, PBD_V_PB_AVAIL, 5$                        ;
                  50 00000000G    8F   D0 00046 4$:     MOVL    #SMG$_INVPAS_ID, R0                           ;
                                  04      0004D         RET                                                   ;
                  53         04 A440   D0 0004E 5$:     MOVL    PBD_A_PBCB[R0], PBCB                          ;
                             1C   A2   D5 00053         TSTL    28(DCB)                                       ; 3306
                                  08   13 00056         BEQL    6$                                            ;
                  50 00000000G    8F   D0 00058         MOVL    #SMG$_ILLBATFNC, R0                           ; 3308
                                  04      0005F         RET                                                   ;
                           400C   8F   BB 00060 6$:     PUSHR   #^M<R2,R3,SP>                                 ; 3315
          0000V   CF              03   FB 00064         CALLS   #3, SMG$$LOCATE_PP                            ;
                  0C              50   E8 00069         BLBS    R0, 7$                                        ;
                  7E         0C   AC   7D 0006C         MOVQ    PASTEBOARD_ROW, -(SP)                         ; 3318
                                  0C   BB 00070         PUSHR   #^M<R2,R3>                                    ; 3317
          0000V   CF              04   FB 00072         CALLS   #4, SMG$$PASTE_VIRTUAL_DISPLAY                ;
                                  04      00077         RET                                                   ;
                  52              6E   D0 00078 7$:     MOVL    PP, R2                                        ; 3323
            18    A2         0C   BC   B0 0007B         MOVW    @PASTEBOARD_ROW, 24(R2)                       ;
            1A    A2         10   BC   B0 00080         MOVW    @PASTEBOARD_COL, 26(R2)                       ; 3324
                                  53   DD 00085         PUSHL   PBCB                                          ; 3329
          0000V   CF              01   FB 00087         CALLS   #1, SMG$$CHECK_OCCLUSION                      ;
                  13              50   E9 0008C         BLBC    STATUS, 8$                                    ;
                                  52   DD 0008F         PUSHL   R2                                            ; 3337
          0000V   CF              01   FB 00091         CALLS   #1, SMG$$CALC_PASTE_TRANSF                    ;
                  09              50   E9 00096         BLBC    STATUS, 8$                                    ;
```

```
                                    53  DD 00099           PUSHL   PBCB                                        ; 3341
                  00000000G  00     01  FB 0009B           CALLS   #1, SMG$$CHECK_FOR_OUTPUT_PBCB              ;
                                        04 000A2 8$:       RET                                                 ; 3343

; Routine Size:  163 bytes,    Routine Base:  _SMG$CODE + 10EA

; 3099          3344  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$PASTE_VIRTUAL_DISPLAY - Paste virtual display to pasteboard'
1 GLOBAL ROUTINE SMG$PASTE_VIRTUAL_DISPLAY (
1                                                DISPLAY_ID,
1                                                PASTEBOARD_ID,
1                                                PASTEBOARD_ROW,
1                                                PASTEBOARD_COL
1                                              ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       The specified virtual display is "pasted" (oriented
1 !       with respect to) a pasteboard.  This makes the display visible.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$PASTE_VIRTUAL_DISPLAY (
1 !                                       DISPLAY_ID.rl.r,
1 !                                       PASTEBOARD_ID.rl.r,
1 !                                       PASTEBOARD_ROW.rl.r,
1 !                                       PASTEBOARD_COL.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r         Id of virtual display to be pasted.
1 !
1 !       PASTEBOARD_ID.rl.r      The pasteboard id of the pasteboard on
1 !                               which the pasting is to take place.
1 !
1 !       PASTEBOARD_ROW.rl.r     Row on pasteboard which is to contain
1 !                               row 1 of the specified virtual display.
1 !
1 !       PASTEBOARD_COL.rl.r     Column on pasteboard which is to contain
1 !                               column 1 of the specified virtual
1 !                               display.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_INVDIS_ID  Invalid virtual display id.
1 !       SMG$_INVPAS_ID  Invalid pasteboard id.
1 !       SMG$_WRONUMARG  Wrong number of arguments.
1 !       SMG$_ILLBATFNC  Display is batched.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2   BEGIN
2   BUILTIN
```

```
; 3158          3402  2             AP,
; 3159          3403  2             CALLG;
; 3160          3404  2
; 3161          3405  2         LOCAL
; 3162          3406  2             STATUS,                         ! Status of subroutine calls
; 3163          3407  2
; 3164          3408  2             PP      : REF $PP_DECL,         ! Addr of the pasting packet
; 3165          3409  2                                             ! being created.
; 3166          3410  2             DCB     : REF $DCB_DECL,        ! Addr. of display control block
; 3167          3411  2             WCB     : REF $WCB_DECL,        ! Addr. of window control block
; 3168          3412  2             PBCB    : REF $PBCB_DECL;       ! Addr of pasteboard control
; 3169          3413  2                                             ! block
; 3170          3414  2
; 3171          3415  2         $SMG$VALIDATE_ARGCOUNT (4, 4);      ! Test for right no. of args
; 3172          3416  2
; 3173          3417  2     !+
; 3174          3418  2     ! Get addresses of associated virtual display control block and
; 3175          3419  2     ! pasteboard control block, validating both the display id and the
; 3176          3420  2     ! pasteboard id.
; 3177          3421  2     !-
; 3178          3422  2         $SMG$GET_DCB ( .DISPLAY_ID, DCB);   ! Get addr of DCB
; 3179          3423  2         $SMG$GET_PBCB ( .PASTEBOARD_ID, PBCB);      ! Get addr of PBCB
; 3180          3424  2
; 3181          3425  2     !+
; 3182          3426  2     ! Give an error if the display is batched.
; 3183          3427  2     !-
; 3184          3428  2
; 3185          3429  2         IF .DCB[DCB_L_BATCH_LEVEL] NEQ 0
; 3186          3430  2         THEN
; 3187          3431  2             RETURN  SMG$_ILLBATFNC;
; 3188          3432  2
; 3189          3433  2     !+
; 3190          3434  2     ! Check to make sure we're don't already have a pasting from this
; 3191          3435  2     ! virtual display to this pasteboard.  If it is, we employ the
; 3192          3436  2     ! repaste logic to remove the current pasting before allowing this new
; 3193          3437  2     ! pasting.  This is necessary because we don't want ambiguous pastings.
; 3194          3438  2     ! Note:  The repaste logic ends up recalling the paste routine
; 3195          3439  2     ! recursively (after doing an unpaste) -- but that's ok since there
; 3196          3440  2     ! can be at most one such pasting.  The second time we are called this
; 3197          3441  2     ! test will fail.
; 3198          3442  2     !-
; 3199          3443  2         IF SMG$$LOCATE_PP( .DCB, .PBCB, PP)
; 3200          3444  2         THEN
; 3201          3445  2             RETURN (CALLG (.AP, SMG$REPASTE_VIRTUAL_DISPLAY));
; 3202          3446  2
; 3203          3447  2         RETURN SMG$$PASTE_VIRTUAL_DISPLAY(.DCB,.PBCB,
; 3204          3448  2                             .PASTEBOARD_ROW,.PASTEBOARD_COL);
; 3205          3449  2
; 3206          3450  1         END;                            ! Routine SMG$PASTE_VIRTUAL_DISPLAY


                                    001C 00000          .ENTRY  SMG$PASTE_VIRTUAL_DISPLAY, Save R2,R3,R4        ; 3346
                 54 00000000'  EF   9E 00002          MOVAB   PBD_L_COUNT, R4                                  ;
                 5E            04   C2 00009          SUBL2   #4, SP                                           ;
```

```
                        04                6C  91 0000C          CMPB    (AP), #4                                 ; 3415
                                          08  13 0000F          BEQL    1$                                       ;
                        50 00000000G      8F  D0 00011          MOVL    #SMG$_WRONUMARG, R0                      ;
                                              04 00018          RET                                              ;
                        50          04    BC  D0 00019 1$:      MOVL    @DISPLAY_ID, R0                          ; 3422
                04      BC          38    A0  D1 0001D          CMPL    56(R0), @DISPLAY_ID                      ;
                                          06  12 00022          BNEQ    2$                                       ;
                        11          44    A0  91 00024          CMPB    68(R0), #17                              ;
                                          08  13 00028          BEQL    3$                                       ;
                        50 00000000G      8F  D0 0002A 2$:      MOVL    #SMG$_INVDIS_ID, R0                      ;
                                              04 00031          RET                                              ;
                        52          04    BC  D0 00032 3$:      MOVL    @DISPLAY_ID, DCB                         ;
                        50          08    BC  D0 00036          MOVL    @PASTEBOARD_ID, R0                       ; 3423
                                          0A  19 0003A          BLSS    4$                                       ;
                        64                50  D1 0003C          CMPL    R0, PBD_L_COUNT                          ;
                                          05  14 0003F          BGTR    4$                                       ;
          08      44    A4                50  E0 00041          BBS     R0, PBD_V_PB_AVAIL, 5$                   ;
                        50 00000000G      8F  D0 00046 4$:      MOVL    #SMG$_INVPAS_ID, R0                      ;
                                              04 0004D          RET                                              ;
                        53          04 A440   D0 0004E 5$:      MOVL    PBD_A_PBCB[R0], PBCB                     ;
                                    1C    A2  D5 00053          TSTL    28(DCB)                                  ; 3429
                                          08  13 00056          BEQL    6$                                       ;
                        50 00000000G      8F  D0 00058          MOVL    #SMG$_ILLBATFNC, R0                      ; 3431
                                              04 0005F          RET                                              ;
                                  400C    8F  BB 00060 6$:      PUSHR   #^M<R2,R3,SP>                            ; 3443
                0000V   CF                03  FB 00064          CALLS   #3, SMG$$LOCATE_PP                       ;
                        06                50  E9 00069          BLBC    R0, 7$                                   ;
                0000V   CF                6C  FA 0006C          CALLG   (AP), SMG$REPASTE_VIRTUAL_DISPLAY        ; 3445
                                              04 00071          RET                                              ;
                        7E          0C    AC  7D 00072 7$:      MOVQ    PASTEBOARD_ROW, -(SP)                    ; 3448
                                          0C  BB 00076          PUSHR   #^M<R2,R3>                               ; 3447
                0000V   CF                04  FB 00078          CALLS   #4, SMG$$PASTE_VIRTUAL_DISPLAY           ;
                                              04 0007D          RET                                              ; 3450

; Routine Size:  126 bytes,    Routine Base:  _SMG$CODE + 118D

; 3207          3451  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$POP_VIRTUAL_DISPLAY - Pop off (delete) a sequence of virtual displays'
1 GLOBAL ROUTINE SMG$POP_VIRTUAL_DISPLAY (
1                                               DISPLAY_ID,
1                                               PASTEBOARD_ID
1                                               ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This procedure deletes all the virtual displays on the specified
1 !       pasteboard, starting with the display specified, up through all
1 !       higher-pasted display.  Each of these displays is unpasted in
1 !       in the course of doing the deletion.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$POP_VIRTUAL_DISPLAY ( DISPLAY_ID.rl.r,
1 !                                                    PASTEBOARD_ID.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r         Address of the display id of the lowest
1 !                               pasted virtual display to be deleted.
1 !                               All higher-pasted displays are deleted
1 !                               as well.
1 !
1 !       PASTEBOARD_ID.rl.r      Address of the pasteboard id involved.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_INVDIS_ID  Invalid display id
1 !       SMG$_INVPAS_ID  Invalid pasteboard id
1 !       SMG$_WRONUMARG  Wrong number of arguments
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
1
2     BEGIN
2     LOCAL
2         STATUS,                             ! Status of subr. calls
2
2         RET_STATUS,                         ! Accumulated status during
2                                             ! loop
2         PBCB : REF $PBCB_DECL,              ! Address of a pasteboard
2                                             ! control block
2
2         DCB  : REF $DCB_DECL,               ! Address of a virtual display
```

```
                                                        ! control block we started with

            PP : REF $PP_DECL;                          ! Addr of 2 longwords that form
                                                        ! queue header in PP currently
                                                        ! under inspection.
    !+
    ! Check for right number of arguments.
    !
        $SMG$VALIDATE_ARGCOUNT ( 2, 2);

    !+
    ! Get addresses of virtual display control block and pasteboard control
    ! block and validate them.
    !-
        $SMG$GET_PBCB ( .PASTEBOARD_ID, PBCB );
        $SMG$GET_DCB  ( .DISPLAY_ID,    DCB);

    !+
    ! Locate the pasting packet that reflects this pasting (if one exists)
    ! .PP is the base address of the pasting packet.
    !-
        IF NOT (STATUS = SMG$$LOCATE_PP ( .DCB, .PBCB, PP))
        THEN
            RETURN (.STATUS);

    !+
    ! Change packet address to address of queue header.
    !-
        PP = .PP + PP_PBCB_QUEUE_OFFSET; ! Start with specified packet

        RET_STATUS = SS$_NORMAL;      ! Assume success to follow

    !+
    ! Batch the sequence of updates we are about to do.
    !-
        IF NOT ( STATUS = SMG$$BEGIN_PASTEBOARD_UPDATE_R1 (.PBCB))
        THEN
            RETURN (.STATUS);

    !+
    ! Loop for all pasting packets starting with this one to the last-pasted
    ! one...
    !-
        WHILE .PP NEQ PBCB [PBCB_A_PP_NEXT]
        DO
            BEGIN   ! For all displays that need to be deleted
            LOCAL
                STATUS,                         ! Status of delete calls

                PP_BASE : REF $PP_DECL,         ! Base address of the PP

                DCB : REF $DCB_DECL;            ! Current virtual display that
                                                ! needs to be deleted.
            !+
            ! Calc. the base address of this pasting packet since the queue
            ! headers for this part of the chain are not at relative 0 in
            ! the pasting packet.
```

```
; 3323          3566  3             !-
; 3324          3567  3             PP_BASE = .PP - PP_PBCB_QUEUE_OFFSET;
; 3325          3568  3
; 3326          3569  3             !+
; 3327          3570  3             ! Find DCB that is in this pairing.
; 3328          3571  3             !-
; 3329          3572  3             DCB = .PP_BASE [PP_A_DCB_ADDR];
; 3330          3573  3
; 3331          3574  3             !+
; 3332          3575  3             ! Delete this virtual display, causing it to be unpasted from
; 3333          3576  3             ! all pasteboards to which it is currently pasted.
; 3334          3577  3             !-
; 3335          3578  4             IF NOT ( STATUS = SMG$DELETE_VIRTUAL_DISPLAY ( DCB [DCB_L_DID]))
; 3336          3579  3             THEN
; 3337          3580  3                 !+
; 3338          3581  3                 ! If no error yet, save this one.
; 3339          3582  3                 !-
; 3340          3583  4                 BEGIN
; 3341          3584  4                 IF .RET_STATUS THEN RET_STATUS = .STATUS;
; 3342          3585  3                 END;
; 3343          3586  3
; 3344          3587  3             !+
; 3345          3588  3             ! Walk this chain backwards, from the packet we started with
; 3346          3589  3             ! back to the head of the chain -- since the most recently
; 3347          3590  3             ! pasted displays are at the head of the chain.
; 3348          3591  3             !-
; 3349          3592  3             PP = .PP_BASE [PP_A_PREV_PBCB];
; 3350          3593  2             END;     ! For all displays that need to be deleted
; 3351          3594  2
; 3352          3595  2
; 3353          3596  3         IF NOT (STATUS = SMG$$END_PASTEBOARD_UPDATE_R2 ( .PBCB ))
; 3354          3597  2         THEN
; 3355          3598  2             RETURN (.STATUS);
; 3356          3599  2
; 3357          3600  2         RETURN (.RET_STATUS);
; 3358          3601  2
; 3359          3602  1         END;                    ! End of routine SMG$POP_VIRTUAL_DISPLAY



                                        007C 00000          .ENTRY  SMG$POP_VIRTUAL_DISPLAY, Save R2,R3,R4,R5,- ; 3453
                                                                    R6                                          ;
                     56 00000000'   EF   9E 00002           MOVAB   PBD_L_COUNT, R6                             ;
                     5E             04   C2 00009           SUBL2   #4, SP                                      ;
                     02             6C   91 0000C           CMPB    (AP), #2                                    ; 3517
                                    08   13 0000F           BEQL    1$                                          ;
                     50 00000000G   8F   D0 00011           MOVL    #SMG$_WRONUMARG, R0                         ;
                                         04 00018           RET                                                 ;
                     50         08  BC   D0 00019 1$:       MOVL    @PASTEBOARD_ID, R0                          ; 3523
                                    0A   19 0001D           BLSS    2$                                          ;
                     66             50   D1 0001F           CMPL    R0, PBD_L_COUNT                             ;
                                    05   14 00022           BGTR    2$                                          ;
           08        44     A6      50   E0 00024           BBS     R0, PBD_V_PB_AVAIL, 3$                      ;
                     50 00000000G   8F   D0 00029 2$:       MOVL    #SMG$_INVPAS_ID, R0                         ;
                                         04 00030           RET                                                 ;
                     55          04 A640  D0 00031 3$:      MOVL    PBD_A_PBCB[R0], PBCB                       ;
                     50          04   BC  D0 00036          MOVL    @DISPLAY_ID, R0                            ; 3524
              04     BC          38   A0  D1 0003A          CMPL    56(R0), @DISPLAY_ID                        ;
                                      06  12 0003F          BNEQ    4$                                         ;
                     11          44   A0  91 00041          CMPB    68(R0), #17                                ;
                                      08  13 00045          BEQL    5$                                         ;
                     50 00000000G     8F  D0 00047 4$:      MOVL    #SMG$_INVDIS_ID, R0                        ;
                                          04 0004E          RET                                                ;
                     50          04   BC  D0 0004F 5$:      MOVL    @DISPLAY_ID, DCB                           ;
                               4021   8F  BB 00053          PUSHR   #^M<R0,R5,SP>                              ; 3530
           0000V     CF               03  FB 00057          CALLS   #3, SMG$$LOCATE_PP                         ;
                     53               50  D0 0005C          MOVL    R0, STATUS                                 ;
                     48               53  E9 0005F          BLBC    STATUS, 9$                                 ;
                     6E               08  C0 00062          ADDL2   #8, PP                                     ; 3537
                     54               01  D0 00065          MOVL    #1, RET_STATUS                             ; 3539
                     50               55  D0 00068          MOVL    PBCB, R0                                   ; 3544
                        00000000G     00  16 0006B          JSB     SMG$$BEGIN_PASTEBOARD_UPDATE_R1            ;
                     53               50  D0 00071          MOVL    R0, STATUS                                 ;
                     33               53  E9 00074          BLBC    STATUS, 9$                                 ;
                     55               6E  D1 00077 6$:      CMPL    PP, PBCB                                   ; 3552
                                      1F  13 0007A          BEQL    8$                                         ;
       52            6E               08  C3 0007C          SUBL3   #8, PP, PP_BASE                            ; 3567
                     50          10   A2  D0 00080          MOVL    16(PP_BASE), DCB                           ; 3572
                                 38   A0  9F 00084          PUSHAB  56(DCB)                                    ; 3578
            FB98     CF               01  FB 00087          CALLS   #1, SMG$DELETE_VIRTUAL_DISPLAY             ;
                     06               50  E8 0008C          BLBS    STATUS, 7$                                 ;
                     03               54  E9 0008F          BLBC    RET_STATUS, 7$                             ; 3584
                     54               50  D0 00092          MOVL    STATUS, RET_STATUS                         ;
                     6E          0C   A2  D0 00095 7$:      MOVL    12(PP_BASE), PP                            ; 3592
                                      DC  11 00099          BRB     6$                                         ; 3552
                     50               55  D0 0009B 8$:      MOVL    PBCB, R0                                   ; 3596
                        00000000G     00  16 0009E          JSB     SMG$$END_PASTEBOARD_UPDATE_R2              ;
                     53               50  D0 000A4          MOVL    R0, STATUS                                 ;
                     04               53  E8 000A7          BLBS    STATUS, 10$                                ;
                     50               53  D0 000AA 9$:      MOVL    STATUS, R0                                 ; 3598
                                          04 000AD          RET                                                ;
                     50               54  D0 000AE 10$:     MOVL    RET_STATUS, R0                             ; 3600
                                          04 000B1          RET                                                ; 3602

; Routine Size:  178 bytes,    Routine Base:  _SMG$CODE + 120B


; 3360          3603  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$REPASTE_VIRTUAL_DISPLAY - Repaste virtual display to pasteboard'
GLOBAL ROUTINE SMG$REPASTE_VIRTUAL_DISPLAY (
                                            DISPLAY_ID,
                                            PASTEBOARD_ID,
                                            PASTEBOARD_ROW,
                                            PASTEBOARD_COL
                                           ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       The specified virtual display is "unpasted" from the specified
!       pasteboard.  It is then "repasted" in the new position to the
!       same pasteboard.  The unpasting and repasting operation is done
!       under cover of a SMG$$BEGIN_PASTEBOARD_UPDATE_R1 and
!       SMG$$END_PASTEBOARD_UPDATE_R2 pair so that there is no effect on the
!       screen while it is going on.  Only the completed results of the
!       operation become visible.
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$REPASTE_VIRTUAL_DISPLAY (
!                                               DISPLAY_ID.rl.r,
!                                               PASTEBOARD_ID.rl.r,
!                                               PASTEBOARD_ROW.rl.r,
!                                               PASTEBOARD_COL.rl.r)
!
! FORMAL PARAMETERS:
!
!       DISPLAY_ID.rl.r         Id of virtual display to be repasted.
!
!       PASTEBOARD_ID.rl.r      The pasteboard id of the pasteboard on
!                               which the unpasting/pasting is to take
!                               place.
!
!       PASTEBOARD_ROW.rl.r     Row on pasteboard which is to contain
!                               row 1 of the specified virtual display
!                               after repasting.
!
!       PASTEBOARD_COL.rl.r     Column on pasteboard which is to contain
!                               column 1 of the specified virtual
!                               display after repasting.
!
! IMPLICIT INPUTS:
!
!       None
!
! IMPLICIT OUTPUTS:
!
!       None
!
! COMPLETION STATUS:
!
!       SS$_NORMAL      Normal successful completion
!       SMG$_INVDIS_ID  Invalid virtual display id.
!       SMG$_INVPAS_ID  Invalid pasteboard id.
!       SMG$_WRONUMARG  Wrong number of arguments.
!
```

```
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2 
2     LOCAL
2         DCB     : REF $DCB_DECL,
2         PBCB    : REF $PBCB_DECL,
2         STATUS ;         ! Status of subroutine calls
2 
2     $SMG$VALIDATE_ARGCOUNT (4, 4);          ! Test for right no. of args
2 
2     $SMG$GET_PBCB(.PASTEBOARD_ID,PBCB);
2     $SMG$GET_DCB(.DISPLAY_ID,DCB);
2 
2 !+
2 ! Set up an extra level of output inhibiting so that our UNPASTE
2 ! operation won't find its way to the screen until we're done.
2 !-
3     IF NOT (STATUS = SMG$$BEGIN_PASTEBOARD_UPDATE_R1 (.PBCB))
2     THEN
2         RETURN (.STATUS);
2 
2 !+
2 ! Unpaste it from where it is.
2 !-
3     IF NOT (STATUS = SMG$$UNPASTE_VIRTUAL_DISPLAY (.DCB, .PBCB))
2     THEN
3         BEGIN
3         SMG$$END_PASTEBOARD_UPDATE_R2 (.PBCB); ! Reduce buffering level
3         RETURN (.STATUS);                       ! Return error
2         END;
2 
2 !+
2 ! Now repaste to the same pasteboard in a new position.
2 !-
2     STATUS = SMG$$PASTE_VIRTUAL_DISPLAY(.DCB,.PBCB,
2                         .PASTEBOARD_ROW,.PASTEBOARD_COL);
2 
2 !+
2 ! Undo one buffering level so that we are back where we started.
2 !-
2     SMG$$END_PASTEBOARD_UPDATE_R2 (.PBCB);
2 
2 !+
2 ! If last PASTE operation yielded an error, return that status, else
2 ! return SS$_NORMAL;
2 !-
2     IF NOT .STATUS THEN RETURN .STATUS;
2 
2     RETURN (SS$_NORMAL);
2 
1     END;                      ! Routine SMG$REPASTE_VIRTUAL_DISPLAY
```

```
                                        00FC 00000          .ENTRY  SMG$REPASTE_VIRTUAL_DISPLAY, Save R2,R3,R4,-; 3605
                                                                    R5,R6,R7                                    ;
                          57 00000000G   00   9E 00002       MOVAB   SMG$$END_PASTEBOARD_UPDATE_R2, R7           ;
                          56 00000000'   EF   9E 00009       MOVAB   PBD_L_COUNT, R6                             ;
                          04             6C   91 00010       CMPB    (AP), #4                                    ; 3672
                                         08   13 00013       BEQL    1$                                          ;
                          50 00000000G   8F   D0 00015       MOVL    #SMG$_WRONUMARG, R0                         ;
                                              04 0001C       RET                                                 ;
                          50          08 BC   D0 0001D 1$:   MOVL    @PASTEBOARD_ID, R0                          ; 3674
                                         0A   19 00021       BLSS    2$                                          ;
                          66             50   D1 00023       CMPL    R0, PBD_L_COUNT                             ;
                                         05   14 00026       BGTR    2$                                          ;
          08        44    A6             50   E0 00028       BBS     R0, PBD_V_PB_AVAIL, 3$                      ;
                          50 00000000G   8F   D0 0002D 2$:   MOVL    #SMG$_INVPAS_ID, R0                         ;
                                              04 00034       RET                                                 ;
                          54          04 A640 D0 00035 3$:   MOVL    PBD_A_PBCB[R0], PBCB                        ;
                          50          04 BC   D0 0003A       MOVL    @DISPLAY_ID, R0                             ; 3675
                    04    BC          38 A0   D1 0003E       CMPL    56(R0), @DISPLAY_ID                         ;
                                         06   12 00043       BNEQ    4$                                          ;
                          11          44 A0   91 00045       CMPB    68(R0), #17                                 ;
                                         08   13 00049       BEQL    5$                                          ;
                          50 00000000G   8F   D0 0004B 4$:   MOVL    #SMG$_INVDIS_ID, R0                         ;
                                              04 00052       RET                                                 ;
                          55          04 BC   D0 00053 5$:   MOVL    @DISPLAY_ID, DCB                            ;
                          50             54   D0 00057       MOVL    PBCB, R0                                    ; 3681
                             00000000G   00   16 0005A       JSB     SMG$$BEGIN_PASTEBOARD_UPDATE_R1             ;
                          53             50   D0 00060       MOVL    R0, STATUS                                  ;
                          2E             53   E9 00063       BLBC    STATUS, 7$                                  ;
                                         54   DD 00066       PUSHL   PBCB                                        ; 3688
                                         55   DD 00068       PUSHL   DCB                                         ;
                 0000V    CF             02   FB 0006A       CALLS   #2, SMG$$UNPASTE_VIRTUAL_DISPLAY            ;
                          53             50   D0 0006F       MOVL    R0, STATUS                                  ;
                          07             53   E8 00072       BLBS    STATUS, 6$                                  ;
                          50             54   D0 00075       MOVL    PBCB, R0                                    ; 3691
                                         67   16 00078       JSB     SMG$$END_PASTEBOARD_UPDATE_R2               ;
                                         18   11 0007A       BRB     7$                                          ; 3692
                          7E          0C AC   7D 0007C 6$:   MOVQ    PASTEBOARD_ROW, -(SP)                       ; 3699
                                         54   DD 00080       PUSHL   PBCB                                        ; 3698
                                         55   DD 00082       PUSHL   DCB                                         ;
                 0000V    CF             04   FB 00084       CALLS   #4, SMG$$PASTE_VIRTUAL_DISPLAY              ;
                          53             50   D0 00089       MOVL    R0, STATUS                                  ;
                          50             54   D0 0008C       MOVL    PBCB, R0                                    ; 3704
                                         67   16 0008F       JSB     SMG$$END_PASTEBOARD_UPDATE_R2               ;
                          04             53   E8 00091       BLBS    STATUS, 8$                                  ; 3710
                          50             53   D0 00094 7$:   MOVL    STATUS, R0                                  ;
                                              04 00097       RET                                                 ;
                          50             01   D0 00098 8$:   MOVL    #1, R0                                      ; 3712
                                              04 0009B       RET                                                 ; 3714

; Routine Size:  156 bytes,    Routine Base:  _SMG$CODE + 12BD


; 3473          3715  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$RESTORE_PHYSICAL_SCREEN - Restore physical screen'
1 GLOBAL ROUTINE SMG$RESTORE_PHYSICAL_SCREEN (
1                                               PASTEBOARD_ID,
1                                               DISPLAY_ID
1                                           ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine reverses the effect of SMG$SAVE_PHYSICAL_SCREEN,
1 !       thereby putting the physical screen back to the point it was
1 !       at just prior to the call to SMG$SAVE_PHYSICAL_SCREEN.
1 !       The display id returned by SMG$SAVE_PHYSICAL_SCREEN must be
1 !       passed to this routine to allow the restoration to happen.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$RESTORE_PHYSICAL_SCREEN (
1 !                                               PASTEBOARD_ID.rl.r,
1 !                                               DISPLAY_ID.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       PASTEBOARD_ID.rl.r      Address of a pasteboard id which is to
1 !                               be "restored".
1 !
1 !       DISPLAY_ID.rl.r         Returned display id invented to
1 !                               perform requested function.
1 !                               This must be the display id returned
1 !                               by SMG$SAVE_FHYSCIAL_SCREEN.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !   SS$_NORMAL          Normal successful completion
1 !   SMG$_INVDIS_ID      Invalid Display Id.
1 !   SMG$_INVPAS_ID      Invalid Pasteboard Id.
1 !
1 !
1 ! SIDE EFFECTS:
1 !       NONE
1 !
1 !--
1
2     BEGIN
2     LOCAL
2       DCB  : REF $DCB_DECL,   ! Address of virtual display control
2                               ! block involved.
2
2       PBCB : REF $PBCB_DECL,  ! Address of pasteboard control block
2
```

```
2          PP    : REF $PP_DECL,      ! Address of the pasting packet that
2                                     ! joins the virtual display to the
2                                     ! pasteboard.
2
2          STATUS;                    ! Status of subr. calls
2
2     !+
2     ! Validate number of arguments.
2     !-
2        $SMG$VALIDATE_ARGCOUNT( 2,2);
2
2     !+
2     ! Map pasteboard id into a PBCB address, and display id into a DCB addr.
2     !-
2        $SMG$GET_PBCB ( .PASTEBOARD_ID, PBCB);
2        $SMG$GET_DCB  ( .DISPLAY_ID,    DCB);
2
2     !+
2     ! Locate the pasting packet that joins this virtual display with this
2     ! pasteboard.
2     !-
3        IF NOT (STATUS = SMG$$LOCATE_PP ( .DCB, .PBCB, PP))
2        THEN
2            RETURN (.STATUS);
2
2     !+
2     ! Invalidate our knowledge of where the physical scrolling region is on
2     ! the screen, since we don't know where the non_SMG user may have left
2     ! it.
2     !-
2        PBCB [PBCB_W_TOP_SCROLL_LINE] = 0;
2        PBCB [PBCB_W_BOT_SCROLL_LINE] = 0;
2
2     !+
2     ! Determine best way to clear affected area.  If the whole screen is
2     ! involved we erase the whole screen in one operation.  If only part
2     ! of the screen is involved, we have to do it a line at at time.
2     !-
2        IF .PP [PP_W_FIRST_WCB_ROW] LEQ 1            AND
2           .PP [PP_W_LAST_WCB_ROW] GEQ .PBCB [PBCB_B_ROWS]
2        THEN
3            BEGIN    ! Full screen involved
3            !+
3            ! Clear the whole physical screen to get rid of what the non-SMG
3            ! user may have put there.
3            !-
4            IF NOT (STATUS = SMG$$ERASE_PASTEBOARD (.PBCB))
3            THEN
3                RETURN (.STATUS);
3
3            END      ! Full screen involved
3
2        ELSE
2
3            BEGIN    ! Only part of screen involved
3            !+
3            ! Clear only the part of the screen involved.  We'll have to do
```

```
3                       ! it line by line.
3                       ! The code to do that should really reside in module SMGMINUPD
3                       ! for modularity.  However, it is here for now.
3                       !-
3                       LOCAL
3                           WCB : REF $WCB_DECL;            ! Addr of window control block
3                                                           ! involved.
3
3                       WCB = .PBCB [PBCB_A_WCB];
3
3                       !+
3                       ! For each line involved, set cursor to column 1 of that line
3                       ! and emit erase sequence.  Setting the cursor to column 1 of
3                       ! the line is necessay for non-VT100 terminals.
3                       !-
3
3                       INCR I FROM .PP [PP_W_FIRST_WCB_ROW] TO .PP [PP_W_LAST_WCB_ROW]
3                       DO
4                           BEGIN           ! Row by row
4                           !+
4                           ! Set cursor to column 1 of row .I.
4                           !-
4                           SMG$$FIND_MIN_CURSOR_POS (
4                                       .PBCB,
4                                       .WCB [WCB_W_OLD_CUR_ROW],           ! Current row
4                                       .WCB [WCB_W_OLD_CUR_COL],           ! Current col
4                                       .I,                                 ! Desired row
4                                       1);                                 ! Desired col
4
4                           !+
4                           ! Get escape sequence needed to erase a line.
4                           ! (Can't move this outside the loop since data is left
4                           ! in memory that FIND_MIN_CURSOR_POS might touch.
4                           !-
4
4                           $SMG$GET_TERM_DATA(ERASE_WHOLE_LINE);
4
4                           !+
4                           ! Erase the Ith line.
4                           !-
4
5                           IF NOT (STATUS = SMG$$OUTPUT ( .PBCB,
5                                               .PBCB[PBCB_L_CAP_LENGTH],
5                                               .PBCB[PBCB_A_CAP_BUFFER]))
4                           THEN
4                               RETURN (.STATUS);
4
3                           END;            ! Row by row
2                       END;    ! Only part of screen involved
2
2                   !+
2                   ! Pop off the virtual display that SMG$SAVE_PHYSICAL_SCREEN placed on
2                   ! top to cover everything up.
2                   !-
3                       IF NOT (STATUS = SMG$POP_VIRTUAL_DISPLAY ( .DISPLAY_ID,
3                                                                 .PASTEBOARD_ID))
2                       THEN
```

```
; 3646          3887  2             RETURN (.STATUS);
; 3647          3888  2
; 3648          3889  2         RETURN (SS$_NORMAL);
; 3649          3890  2
; 3650          3891  1         END;                    ! End of routine SMG$RESTORE_PHYSICAL_SCREEN



                                             03FC 00000          .ENTRY   SMG$RESTORE_PHYSICAL_SCREEN, Save R2,R3,R4,-; 3717
                                                                          R5,R6,R7,R8,R9                               ;
                       59 00000000'    EF  9E 00002          MOVAB    PBD_L_COUNT, R9                              ;
                       5E              14  C2 00009          SUBL2    #20, SP                                      ;
                       02              6C  91 0000C          CMPB     (AP), #2                                     ; 3782
                                       08  13 0000F          BEQL     1$                                           ;
                       50 00000000G    8F  D0 00011          MOVL     #SMG$_WRONUMARG, R0                          ;
                                           04 00018          RET                                                   ;
                       50          04  BC  D0 00019  1$:     MOVL     @PASTEBOARD_ID, R0                           ; 3787
                                       0A  19 0001D          BLSS     2$                                           ;
                       69              50  D1 0001F          CMPL     R0, PBD_L_COUNT                              ;
                       05              14  14 00022          BGTR     2$                                           ;
          08           44              A9  50 E0 00024       BBS      R0, PBD_V_PB_AVAIL, 3$                       ;
                       50 00000000G    8F  D0 00029  2$:     MOVL     #SMG$_INVPAS_ID, R0                          ;
                                           04 00030          RET                                                   ;
                       53          04 A940 D0 00031  3$:     MOVL     PBD_A_PBCB[R0], PBCB                         ;
                       50          08  BC  D0 00036          MOVL     @DISPLAY_ID, R0                              ; 3788
                 08    BC          38  A0  D1 0003A          CMPL     56(R0), @DISPLAY_ID                          ;
                                       06  12 0003F          BNEQ     4$                                           ;
                       11          44  A0  91 00041          CMPB     68(R0), #17                                  ;
                                       08  13 00045          BEQL     5$                                           ;
                       50 00000000G    8F  D0 00047  4$:     MOVL     #SMG$_INVDIS_ID, R0                          ;
                                           04 0004E          RET                                                   ;
                       50          08  BC  D0 0004F  5$:     MOVL     @DISPLAY_ID, DCB                             ;
                                   04  AE  9F 00053          PUSHAB   PP                                           ; 3794
                                       09  BB 00056          PUSHR    #^M<R0,R3>                                   ;
                0000V  CF              03  FB 00058          CALLS    #3, SMG$$LOCATE_PP                           ;
                       56              50  D0 0005D          MOVL     R0, STATUS                                   ;
                       27              56  E9 00060          BLBC     STATUS, 6$                                   ;
                                 00F4  C3  D4 00063          CLRL     244(PBCB)                                    ; 3803
                       52          04  AE  D0 00067          MOVL     PP, R2                                       ; 3811
                       01          2F  A2  B1 0006B          CMPW     47(R2), #1                                   ;
                                       1C  1A 0006F          BGTRU    7$                                           ;
                       50          5F  A3  9A 00071          MOVZBL   95(PBCB), R0                                 ; 3812
                 31    A2              50  B1 00075          CMPW     R0, 49(R2)                                   ;
                                       12  1A 00079          BGTRU    7$                                           ;
                                       53  DD 0007B          PUSHL    PBCB                                         ; 3819
            00000000G  00              01  FB 0007D          CALLS    #1, SMG$$ERASE_PASTEBOARD                    ;
                       56              50  D0 00084          MOVL     R0, STATUS                                   ;
                       78              56  E8 00087          BLBS     STATUS, 12$                                  ;
                                     0086  31 0008A  6$:     BRW      13$                                          ; 3821
                       54          08  A3  D0 0008D  7$:     MOVL     8(PBCB), WCB                                 ; 3838
                       58          31  A2  3C 00091          MOVZWL   49(R2), R8                                   ; 3846
                       57        00FC  C3  9E 00095          MOVAB    252(PBCB), R7                                ; 3865
                       55        0108  C3  9E 0009A          MOVAB    264(PBCB), R5                                ;
                       52          2F  A2  3C 0009F          MOVZWL   47(R2), I                                    ; 3873
                                       52  D7 000A3          DECL     I                                            ;
```

```
                                          57   11 000A5        BRB     11$                                   ;
                                          01   DD 000A7  8$:   PUSHL   #1                                    ; 3852
                                          52   DD 000A9        PUSHL   I                                     ; 3856
                    7E          26    A4  32 000AB        CVTWL   38(WCB), -(SP)                        ; 3855
                    7E          24    A4  32 000AF        CVTWL   36(WCB), -(SP)                        ; 3854
                                          53   DD 000B3        PUSHL   PBCB                                  ; 3853
          00000000G 00                    05   FB 000B5        CALLS   #5, SMG$$FIND_MIN_CURSOR_POS          ;
                                          67   D5 000BC        TSTL    (R7)                                  ; 3865
                                          04   12 000BE        BNEQ    9$                                    ;
                                          65   D4 000C0        CLRL    (R5)                                  ;
                                          25   11 000C2        BRB     10$                                   ;
                                08    AE  D4 000C4  9$:   CLRL    INPUT_ARGS                            ;
                                08    AE  9F 000C7        PUSHAB  INPUT_ARGS                            ;
                              0104    C3  DD 000CA        PUSHL   260(PBCB)                             ;
                                          55   DD 000CE        PUSHL   R5                                    ;
                              0100    C3  9F 000D0        PUSHAB  256(PBCB)                             ;
               10   AE        01DB    8F  3C 000D4        MOVZWL  #475, 16(SP)                          ;
                                10    AE  9F 000DA        PUSHAB  16(SP)                                ;
                                          57   DD 000DD        PUSHL   R7                                    ;
          00000000G 00                    06   FB 000DF        CALLS   #6, SMG$GET_TERM_DATA                 ;
                    31                    50   E9 000E6        BLBC    STATUS, 15$                           ;
                              0104    C3  DD 000E9  10$:  PUSHL   260(PBCB)                             ; 3873
                                          65   DD 000ED        PUSHL   (R5)                                  ; 3872
                                          53   DD 000EF        PUSHL   PBCB                                  ; 3871
          00000000G 00                    03   FB 000F1        CALLS   #3, SMG$$OUTPUT                       ;
                    56                    50   D0 000F8        MOVL    R0, STATUS                            ;
                    15                    56   E9 000FB        BLBC    STATUS, 13$                           ;
            A5      52                    58   F3 000FE  11$:  AOBLEQ  R8, I, 8$                             ; 3846
                                04    AC  DD 00102  12$:  PUSHL   PASTEBOARD_ID                         ; 3885
                                08    AC  DD 00105        PUSHL   DISPLAY_ID                            ; 3884
               FDA5 CF                    02   FB 00108        CALLS   #2, SMG$POP_VIRTUAL_DISPLAY           ;
                    56                    50   D0 0010D        MOVL    R0, STATUS                            ;
                    04                    56   E8 00110        BLBS    STATUS, 14$                           ;
                    50                    56   D0 00113  13$:  MOVL    STATUS, R0                            ; 3887
                                               04 00116        RET                                           ;
                    50                    01   D0 00117  14$:  MOVL    #1, R0                                ; 3889
                                               04 0011A  15$:  RET                                           ; 3891

; Routine Size:  283 bytes,    Routine Base:  _SMG$CODE + 1359


; 3651          3892  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$SAVE_PHYSICAL_SCREEN - Save physical screen'
GLOBAL ROUTINE SMG$SAVE_PHYSICAL_SCREEN (
                                         PASTEBOARD_ID,
                                         DISPLAY_ID,
                                         DESIRED_ROW_START,
                                         DESIRED_ROW_END
                                        ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       This routine should be called before calling a procedure which
!       may perform output to the screen without using the SMG$
!       This procedure saves the state of the screen so that it can be
!       restored via a later call to SMG$RESTORE_PHYSICAL_SCREEN.
!
!       This routine performs 4 functions:
!       It:
!           a). Creates a virtual display which is as wide as the
!               physical screen and is as high indicated by the
!               desired_row_start and desired_row_end.
!               The resulting virtual display id is returned
!               to the caller.
!
!           b). Pastes this virtual display to cover the screen at a
!               position corresponding to column 1 of desired_row_start.
!
!           c). Set the physical cursor to (1,1) in the virtual display.
!               This corresponds to (desired_row_start, 1) on the
!               physical screen.
!
!           d). Set the physical scrolling region to be the height
!               of the resulting virtual display.
!
!       If either desired_row_start or desired_row_end are omitted,
!       the first row of the physical display and the last row of the
!       physical display are used, respectively, in calculating the
!       height of the virtual display.
!
!       The effects of this routine can be reversed by doing a
!       SMG$RESTORE_PHYSICAL_SCREEN (Display_id.rl.r, Pasteboard_id.rl.r),
!       supplying the display_id returned by this routine.
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$SAVE_PHYSICAL_SCREEN (
!                                       PASTEBOARD_ID.rl.r,
!                                       DISPLAY_ID.wl.r
!                                       [,DESIRED_ROW_START.rl.r]
!                                       [,DESIRED_ROW_END.rl.r])
!
! FORMAL PARAMETERS:
!
!       PASTEBOARD_ID.rl.r      Address of a pasteboard id which is to
!                               be "saved".
!
!       DISPLAY_ID.wl.r         Returned display id invented to
!                               perform requested function.
```

```
!
!       DESIRED_ROW_START.rl.r  Optional.  The address of the 1st row
!                               to be "saved".  If omitted, row 1 of
!                               the physical display is used.
!
!       DESIRED_ROW_END.rl.r    Optional.  The address of the last row
!                               to be "saved".  If omitted, the last
!                               row of the physical display is used.
! IMPLICIT INPUTS:
!
!       NONE
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! COMPLETION STATUS:
!
!               SS$_NORMAL      Normal successful completion
!
! From: SMG$CREATE_VIRTUAL_DISPLAY
!               LIB$_INSVIRMEM  Insufficient virtual memory
!
! From: SMG$PASTE_VIRTUAL_DISPLAY
!               SMG$_INVPAS_ID  Invalid Pasteboard Id.
!
!
! SIDE EFFECTS:
!
!       The appropriate part of the physical screen will be blanked,
!       scrolling region will be full height of the past to be "saved",
!       and cursor will be at (desired_row_start,1) on screen.
!--

    BEGIN
    BUILTIN
        NULLPARAMETER;

    LOCAL
        ROW1,                           ! Resulting 1st row
        ROWN,                           ! Resulting last row
        FULL_SCREEN,                    ! Logical indicating that we
                                        ! are saving the whole screen.
        PBCB : REF $PBCB_DECL,          ! Address of pasteboard control
                                        ! block

        NEW_DCB : REF $DCB_DECL,        ! Address of a display control
                                        ! block.  This will also
                                        ! become the display_id
                                        ! returned.

        STATUS;                         ! Status of subr. calls

!+
! Validate number of arguments and get the PBCB that goes with the
! Pasteboard id.
!-
```

```
2          $SMG$VALIDATE_ARGCOUNT( 2,4);
2
2          $SMG$GET_PBCB ( .PASTEBOARD_ID, PBCB);
2
2     !+
2     ! Assume full screen case and intialize accordingly
2     !-
2          FULL_SCREEN = 1;        ! Assume full screen
2          ROW1 = 1;
2          ROWN = .PBCB [PBCB_B_ROWS];
2
2     !+
2     ! See which optional parameters were supplied and re-adjust assumptions.
2     !-
2          IF NOT NULLPARAMETER (DESIRED_ROW_START)
2          THEN
3              BEGIN   ! Desired_row_start specified
3              FULL_SCREEN = 0;
3              ROW1 = ..DESIRED_ROW_START;
3              END;     ! Desired_row_start specified
2
2          IF NOT NULLPARAMETER (DESIRED_ROW_END)
2          THEN
3              BEGIN   ! Desired_row_end specified
3              FULL_SCREEN = 0;
3              ROWN = ..DESIRED_ROW_END;
3              END;     ! Desired_row_end specified
2     !+
2     ! If either of the optional row parameters were supplied, make sure
2     ! we got a consistant range.
2     !-
2          IF NOT .FULL_SCREEN
2          THEN
3              BEGIN   ! Validity check on rows
3              IF .ROW1 LSS 1                          OR ! Start off top
3                  .ROW1 GEQ .PBCB [PBCB_B_ROWS] -1    OR ! need 2 lines to scroll
3                  .ROWN LSS 1                         OR ! End off top
3                  .ROWN GTR .PBCB [PBCB_B_ROWS]       OR ! End off bottom
3                  .ROWN - .ROW1 LSS 1                    ! Wrong order
3              THEN
3                  RETURN SMG$_INVROW;
3
3              END;     ! Validity check on rows
2
2     !+
2     ! Create a virtual display the same width as the physical screen and
2     ! as high as desired.
2     !-
3          IF NOT (STATUS = SMG$$CREATE_VIRTUAL_DISPLAY (
3                              %REF ( .ROWN - .ROW1 +1),          ! # rows
3                              %REF (.PBCB [PBCB_W_WIDTH]),       ! # columns
3                              NEW_DCB,                           ! new disp. id
3                              %REF(0),                           ! default display attr
3                              %REF(0),                           ! default video attr
3                              %REF(0)                            ! default alt char set
3                              ))
2          THEN
```

```
; 3824          4064  2             RETURN (.STATUS);
; 3825          4065  2
; 3826          4066  2     !+
; 3827          4067  2     ! Paste newly-create virtual display to (desired_row_start,1) of
; 3828          4068  2     ! pasteboard.
; 3829          4069  2     !-
; 3830          4070  3         IF NOT (STATUS = SMG$$PASTE_VIRTUAL_DISPLAY (
; 3831          4071  3                         .NEW_DCB,                   ! DCB address
; 3832          4072  3                         .PBCB,                      ! Pasteboard control block
; 3833          4073  3                         ROW1,                       ! Row
; 3834          4074  3                         %REF (1)))                  ! Col 1
; 3835          4075  2         THEN
; 3836          4076  2             RETURN (.STATUS);
; 3837          4077  2
; 3838          4078  2
; 3839          4079  2     !+
; 3840          4080  2     ! Set physical scrolling region to be full height of screen.
; 3841          4081  2     !-
; 3842          4082  3         IF NOT (STATUS = SMG$$FORCE_SCROLL_REG ( .PBCB,        ! Pasteboard
; 3843          4083  3                                                  .ROW1,        ! Top row
; 3844          4084  3                                                  .ROWN))       ! Bottom row
; 3845          4085  2         THEN
; 3846          4086  2             RETURN (.STATUS);
; 3847          4087  2
; 3848          4088  2     !+
; 3849          4089  2     ! Return id of newly-create virtual display to caller.
; 3850          4090  2     !-
; 3851          4091  2         .DISPLAY_ID = .NEW_DCB;
; 3852          4092  2
; 3853          4093  2         RETURN (SS$_NORMAL);
; 3854          4094  2
; 3855          4095  1         END;                    ! End of routine SMG$SAVE_PHYSICAL_SCREEN



                                  001C 00000          .ENTRY  SMG$SAVE_PHYSICAL_SCREEN, Save R2,R3,R4       ; 3894
                 54 00000000'   EF   9E 00002          MOVAB   PBD_L_COUNT, R4                                ;
                 5E             1C   C2 00009          SUBL2   #28, SP                                        ;
      50         6C             02   83 0000C          SUBB3   #2, (AP), DIFF                                 ; 4007
                 02             50   91 00010          CMPB    DIFF, #2                                       ;
                                08   1B 00013          BLEQU   1$                                             ;
                 50 00000000G   8F   D0 00015          MOVL    #SMG$_WRONUMARG, R0                            ;
                                     04 0001C          RET                                                    ;
                 50       04    BC   D0 0001D 1$:      MOVL    @PASTEBOARD_ID, R0                             ; 4009
                                0A   19 00021          BLSS    2$                                             ;
                 64             50   D1 00023          CMPL    R0, PBD_L_COUNT                                ;
                                05   14 00026          BGTR    2$                                             ;
      08   44    A4             50   E0 00028          BBS     R0, PBD_V_PB_AVAIL, 3$                         ;
                 50 00000000G   8F   D0 0002D 2$:      MOVL    #SMG$_INVPAS_ID, R0                            ;
                                     04 00034          RET                                                    ;
                 53       04 A440    D0 00035 3$:      MOVL    PBD_A_PBCB[R0], PBCB                           ;
                 50             01   D0 0003A          MOVL    #1, FULL_SCREEN                                ; 4014
           18    AE             01   D0 0003D          MOVL    #1, ROW1                                       ; 4015
                 52       5F    A3   9A 00041          MOVZBL  95(PBCB), ROWN                                 ; 4016
                 03             6C   91 00045          CMPB    (AP), #3                                       ; 4021
```

```
                                                        C  4
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages     16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742              Page 109
1-096           SMG$SAVE_PHYSICAL_SCREEN - Save physical screen 14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1               (22)

                                        0C  1F 00048       BLSSU   4$                                                   :
                                  0C    AC  D5 0004A       TSTL    12(AP)                                               :
                                        07  13 0004D       BEQL    4$                                                   :
                                        50  D4 0004F       CLRL    FULL_SCREEN                                          : 4024
                      18    AE    0C    BC  D0 00051       MOVL    @DESIRED_ROW_START, ROW1                             : 4025
                            04          6C  91 00056 4$:   CMPB    (AP), #4                                             : 4028
                                        0B  1F 00059       BLSSU   5$                                                   :
                                  10    AC  D5 0005B       TSTL    16(AP)                                               :
                                        06  13 0005E       BEQL    5$                                                   :
                                        50  D4 00060       CLRL    FULL_SCREEN                                          : 4031
                            52    10    BC  D0 00062       MOVL    @DESIRED_ROW_END, ROWN                               : 4032
                            2F          50  E8 00066 5$:   BLBS    FULL_SCREEN, 7$                                      : 4038
                                  18    AE  D5 00069       TSTL    ROW1                                                 : 4041
                                        22  15 0006C       BLEQ    6$                                                   :
                            50    5F    A3  9A 0006E       MOVZBL  95(PBCB), R0                                         : 4042
                                        50  D7 00072       DECL    R0                                                   :
                            50    18    AE  D1 00074       CMPL    ROW1, R0                                             :
                                        16  18 00078       BGEQ    6$                                                   :
                                        52  D5 0007A       TSTL    ROWN                                                 : 4043
                                        12  15 0007C       BLEQ    6$                                                   :
        52        5F    A3          08  00  ED 0007E       CMPZV   #0, #8, 95(PBCB), ROWN                               : 4044
                                        0A  19 00084       BLSS    6$                                                   :
                50    18    AE          01  C1 00086       ADDL3   #1, ROW1, R0                                         : 4045
                            50          52  D1 0008B       CMPL    ROWN, R0                                             :
                                        08  18 0008E       BGEQ    7$                                                   :
                            50 00000000G    8F  D0 00090 6$:   MOVL    #SMG$_INVROW, R0                                 : 4047
                                            04 00097       RET                                                          :
                                  10    AE  D4 00098 7$:   CLRL    16(SP)                                               : 4061
                                  10    AE  9F 0009B       PUSHAB  16(SP)                                               :
                                  10    AE  D4 0009E       CLRL    16(SP)                                               : 4060
                                  10    AE  9F 000A1       PUSHAB  16(SP)                                               :
                                  10    AE  D4 000A4       CLRL    16(SP)                                               : 4059
                                  10    AE  9F 000A7       PUSHAB  16(SP)                                               :
                                  20    AE  9F 000AA       PUSHAB  NEW_DCB                                              : 4055
                      14    AE    5A    A3  3C 000AD       MOVZWL  90(PBCB), 20(SP)                                     : 4057
                                  14    AE  9F 000B2       PUSHAB  20(SP)                                               :
                50          52    2C    AE  C3 000B5       SUBL3   ROW1, ROWN, R0                                       : 4056
                      14    AE    01    A0  9E 000BA       MOVAB   1(R0), 20(SP)                                        :
                                  14    AE  9F 000BF       PUSHAB  20(SP)                                               :
                    0000V   CF          06  FB 000C2       CALLS   #6, SMG$$CREATE_VIRTUAL_DISPLAY                      :
                            30          50  E9 000C7       BLBC    STATUS, 8$                                           : 4055
                      10    AE          01  D0 000CA       MOVL    #1, 16(SP)                                           : 4074
                                  10    AE  9F 000CE       PUSHAB  16(SP)                                               :
                                  1C    AE  9F 000D1       PUSHAB  ROW1                                                 : 4070
                                        53  DD 000D4       PUSHL   PBCB                                                 : 4072
                                  20    AE  DD 000D6       PUSHL   NEW_DCB                                              : 4071
                    0000V   CF          04  FB 000D9       CALLS   #4, SMG$$PASTE_VIRTUAL_DISPLAY                       :
                            19          50  E9 000DE       BLBC    STATUS, 8$                                           : 4070
                                        52  DD 000E1       PUSHL   ROWN                                                 : 4084
                                  1C    AE  DD 000E3       PUSHL   ROW1                                                 : 4083
                                        53  DD 000E6       PUSHL   PBCB                                                 : 4082
                00000000G   00          03  FB 000E8       CALLS   #3, SMG$$FORCE_SCROLL_REG                            :
                            08          50  E9 000EF       BLBC    STATUS, 8$                                           :
                      08    BC    14    AE  D0 000F2       MOVL    NEW_DCB, @DISPLAY_ID                                 : 4091
                            50          01  D0 000F7       MOVL    #1, R0                                               : 4093
                                            04 000FA 8$:   RET                                                          : 4095
```

```
; Routine Size:  251 bytes,    Routine Base:  _SMG$CODE + 1474

; 3856          4096  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$SET_DISPLAY_SCROLL_REGION - Set scrolling region in a virtual display'
1 GLOBAL ROUTINE SMG$SET_DISPLAY_SCROLL_REGION (
1                                               DISPLAY_ID,
1                                               TOP_LINE_OF_REGION,
1                                               BOTTOM_LINE_OF_REGION
1                                               ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine sets the top and bottom lines of a 'scrolling region'
1 !       in a virtual display.  The scrolling region limits are used by
1 !       output routines which scroll (SMG$PUT_WITH_SCROLL and
1 !       SMG$PUT_LINE with line advancing).  If this routine is called
1 !       with only a display_id, the scrolling region defaults to the
1 !       entire display.
1 !
1 !       If a top and bottom line are passed, they must be within the
1 !       display bounds.  Scrolling can not occur outside the bounds of
1 !       a display.
1 !
1 !       This routine does not change the appearance of the screen or the
1 !       cursor position.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$SET_DISPLAY_SCROLL_REGION (
1 !                                               DISPLAY_ID.rl.r
1 !                                               [,TOP_LINE_OF_REGION.rl.r]
1 !                                               [,BOTTOM_LINE_OF_REGION.rl.r])
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r         Display id of desired display.
1 !
1 !       TOP_LINE_OF_REGION.rl.r Optional.  The top line of a scrolling
1 !                               region.  Defaults to line 1 of the display.
1 !
1 !       BOTTOM_LINE_OF_REGION.rl.r
1 !                               Optional.  The bottom line of a scrolling
1 !                               region.  Defaults to the bottom line of the
1 !                               display.
1 !
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_INVARG     Bottom line is less than or equal to top line.
1 !       SMG$_INVROW     Row number is negative or too large
1 !       SMG$_WRONUMARG  Wrong number arguments.
```

```
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     BUILTIN
2         NULLPARAMETER;
2
2     LOCAL
2         TOP_LINE,                           ! working top line
2         BOTTOM_LINE,                        ! working bottom line
2         DCB : REF $DCB_DECL;                ! Addr. of display control block
2
2     $SMG$VALIDATE_ARGCOUNT (1,3);
2
2     $SMG$GET_DCB ( .DISPLAY_ID, DCB);      ! Get address of display control
2                                             ! block
2
2 !+
2 ! Validate optional arguments.
2 !-
2
2     TOP_LINE = .DCB [DCB_W_ROW_START];     ! init to default
2
2     IF NOT NULLPARAMETER (TOP_LINE_OF_REGION)
2     THEN
3         BEGIN
3         IF ..TOP_LINE_OF_REGION GEQ .DCB [DCB_W_ROW_START] AND
3             ..TOP_LINE_OF_REGION LEQ .DCB [DCB_W_NO_ROWS]
3         THEN
3             TOP_LINE = ..TOP_LINE_OF_REGION
3         ELSE
3             RETURN (SMG$_INVROW);           ! can't be outside display
2         END;
2
2     BOTTOM_LINE = .DCB [DCB_W_NO_ROWS];    ! init to default
2
2     IF NOT NULLPARAMETER (BOTTOM_LINE_OF_REGION)
2     THEN
3         BEGIN
3         IF ..BOTTOM_LINE_OF_REGION GEQ .DCB [DCB_W_ROW_START] AND
3             ..BOTTOM_LINE_OF_REGION LEQ .DCB [DCB_W_NO_ROWS]
3         THEN
3             BOTTOM_LINE = ..BOTTOM_LINE_OF_REGION
3         ELSE
3             RETURN (SMG$_INVROW);           ! can't be outside display
2         END;
2
2     IF .BOTTOM_LINE LEQ .TOP_LINE
2     THEN
2         RETURN (SMG$_INVARG);               ! can't go backwards or
2                                             ! overlap
2
2 !+
2 ! If we get here, we have a valid scrolling region.  Store it.
2 !-
```

```
; 3972        4211  2
; 3973        4212  2        DCB [DCB_W_TOP_OF_SCRREG] = .TOP_LINE;
; 3974        4213  2        DCB [DCB_W_BOTTOM_OF_SCRREG] = .BOTTOM_LINE;
; 3975        4214  2
; 3976        4215  2        RETURN (SS$_NORMAL);
; 3977        4216  1        END;                     ! end of routine SMG$SET_DISPLAY_SCROLL_REGION



                                                 0004 00000         .ENTRY  SMG$SET_DISPLAY_SCROLL_REGION, Save R2        ; 4098
                 50            6C             01   83 00002         SUBB3   #1, (AP), DIFF                                ; 4168
                               02             50   91 00006         CMPB    DIFF, #2                                      ;
                                              08   1B 00009         BLEQU   1$                                            ;
                               50 00000000G   8F   D0 0000B         MOVL    #SMG$_WRONUMARG, R0                           ;
                                              04      00012         RET                                                   ;
                               50         04  BC   D0 00013 1$:     MOVL    @DISPLAY_ID, R0                               ; 4170
                          04   BC         38  A0   D1 00017         CMPL    56(R0), @DISPLAY_ID                           ;
                                              06   12 0001C         BNEQ    2$                                            ;
                               11         44  A0   91 0001E         CMPB    68(R0), #17                                   ;
                                              08   13 00022         BEQL    3$                                            ;
                               50 00000000G   8F   D0 00024 2$:     MOVL    #SMG$_INVDIS_ID, R0                           ;
                                              04      0002B         RET                                                   ;
                               50         04  BC   D0 0002C 3$:     MOVL    @DISPLAY_ID, DCB                              ;
                               52             60   3C 00030         MOVZWL  (DCB), TOP_LINE                               ; 4177
                               02             6C   91 00033         CMPB    (AP), #2                                      ; 4179
                                              1A   1F 00036         BLSSU   4$                                            ;
                                          08  AC   D5 00038         TSTL    8(AP)                                         ;
                                              15   13 0003B         BEQL    4$                                            ;
   08   BC             60            10       00   ED 0003D         CMPZV   #0, #16, (DCB), @TOP_LINE_OF_REGION           ; 4182
                                              32   14 00043         BGTR    5$                                            ;
   08   BC      02     A0            10       00   ED 00045         CMPZV   #0, #16, 2(DCB), @TOP_LINE_OF_REGION          ; 4183
                                              29   19 0004C         BLSS    5$                                            ;
                               52         08  BC   D0 0004E         MOVL    @TOP_LINE_OF_REGION, TOP_LINE                 ; 4185
                               51         02  A0   3C 00052 4$:     MOVZWL  2(DCB), BOTTOM_LINE                           ; 4190
                               03             6C   91 00056         CMPB    (AP), #3                                      ; 4192
                                              24   1F 00059         BLSSU   6$                                            ;
                                          0C  AC   D5 0005B         TSTL    12(AP)                                        ;
                                              1F   13 0005E         BEQL    6$                                            ;
   0C   BC             60            10       00   ED 00060         CMPZV   #0, #16, (DCB), @BOTTOM_LINE_OF_REGION        ; 4195
                                              0F   14 00066         BGTR    5$                                            ;
   0C   BC      02     A0            10       00   ED 00068         CMPZV   #0, #16, 2(DCB), @BOTTOM_LINE_OF_REGION       ; 4196
                                              06   19 0006F         BLSS    5$                                            ;
                               51         0C  BC   D0 00071         MOVL    @BOTTOM_LINE_OF_REGION, BOTTOM_LINE           ; 4198
                                              08   11 00075         BRB     6$                                            ;
                               50 00000000G   8F   D0 00077 5$:     MOVL    #SMG$_INVROW, R0                              ; 4200
                                              04      0007E         RET                                                   ;
                               52             51   D1 0007F 6$:     CMPL    BOTTOM_LINE, TOP_LINE                         ; 4203
                                              08   14 00082         BGTR    7$                                            ;
                               50 00000000G   8F   D0 00084         MOVL    #SMG$_INVARG, R0                              ; 4205
                                              04      0008B         RET                                                   ;
                          48   A0             52   B0 0008C 7$:     MOVW    TOP_LINE, 72(DCB)                             ; 4212
                          4A   A0             51   B0 00090         MOVW    BOTTOM_LINE, 74(DCB)                          ; 4213
                               50             01   D0 00094         MOVL    #1, R0                                        ; 4215
                                              04      00097         RET                                                   ; 4216
```

```
; Routine Size:  152 bytes,    Routine Base:  _SMG$CODE + 156F

; 3978          4217  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$UNPASTE_VIRTUAL_DISPLAY - Unpaste virtual display from pasteboard'
1 GLOBAL ROUTINE SMG$UNPASTE_VIRTUAL_DISPLAY (
1                                               DISPLAY_ID,
1                                               PASTEBOARD_ID
1                                              ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       The specified virtual display is "unpasted" from a pasteboard.
1 !       Unpasting does not destroy the virtual display or its contents.
1 !       It merely removes its mapping to a particular pasteboard and
1 !       hence its visibility on that pasteboard.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$UNPASTE_VIRTUAL_DISPLAY (
1 !                                               DISPLAY_ID.rl.r,
1 !                                               PASTEBOARD_ID.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DISPLAY_ID.rl.r         Id of virtual display to be unpasted.
1 !
1 !       PASTEBOARD_ID.rl.r      The pasteboard id of the pasteboard from
1 !                               which the unpasting is to take place.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_INVDIS_ID  Invalid virtual display id.
1 !       SMG$_INVPAS_ID  Invalid pasteboard id.
1 !       SMG$_WRONUMARG  Wrong number of arguments.
1 !       SMG$_NOTPASTED  Specified virtual display is not currently
1 !                       pasted to the specified pasteboard.
1 !       SMG$_ILLBATFNC  Display is batched.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2         STATUS,                         ! Status of subroutine call
2
2         DCB     : REF $DCB_DECL,        ! Addr of display control block
2         PBCB    : REF $PBCB_DECL;       ! Addr of pasteboard control block
2
2     $SMG$VALIDATE_ARGCOUNT (2, 2);      ! Test for right no. of args
2
```

```
; 4037      4275  2 !+
; 4038      4276  2 ! Get addresses of virtual display control block and pasteboard control
; 4039      4277  2 ! block and validate display id and pasteboard id.
; 4040      4278  2 !-
; 4041      4279  2     $SMG$GET_PBCB ( .PASTEBOARD_ID, PBCB);
; 4042      4280  2                                         ! Get addr of pasteboard control
; 4043      4281  2                                         ! block
; 4044      4282  2
; 4045      4283  2     $SMG$GET_DCB ( .DISPLAY_ID, DCB);    ! Get addr of virtual display
; 4046      4284  2                                         ! control block
; 4047      4285  2
; 4048      4286  2 !+
; 4049      4287  2 ! Give an error if the display is batched.
; 4050      4288  2 !-
; 4051      4289  2
; 4052      4290  2     IF .DCB[DCB_L_BATCH_LEVEL] NEQ 0
; 4053      4291  2     THEN
; 4054      4292  2         RETURN  SMG$_ILLBATFNC;
; 4055      4293  2
; 4056      4294  2     RETURN SMG$$UNPASTE_VIRTUAL_DISPLAY(.DCB,.PBCB)
; 4057      4295  2
; 4058      4296  1     END;                              ! Routine SMG$UNPASTE_VIRTUAL_DISPLAY



                                      0004 00000          .ENTRY  SMG$UNPASTE_VIRTUAL_DISPLAY, Save R2              ; 4219
                    52 00000000'  EF   9E 00002          MOVAB   PBD_L_COUNT, R2
                    02            6C   91 00009          CMPB    (AP), #2                                           ; 4273
                                  08   13 0000C          BEQL    1$
                    50 00000000G  8F   D0 0000E          MOVL    #SMG$_WRONUMARG, R0
                                       04 00015          RET
                    50        08  BC   D0 00016 1$:      MOVL    @PASTEBOARD_ID, R0                                 ; 4279
                                  0A   19 0001A          BLSS    2$
                    62            50   D1 0001C          CMPL    R0, PBD_L_COUNT
                                  05   14 0001F          BGTR    2$
          08        44            A2   50 E0 00021       BBS     R0, PBD_V_PB_AVAIL, 3$
                    50 00000000G  8F   D0 00026 2$:      MOVL    #SMG$_INVPAS_ID, R0
                                       04 0002D          RET
                    51        04 A240  D0 0002E 3$:      MOVL    PBD_A_PBCB[R0], PBCB
                    50        04  BC   D0 00033          MOVL    @DISPLAY_ID, R0                                    ; 4283
               04   BC        38  A0   D1 00037          CMPL    56(R0), @DISPLAY_ID
                                  06   12 0003C          BNEQ    4$
                    11        44  A0   91 0003E          CMPB    68(R0), #17
                                  08   13 00042          BEQL    5$
                    50 00000000G  8F   D0 00044 4$:      MOVL    #SMG$_INVDIS_ID, R0
                                       04 0004B          RET
                    50        04  BC   D0 0004C 5$:      MOVL    @DISPLAY_ID, DCB
                              1C  A0   D5 00050          TSTL    28(DCB)                                            ; 4290
                                  08   13 00053          BEQL    6$
                    50 00000000G  8F   D0 00055          MOVL    #SMG$_ILLBATFNC, R0                                ; 4292
                                       04 0005C          RET
                                  03   BB 0005D 6$:      PUSHR   #^M<R0,R1>                                         ; 4294
               0000V CF           02   FB 0005F          CALLS   #2, SMG$$UNPASTE_VIRTUAL_DISPLAY
                                       04 00064          RET                                                        ; 4296
```

```
; Routine Size:  101 bytes,    Routine Base:  _SMG$CODE + 1607

; 4059          4297  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$$CALC_PASTE_TRANSF - Calculate pasting transformation constants'
GLOBAL ROUTINE SMG$$CALC_PASTE_TRANSF ( PP   : REF $PP_DECL ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       This procedure precalculates the constants needed to efficiently
!       copy portions of the text and attributes from the virtual
!       display buffers located in the DCB to the window buffer located
!       in the WCB.
!       This data is derived from the pasting relationship between
!       the given virtual display and the pasteboard to which it is
!       pasted.  The calculated constants are stored in the pasting
!       packet that reflects this pasting.
!
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$$CALC_PASTE_TRANSF ( PP.mab.r)
!
! FORMAL PARAMETERS:
!
!       PP.mab.r        Address of pasting packet.
!
! IMPLICIT INPUTS:
!
!       NONE
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! COMPLETION STATUS:
!
!       SS$_NORMAL      Normal successful completion
!
! SIDE EFFECTS:
!
!       NONE
!--

    BEGIN
    LOCAL
        TEMP    : BLOCK [8,BYTE],       ! Temporary representation of
                                        ! display buffer area as
                                        ! projected on window buffer.
        DCB     : REF $DCB_DECL,        ! Addr of DCB involved.
        WCB     : REF $WCB_DECL,        ! Addr of WCB involved.
        PBCB    : REF $PBCB_DECL,       ! Addr of PBCB involved.
        OVERLAP : BLOCK [8,BYTE];       ! Describes area of overlap
                                        ! between virtual display and
                                        ! window buffer.

    PBCB = .PP [PP_A_PBCB_ADDR] ;
    WCB = .PBCB [PBCB_A_WCB] ;
    DCB = .PP [PP_A_DCB_ADDR] ;

!+
2 ! Mark the border label as being invisible until it proves otherwise.
2 !-
2       PP [PP_W_LABEL_BYTES_TO_MOVE] = 0;
2       PP [PP_W_SRC_LABEL_OFF]       = 0;
2       PP [PP_W_DST_LABEL_OFF]       = 0;
2
2
2       TEMP [DCB_W_ROW_START] = .DCB [DCB_W_ROW_START] + .PP [PP_W_ROW]-1;
2       TEMP [DCB_W_NO_ROWS]   = .DCB [DCB_W_NO_ROWS];
2       TEMP [DCB_W_COL_START] = .DCB [DCB_W_COL_START] + .PP [PP_W_COL]-1;
2       TEMP [DCB_W_NO_COLS]   = .DCB [DCB_W_NO_COLS];
2
2 !+
2 ! Check to see what part (if any) of this virtual display maps onto
2 ! the viewable part of the pasteboard -- i.e., the area that goes into
2 ! the window control block buffer.
2 !-
2       IF NOT SMG$$OCCLUDE (
2                               WCB [WCB_Q_COORD],      ! Area of window buffer
2                               TEMP,                   ! Area of display buffer
2                               OVERLAP )               ! Area of overlap
2                                                       ! (if any)
2       THEN
3           BEGIN   ! No overlap
3           PP [PP_W_ROWS_TO_MOVE] = 0 ; ! There are no rows to move
3           !+
3           ! If the display isn't visible, the border label isn't visible
3           ! either.    **** Not really true -- clean this up later ****
3           !-
3           END     ! No overlap
2       ELSE
3           BEGIN   ! Overlap
3           LOCAL
3               DCB_START_ROW,          ! 1st row of display buffer that lands
3                                       ! in window buffer.
3               DCB_START_COL;          ! 1st column of display buffer that
3                                       ! lands in window buffer.
3
3           PP [PP_W_ROWS_TO_MOVE] = .OVERLAP [DCB_W_NO_ROWS];
3           PP [PP_W_MOVE_LENGTH]  = .OVERLAP [DCB_W_NO_COLS];
3
3           PP [PP_W_FIRST_WCB_ROW] = .OVERLAP [DCB_W_ROW_START];
3           PP [PP_W_LAST_WCB_ROW]  = .OVERLAP [DCB_W_ROW_START] +
3                                     .OVERLAP [DCB_W_NO_ROWS] - 1;
3
3           PP [PP_W_FIRST_WCB_COL] = .OVERLAP [DCB_W_COL_START];
3           PP [PP_W_LAST_WCB_COL]  = .OVERLAP [DCB_W_COL_START] +
3                                     .OVERLAP [DCB_W_NO_COLS] - 1;
3
3           PP [PP_L_MOVE_SIZE] = .OVERLAP [DCB_W_NO_ROWS] *
3                                 .OVERLAP [DCB_W_NO_COLS];
3
3           DCB_START_ROW = .OVERLAP [DCB_W_ROW_START] - .PP [PP_W_ROW] +1;
3           DCB_START_COL = .OVERLAP [DCB_W_COL_START] - .PP [PP_W_COL] +1;
3
3           PP [PP_W_FROM_INDEX] = (.DCB_START_ROW -1) *.DCB [DCB_W_NO_COLS]
3                                  + .DCB_START_COL - 1;
```

```
3
3          PP [PP_W_TO_INDEX] = (.OVERLAP [DCB_W_ROW_START] -1) *
3                                .WCB [WCB_W_NO_COLS] +
3                                .OVERLAP [DCB_Q_COL_START] -1;
3
3          IF .DCB [DCB_V_BORDERED]
3          THEN
4              BEGIN           ! Bordered display
4              LOCAL
4                  UPPER_ROW,          ! Row above top row of pasted display
4                  LOWER_ROW,          ! Row below bottom row of pasted display
4                  LEFT_COL,                   ! Col. to left of pasted display
4                  RIGHT_COL,          ! Col. to right of pasted display
4                  LDES : REF BLOCK [,BYTE];! Address of dynamic descr. in
4                                           ! DCB that points to label
4                                           ! string.
4
4              LDES = DCB [DCB_Q_LABEL_DESC];
4
4              !+
4              ! Compute the row and column numbers where the borders fall.
4              ! Note these rows and columns may not map into the buffer
4              ! and need to be validated before use.
4              !-
4              UPPER_ROW = .PP [PP_W_ROW] - 1 ;
4              LOWER_ROW = .PP [PP_W_ROW] + .DCB [DCB_W_NO_ROWS];
4              LEFT_COL  = .PP [PP_W_COL] - 1 ;
4              RIGHT_COL = .PP [PP_W_COL] + .DCB [DCB_W_NO_COLS];
4
4              IF .LDES [DSC$W_LENGTH] NEQ 0
4              THEN
5                  BEGIN   ! Label position computation
5                  CASE .DCB [DCB_B_LABEL_POS] FROM SMG$K_TOP TO SMG$K_RIGHT OF
5                  SET
5                      [SMG$K_TOP]:
6                          BEGIN   ! Label in top row
6                          IF .UPPER_ROW GEQ 1
6                          THEN
7                              BEGIN           ! Top row in buffer
7                              LOCAL
7                                  DCOLS : SIGNED; ! Dest. col. start
7
7                              DCOLS =         .PP [PP_W_COL] +
7                                              .DCB [DCB_W_LABEL_UNITS] -2 ;
7
7                              IF .DCOLS LEQ .WCB [WCB_W_NO_COLS]
7                              THEN
8                                  BEGIN   ! partially on screen
8                                  LOCAL
8                                      DCOLE : SIGNED; ! Dest. col end
8
8                                  DCOLE = MIN ( (.LDES [DSC$W_LENGTH] + .DCOLS -1),
9                                              (.PP [PP_W_COL] +
8                                               .DCB [DCB_W_NO_COLS] ),
8                                               .WCB [WCB_W_NO_COLS]);
8
8                                  PP [PP_W_LABEL_BYTES_TO_MOVE] =
8                       MAX ( 0, .DCOLE +1 -
8                                MAX (0, .DCOLS) );
8
8               IF .PP [PP_W_COL] LEQ 0
8               THEN
9                   BEGIN     ! Using tail end of label
9                   PP [PP_W_SRC_LABEL_OFF] =
9                       .LDES [DSC$W_LENGTH] -
9                       .PP [PP_W_LABEL_BYTES_TO_MOVE];
9                   END ! Using tail end of label
8               ELSE
9                   BEGIN     ! Using front end of label
9                   PP [PP_W_SRC_LABEL_OFF] = 0;
8                   END;      ! Using front end of label
8
8               PP [PP_W_DST_LABEL_OFF] = (.UPPER_ROW -1) *
8                                     .WCB [WCB_W_NO_COLS] +
8                                     MAX(0, .DCOLS - 1);
7               END; ! Partially on screen
7
6           END;        ! Top row in buffer
5       END;    ! Label in top row
5
5   [SMG$K_BOTTOM]:
6       BEGIN   ! Label in bottom row
6       IF .LOWER_ROW LEQ .WCB [WCB_W_NO_ROWS]
6       THEN
7           BEGIN       ! Bottom row in buffer
7           LOCAL
7               DCOLS : SIGNED; ! Dest. col. start
7
7           DCOLS =       .PP [PP_W_COL] +
7                         .DCB [DCB_W_LABEL_UNITS] - 2;
7
7           IF .DCOLS LEQ .WCB [WCB_W_NO_COLS]
7           THEN
8               BEGIN ! Partially visible
8               LOCAL
8                   DCOLE : SIGNED; ! Dest. col. end
8
8               DCOLE = MIN ( (.LDES [DSC$W_LENGTH] + .DCOLS -1),
8                         (.PP [PP_W_COL] +
8                           .DCB [DCB_W_NO_COLS] ),
8                           .WCB [WCB_W_NO_COLS]);
8
8               PP [PP_W_LABEL_BYTES_TO_MOVE] =
8                       MAX ( 0, .DCOLE + 1 -
8                                MAX (0, .DCOLS) );
8
8
8               IF .PP [PP_W_COL] LEQ 0
8               THEN
9                   BEGIN     ! Using tail end of label
9                   PP [PP_W_SRC_LABEL_OFF] =
9                       .LDES [DSC$W_LENGTH] -
9                       .PP [PP_W_LABEL_BYTES_TO_MOVE];
9                   END ! Using tail end of label
```

```
8                ELSE
9                   BEGIN        ! Using front end of label
9                   PP [PP_W_SRC_LABEL_OFF] = 0;
8                   END;         ! Using front end of label
8                PP [PP_W_DST_LABEL_OFF] = (.LOWER_ROW -1) *
8                                             .WCB [WCB_W_NO_COLS] +
8                                          MAX(0, .DCOLS - 1);
8
7                END ;! Partially visible
6             END;        ! Bottom row in buffer
5          END;     ! Label in bottom row
5
5       [SMG$K_LEFT]:
6          BEGIN    !Label in left column
6          IF .LEFT_COL GEQ 1
6          THEN
7             BEGIN          ! Left column in buffer
7             LOCAL
7                DROWS : SIGNED; ! Dest. row start
7
7             DROWS =        .PP [PP_W_ROW] +
7                            .DCB [DCB_W_LABEL_UNITS] - 2;
7
7             IF .DROWS LEQ .WCB [WCB_W_NO_ROWS]
7             THEN
8                BEGIN ! Partially visible
8                LOCAL
8                   DROWE : SIGNED ; ! Dest. row end
8
8                DROWE = MIN ( (.LDES [DSC$W_LENGTH] + .DROWS -1),
9                            (.PP [PP_W_ROW] +
8                             .DCB [DCB_W_NO_ROWS] ),
8                             .WCB [WCB_W_NO_ROWS]);
8
8                PP [PP_W_LABEL_BYTES_TO_MOVE] =
8                      MAX ( 0, .DROWE + 1 -
8                             MAX (0, .DROWS) );
8
8                IF .PP [PP_W_ROW] LEQ 0
8                THEN
9                   BEGIN        ! Using tail end of label
9                   PP [PP_W_SRC_LABEL_OFF] =
9                      .LDES [DSC$W_LENGTH] -
9                      .PP [PP_W_LABEL_BYTES_TO_MOVE];
9                   END ! Using tail end of label
8                ELSE
9                   BEGIN        ! Using front end of label
9                   PP [PP_W_SRC_LABEL_OFF] = 0;
8                   END;         ! Using front end of label
8
8                PP [PP_W_DST_LABEL_OFF] = (.DROWS -1) *
8                                             .WCB [WCB_W_NO_COLS] +
8                                          MAX(0, .LEFT_COL - 1);
7                END; ! Partially visible
6             END;        ! Left column in buffer
5          END;     ! Label in left column
5
```

```
                    [SMG$K_RIGHT]:
                        BEGIN   ! Label in right column
                        IF .RIGHT_COL LEQ .WCB [WCB_W_NO_COLS]
                        THEN
                            BEGIN        ! Right column in buffer
                            LOCAL
                                DROWS : SIGNED; ! Dest. row start

                            DROWS =        .PP [PP_W_ROW] +
                                           .DCB [DCB_W_LABEL_UNITS] - 2;

                            IF .DROWS LEQ .WCB [WCB_W_NO_ROWS]
                            THEN
                                BEGIN ! Partially visible
                                LOCAL
                                  DROWE : SIGNED ; ! Dest. row end

                                DROWE = MIN ( (.LDES [DSC$W_LENGTH] + .DROWS -1),
                                          (.PP [PP_W_ROW] +
                                            .DCB [DCB_W_NO_ROWS] ),
                                            .WCB [WCB_W_NO_ROWS]);

                                PP [PP_W_LABEL_BYTES_TO_MOVE] =
                                        MAX ( 0, .DROWE + 1 -
                                                 MAX (0, .DROWS) );


                                IF .PP [PP_W_ROW] LEQ 0
                                THEN
                                    BEGIN        ! Using tail end of label
                                    PP [PP_W_SRC_LABEL_OFF] =
                                        .LDES [DSC$W_LENGTH] -
                                        .PP [PP_W_LABEL_BYTES_TO_MOVE];
                                    END ! Using tail end of label
                                ELSE
                                    BEGIN        ! Using front end of label
                                    PP [PP_W_SRC_LABEL_OFF] = 0;
                                    END;         ! Using front end of label

                                PP [PP_W_DST_LABEL_OFF] = (.DROWS -1) *
                                                      .WCB [WCB_W_NO_COLS] +
                                                      MAX(0, .RIGHT_COL - 1);

                                END; ! Partially visible
                            END;         ! Right column in buffer
                        END;    ! Label in right column

                    [OUTRANGE]:
                        RETURN (SMG$_FATERRLIB);

                TES;
                END;        ! Label position computation
            END;            ! Bordered display
        END;    ! Overlap

!+
! If the virtual display width matches the window control block width,
; 4403          4640  2 ! and the width of the data to be move during a mapping operation is
; 4404          4641  2 ! this same width, then both the source area and the destination are
; 4405          4642  2 ! contiguous sets of bytes and can be moved with a single CH$MOVE.
; 4406          4643  2 ! If not, they have to be moved a row at a time since that is how many
; 4407          4644  2 ! are piece-wise contiguous.
; 4408          4645  2 !-
; 4409          4646  2     PP [PP_V_CONTIG] = 0; ! Assume not contiguous until so proven.
; 4410          4647  2     IF .DCB [DCB_W_NO_COLS]   EQL .WCB [WCB_W_NO_COLS]      AND
; 4411          4648  2        .PP [PP_W_MOVE_LENGTH] EQL .DCB [DCB_W_NO_COLS]
; 4412          4649  2     THEN
; 4413          4650  2         PP [PP_V_CONTIG] = 1;    ! Contiguous
; 4414          4651  2
; 4415          4652  2     RETURN (SS$_NORMAL);
; 4416          4653  1     END;                    ! End of routine SMG$$CALC_PASTE_TRANSF



                                       0FFC 00000          .ENTRY  SMG$$CALC_PASTE_TRANSF, Save R2,R3,R4,R5,-   ; 4299
                                                                   R6,R7,R8,R9,R10,R11                          ;
                        5E          2C   C2 00002          SUBL2   #44, SP                                      ;
                        57     04   AC   D0 00005          MOVL    PP, R7                                       ; 4350
                        50     14   A7   D0 00009          MOVL    20(R7), PBCB                                 ;
                        59     08   A0   D0 0000D          MOVL    8(PBCB), WCB                                 ; 4351
                        52     10   A7   D0 00011          MOVL    16(R7), DCB                                  ; 4352
                 18     AE     24   A7   9E 00015          MOVAB   36(R7), 24(SP)                               ; 4357
                               18   BE   B4 0001A          CLRW    @24(SP)                                      ;
                 14     AE     26   A7   9E 0001D          MOVAB   38(R7), 20(SP)                               ; 4358
                               14   BE   B4 00022          CLRW    @20(SP)                                      ;
                 10     AE     28   A7   9E 00025          MOVAB   40(R7), 16(SP)                               ; 4359
                               10   BE   B4 0002A          CLRW    @16(SP)                                      ;
                 0C     AE     18   A7   9E 0002D          MOVAB   24(R7), 12(SP)                               ; 4362
                        50          62   3C 00032          MOVZWL  (DCB), R0                                    ;
                        51     0C   BE   32 00035          CVTWL   @12(SP), R1                                  ;
                        50          51   C0 00039          ADDL2   R1, R0                                       ;
          24   AE       50          01   A3 0003C          SUBW3   #1, R0, TEMP                                 ;
                 26     AE     02   A2   B0 00041          MOVW    2(DCB), TEMP+2                               ; 4363
                 08     AE     1A   A7   9E 00046          MOVAB   26(R7), 8(SP)                                ; 4364
                        50     04   A2   3C 0004B          MOVZWL  4(DCB), R0                                   ;
                        51     08   BE   32 0004F          CVTWL   @8(SP), R1                                   ;
                        50          51   C0 00053          ADDL2   R1, R0                                       ;
          28   AE       50          01   A3 00056          SUBW3   #1, R0, TEMP+4                               ;
                 04     AE     06   A2   3C 0005B          MOVZWL  6(DCB), 4(SP)                                ; 4365
                 2A     AE     04   AE   B0 00060          MOVW    4(SP), TEMP+6                                ;
                               1C   AE   9F 00065          PUSHAB  OVERLAP                                      ; 4373
                               28   AE   9F 00068          PUSHAB  TEMP                                         ;
                                    59   DD 0006B          PUSHL   WCB                                          ;
             00000000G  00          03   FB 0006D          CALLS   #3, SMG$$OCCLUDE                             ;
                        06          50   E8 00074          BLBS    R0, 2$                                       ;
                               1C   A7   B4 00077          CLRW    28(R7)                                       ; 4379
                                  0258   31 0007A  1$:     BRW     42$                                          ; 4372
                 1C     A7     1E   AE   B0 0007D  2$:     MOVW    OVERLAP+2, 28(R7)                            ; 4393
                 22     A7     22   AE   B0 00082          MOVW    OVERLAP+6, 34(R7)                            ; 4394
                 2F     A7     1C   AE   B0 00087          MOVW    OVERLAP, 47(R7)                              ; 4396
                        50     1C   AE   3C 0008C          MOVZWL  OVERLAP, R0                                  ; 4398
                        51     1E   AE   3C 00090          MOVZWL  OVERLAP+2, R1                                ;
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                                                                 F  5
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages     16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742              Page 125
1-096           SMG$$CALC_PASTE_TRANSF - Calculate pasting tran  14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1               (25)

                          50          51  C0 00094        ADDL2   R1, R0                          ;
          31   A7         50          01  A3 00097        SUBW3   #1, R0, 49(R7)                  ;
                          53    20    AE  3C 0009C        MOVZWL  OVERLAP+4, R3                   ; 4400
                     33   A7          53  B0 000A0        MOVW    R3, 51(R7)                      ;
                          50    22    AE  3C 000A4        MOVZWL  OVERLAP+6, R0                   ; 4402
                          51    FF  A340  9E 000A8        MOVAB   -1(R3)[R0], R1                  ;
                     35   A7          51  B0 000AD        MOVW    R1, 53(R7)                      ;
                          50    1E    AE  3C 000B1        MOVZWL  OVERLAP+2, R0                   ; 4405
                          51    22    AE  3C 000B5        MOVZWL  OVERLAP+6, R1                   ;
          2B   A7         50          51  C5 000B9        MULL3   R1, R0, 43(R7)                  ;
                          51    1C    AE  3C 000BE        MOVZWL  OVERLAP, R1                     ; 4407
                          50    0C    BE  32 000C2        CVTWL   @12(SP), R0                     ;
                          51          50  C2 000C6        SUBL2   R0, R1                          ;
                          50    08    BE  32 000C9        CVTWL   @8(SP), R0                      ; 4408
               50         53          50  C3 000CD        SUBL3   R0, R3, R0                      ;
                          51    04    AE  C4 000D1        MULL2   4(SP), R1                       ; 4410
                          54        8041  9E 000D5        MOVAB   (DCB_START_COL)+[R1], R4        ; 4411
                     1E   A7          54  B0 000D9        MOVW    R4, 30(R7)                      ;
                          50    1C    AE  3C 000DD        MOVZWL  OVERLAP, R0                     ; 4413
                                      50  D7 000E1        DECL    R0                              ;
                          5A    06    A9  3C 000E3        MOVZWL  6(WCB), R10                     ; 4414
                          50          5A  C4 000E7        MULL2   R10, R0                         ;
                          51    FF  A340  9E 000EA        MOVAB   -1(R3)[R0], R1                  ; 4415
                     20   A7          51  B0 000EF        MOVW    R1, 32(R7)                      ;
                          83    2F    A2  E9 000F3        BLBC    47(DCB), 1$                     ; 4417
                          50    08    A2  9E 000F7        MOVAB   8(R2), LDES                     ; 4429
                          55    0C    BE  32 000FB        CVTWL   @12(SP), UPPER_ROW              ; 4436
                                      55  D7 000FF        DECL    UPPER_ROW                       ;
                          5B    0C    BE  32 00101        CVTWL   @12(SP), R11                    ; 4437
                          51    02    A2  3C 00105        MOVZWL  2(DCB), R1                      ;
                          5B          51  C0 00109        ADDL2   R1, R11                         ;
                          51          5B  D0 0010C        MOVL    R11, LOWER_ROW                  ;
                          54    08    BE  32 0010F        CVTWL   @8(SP), LEFT_COL                ; 4438
                                      54  D7 00113        DECL    LEFT_COL                        ;
                          58    08    BE  32 00115        CVTWL   @8(SP), R8                      ; 4439
                          58    04    AE  C0 00119        ADDL2   4(SP), R8                       ;
                          53          58  D0 0011D        MOVL    R8, RIGHT_COL                   ;
                          56          60  3C 00120        MOVZWL  (LDES), R6                      ; 4441
                                      74  13 00123        BEQL    12$                             ;
               03         00    31    A2  8F 00125        CASEB   49(DCB), #0, #3                 ; 4444
  0141       00D6       0071        0010     0012A 3$:    .WORD   4$-3$,-                         ;
                                                                  13$-3$,-                        ;
                                                                  23$-3$,-                        ;
                                                                  33$-3$                          ;
                          50 00000000G    8F  D0 00132        MOVL    #SMG$_FATERRLIB, R0             ; 4631
                                          04 00139        RET                                     ;
                                      55  D5 0013A 4$:    TSTL    UPPER_ROW                       ; 4448
                                      5B  15 0013C        BLEQ    12$                             ;
                          50    08    BE  32 0013E        CVTWL   @8(SP), R0                      ; 4455
                          6E    2C    A2  3C 00142        MOVZWL  44(DCB), (SP)                   ;
                          50          6E  C0 00146        ADDL2   (SP), R0                        ;
                          50          02  C2 00149        SUBL2   #2, DCOLS                       ;
                          5A          50  D1 0014C        CMPL    DCOLS, R10                      ; 4457
                                      63  14 0014F        BGTR    14$                             ;
                          52    FF  A046  9E 00151        MOVAB   -1(DCOLS)[R6], R2               ; 4463
                          58          52  D1 00156        CMPL    R2, R8                          ; 4464
                                      03  15 00159        BLEQ    5$                              ;
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                                                   G  5
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages     16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742          Page 126
1-096           SMG$$CALC_PASTE_TRANSF - Calculate pasting tran 14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1          (25)

                     52             58 D0 0015B       MOVL    R8, R2                          ;
                     5A             52 D1 0015E 5$:   CMPL    R2, R10                         ; 4466
                                    03 15 00161       BLEQ    6$                              ;
                     52             5A D0 00163       MOVL    R10, R2                         ;
                     58             50 D0 00166 6$:   MOVL    DCOLS, R8                       ; 4470
                                    02 18 00169       BGEQ    7$                              ;
                                    58 D4 0016B       CLRL    R8                              ;
                     52             58 C2 0016D 7$:   SUBL2   R8, R2                          ;
                                    52 D6 00170       INCL    R2                              ; 4469
                                    02 18 00172       BGEQ    8$                              ;
                                    52 D4 00174       CLRL    R2                              ;
                18   BE             52 B0 00176 8$:   MOVW    R2, @24(SP)                     ;
                             08     BE B5 0017A       TSTW    @8(SP)                          ; 4472
                                    08 14 0017D       BGTR    9$                              ;
         14     BE   56      18     BE A3 0017F       SUBW3   @24(SP), R6, @20(SP)            ; 4477
                                    03 11 00185       BRB     10$                             ; 4472
                             14     BE B4 00187 9$:   CLRW    @20(SP)                         ; 4481
                                    55 D7 0018A 10$:  DECL    R5                              ; 4484
                     55             5A C4 0018C       MULL2   R10, R5                         ; 4485
                     02             50 F4 0018F       SOBGEQ  R0, 11$                         ; 4486
                                    50 D4 00192       CLRL    R0                              ;
         10     BE   55             50 A1 00194 11$:  ADDW3   R0, R5, @16(SP)                 ;
                                    63 11 00199 12$:  BRB     22$                             ; 4444
  51     02     A9   10             00 ED 0019B 13$:  CMPZV   #0, #16, 2(WCB), LOWER_ROW      ; 4494
                                    76 19 001A1       BLSS    24$                             ;
                     50      08     BE 32 001A3       CVTWL   @8(SP), R0                      ; 4501
                     55      2C     A2 3C 001A7       MOVZWL  44(DCB), R5                     ;
                     50             55 C0 001AB       ADDL2   R5, R0                          ;
                     50             02 C2 001AE       SUBL2   #2, DCOLS                       ;
                     5A             50 D1 001B1       CMPL    DCOLS, R10                      ; 4503
                                    48 14 001B4 14$:  BGTR    22$                             ;
                     52      FF A046   9E 001B6       MOVAB   -1(DCOLS)[R6], R2               ; 4509
                     58             52 D1 001BB       CMPL    R2, R8                          ; 4510
                                    03 15 001BE       BLEQ    15$                             ;
                     52             58 D0 001C0       MOVL    R8, R2                          ;
                     5A             52 D1 001C3 15$:  CMPL    R2, R10                         ; 4512
                                    03 15 001C6       BLEQ    16$                             ;
                     52             5A D0 001C8       MOVL    R10, R2                         ;
                     55             50 D0 001CB 16$:  MOVL    DCOLS, R5                       ; 4516
                                    02 18 001CE       BGEQ    17$                             ;
                                    55 D4 001D0       CLRL    R5                              ;
                     52             55 C2 001D2 17$:  SUBL2   R5, R2                          ;
                                    52 D6 001D5       INCL    R2                              ; 4515
                                    02 18 001D7       BGEQ    18$                             ;
                                    52 D4 001D9       CLRL    R2                              ;
                18   BE             52 B0 001DB 18$:  MOVW    R2, @24(SP)                     ;
                             08     BE B5 001DF       TSTW    @8(SP)                          ; 4519
                                    08 14 001E2       BGTR    19$                             ;
         14     BE   56      18     BE A3 001E4       SUBW3   @24(SP), R6, @20(SP)            ; 4524
                                    03 11 001EA       BRB     20$                             ; 4519
                             14     BE B4 001EC 19$:  CLRW    @20(SP)                         ; 4528
                                    51 D7 001EF 20$:  DECL    R1                              ; 4530
                     51             5A C4 001F1       MULL2   R10, R1                         ; 4531
                     02             50 F4 001F4       SOBGEQ  R0, 21$                         ; 4532
                                    50 D4 001F7       CLRL    R0                              ;
         10     BE   51             50 A1 001F9 21$:  ADDW3   R0, R1, @16(SP)                 ;
                                    69 11 001FE 22$:  BRB     32$                             ; 4444
                                    54   D5 00200 23$:     TSTL    LEFT_COL                              ; 4540
                                    65   15 00202          BLEQ    32$                                   ;
                       51     0C    BE   32 00204          CVTWL   @12(SP), R1                           ; 4547
                       50     2C    A2   3C 00208          MOVZWL  44(DCB), R0                           ;
                       51           50   C0 0020C          ADDL2   R0, R1                                ;
                       50     FE    A1   9E 0020F          MOVAB   -2(R1), DROWS                         ;
     50     02    A9   10           00   ED 00213          CMPZV   #0, #16, 2(WCB), DROWS                ; 4549
                                    6A   19 00219 24$:     BLSS    34$                                   ;
                       51     FF A046    9E 0021B          MOVAB   -1(DROWS)[R6], R1                     ; 4555
                       5B           51   D1 00220          CMPL    R1, R11                               ; 4556
                                    03   15 00223          BLEQ    25$                                   ;
                       51           5B   D0 00225          MOVL    R11, R1                               ;
     51     02    A9   10           00   ED 00228 25$:     CMPZV   #0, #16, 2(WCB), R1                   ; 4558
                                    04   18 0022E          BGEQ    26$                                   ;
                       51     02    A9   3C 00230          MOVZWL  2(WCB), R1                            ;
                       51           50   7D 00234 26$:     MOVQ    DROWS, R1                             ; 4562
                                    51   D5 00237          TSTL    R1                                    ;
                                    02   18 00239          BGEQ    27$                                   ;
                                    51   D4 0023B          CLRL    R1                                    ;
                       52           51   C2 0023D 27$:     SUBL2   R1, R2                                ;
                                    52   D6 00240          INCL    R2                                    ; 4561
                                    02   18 00242          BGEQ    28$                                   ;
                                    52   D4 00244          CLRL    R2                                    ;
                 18    BE           52   B0 00246 28$:     MOVW    R2, @24(SP)                           ;
                              0C    BE   B5 0024A          TSTW    @12(SP)                               ; 4564
                                    08   14 0024D          BGTR    29$                                   ;
            14    BE   56     18    BE   A3 0024F          SUBW3   @24(SP), R6, @20(SP)                  ; 4569
                                    03   11 00255          BRB     30$                                   ; 4564
                              14    BE   B4 00257 29$:     CLRW    @20(SP)                               ; 4573
                                    50   D7 0025A 30$:     DECL    R0                                    ; 4576
                       50           5A   C4 0025C          MULL2   R10, R0                               ; 4577
                       02           54   F4 0025F          SOBGEQ  R4, 31$                               ; 4578
                                    54   D4 00262          CLRL    R4                                    ;
            10    BE   50           54   A1 00264 31$:     ADDW3   R4, R0, @16(SP)                       ;
                                    6A   11 00269 32$:     BRB     42$                                   ; 4444
                       5A           53   D1 0026B 33$:     CMPL    RIGHT_COL, R10                        ; 4585
                                    65   14 0026E          BGTR    42$                                   ;
                       51     0C    BE   32 00270          CVTWL   @12(SP), R1                           ; 4592
                       50     2C    A2   3C 00274          MOVZWL  44(DCB), R0                           ;
                       51           50   C0 00278          ADDL2   R0, R1                                ;
                       50     FE    A1   9E 0027B          MOVAB   -2(R1), DROWS                         ;
     50     02    A9   10           00   ED 0027F          CMPZV   #0, #16, 2(WCB), DROWS                ; 4594
                                    4E   19 00285 34$:     BLSS    42$                                   ;
                       51     FF A046    9E 00287          MOVAB   -1(DROWS)[R6], R1                     ; 4600
                       5B           51   D1 0028C          CMPL    R1, R11                               ; 4601
                                    03   15 0028F          BLEQ    35$                                   ;
                       51           5B   D0 00291          MOVL    R11, R1                               ;
     51     02    A9   10           00   ED 00294 35$:     CMPZV   #0, #16, 2(WCB), R1                   ; 4603
                                    04   18 0029A          BGEQ    36$                                   ;
                       51     02    A9   3C 0029C          MOVZWL  2(WCB), R1                            ;
                       51           50   7D 002A0 36$:     MOVQ    DROWS, R1                             ; 4607
                                    51   D5 002A3          TSTL    R1                                    ;
                                    02   18 002A5          BGEQ    37$                                   ;
                                    51   D4 002A7          CLRL    R1                                    ;
                       52           51   C2 002A9 37$:     SUBL2   R1, R2                                ;
                                    52   D6 002AC          INCL    R2                                    ; 4606
                                    02   18 002AE          BGEQ    38$                                   ;
```

```
                                       52   D4 002B0          CLRL    R2                                        ;
                  18   BE              52   B0 002B2 38$:     MOVW    R2, @24(SP)                               ;
                                  0C   BE   B5 002B6          TSTW    @12(SP)                                   ; 4610
                                       08   14 002B9          BGTR    39$                                       ;
        14   BE              56   18   BE   A3 002BB          SUBW3   @24(SP), R6, @20(SP)                      ; 4615
                                       03   11 002C1          BRB     40$                                       ; 4610
                                  14   BE   B4 002C3 39$:     CLRW    @20(SP)                                   ; 4619
                                       50   D7 002C6 40$:     DECL    R0                                        ; 4622
                             50        5A   C4 002C8          MULL2   R10, R0                                   ; 4623
                             02        53   F4 002CB          SOBGEQ  R3, 41$                                   ; 4624
                                       53   D4 002CE          CLRL    R3                                        ;
        10   BE              50        53   A1 002D0 41$:     ADDW3   R3, R0, @16(SP)                           ;
                       2A    A7        02   8A 002D5 42$:     BICB2   #2, 42(R7)                                ; 4646
                       04    AE   06   A9   B1 002D9          CMPW    6(WCB), 4(SP)                             ; 4647
                                       0B   12 002DE          BNEQ    43$                                       ;
                       04    AE   22   A7   B1 002E0          CMPW    34(R7), 4(SP)                             ; 4648
                                       04   12 002E5          BNEQ    43$                                       ;
                       2A    A7        02   88 002E7          BISB2   #2, 42(R7)                                ; 4650
                             50        01   D0 002EB 43$:     MOVL    #1, R0                                    ; 4652
                                            04 002EE          RET                                               ; 4653

; Routine Size:  751 bytes,    Routine Base:  _SMG$CODE + 166C


; 4417          4654  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$CHECK_OCCLUSION - Check pastings for occlusion'
1 GLOBAL ROUTINE SMG$$CHECK_OCCLUSION (
1                                   PBCB : REF $PBCB_DECL
1                                   ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This procedure checks the overlap in all the pastings to
1 !       a given pasteboard -- setting a bit in the respective pasting
1 !       packets to record whether each pasting is occluded by
1 !       higher (more-recently pasted) pastings.  This procedure is
1 !       invoked whenever there is a change in the pasting order or
1 !       pasting position of any virtual display.
1 !       If we can determine at pasting time that a particular virtual
1 !       display (as pasted) and with a given succession of higher-pasted
1 !       virtual displays is not occluded by any of them,
1 !       we can make mapping run faster since a change to a virtual
1 !       display which is not occluded causes only the changed virtual
1 !       display to be remapped.  Higher pasted virtual displays do not
1 !       have to be remapped since it is known that they do not occlude
1 !       the changed one.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$CHECK_OCCLUSION ( PBCB.rab.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       PBCB.rab.r              Address of pasteboard control block
1 !                               which has something new or different
1 !                               pasted to it.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
1
2     BEGIN
2     LOCAL
2       THIS_PP : REF $PP_DECL,
2                       ! Addr of pasting packet for upper-most pasted
2                       ! virtual display.
2
2       THIS_Q_HEAD : REF BLOCK [,BYTE];
2                       ! Addr of 2 longwords that form queue header in
```

```
                                        ! PP currently under inspection.
    !+
    ! To initialize for the rest of the algorithm, run through whole pasting
    ! list marking all packets not occluded.
    !-
        THIS_Q_HEAD = .PBCB [PBCB_A_PP_NEXT];          ! 1st (more recent pasting)
        WHILE .THIS_Q_HEAD NEQ PBCB [PBCB_A_PP_NEXT]
        DO
            BEGIN   ! Init. pass
            THIS_PP = .THIS_Q_HEAD - PP_PBCB_QUEUE_OFFSET; ! To top of packet
            THIS_PP [ PP_V_OCCLUDED] = 0;   ! Init to not occluded
            THIS_Q_HEAD = .THIS_PP [PP_A_NEXT_PBCB];     ! To queue header in
                                                         !  next packet
            END;    ! Init. pass

        THIS_Q_HEAD = .PBCB [PBCB_A_PP_NEXT];
        THIS_PP = .THIS_Q_HEAD - PP_PBCB_QUEUE_OFFSET;

    !+
    ! Loop for all pasting packets starting with most-recently pasted one.
    !-
        WHILE .THIS_Q_HEAD NEQ PBCB [PBCB_A_PP_NEXT]
        DO
            BEGIN   ! For all displays from top to bottom
            LOCAL
                NEXT_PP         : REF $PP_DECL,
                                ! Addr of pasting packet currently under
                                ! inspection.

                NEXT_PP_Q_HEAD : REF BLOCK [,BYTE],
                                ! Addr of 2 longwords that form queue
                                ! header in PP currently under
                                ! inspection.

                TEMP_THIS : BLOCK [8,BYTE],
                                ! Area of projection of THIS virtual
                                ! display on pasteboard

                TEMP_NEXT : BLOCK [8,BYTE],
                                ! Area of projection of NEXT virtual
                                ! display on pasteboard

                THIS_DCB : REF BLOCK [,BYTE];
                                ! Addr of virtual display currently
                                ! under inspection.

            !+
            ! Recalculate pasting packet address and DCB address for this
            ! iteration.
            !-
            THIS_PP = .THIS_Q_HEAD - PP_PBCB_QUEUE_OFFSET;
            THIS_DCB = .THIS_PP [PP_A_DCB_ADDR];

            !+
            ! It is safe to assume that there is at least one virtual
            ! display pasted to this pasteboard -- but there may not be more
```

```
3              ! than one.  Be careful about reaching ahead to a packet that
3              ! may not be a packet.  If doesn't exist, pointer will be
3              ! pointing back into PBCB -- and inner loop will not be
3              ! executed.
3              !-
3             NEXT_PP_Q_HEAD = .THIS_PP [PP_A_NEXT_PBCB];
3
3             IF .NEXT_PP_Q_HEAD NEQ PBCB [PBCB_A_PP_NEXT]
3             THEN
4                 BEGIN        ! NEXT exists
4                 NEXT_PP = .NEXT_PP_Q_HEAD - PP_PBCB_QUEUE_OFFSET;
4                 !+
4                 ! Form a representation of the projection of THIS virtual
4                 ! display onto pasteboard coordinate system.
4                 !-
4                 TEMP_THIS [DCB_W_ROW_START] = .THIS_DCB [DCB_W_ROW_START] +
4                                               .THIS_PP [PP_W_ROW] - 1;
4                 TEMP_THIS [DCB_W_NO_ROWS]   = .THIS_DCB [DCB_W_NO_ROWS];
4                 TEMP_THIS [DCB_W_COL_START] = .THIS_DCB [DCB_W_COL_START] +
4                                               .THIS_PP [PP_W_COL] - 1;
4                 TEMP_THIS [DCB_W_NO_COLS]   = .THIS_DCB [DCB_W_NO_COLS];
4
4                 !+
4                 ! If this virtual display is bordered, its projection is
4                 ! bigger than if it were not.  Adjust its projection
4                 ! representation.
4                 !-
4                 IF .THIS_DCB [DCB_V_BORDERED]
4                 THEN
5                     BEGIN    ! Border adjustment
5                     TEMP_THIS [DCB_W_ROW_START] = .TEMP_THIS [DCB_W_ROW_START] - 1;
5                     TEMP_THIS [DCB_W_NO_ROWS]   = .TEMP_THIS [DCB_W_NO_ROWS] + 2;
5                     TEMP_THIS [DCB_W_COL_START] = .TEMP_THIS [DCB_W_COL_START] - 1;
5                     TEMP_THIS [DCB_W_NO_COLS]   = .TEMP_THIS [DCB_W_NO_COLS] + 2;
4                     END;     ! Border adjustment
4
3                 END;         ! Next exists
3
3             WHILE .NEXT_PP_Q_HEAD NEQ PBCB [PBCB_A_PP_NEXT]
3             DO
4                 BEGIN        ! For all displays from current to bottom
4                 LOCAL
4                     NEXT_DCB : REF $DCB_DECL,
4                                    ! Addr of DCB associated with NEXT_PP
4                     OVERLAP : BLOCK [8,BYTE];
4                                    ! Returned by SMG$$OCCLUDE, but not
4                                    ! used in this context
4
4                 NEXT_PP = .NEXT_PP_Q_HEAD - PP_PBCB_QUEUE_OFFSET;
4                 NEXT_DCB = .NEXT_PP [PP_A_DCB_ADDR];
4
4                 !+
4                 ! Form a representation of the projection of NEXT virtual
4                 ! display onto pasteboard coordinate system.
4                 !-
4                 TEMP_NEXT [DCB_W_ROW_START] = .NEXT_DCB [DCB_W_ROW_START] +
4                                               .NEXT_PP [PP_W_ROW] - 1;
```

```
; 4590          4826 4                  TEMP_NEXT [DCB_W_NO_ROWS]    = .NEXT_DCB [DCB_W_NO_ROWS];
; 4591          4827 4                  TEMP_NEXT [DCB_W_COL_START] = .NEXT_DCB [DCB_W_COL_START] +
; 4592          4828 4                                                .NEXT_PP [PP_W_COL] - 1;
; 4593          4829 4                  TEMP_NEXT [DCB_W_NO_COLS]    = .NEXT_DCB [DCB_W_NO_COLS];
; 4594          4830 4
; 4595          4831 4                  !+
; 4596          4832 4                  ! If this next virtual display is bordered, its projection is
; 4597          4833 4                  ! bigger than if it were not.  Adjust its projection
; 4598          4834 4                  ! representation.
; 4599          4835 4                  !-
; 4600          4836 4                  IF .NEXT_DCB [DCB_V_BORDERED]
; 4601          4837 4                  THEN
; 4602          4838 5                      BEGIN   ! Border adjustment
; 4603          4839 5                      TEMP_NEXT [DCB_W_ROW_START] = .TEMP_NEXT [DCB_W_ROW_START] - 1;
; 4604          4840 5                      TEMP_NEXT [DCB_W_NO_ROWS]    = .TEMP_NEXT [DCB_W_NO_ROWS] + 2;
; 4605          4841 5                      TEMP_NEXT [DCB_W_COL_START] = .TEMP_NEXT [DCB_W_COL_START] - 1;
; 4606          4842 5                      TEMP_NEXT [DCB_W_NO_COLS]    = .TEMP_NEXT [DCB_W_NO_COLS] + 2;
; 4607          4843 4                      END;     ! Border adjustment
; 4608          4844 4
; 4609          4845 4                  !+
; 4610          4846 4                  ! Check to see if THIS virtual display occludes NEXT
; 4611          4847 4                  ! vitual display and if so set occlusion bit of NEXT.
; 4612          4848 4                  !-
; 4613          4849 4                  IF SMG$$OCCLUDE ( TEMP_NEXT, TEMP_THIS, OVERLAP)
; 4614          4850 4                  THEN
; 4615          4851 4                      NEXT_PP [PP_V_OCCLUDED] = 1;
; 4616          4852 4
; 4617          4853 4                  !+
; 4618          4854 4                  ! Walk chain in direction of earlier pasted packets.
; 4619          4855 4                  !-
; 4620          4856 4                  NEXT_PP_Q_HEAD = .NEXT_PP [PP_A_NEXT_PBCB];
; 4621          4857 4
; 4622          4858 3                  END;         ! For all displays from current to bottom
; 4623          4859 3
; 4624          4860 3              !+
; 4625          4861 3              ! Walk chain in direction of earlier pasted packets.
; 4626          4862 3              !-
; 4627          4863 3              THIS_Q_HEAD = .THIS_PP [PP_A_NEXT_PBCB];
; 4628          4864 3
; 4629          4865 2              END;     ! For all displays from top to bottom
; 4630          4866 2
; 4631          4867 2          RETURN (SS$_NORMAL);
; 4632          4868 2
; 4633          4869 1          END;                    ! End of routine SMG$$CHECK_OCCLUSION



                                   00FC 00000          .ENTRY  SMG$$CHECK_OCCLUSION, Save R2,R3,R4,R5,R6,- ; 4656
                                                               R7                                          ;
                      5E        18  C2 00002          SUBL2   #24, SP                                     ;
                      56    04  AC  D0 00005          MOVL    PBCB, R6                                    ; 4718
                      54        66  D0 00009          MOVL    (R6), THIS_Q_HEAD                           ;
                      56        54  D1 0000C  1$:     CMPL    THIS_Q_HEAD, R6                             ; 4719
                                0E  13 0000F          BEQL    2$                                          ;
                      52    F8  A4  9E 00011          MOVAB   -8(R4), THIS_PP                             ; 4722
```

```
                                                  N  5
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages     16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742          Page 133
1-096           SMG$$CHECK_OCCLUSION - Check pastings for occlu 14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1            (26)

                        2A    A2            01  8A 00015         BICB2   #1, 42(THIS_PP)                                  ; 4723
                              54      08    A2  D0 00019         MOVL    8(THIS_PP), THIS_Q_HEAD                          ; 4724
                                            ED  11 0001D         BRB     1$                                               ; 4719
                              54            66  D0 0001F  2$:    MOVL    (R6), THIS_Q_HEAD                                ; 4728
                              52      F8    A4  9E 00022         MOVAB   -8(R4), THIS_PP                                  ; 4729
                              56            54  D1 00026  3$:    CMPL    THIS_Q_HEAD, R6                                  ; 4734
                                            03  12 00029         BNEQ    4$                                               ;
                                      00BB  31 0002B         BRW     9$                                               ;
                              52      F8    A4  9E 0002E  4$:    MOVAB   -8(R4), THIS_PP                                  ; 4763
                              50      10    A2  D0 00032         MOVL    16(THIS_PP), THIS_DCB                            ; 4764
                              55      08    A2  D0 00036         MOVL    8(THIS_PP), NEXT_PP_Q_HEAD                       ; 4774
                              56            55  D1 0003A         CMPL    NEXT_PP_Q_HEAD, R6                               ; 4776
                                            3F  13 0003D         BEQL    5$                                               ;
                              53      F8    A5  9E 0003F         MOVAB   -8(R5), NEXT_PP                                  ; 4779
                              51            60  3C 00043         MOVZWL  (THIS_DCB), R1                                   ; 4785
                              57      18    A2  32 00046         CVTWL   24(THIS_PP), R7                                  ;
                              51            57  C0 0004A         ADDL2   R7, R1                                           ;
          10    AE            51            01  A3 0004D         SUBW3   #1, R1, TEMP_THIS                                ;
                        12    AE      02    A0  B0 00052         MOVW    2(THIS_DCB), TEMP_THIS+2                         ; 4786
                              51      04    A0  3C 00057         MOVZWL  4(THIS_DCB), R1                                  ; 4788
                              57      1A    A2  32 0005B         CVTWL   26(THIS_PP), R7                                  ;
                              51            57  C0 0005F         ADDL2   R7, R1                                           ;
          14    AE            51            01  A3 00062         SUBW3   #1, R1, TEMP_THIS+4                              ;
                        16    AE      06    A0  B0 00067         MOVW    6(THIS_DCB), TEMP_THIS+6                         ; 4789
                              0E      2F    A0  E9 0006C         BLBC    47(THIS_DCB), 5$                                 ; 4796
                                      10    AE  B7 00070         DECW    TEMP_THIS                                        ; 4799
                        12    AE            02  A0 00073         ADDW2   #2, TEMP_THIS+2                                  ; 4800
                                      14    AE  B7 00077         DECW    TEMP_THIS+4                                      ; 4801
                        16    AE            02  A0 0007A         ADDW2   #2, TEMP_THIS+6                                  ; 4802
                              56            55  D1 0007E  5$:    CMPL    NEXT_PP_Q_HEAD, R6                               ; 4807
                                            5F  13 00081         BEQL    8$                                               ;
                              53      F8    A5  9E 00083         MOVAB   -8(R5), NEXT_PP                                  ; 4817
                              50      10    A3  D0 00087         MOVL    16(NEXT_PP), NEXT_DCB                            ; 4818
                              51            60  3C 0008B         MOVZWL  (NEXT_DCB), R1                                   ; 4825
                              57      18    A3  32 0008E         CVTWL   24(NEXT_PP), R7                                  ;
                              51            57  C0 00092         ADDL2   R7, R1                                           ;
          08    AE            51            01  A3 00095         SUBW3   #1, R1, TEMP_NEXT                                ;
                        0A    AE      02    A0  B0 0009A         MOVW    2(NEXT_DCB), TEMP_NEXT+2                         ; 4826
                              51      04    A0  3C 0009F         MOVZWL  4(NEXT_DCB), R1                                  ; 4828
                              57      1A    A3  32 000A3         CVTWL   26(NEXT_PP), R7                                  ;
                              51            57  C0 000A7         ADDL2   R7, R1                                           ;
          0C    AE            51            01  A3 000AA         SUBW3   #1, R1, TEMP_NEXT+4                              ;
                        0E    AE      06    A0  B0 000AF         MOVW    6(NEXT_DCB), TEMP_NEXT+6                         ; 4829
                              0E      2F    A0  E9 000B4         BLBC    47(NEXT_DCB), 6$                                 ; 4836
                                      08    AE  B7 000B8         DECW    TEMP_NEXT                                        ; 4839
                        0A    AE            02  A0 000BB         ADDW2   #2, TEMP_NEXT+2                                  ; 4840
                                      0C    AE  B7 000BF         DECW    TEMP_NEXT+4                                      ; 4841
                        0E    AE            02  A0 000C2         ADDW2   #2, TEMP_NEXT+6                                  ; 4842
                                            5E  DD 000C6  6$:    PUSHL   SP                                               ; 4849
                                      14    AE  9F 000C8         PUSHAB  TEMP_THIS                                        ;
                                      10    AE  9F 000CB         PUSHAB  TEMP_NEXT                                        ;
                  00000000G   00            03  FB 000CE         CALLS   #3, SMG$$OCCLUDE                                 ;
                              04            50  E9 000D5         BLBC    R0, 7$                                           ;
                        2A    A3            01  88 000D8         BISB2   #1, 42(NEXT_PP)                                  ; 4851
                              55      08    A3  D0 000DC  7$:    MOVL    8(NEXT_PP), NEXT_PP_Q_HEAD                       ; 4856
                                            9C  11 000E0         BRB     5$                                               ; 4807
                              54      08    A2  D0 000E2  8$:    MOVL    8(THIS_PP), THIS_Q_HEAD                          ; 4863
```

```
                                      FF3D  31 000E6         BRW     3$                                           ; 4734
                    50                  01  D0 000E9 9$:     MOVL    #1, R0                                       ; 4867
                                        04 000EC             RET                                                  ; 4869

; Routine Size:  237 bytes,    Routine Base:  _SMG$CODE + 195B


; 4634          4870  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$CHECK_OCCLUSION_FIRST - Check pastings for occlusion'
1 GLOBAL ROUTINE SMG$$CHECK_OCCLUSION_FIRST (
1                                       PBCB : REF $PBCB_DECL
1                                       ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This procedure updates the overlap bit in all the pastings to
1 !       a given pasteboard -- setting a bit in the respective pasting
1 !       packets to record whether each pasting is occluded by
1 !       the highest (most-recently pasted) pasting.  This procedure is
1 !       invoked whenever a virtual display is freshly pasted.
1 !
1 !       This routine differs from SMG$$CHECK_OCCLUSION it that that
1 !       routine compares all pastings to all other pasting.  This
1 !       routine only compares the top pasting to all the others since
1 !       the addition of this new top one can only add an occlusion to
1 !       a lower one.  Any occlusions already existing at a low level
1 !       cannot have been modified by pasting one more on top and there
1 !       is no reason to recalculate their relationship to each other.
1 !
1 !       If we can determine at pasting time that a particular virtual
1 !       display (as pasted) and with a given succession of higher-pasted
1 !       virtual displays is not occluded by any of them,
1 !       we can make mapping run faster since a change to a virtual
1 !       display which is not occluded causes only the changed virtual
1 !       display to be remapped.  Higher pasted virtual displays do not
1 !       have to be remapped since it is known that they do not occlude
1 !       the changed one.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$CHECK_OCCLUSION_FIRST ( PBCB.rab.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       PBCB.rab.r              Address of pasteboard control block
1 !                               which has a new virtual display pasted
1 !                               to it.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
1
```

```
2       BEGIN
2       LOCAL
2           THIS_PP : REF $PP_DECL,
2                           ! Addr of pasting packet for upper-most pasted
2                           ! virtual display.
2
2           THIS_Q_HEAD : REF BLOCK [,BYTE],
2                           ! Addr of 2 longwords that form queue header in
2                           ! PP currently under inspection.
2
2           NEXT_PP : REF $PP_DECL,
2                           ! Addr of pasting packet currently under
2                           ! inspection.
2
2           NEXT_PP_Q_HEAD : REF BLOCK [,BYTE],
2                           ! Addr of 2 longwords that form queue
2                           ! header in PP currently under
2                           ! inspection.
2
2           TEMP_THIS : BLOCK [8,BYTE],
2                           ! Area of projection of THIS virtual
2                           ! display on pasteboard
2
2           TEMP_NEXT : BLOCK [8,BYTE],
2                           ! Area of projection of NEXT virtual
2                           ! display on pasteboard
2
2           THIS_DCB : REF $DCB_DECL;
2
2                           ! Addr of virtual display currently
2                           ! under inspection.
2
2       THIS_Q_HEAD = .PBCB [PBCB_A_PP_NEXT];          ! Most recent pasting
2       THIS_PP = .THIS_Q_HEAD - PP_PBCB_QUEUE_OFFSET;
2
2       THIS_DCB = .THIS_PP [PP_A_DCB_ADDR];
2
2   !+
2   ! It is safe to assume that there is at least one virtual
2   ! display pasted to this pasteboard -- but there may not be more than
2   ! one.  Be careful about reaching ahead to a packet that may not be a
2   ! packet.  If doesn't exist, pointer will be pointing back into PBCB
2   ! -- and inner loop will not be executed.
2   !-
2       NEXT_PP_Q_HEAD = .THIS_PP [PP_A_NEXT_PBCB];
2
2       IF .NEXT_PP_Q_HEAD NEQ PBCB [PBCB_A_PP_NEXT]
2       THEN
3           BEGIN   ! NEXT exists
3           NEXT_PP = .NEXT_PP_Q_HEAD - PP_PBCB_QUEUE_OFFSET;
3           !+
3           ! Form a representation of the projection of THIS virtual
3           ! display onto pasteboard coordinate system.
3           !-
3           TEMP_THIS [DCB_W_ROW_START] = .THIS_DCB [DCB_W_ROW_START] +
3                                         .THIS_PP [PP_W_ROW] - 1;
3           TEMP_THIS [DCB_W_NO_ROWS]   = .THIS_DCB [DCB_W_NO_ROWS];
```

```
3           TEMP_THIS [DCB_W_COL_START] = .THIS_DCB [DCB_W_COL_START] +
3                                         .THIS_PP [PP_W_COL] - 1;
3           TEMP_THIS [DCB_W_NO_COLS]   = .THIS_DCB [DCB_W_NO_COLS];
3
3           !+
3           ! If this virtual display is bordered, its projection is bigger
3           ! than if it were not.  Adjust its projection representation.
3           !-
3           IF .THIS_DCB [DCB_V_BORDERED]
3           THEN
4               BEGIN       ! Border adjustment
4               TEMP_THIS [DCB_W_ROW_START] = .TEMP_THIS [DCB_W_ROW_START] - 1;
4               TEMP_THIS [DCB_W_NO_ROWS]   = .TEMP_THIS [DCB_W_NO_ROWS] + 2;
4               TEMP_THIS [DCB_W_COL_START] = .TEMP_THIS [DCB_W_COL_START] - 1;
4               TEMP_THIS [DCB_W_NO_COLS]   = .TEMP_THIS [DCB_W_NO_COLS] + 2;
3               END;        ! Border adjustment
3
2           END;    ! Next exists
2
2       WHILE .NEXT_PP_Q_HEAD NEQ PBCB [PBCB_A_PP_NEXT]
2       DO
3           BEGIN   ! For all displays from current to bottom
3           LOCAL
3               NEXT_DCB : REF $DCB_DECL,
3                                       ! Addr of DCB associated with NEXT_PP
3               OVERLAP : BLOCK [8,BYTE];
3                                       ! Returned by SMG$$OCCLUDE, but not
3                                       ! used in this context
3
3           NEXT_PP = .NEXT_PP_Q_HEAD - PP_PBCB_QUEUE_OFFSET;
3           NEXT_DCB = .NEXT_PP [PP_A_DCB_ADDR];
3
3           !+
3           ! Form a representation of the projection of NEXT virtual
3           ! display onto pasteboard coordinate system.
3           !-
3           TEMP_NEXT [DCB_W_ROW_START] = .NEXT_DCB [DCB_W_ROW_START] +
3                                         .NEXT_PP [PP_W_ROW] - 1;
3           TEMP_NEXT [DCB_W_NO_ROWS]   = .NEXT_DCB [DCB_W_NO_ROWS];
3           TEMP_NEXT [DCB_W_COL_START] = .NEXT_DCB [DCB_W_COL_START] +
3                                         .NEXT_PP [PP_W_COL] - 1;
3           TEMP_NEXT [DCB_W_NO_COLS]   = .NEXT_DCB [DCB_W_NO_COLS];
3
3               !+
3               ! If this next virtual display is bordered, its projection is
3               ! bigger than if it were not.  Adjust its projection
3               ! representation.
3               !-
3               IF .NEXT_DCB [DCB_V_BORDERED]
3               THEN
4                   BEGIN   ! Border adjustment
4                   TEMP_NEXT [DCB_W_ROW_START] = .TEMP_NEXT [DCB_W_ROW_START] - 1;
4                   TEMP_NEXT [DCB_W_NO_ROWS]   = .TEMP_NEXT [DCB_W_NO_ROWS] + 2;
4                   TEMP_NEXT [DCB_W_COL_START] = .TEMP_NEXT [DCB_W_COL_START] - 1;
4                   TEMP_NEXT [DCB_W_NO_COLS]   = .TEMP_NEXT [DCB_W_NO_COLS] + 2;
3                   END;    ! Border adjustment
3
```

```
; 4807          5042  3             !+
; 4808          5043  3             ! Check to see if THIS virtual display occludes NEXT
; 4809          5044  3             ! vitual display and if so set occlusion bit of NEXT.
; 4810          5045  3             !-
; 4811          5046  3             IF SMG$$OCCLUDE ( TEMP_NEXT, TEMP_THIS, OVERLAP)
; 4812          5047  3             THEN
; 4813          5048  3                 NEXT_PP [PP_V_OCCLUDED] = 1;
; 4814          5049  3
; 4815          5050  3             !+
; 4816          5051  3             ! Walk chain in direction of earlier pasted packets.
; 4817          5052  3             !-
; 4818          5053  3             NEXT_PP_Q_HEAD = .NEXT_PP [PP_A_NEXT_PBCB];
; 4819          5054  3
; 4820          5055  2             END;     ! For all displays from current to bottom
; 4821          5056  2
; 4822          5057  2
; 4823          5058  2         RETURN (SS$_NORMAL);
; 4824          5059  2
; 4825          5060  1         END;                ! End of routine SMG$$CHECK_OCCLUSION_FIRST



                                  003C 00000          .ENTRY  SMG$$CHECK_OCCLUSION_FIRST, Save R2,R3,R4,- ; 4872
                                                              R5                                          ;
                 5E          18    C2 00002           SUBL2   #24, SP                                     ;
                 51    04    BC    D0 00005           MOVL    @PBCB, THIS_Q_HEAD                          ; 4960
                 51          08    C2 00009           SUBL2   #8, THIS_PP                                 ; 4961
                 50    10    A1    D0 0000C           MOVL    16(THIS_PP), THIS_DCB                       ; 4963
                 53    08    A1    D0 00010           MOVL    8(THIS_PP), NEXT_PP_Q_HEAD                  ; 4972
            04   AC          53    D1 00014           CMPL    NEXT_PP_Q_HEAD, PBCB                        ; 4974
                             3F    13 00018           BEQL    1$                                          ;
                 52    F8    A3    9E 0001A           MOVAB   -8(R3), NEXT_PP                             ; 4977
                 54          60    3C 0001E           MOVZWL  (THIS_DCB), R4                              ; 4983
                 55    18    A1    32 00021           CVTWL   24(THIS_PP), R5                             ;
                 54          55    C0 00025           ADDL2   R5, R4                                      ;
  10   AE        54          01    A3 00028           SUBW3   #1, R4, TEMP_THIS                           ;
            12   AE    02    A0    B0 0002D           MOVW    2(THIS_DCB), TEMP_THIS+2                    ; 4984
                 54    04    A0    3C 00032           MOVZWL  4(THIS_DCB), R4                             ; 4986
                 51    1A    A1    32 00036           CVTWL   26(THIS_PP), R1                             ;
                 51          54    C0 0003A           ADDL2   R4, R1                                      ;
  14   AE        51          01    A3 0003D           SUBW3   #1, R1, TEMP_THIS+4                         ;
            16   AE    06    A0    B0 00042           MOVW    6(THIS_DCB), TEMP_THIS+6                    ; 4987
                 0E    2F    A0    E9 00047           BLBC    47(THIS_DCB), 1$                            ; 4993
                       10    AE    B7 0004B           DECW    TEMP_THIS                                   ; 4996
            12   AE          02    A0 0004E           ADDW2   #2, TEMP_THIS+2                             ; 4997
                       14    AE    B7 00052           DECW    TEMP_THIS+4                                 ; 4998
            16   AE          02    A0 00055           ADDW2   #2, TEMP_THIS+6                             ; 4999
            04   AC          53    D1 00059  1$:      CMPL    NEXT_PP_Q_HEAD, PBCB                        ; 5004
                             5F    13 0005D           BEQL    4$                                          ;
                 52    F8    A3    9E 0005F           MOVAB   -8(R3), NEXT_PP                             ; 5014
                 50    10    A2    D0 00063           MOVL    16(NEXT_PP), NEXT_DCB                       ; 5015
                 51          60    3C 00067           MOVZWL  (NEXT_DCB), R1                              ; 5022
                 54    18    A2    32 0006A           CVTWL   24(NEXT_PP), R4                             ;
                 51          54    C0 0006E           ADDL2   R4, R1                                      ;
  08   AE        51          01    A3 00071           SUBW3   #1, R1, TEMP_NEXT                           ;
```

```
                        0A    AE      02    A0  B0 00076        MOVW    2(NEXT_DCB), TEMP_NEXT+2              ; 5023
                              51      04    A0  3C 0007B        MOVZWL  4(NEXT_DCB), R1                       ; 5025
                              54      1A    A2  32 0007F        CVTWL   26(NEXT_PP), R4                       ;
                              51            54  C0 00083        ADDL2   R4, R1                                ;
              0C    AE        51            01  A3 00086        SUBW3   #1, R1, TEMP_NEXT+4                   ;
                        0E    AE      06    A0  B0 0008B        MOVW    6(NEXT_DCB), TEMP_NEXT+6              ; 5026
                              0E      2F    A0  E9 00090        BLBC    47(NEXT_DCB), 2$                      ; 5033
                                      08    AE  B7 00094        DECW    TEMP_NEXT                             ; 5036
                        0A    AE            02  A0 00097        ADDW2   #2, TEMP_NEXT+2                       ; 5037
                                      0C    AE  B7 0009B        DECW    TEMP_NEXT+4                           ; 5038
                        0E    AE            02  A0 0009E        ADDW2   #2, TEMP_NEXT+6                       ; 5039
                                            5E  DD 000A2 2$:    PUSHL   SP                                    ; 5046
                                      14    AE  9F 000A4        PUSHAB  TEMP_THIS                             ;
                                      10    AE  9F 000A7        PUSHAB  TEMP_NEXT                             ;
                   00000000G  00            03  FB 000AA        CALLS   #3, SMG$$OCCLUDE                      ;
                              04            50  E9 000B1        BLBC    R0, 3$                                ;
                        2A    A2            01  88 000B4        BISB2   #1, 42(NEXT_PP)                       ; 5048
                              53      08    A2  D0 000B8 3$:    MOVL    8(NEXT_PP), NEXT_PP_Q_HEAD            ; 5053
                                            9B  11 000BC        BRB     1$                                    ; 5004
                              50            01  D0 000BE 4$:    MOVL    #1, R0                                ; 5058
                                                04 000C1        RET                                           ; 5060

; Routine Size:  194 bytes,    Routine Base:  _SMG$CODE + 1A48

; 4826          5061  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$CREATE_PASTEBOARD - Create Pasteboard Control Block (PBCB)'
1 GLOBAL ROUTINE SMG$$CREATE_PASTEBOARD (
1                                  ROWS,
1                                  COLS,
1                                  PBCB_ADDR
1                                         ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine allocates space for a pasteboard control block.
1 !       It also allocates a buffer called the output buffer
1 !       which is used to buffer output to this terminal
1 !       (if buffering is enabled).
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$CREATE_PASTEBOARD (
1 !                                          ROWS.rl.r,
1 !                                          COLS.rl.r,
1 !                                          PBCB.wl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       ROWS.rl.r        Max. number of rows that a window onto this
1 !                        pasteboard will have.
1 !
1 !       COLS.rl.r        Max. number of columns that a window onto this
1 !                        pasteboard will have.
1 !
1 !       PBCB_ADDR.wl.r   Address of the newly-created PBCB -- returned to
1 !                        caller.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       items in PBCB get filled in.
1 !       in particular, an output buffer is allocated.
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL       Normal successful completion
1 !       LIB$_INSVIRMEM   Insufficient virtual memory to allocate needed
1 !                        buffers.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
```

```
    BEGIN
    LOCAL
        PBCB : REF $PBCB_DECL, ! Address of PBCB allocated.

        STATUS;             ! Status of subroutine calls

    LITERAL

        PBCB_K_OUTBUF_DEFAULT_SIZE

            = 256;          ! Default size for output buffer
                            ! (if all other algorithms fail)

!+
! Allocate space for the PBCB itself.
!-
    IF NOT (STATUS = LIB$GET_VM (%REF (PBCB_K_SIZE), PBCB))
    THEN
        RETURN (.STATUS);

    CH$FILL (0, PBCB_K_SIZE, .PBCB);     ! Clear all fields to default 0

!+
! Allocate the window control block that goes along with this
! pasteboard, returning failure if we can't.
!-
    IF NOT (STATUS = SMG$$CREATE_WCB (.ROWS, .COLS, PBCB [PBCB_A_WCB]))
    THEN
        BEGIN   ! No more space
        !+
        ! If we can't get space for WCB, we might as well give back
        ! the PBCB space itself.
        !-
        LIB$FREE_VM (%REF (PBCB_K_SIZE), PBCB);
        RETURN (.STATUS);
        END;    ! No more space

!+
! Allocate output buffer that goes along with this pasteboard, returning
! failure if we can't.
! This buffer is used (if buffering is enabled) to buffer all output to
! this terminal.
! When V3B comes out, we should do a better job in figuring
! out a good size for this buffer by looking at sysgen paramaters
! and user quotas, etc.  For now, we just allocate a fixed space.
!-

    STATUS = LIB$GET_VM (%REF (PBCB_K_OUTBUF_DEFAULT_SIZE),
                         PBCB [PBCB_A_OUTPUT_BUFFER] );
    IF NOT .STATUS
    THEN
        BEGIN
        !+
        ! If we can't get space for the output buffer, we might as well
        ! give back the PBCB space itself as well as the WCB space.
        ! Ignore any errors that occur while trying to free this space.
        !-
```

```
; 4937          5170 3          SMG$$DEALLOCATE_WCB( .PBCB [PBCB_A_WCB] );
; 4938          5171 3          LIB$FREE_VM (%REF (PBCB_K_SIZE), PBCB);
; 4939          5172 3          RETURN (.STATUS);
; 4940          5173 2          END;
; 4941          5174 2
; 4942          5175 2      PBCB [PBCB_W_OUTPUT_BUFSIZ] = PBCB_K_OUTBUF_DEFAULT_SIZE;    ! allocation
; 4943          5176 2
; 4944          5177 2  !+
; 4945          5178 2  ! Initialize pasting queue header to self.
; 4946          5179 2  !-
; 4947          5180 2      PBCB [PBCB_A_PP_NEXT] = PBCB [PBCB_A_PP_NEXT];
; 4948          5181 2      PBCB [PBCB_A_PP_PREV] = PBCB [PBCB_A_PP_NEXT];
; 4949          5182 2
; 4950          5183 2  !+
; 4951          5184 2  ! Initialize mode settings to default.
; 4952          5185 2  !-
; 4953          5186 2      PBCB [PBCB_L_MODE_SETTINGS] = PBCB_K_DEF_MODE_SETTINGS;
; 4954          5187 2
; 4955          5188 2  !+
; 4956          5189 2  ! Return the address of the PBCB we've built.
; 4957          5190 2  !-
; 4958          5191 2      .PBCB_ADDR = .PBCB;
; 4959          5192 2
; 4960          5193 2      RETURN (SS$_NORMAL);
; 4961          5194 1      END;                              ! Routine SMG$$CREATE_PASTEBOARD




                                               00FC 00000          .ENTRY  SMG$$CREATE_PASTEBOARD, Save R2,R3,R4,R5,-   ; 5063
                                                                           R6,R7
                            57 00000000G   00  9E 00002          MOVAB   LIB$GET_VM, R7                                  ;
                            5E             08  C2 00009          SUBL2   #8, SP                                          ;
                                      04   AE  9F 0000C          PUSHAB  PBCB                                            ; 5129
                  04   AE           014C   8F  3C 0000F          MOVZWL  #332, 4(SP)                                     ;
                                      04   AE  9F 00015          PUSHAB  4(SP)                                           ;
                            67             02  FB 00018          CALLS   #2, LIB$GET_VM                                  ;
                            56             50  D0 0001B          MOVL    R0, STATUS                                      ;
                            51             56  E9 0001E          BLBC    STATUS, 2$                                      ;
   014C   8F          00    6E             00  2C 00021          MOVC5   #0, (SP), #0, #332, @PBCB                       ; 5133
                                      04   BE     00028                                                                  ;
                      7E          04   AE  08  C1 0002A          ADDL3   #8, PBCB, -(SP)                                 ; 5139
                            7E        04   AC  7D 0002F          MOVQ    ROWS, -(SP)                                     ;
                     0000V  CF             03  FB 00033          CALLS   #3, SMG$$CREATE_WCB                             ;
                            56             50  D0 00038          MOVL    R0, STATUS                                      ;
                            21             56  E9 0003B          BLBC    STATUS, 1$                                      ;
                            52        04   AE  D0 0003E          MOVL    PBCB, R2                                        ; 5161
                                      6C   A2  9F 00042          PUSHAB  108(R2)                                         ;
                  04   AE           0100   8F  3C 00045          MOVZWL  #256, 4(SP)                                     ; 5160
                                      04   AE  9F 0004B          PUSHAB  4(SP)                                           ;
                            67             02  FB 0004E          CALLS   #2, LIB$GET_VM                                  ; 5161
                            56             50  D0 00051          MOVL    R0, STATUS                                      ;
                            1F             56  E8 00054          BLBS    STATUS, 3$                                      ; 5162
                                      08   A2  DD 00057          PUSHL   8(R2)                                           ; 5170
                     0000V  CF             01  FB 0005A          CALLS   #1, SMG$$DEALLOCATE_WCB                         ;
                                      04   AE  9F 0005F 1$:      PUSHAB  PBCB                                            ; 5171
```

```
                 04   AE      014C   8F  3C 00062         MOVZWL  #332, 4(SP)                        ;
                                04   AE  9F 00068         PUSHAB  4(SP)                              ;
          00000000G   00             02  FB 0006B         CALLS   #2, LIB$FREE_VM                    ;
                      50             56  D0 00072 2$:     MOVL    STATUS, R0                         ; 5172
                                     04     00075         RET                                        ;
                      50        04   AE  D0 00076 3$:     MOVL    PBCB, R0                           ; 5175
                 70   A0      0100   8F  B0 0007A         MOVW    #256, 112(R0)                      ;
                      60             50  D0 00080         MOVL    R0, (R0)                           ; 5180
                 04   A0             50  D0 00083         MOVL    R0, 4(R0)                          ; 5181
                 0C   A0             02  D0 00087         MOVL    #2, 12(R0)                         ; 5186
                 0C   BC             50  D0 0008B         MOVL    R0, @PBCB_ADDR                     ; 5191
                      50             01  D0 0008F         MOVL    #1, R0                             ; 5193
                                     04     00092         RET                                        ; 5194

; Routine Size:  147 bytes,    Routine Base:  _SMG$CODE + 1B0A


; 4962          5195  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$CREATE_VIRTUAL_DISPLAY - Create Virtual Display'
1 GLOBAL ROUTINE SMG$$CREATE_VIRTUAL_DISPLAY (
1                                            NUM_ROWS,       ! height
1                                            NUM_COLS,       ! width
1                                            NEW_DISPLAY_ID,
1                                            DISPLAY_ATTRIBUTES,
1                                            VIDEO_ATTRIBUTES,
1                                            CHAR_SET
1                                            ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine creates a new virtual display -- returning its
1 !       assigned display_id.  Its initial contents are blanks with
1 !       video attributes set to those specified.  The cursor
1 !       will be at row 1 column 1.
1 !       This is the inner-most create_virtual_display routine.  It
1 !       assumes all of its parameters are present.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$CREATE_VIRTUAL_DISPLAY (
1 !                               NUM_ROWS.rl.r,          ! Height
1 !                               NUM_COLS.rl.r,          ! Width
1 !                               NEW_DISPLAY_ID.wl.r,
1 !                               DISPLAY_ATTRIBUTES.rl.r,
1 !                               VIDEO_ATTRIBUTES.rl.r,
1 !                               CHAR_SET.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       NUM_ROWS.rl.r     Number of rows in new virtual display.
1 !
1 !       NUM_COLS.rl.r     Number of columns in new virtual display.
1 !
1 !       NEW_DISPLAY_ID.wl.r       Virtual display id of newly-created
1 !                                 virtual display.
1 !
1 !       DISPLAY_ATTRIBUTES.rl.r The default display attributes.
1 !
1 !                       SMG$M_BORDER if virtual display is to be
1 !                                    displayed with a border.
1 !
1 !                       SMG$M_TRUNC_ICON if an icon should be displayed
1 !                                    when text overflows the display
1 !                                    bounds.
1 !
1 !                       SMG$M_DISPLAY_CONTROLS if carriage controls (CR, LF,
1 !                                    (FF, VT, HT) should be displayed instead
1 !                                    of executed.
1 !
1 !       VIDEO_ATTRIBUTES.rl.r   The default rendition code to be
1 !                       applied to all output to this display unless
1 !                       overridden on a particular output call.
1 !
1 !                       Values:
1 !
```

```
1 !                             SMG$M_BLINK      displays characters blinking.
1 !
1 !                             SMG$M_BOLD       displays characters in
1 !                                              higher-than-normal intensity.
1 !
1 !                             SMG$M_REVERSE    displays characters in reverse
1 !                                              video -- that is, using the
1 !                                              opposite default rendition of
1 !                                              the virtual display.
1 !
1 !                             SMG$M_UNDERLINE  displays characters underlined.
1 !
1 !         CHAR_SET.rb.r       Specifies the default character set to be used
1 !                             for this display.
1 !                             Recognized values are:
1 !                                              SMG$C_UNITED_KINGDOM
1 !                                              SMG$C_ASCII (default)
1 !                                              SMG$C_SPEC_GRAPHICS
1 !                                              SMG$C_ALT_CHAR
1 !                                              SMG$C_ALT_GRAPHICS
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !         NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !         NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !         SS$_NORMAL          Normal successful completion
1 !         LIB$_INSVIRMEM      Insufficient virtual memory to allocate needed
1 !                             buffer.
1 !         SMG$_INVARG         Unrecognized Video Attributes
1 !                          or Unrecognized Display Attributes
1 !
1 ! SIDE EFFECTS:
1 !
1 !         NONE
1 !--
2     BEGIN
2     LOCAL
2         STATUS,                   ! Status of subroutine calls
2         DCB : REF $DCB_DECL,      ! Addr of display control block
2         DESC : REF BLOCK [8,BYTE]; ! Pointer to dynamic descriptor in
2                                   ! DCB for border label
2
2 !+
2 ! Allocate space for DCB itself.  Quit if we can't get it.
2 !-
3     IF NOT (STATUS = LIB$GET_VM ( %REF (DCB_K_SIZE), DCB))
2     THEN
2         RETURN (.STATUS);
2
2     CH$FILL (0, DCB_K_SIZE, .DCB);        ! set all fields to default of 0
2
```

```
2 !+
2 ! Set up dimensions of display
2 !-
2     DCB [DCB_W_ROW_START] = 1;
2     DCB [DCB_W_NO_ROWS]   = ..NUM_ROWS;
2     DCB [DCB_W_COL_START] = 1;
2     DCB [DCB_W_NO_COLS]   = ..NUM_COLS;
2     DCB [DCB_L_BUFSIZE]   = ..NUM_ROWS * ..NUM_COLS;
2
2 !+
2 ! Record default display attributes, default video attributes and
2 ! default character set.
2 !-
2     DCB [DCB_B_DEF_DISPLAY_ATTR] = ..DISPLAY_ATTRIBUTES;
2     DCB [DCB_B_DEF_VIDEO_ATTR]   = ..VIDEO_ATTRIBUTES;
2     DCB [DCB_B_DEF_CHAR_SET]     = ..CHAR_SET;
2
2 !+
2 ! Set up various fields in the DCB
2 !-
2     DCB [DCB_L_DID] = .DCB;              ! Display id itself -- the
2                                          ! address of the DCB
2
2     DCB [DCB_W_CURSOR_ROW] = 1;          ! Cursor row and column to home
2     DCB [DCB_W_CURSOR_COL] = 1;
2
2     DCB [DCB_B_STRUCT_TYPE]  = DCB_K_STRUCT_TYPE; ! Mark as being a DCB
2     DCB [DCB_W_DCB_LENGTH]   = DCB_K_SIZE;        ! Size of structure
2
2     DCB [DCB_W_TOP_OF_SCRREG] = .DCB [DCB_W_ROW_START];
2     DCB [DCB_W_BOTTOM_OF_SCRREG] = .DCB [DCB_W_NO_ROWS];
2                                          ! init scrolling region
2 !+
2 ! Allocate enough space for both the text buffer and the attribute
2 ! buffer.
2 !-
3     IF NOT (STATUS = LIB$GET_VM (%REF (.DCB [DCB_L_BUFSIZE] *2),
3                                  DCB [DCB_A_TEXT_BUF]))
3     THEN
3         BEGIN   ! Ran out of space
3         !+
3         ! If we can't get enough space for the buffers, we might as well
3         ! give back the DCB space itself.
3         !-
3         LIB$FREE_VM ( %REF (DCB_K_SIZE), DCB); ! Return DCB space
3         RETURN (.STATUS);           ! Return the LIB$_INSVIRMEM from the
3                                     ! buffer allocation attempt
2         END;    ! Ran out of space
2
2 !+
2 ! Use upper half of space allocated as the attribute buffer.
2 !-
2     DCB [DCB_A_ATTR_BUF] = .DCB [DCB_A_TEXT_BUF] + .DCB [DCB_L_BUFSIZE];
2
2 !+
2 ! Initialize text and attribute buffers.
2 !-
```

```
2        CH$FILL (%C' ', .DCB [DCB_L_BUFSIZE], .DCB [DCB_A_TEXT_BUF]);
2        CH$FILL (.DCB [DCB_B_DEF_VIDEO_ATTR], .DCB [DCB_L_BUFSIZE],
2                 .DCB [DCB_A_ATTR_BUF]);
2
2    !+
2    ! If we are dealing with a non-standard character set, allocate the
2    ! char_set buffer.  If we can't, bail out, giving back all the space
2    ! allocated on this transaction.
2    !-
2        IF .DCB [DCB_B_DEF_CHAR_SET] NEQ 0
2        THEN
3            BEGIN   ! Will need char_set buffer
4            IF NOT (STATUS = LIB$GET_VM ( DCB [DCB_L_BUFSIZE],
4                                          DCB [DCB_A_CHAR_SET_BUF]))
3            THEN
4                BEGIN        ! Bailout
4                !+
4                ! If we can't get space for buffer we need, give back the
4                ! the text and attribute buffer, and DCB itself before
4                ! quitting.
4                !-
4                LIB$FREE_VM (%REF (2 * .DCB [DCB_L_BUFSIZE]),
4                             DCB [DCB_A_TEXT_BUF]);
4                LIB$FREE_VM (%REF (DCB_K_SIZE), DCB);
4                RETURN (.STATUS);
3                END;         ! Bailout
3
3            CH$FILL (.DCB [DCB_B_DEF_CHAR_SET], .DCB [DCB_L_BUFSIZE],
3                     .DCB [DCB_A_CHAR_SET_BUF]);
3
2            END;    ! Will need char_set buffer
2
2
2    !+
2    ! Allocate and clear the line characteristics vector.
2    !-
3        IF NOT (STATUS = LIB$GET_VM ( %REF ( .DCB [DCB_W_NO_ROWS] +1),
3                                       DCB [DCB_A_LINE_CHAR]))
2        THEN
3            BEGIN   ! Error path
3            !+
3            ! Give back all space accumulated on this trans. before
3            ! bailing out.
3            !-
3            LIB$FREE_VM (%REF (2 * .DCB [DCB_L_BUFSIZE]),
3                         DCB [DCB_A_TEXT_BUF]);
3
3            IF .DCB [DCB_A_CHAR_SET_BUF] NEQ 0
3            THEN
3                LIB$FREE_VM ( DCB [DCB_L_BUFSIZE], DCB [DCB_A_CHAR_SET_BUF]);
3
3            LIB$FREE_VM (%REF (DCB_K_SIZE), DCB);
3
3            RETURN (.STATUS);
2            END;    ! Error path
2
2        CH$FILL ( 0, .DCB [DCB_W_NO_ROWS] + 1, .DCB [DCB_A_LINE_CHAR]);
```

```
; 5192          5424  2
; 5193          5425  2  !+
; 5194          5426  2  ! Initialize pasting queue headers to point to self.
; 5195          5427  2  !-
; 5196          5428  2      DCB [DCB_A_PP_NEXT] = DCB [DCB_A_PP_NEXT];
; 5197          5429  2      DCB [DCB_A_PP_PREV] = DCB [DCB_A_PP_NEXT];
; 5198          5430  2
; 5199          5431  2  !+
; 5200          5432  2  ! Initialize border label descriptor to virgin dynamic string descriptor
; 5201          5433  2  !-
; 5202          5434  2      DESC = DCB [DCB_Q_LABEL_DESC];
; 5203          5435  2
; 5204          5436  2      DESC [DSC$B_CLASS]           = DSC$K_CLASS_D;
; 5205          5437  2      DESC [DSC$B_DTYPE]           = DSC$K_DTYPE_T;
; 5206          5438  2
; 5207          5439  2  !+
; 5208          5440  2  ! Return the new display id to caller
; 5209          5441  2  !-
; 5210          5442  2      .NEW_DISPLAY_ID = .DCB;
; 5211          5443  2
; 5212          5444  2      RETURN (SS$_NORMAL);
; 5213          5445  1      END;                          ! Routine SMG$$CREATE_VIRTUAL_DISPLAY



                                               03FC 00000          .ENTRY  SMG$$CREATE_VIRTUAL_DISPLAY, Save R2,R3,R4,-; 5197
                                                                           R5,R6,R7,R8,R9                              ;
                              59 00000000G  00  9E 00002           MOVAB   LIB$FREE_VM, R9                             ;
                              58 00000000G  00  9E 00009           MOVAB   LIB$GET_VM, R8                              ;
                              5E            08  C2 00010           SUBL2   #8, SP                                      ;
                                       04   AE  9F 00013           PUSHAB  DCB                                         ; 5304
                        04    AE       70   8F  9A 00016           MOVZBL  #112, 4(SP)                                 ;
                                       04   AE  9F 0001B           PUSHAB  4(SP)                                       ;
                              68            02  FB 0001E           CALLS   #2, LIB$GET_VM                              ;
                              57            50  D0 00021           MOVL    R0, STATUS                                  ;
                              03            57  E8 00024           BLBS    STATUS, 1$                                  ;
                                          00F5  31 00027           BRW     7$                                          ;
                              56       04   AE  D0 0002A 1$:       MOVL    DCB, R6                                     ; 5308
   0070    8F          00     6E            00  2C 0002E           MOVC5   #0, (SP), #0, #112, (R6)                    ;
                                            66     00035                                                               ;
                              66            01  B0 00036           MOVW    #1, (R6)                                    ; 5313
                        02    A6       04   BC  B0 00039           MOVW    @NUM_ROWS, 2(R6)                            ; 5314
                        04    A6            01  B0 0003E           MOVW    #1, 4(R6)                                   ; 5315
                        06    A6       08   BC  B0 00042           MOVW    @NUM_COLS, 6(R6)                            ; 5316
           3C    A6     04    BC       08   BC  C5 00047           MULL3   @NUM_COLS, @NUM_ROWS, 60(R6)                ; 5317
                        2F    A6       10   BC  90 0004E           MOVB    @DISPLAY_ATTRIBUTES, 47(R6)                 ; 5323
                        2E    A6       14   BC  90 00053           MOVB    @VIDEO_ATTRIBUTES, 46(R6)                   ; 5324
                        30    A6       18   BC  90 00058           MOVB    @CHAR_SET, 48(R6)                           ; 5325
                        38    A6            56  D0 0005D           MOVL    R6, 56(R6)                                  ; 5330
                        28    A6 00010001   8F  D0 00061           MOVL    #65537, 40(R6)                              ; 5333
                        44    A6            11  90 00069           MOVB    #17, 68(R6)                                 ; 5336
                        45    A6       70   8F  9B 0006D           MOVZBW  #112, 69(R6)                                ; 5337
                        48    A6            66  D0 00072           MOVL    (R6), 72(R6)                                ; 5339
                                       10   A6  9F 00076           PUSHAB  16(R6)                                      ; 5347
           04    AE     3C    A6            01  78 00079           ASHL    #1, 60(R6), 4(SP)                           ; 5346
```

```
                                         04    AE   9F 0007F          PUSHAB  4(SP)                                        ;
                             68                02   FB 00082          CALLS   #2, LIB$GET_VM                               ; 5347
                             57                50   D0 00085          MOVL    R0, STATUS                                   ;
                             03                57   E8 00088          BLBS    STATUS, 2$                                   ;
                                       0083    31      0008B          BRW     6$                                           ;
                             56          04    AE   D0 0008E 2$:      MOVL    DCB, R6                                      ; 5362
               14    A6      10    A6    3C    A6   C1 00092          ADDL3   60(R6), 16(R6), 20(R6)                       ;
     3C   A6         20            6E          00   2C 00099          MOVC5   #0, (SP), #32, 60(R6), @16(R6)               ; 5367
                                         10    B6      0009F                                                               ;
     3C   A6   2E    A6            6E          00   2C 000A1          MOVC5   #0, (SP), 46(R6), 60(R6), @20(R6)            ; 5369
                                         14    B6      000A8                                                               ;
                                         30    A6   95 000AA          TSTB    48(R6)                                       ; 5376
                                               2A   13 000AD          BEQL    4$                                           ;
                                         18    A6   9F 000AF          PUSHAB  24(R6)                                       ; 5380
                                         3C    A6   9F 000B2          PUSHAB  60(R6)                                       ; 5379
                             68                02   FB 000B5          CALLS   #2, LIB$GET_VM                               ; 5380
                             57                50   D0 000B8          MOVL    R0, STATUS                                   ;
                             0E                57   E8 000BB          BLBS    STATUS, 3$                                   ;
                                         10    A6   9F 000BE          PUSHAB  16(R6)                                       ; 5389
               04    AE      3C    A6          01   78 000C1          ASHL    #1, 60(R6), 4(SP)                            ; 5388
                                         04    AE   9F 000C7          PUSHAB  4(SP)                                        ;
                                               42   11 000CA          BRB     5$                                           ; 5389
                             50          04    AE   D0 000CC 3$:      MOVL    DCB, R0                                      ; 5394
     3C   A0   30    A0            6E          00   2C 000D0          MOVC5   #0, (SP), 48(R0), 60(R0), @24(R0)            ; 5395
                                         18    B0      000D7                                                               ;
                             52          04    AE   D0 000D9 4$:      MOVL    DCB, R2                                      ; 5404
                                         4C    A2   9F 000DD          PUSHAB  76(R2)                                       ;
                       04    AE          02    A2   3C 000E0          MOVZWL  2(R2), 4(SP)                                 ; 5403
                                         04    AE   D6 000E5          INCL    4(SP)                                        ;
                                         04    AE   9F 000E8          PUSHAB  4(SP)                                        ;
                             68                02   FB 000EB          CALLS   #2, LIB$GET_VM                               ; 5404
                             57                50   D0 000EE          MOVL    R0, STATUS                                   ;
                             2F                57   E8 000F1          BLBS    STATUS, 8$                                   ;
                                         10    A2   9F 000F4          PUSHAB  16(R2)                                       ; 5412
               04    AE      3C    A2          01   78 000F7          ASHL    #1, 60(R2), 4(SP)                            ; 5411
                                         04    AE   9F 000FD          PUSHAB  4(SP)                                        ;
                             69                02   FB 00100          CALLS   #2, LIB$FREE_VM                              ; 5412
                                         18    A2   D5 00103          TSTL    24(R2)                                       ; 5414
                                               09   13 00106          BEQL    6$                                           ;
                                         18    A2   9F 00108          PUSHAB  24(R2)                                       ; 5416
                                         3C    A2   9F 0010B          PUSHAB  60(R2)                                       ;
                             69                02   FB 0010E 5$:      CALLS   #2, LIB$FREE_VM                              ;
                                         04    AE   9F 00111 6$:      PUSHAB  DCB                                          ; 5418
                       04    AE          70    8F   9A 00114          MOVZBL  #112, 4(SP)                                  ;
                                         04    AE   9F 00119          PUSHAB  4(SP)                                        ;
                             69                02   FB 0011C          CALLS   #2, LIB$FREE_VM                              ;
                             50                57   D0 0011F 7$:      MOVL    STATUS, R0                                   ; 5420
                                                    04 00122          RET                                                  ;
                             56          04    AE   D0 00123 8$:      MOVL    DCB, R6                                      ; 5423
                             50          02    A6   3C 00127          MOVZWL  2(R6), R0                                    ;
                                               50   D6 0012B          INCL    R0                                           ;
          50         00            6E          00   2C 0012D          MOVC5   #0, (SP), #0, R0, @76(R6)                    ;
                                         4C    B6      00132                                                               ;
                       20    A6          20    A6   9E 00134          MOVAB   32(R6), 32(R6)                               ; 5428
                       24    A6          20    A6   9E 00139          MOVAB   32(R6), 36(R6)                               ; 5429
                             50          08    A6   9E 0013E          MOVAB   8(R6), DESC                                  ; 5434
                       02    A0        020E    8F   B0 00142          MOVW    #526, 2(DESC)                                ; 5437
```

```
                        0C   BC              56  D0 00148         MOVL    R6, @NEW_DISPLAY_ID                      ; 5442
                             50              01  D0 0014C         MOVL    #1, R0                                   ; 5444
                                                 04 0014F         RET                                              ; 5445

; Routine Size:  336 bytes,    Routine Base:  _SMG$CODE + 1B9D


; 5214          5446  1 !<BLF/PAGE>
```

```
%SBTTL 'SMG$$CREATE_WCB - Create WCB and its buffers'
GLOBAL ROUTINE SMG$$CREATE_WCB (
                                ROWS,
                                COLS,
                                WCB_ADDR
                                        ) =
!++
! FUNCTIONAL DESCRIPTION:
!
!       This routine allocates space for the window control block and
!       its window text and attribute buffers and initializes them.
!       Two sets of these two buffers are built -- one to reflect what
!       is currently on the screen and one to build up what the next
!       screen image should look like.
!
! CALLING SEQUENCE:
!
!       ret_status.wlc.v = SMG$$CREATE_WCB (     ROWS.rl.r,
!                                               COLS.rl.r,
!                                               WCB_ADDR.wl.r)
!
! FORMAL PARAMETERS:
!
!       ROWS.rl.r       No. of rows in each of the buffers
!
!       COLS.rl.r       No. of columns in each of the buffers
!
!       WCB_ADDR.wl.r   Address of the newly-created WCB -- returned to
!                       caller.
!
!
!
! IMPLICIT INPUTS:
!
!       NONE
!
! IMPLICIT OUTPUTS:
!
!       NONE
!
! COMPLETION STATUS:
!
!       SS$_NORMAL      Normal successful completion
!       LIB$_INSVIRMEM  Insufficient virtual memory to allocate needed
!                       buffer.
!
! SIDE EFFECTS:
!
!       NONE
!--
    BEGIN
    LOCAL
        WCB : REF $WCB_DECL,    ! Address of WCB allocated.
        STATUS;                 ! Status of subroutine calls

!+
! Allocate space for the WCB itself.
```

```
!-
    IF NOT (STATUS = LIB$GET_VM (%REF (WCB_K_SIZE), WCB))
    THEN
        RETURN (.STATUS);

    CH$FILL (0, WCB_K_SIZE, .WCB);       ! Clear all fields to default 0

    WCB [WCB_L_BUFSIZE] = ..ROWS * ..COLS; ! Overall size of each buffer

!+
! Attempt to get space for all 4 buffers at once, returning an error if
! we can't.
!-
    IF NOT (STATUS = LIB$GET_VM ( %REF (4 * .WCB [WCB_L_BUFSIZE]),
                                  WCB [WCB_A_TEXT_BUF]))
    THEN
        BEGIN   ! No more space
        !+
        ! If we can't get space for buffers, we might as well give back
        ! the WCB space itself.
        !-
        LIB$FREE_VM (%REF (WCB_K_SIZE), WCB);
        RETURN (.STATUS);
        END;    ! No more space

!+
! Carve up the space gotten into the 4 buffers we need.
!-
    WCB [WCB_A_ATTR_BUF]     = .WCB [WCB_A_TEXT_BUF] +     .WCB [WCB_L_BUFSIZE];
    WCB [WCB_A_SCR_TEXT_BUF] = .WCB [WCB_A_TEXT_BUF] + 2 * .WCB [WCB_L_BUFSIZE];
    WCB [WCB_A_SCR_ATTR_BUF] = .WCB [WCB_A_TEXT_BUF] + 3 * .WCB [WCB_L_BUFSIZE];

!+
! Initialize the working buffers.
!-
    CH$FILL (%C' ', .WCB [WCB_L_BUFSIZE], .WCB [WCB_A_TEXT_BUF]);
    CH$FILL (0,     .WCB [WCB_L_BUFSIZE], .WCB [WCB_A_ATTR_BUF]);

!+
! Initialize the buffers representing what's on the screen to non-
! matchable text as an initial state.  This means the first time
! minimum screen update looks at it it will cause the entire window
! to be repainted.
!-
    CH$FILL (-1, .WCB [WCB_L_BUFSIZE], .WCB [WCB_A_SCR_TEXT_BUF]);
    CH$FILL (0,  .WCB [WCB_L_BUFSIZE], .WCB [WCB_A_SCR_ATTR_BUF]);

!+
! Allocate the line characteristic vectors.  There are two of them --
! one for the text buffer and one for the screen text buffer.  We
! allocate and initialize them together for efficiency.
!-
    IF NOT (STATUS = LIB$GET_VM ( %REF (2 * (..ROWS + 1)),
                                  WCB [WCB_A_LINE_CHAR]))
    THEN
        BEGIN   ! Error path
        !+
; 5330          5561  3             ! Give back all space accumulated on this transaction.
; 5331          5562  3             !-
; 5332          5563  3             LIB$FREE_VM ( %REF (4 * .WCB [WCB_L_BUFSIZE]),
; 5333          5564  3                           WCB [WCB_A_TEXT_BUF]);
; 5334          5565  3
; 5335          5566  3             LIB$FREE_VM ( %REF (WCB_K_SIZE), WCB);
; 5336          5567  2             END;      ! Error path
; 5337          5568  2     !+
; 5338          5569  2     ! Clear both buffer to zero at once
; 5339          5570  2     !-
; 5340          5571  2         CH$FILL (0, 2 * (..ROWS + 1), .WCB [WCB_A_LINE_CHAR]);
; 5341          5572  2
; 5342          5573  2     !+
; 5343          5574  2     ! Use upper half of space just allocated and cleared as the line
; 5344          5575  2     ! characteristics vector for the screen text buffer.
; 5345          5576  2     !-
; 5346          5577  2         WCB [WCB_A_SCR_LINE_CHAR] = .WCB [WCB_A_LINE_CHAR] + ..ROWS + 1;
; 5347          5578  2
; 5348          5579  2     !+
; 5349          5580  2     ! Fill in rest of WCB and return the address of the WCB we've built.
; 5350          5581  2     !-
; 5351          5582  2         WCB [WCB_W_NO_ROWS] = ..ROWS;
; 5352          5583  2         WCB [WCB_W_ROW_START] = 1;
; 5353          5584  2         WCB [WCB_W_NO_COLS] = ..COLS;
; 5354          5585  2         WCB [WCB_W_COL_START]  = 1;
; 5355          5586  2
; 5356          5587  2         .WCB_ADDR = .WCB;
; 5357          5588  2
; 5358          5589  2         RETURN (SS$_NORMAL);
; 5359          5590  1         END;                              ! Routine SMG$$CREATE_WCB


                                        0FFC 00000          .ENTRY   SMG$$CREATE_WCB, Save R2,R3,R4,R5,R6,R7,R8,-; 5448
                                                                     R9,R10,R11                                   ;
                         5B 00000000G  00  9E 00002          MOVAB    LIB$FREE_VM, R11                             ;
                         5E            08  C2 00009          SUBL2    #8, SP                                       ;
                                   04  AE  9F 0000C          PUSHAB   WCB                                          ; 5505
                    04   AE            34  D0 0000F          MOVL     #52, 4(SP)                                   ;
                                   04  AE  9F 00013          PUSHAB   4(SP)                                        ;
              00000000G  00            02  FB 00016          CALLS    #2, LIB$GET_VM                               ;
                         5A            50  D0 0001D          MOVL     R0, STATUS                                   ;
                         3A            5A  E9 00020          BLBC     STATUS, 1$                                   ;
                         56        04  AE  D0 00023          MOVL     WCB, R6                                      ; 5509
  34          00         6E            00  2C 00027          MOVC5    #0, (SP), #0, #52, (R6)                      ;
                                       66     0002C                                                               ;
                         59        04  BC  D0 0002D          MOVL     @ROWS, R9                                    ; 5511
         28   A6         59        08  BC  C5 00031          MULL3    @COLS, R9, 40(R6)                            ;
                                   08  A6  9F 00037          PUSHAB   8(R6)                                        ; 5518
         04   AE    28   A6            02  78 0003A          ASHL     #2, 40(R6), 4(SP)                            ; 5517
                                   04  AE  9F 00040          PUSHAB   4(SP)                                        ;
              00000000G  00            02  FB 00043          CALLS    #2, LIB$GET_VM                               ; 5518
                         5A            50  D0 0004A          MOVL     R0, STATUS                                   ;
                         11            5A  E8 0004D          BLBS     STATUS, 2$                                   ;
                                   04  AE  9F 00050          PUSHAB   WCB                                          ; 5525
```

```
                                                 I  7
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages    16-Sep-1984 00:29:22   VAX-11 Bliss-32 V4.0-742          Page 154
1-096           SMG$$CREATE_WCB - Create WCB and its buffers    14-Sep-1984 13:09:43   [SMGRTL.SRC]SMGDISLIN.B32;1            (31)

                     04    AE           34  D0 00053       MOVL    #52, 4(SP)                         ;
                                   04   AE  9F 00057       PUSHAB  4(SP)                              ;
                           6B           02  FB 0005A       CALLS   #2, LIB$FREE_VM                    ;
                           50           5A  D0 0005D 1$:   MOVL    STATUS, R0                         ; 5526
                                            04 00060       RET                                        ;
                           56      04   AE  D0 00061 2$:   MOVL    WCB, R6                            ; 5532
                           57      08   A6  9E 00065       MOVAB   8(R6), R7                          ;
                           58      28   A6  9E 00069       MOVAB   40(R6), R8                         ;
        0C   A6            67           68  C1 0006D       ADDL3   (R8), (R7), 12(R6)                 ;
                           50           68  D0 00072       MOVL    (R8), R0                           ; 5533
                     14    A6      00 B740  3E 00075       MOVAW   @0(R7)[R0], 20(R6)                 ;
             50            68           03  C5 0007B       MULL3   #3, (R8), R0                       ; 5534
        18   A6            50           67  C1 0007F       ADDL3   (R7), R0, 24(R6)                   ;
68           20            6E           00  2C 00084       MOVC5   #0, (SP), #32, (R8), @0(R7)        ; 5539
                                   00   B7     00089                                                  ;
68           00            6E           00  2C 0008B       MOVC5   #0, (SP), #0, (R8), @12(R6)        ; 5540
                                   0C   B6     00090                                                  ;
68      FF   8F            6E           00  2C 00092       MOVC5   #0, (SP), #-1, (R8), @20(R6)       ; 5548
                                   14   B6     00098                                                  ;
68           00            6E           00  2C 0009A       MOVC5   #0, (SP), #0, (R8), @24(R6)        ; 5549
                                   18   B6     0009F                                                  ;
                                   2C   A6  9F 000A1       PUSHAB  44(R6)                             ; 5557
             52            59           01  78 000A4       ASHL    #1, R9, R2                         ; 5556
                           52           02  C0 000A8       ADDL2   #2, R2                             ;
                     04    AE           52  D0 000AB       MOVL    R2, 4(SP)                          ;
                                   04   AE  9F 000AF       PUSHAB  4(SP)                              ;
          00000000G        00           02  FB 000B2       CALLS   #2, LIB$GET_VM                     ; 5557
                           5A           50  D0 000B9       MOVL    R0, STATUS                         ;
                           1A           5A  E8 000BC       BLBS    STATUS, 3$                         ;
                                        57  DD 000BF       PUSHL   R7                                 ; 5564
        04   AE            68           02  78 000C1       ASHL    #2, (R8), 4(SP)                    ; 5563
                                   04   AE  9F 000C6       PUSHAB  4(SP)                              ;
                           6B           02  FB 000C9       CALLS   #2, LIB$FREE_VM                    ; 5564
                                   04   AE  9F 000CC       PUSHAB  WCB                                ; 5566
                     04    AE           34  D0 000CF       MOVL    #52, 4(SP)                         ;
                                   04   AE  9F 000D3       PUSHAB  4(SP)                              ;
                           6B           02  FB 000D6       CALLS   #2, LIB$FREE_VM                    ;
                           57      04   AE  D0 000D9 3$:   MOVL    WCB, R7                            ; 5571
52           00            6E           00  2C 000DD       MOVC5   #0, (SP), #0, R2, @44(R7)          ;
                                   2C   B7     000E2                                                  ;
             50            59      2C   A7  C1 000E4       ADDL3   44(R7), R9, R0                     ; 5577
                     30    A7      01   A0  9E 000E9       MOVAB   1(R0), 48(R7)                      ;
                     02    A7           59  B0 000EE       MOVW    R9, 2(R7)                          ; 5582
                           67           01  B0 000F2       MOVW    #1, (R7)                           ; 5583
                     06    A7      08   BC  B0 000F5       MOVW    @COLS, 6(R7)                       ; 5584
                     04    A7           01  B0 000FA       MOVW    #1, 4(R7)                          ; 5585
                     0C    BC           57  D0 000FE       MOVL    R7, @WCB_ADDR                      ; 5587
                           50           01  D0 00102       MOVL    #1, R0                             ; 5589
                                            04 00105       RET                                        ; 5590

; Routine Size:  262 bytes,    Routine Base:  _SMG$CODE + 1CED

; 5360         5591  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$DEALLOCATE_WCB - Get rid of WCB and its buffers'
1 GLOBAL ROUTINE SMG$$DEALLOCATE_WCB (WCB : REF $WCB_DECL) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine deallocates space for the window control block and
1 !       its window text and attribute buffers.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$CREATE_WCB ( WCB.wl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       WCB.wl.r        Address of the previously-created WCB.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       contents of WCB
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       LIB$_xxx        Errors from LIB$FREE_VM
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2       RET_STATUS,             ! Status to be returned to caller
2       STATUS;                 ! Status of subroutine calls
2
2 !+
2 ! Attempt to deallocate the space for all 4 buffers (text and attr) at
2 ! once.
2 !-
2     RET_STATUS = LIB$FREE_VM ( %REF(4 * .WCB [WCB_L_BUFSIZE]),
2                                 WCB [WCB_A_TEXT_BUF]);
2
2 !+
2 ! Attempt to deallocate the alternate character set buffers if they
2 ! exist.
2 !-
2     IF .WCB [WCB_A_CHAR_SET_BUF] NEQ 0
2     THEN
3       BEGIN   ! Free alt char set buffers
3       ! NOTE: Right now we free them separately.  If it turns out
3       ! they are allocated as a adjacent pair, we can deallocate
3       ! them with a single call.
3
3       STATUS = LIB$FREE_VM ( WCB [WCB_L_BUFSIZE],
: 5419       5649 3                       WCB [WCB_A_CHAR_SET_BUF]);
: 5420       5650 3
: 5421       5651 3            IF NOT .STATUS THEN RET_STATUS = .STATUS ; ! Propagate an error
: 5422       5652 3                                                       ! status
: 5423       5653 3
: 5424       5654 3            STATUS = LIB$FREE_VM ( WCB [WCB_L_BUFSIZE],
: 5425       5655 3                       WCB [WCB_A_SCR_CHAR_SET_BUF]);
: 5426       5656 3
: 5427       5657 3            IF NOT .STATUS THEN RET_STATUS = .STATUS ; ! Propagate an error
: 5428       5658 3                                                       ! status
: 5429       5659 2            END;     ! Free alt char set buffers
: 5430       5660 2
: 5431       5661 2   !+
: 5432       5662 2   ! Deallocate the line characteristics vectors.  These were allocated
: 5433       5663 2   ! as a pair so can be deallocated as a pair.
: 5434       5664 2   !-
: 5435       5665 2        STATUS = LIB$FREE_VM ( %REF ( 2 * (.WCB [WCB_W_NO_ROWS] + 1)),
: 5436       5666 2                       WCB [WCB_A_LINE_CHAR]);
: 5437       5667 2
: 5438       5668 2        IF NOT .STATUS THEN RET_STATUS = .STATUS;   ! Propagate an error
: 5439       5669 2                                                    ! status
: 5440       5670 2
: 5441       5671 2   !+
: 5442       5672 2   ! Deallocate the WCB itself.
: 5443       5673 2   !-
: 5444       5674 2        STATUS = LIB$FREE_VM (%REF(WCB_K_SIZE), WCB);
: 5445       5675 2        IF NOT .STATUS THEN RET_STATUS = .STATUS ; ! Propagate an error status
: 5446       5676 2
: 5447       5677 2        RETURN (.RET_STATUS);
: 5448       5678 2
: 5449       5679 1        END;                     ! Routine SMG$$DEALLOCATE_WCB


                                      001C 00000            .ENTRY  SMG$$DEALLOCATE_WCB, Save R2,R3,R4                ; 5593
                    54 00000000G  00   9E 00002            MOVAB   LIB$FREE_VM, R4                                   ;
                    5E            04   C2 00009            SUBL2   #4, SP                                            ;
                    52       04   AC   D0 0000C            MOVL    WCB, R2                                           ; 5635
                             08   A2   9F 00010            PUSHAB  8(R2)                                             ;
      04   AE       28   A2       02   78 00013            ASHL    #2, 40(R2), 4(SP)                                 ; 5634
                             04   AE   9F 00019            PUSHAB  4(SP)                                             ;
                    64            02   FB 0001C            CALLS   #2, LIB$FREE_VM                                   ; 5635
                    53            50   D0 0001F            MOVL    R0, RET_STATUS                                    ;
                             10   A2   D5 00022            TSTL    16(R2)                                            ; 5641
                                  1E   13 00025            BEQL    2$                                                ;
                             10   A2   9F 00027            PUSHAB  16(R2)                                            ; 5649
                             28   A2   9F 0002A            PUSHAB  40(R2)                                            ; 5648
                    64            02   FB 0002D            CALLS   #2, LIB$FREE_VM                                   ; 5649
                    03            50   E8 00030            BLBS    STATUS, 1$                                        ; 5651
                    53            50   D0 00033            MOVL    STATUS, RET_STATUS                                ;
                             1C   A2   9F 00036  1$:       PUSHAB  28(R2)                                            ; 5655
                             28   A2   9F 00039            PUSHAB  40(R2)                                            ; 5654
                    64            02   FB 0003C            CALLS   #2, LIB$FREE_VM                                   ; 5655
                    03            50   E8 0003F            BLBS    STATUS, 2$                                        ; 5657
                    53            50   D0 00042            MOVL    STATUS, RET_STATUS                                ;
```

L 7

```
                                  2C    A2  9F 00045 2$:    PUSHAB  44(R2)                               ; 5666
                       51   02    A2  3C 00048          MOVZWL  2(R2), R1                            ; 5665
        04    AE       51         01  78 0004C          ASHL    #1, R1, 4(SP)                        ;
                  04   AE         02  C0 00051          ADDL2   #2, 4(SP)                            ;
                            04    AE  9F 00055          PUSHAB  4(SP)                                ;
                       64         02  FB 00058          CALLS   #2, LIB$FREE_VM                      ; 5666
                       03         50  E8 0005B          BLBS    STATUS, 3$                           ; 5668
                       53         50  D0 0005E          MOVL    STATUS, RET_STATUS                   ;
                            04    AC  9F 00061 3$:      PUSHAB  WCB                                  ; 5674
                  04   AE         34  D0 00064          MOVL    #52, 4(SP)                           ;
                            04    AE  9F 00068          PUSHAB  4(SP)                                ;
                       64         02  FB 0006B          CALLS   #2, LIB$FREE_VM                      ;
                       03         50  E8 0006E          BLBS    STATUS, 4$                           ; 5675
                       53         50  D0 00071          MOVL    STATUS, RET_STATUS                   ;
                       50         53  D0 00074 4$:      MOVL    RET_STATUS, R0                       ; 5677
                                  04 00077              RET                                          ; 5679

; Routine Size:  120 bytes,    Routine Base:  _SMG$CODE + 1DF3

; 5450          5680  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$DUPL_VIRTUAL_DISPLAY - Duplicate a virtual display'
1 GLOBAL ROUTINE SMG$$DUPL_VIRTUAL_DISPLAY (
1                                               CURR_DISPLAY_ID,
1                                               NEW_DISPLAY_ID
1                                               ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine makes a copy of an existing virtual display,
1 !       assigning it a new virtual display number.  The new virtual
1 !       will not be pasted anywhere -- even if the virtual display from
1 !       which it was created was.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$DUPL_VIRTUAL_DISPLAY (CURR_DISPLAY_ID,
1 !                                                      NEW_DISPLAY_ID)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       CURR_DISPLAY_ID.rl.r    Display id of virtual display to be
1 !                               replicated.
1 !
1 !       NEW_DISPLAY_ID.wl.r     Display id of newly-created virtual
1 !                               display.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       NONE
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       NONE
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       LIB$_INSVIRMEM  Insufficient virtual memory to allocate needed
1 !                       buffer.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2       DCB     : REF $DCB_DECL,        ! Address of current DCB.
2       DCB_NEW : REF $DCB_DECL,        ! Address of new DCB
2       STATUS;         ! Status of subroutine calls
2
2     $SMG$GET_DCB (.CURR_DISPLAY_ID, DCB); ! Get addr of DCB for current
2                                           ! display
2
2 !+
2 ! If a backup DCB does not yet exist, allocate one.
2 ! Make a new virtual display using the sizes and attributes of the old
2 ! one.  Quit if we can't.
```

```
2 !-
2     IF .DCB [DCB_A_BACKUP_DCB] EQL 0
2     THEN
3         BEGIN   ! 1st time, create the backup
4         IF NOT (STATUS = SMG$$CREATE_VIRTUAL_DISPLAY (
4                         %REF (.DCB [DCB_W_NO_ROWS]),              ! #rows
4                         %REF (.DCB [DCB_W_NO_COLS]),              ! #cols
4                         .NEW_DISPLAY_ID,                          ! new id
4                         %REF (.DCB [DCB_B_DEF_DISPLAY_ATTR]),     ! disp
4                         %REF (.DCB [DCB_B_DEF_VIDEO_ATTR]),       ! video
4                         %REF (.DCB [DCB_B_DEF_CHAR_SET])))        ! alt char set
3         THEN
3             RETURN (.STATUS);
3
3         $SMG$GET_DCB (.NEW_DISPLAY_ID, DCB_NEW); ! Get DCB address of new
3
3         !+
3         ! Store the new display id in the new DCB.
3         !-
3         DCB_NEW [DCB_L_DID] = ..NEW_DISPLAY_ID;
3
3         END     ! 1st time, create the backup
3
2     ELSE
3         BEGIN   ! Backup already exists
3         .NEW_DISPLAY_ID = .DCB [DCB_A_BACKUP_DCB]; ! Return id of existing
3         DCB_NEW =         .DCB [DCB_A_BACKUP_DCB];
2         END;    ! Backup already exists
2
2 !+
2 ! Now need to copy over the current text and attribute buffers from
2 ! the current to the new.
2 !-
2
2     CH$MOVE ( .DCB [DCB_L_BUFSIZE],                               ! #bytes
2               .DCB [DCB_A_TEXT_BUF],                              ! from
2               .DCB_NEW [DCB_A_TEXT_BUF]);                         ! to
2
2     CH$MOVE ( .DCB [DCB_L_BUFSIZE],                               ! #bytes
2               .DCB [DCB_A_ATTR_BUF],                              ! from
2               .DCB_NEW [DCB_A_ATTR_BUF]);                         ! to
2
2 !+
2 ! Copy over the line characteristics vector.
2 !-
2     CH$MOVE ( .DCB [DCB_W_NO_ROWS] + 1,
2               .DCB [DCB_A_LINE_CHAR],
2               .DCB_NEW [DCB_A_LINE_CHAR]);
2
2 !+
2 ! Copy over stuff relating to borders and labels.
2 !-
2     IF .DCB_NEW [DCB_V_BORDERED]
2     THEN
3         BEGIN   ! Bordered
3         LOCAL
3             DESC : REF BLOCK [8,BYTE];  ! Pointer to dynamic string
```

```
3                                                           ! descriptor in DCB for border
3                                                           ! label
3
3               DESC = DCB [DCB_Q_LABEL_DESC];
3
3               !+
3               ! If label exists, make a copy.
3               !-
3               IF .DESC [DSC$A_POINTER] NEQ 0
3               THEN
4                   BEGIN       ! Labeled
5                   IF NOT (STATUS = LIB$SCOPY_DXDX ( .DESC,
5                                           DCB_NEW [DCB_Q_LABEL_DESC] ))
4                   THEN
4                       RETURN (.STATUS);
4
4                   DCB_NEW [DCB_W_LABEL_UNITS]    = .DCB [DCB_W_LABEL_UNITS];
4                   DCB_NEW [DCB_B_LABEL_POS]      = .DCB [DCB_B_LABEL_POS];
4                   DCB_NEW [DCB_B_LABEL_CHAR_SET] = .DCB [DCB_B_LABEL_CHAR_SET];
4                   DCB_NEW [DCB_V_LABEL_CENTER]   = .DCB [DCB_V_LABEL_CENTER];
4
3                   END;        ! Labeled
2               END;    ! Bordered
2
2       !+
2       ! If alternate character set buffer involved, copy it over as well.
2       !-
2           IF .DCB_NEW [DCB_A_CHAR_SET_BUF] NEQ 0
2           THEN
3               BEGIN   ! Alt char set buffer involved
4               IF NOT (STATUS = LIB$GET_VM (DCB [DCB_L_BUFSIZE],
4                                       DCB_NEW [DCB_A_CHAR_SET_BUF]))
3               THEN
3                   RETURN (.STATUS);
3
3               CH$MOVE (.DCB [DCB_L_BUFSIZE],                          ! Num.
3                       .DCB [DCB_A_CHAR_SET_BUF],                      ! From
3                       .DCB_NEW [DCB_A_CHAR_SET_BUF]);                 ! To
3
2               END;    ! Alt char set buffer involved
2
2       !+
2       ! Also preserve the current cursor postion.
2       !-
2           DCB_NEW [DCB_W_CURSOR_ROW] = .DCB [DCB_W_CURSOR_ROW];
2           DCB_NEW [DCB_W_CURSOR_COL] = .DCB [DCB_W_CURSOR_COL];
2
2           RETURN (SS$_NORMAL);
1           END;                        ! Routine SMG$$DUPL_VIRTUAL_DISPLAY


                                03FC 00000          .ENTRY  SMG$$DUPL_VIRTUAL_DISPLAY, Save R2,R3,R4,-   ; 5682
                                                            R5,R6,R7,R8,R9                               ;
                  59 00000000G  8F   D0 00002       MOVL    #SMG$_INVDIS_ID, R9                          ;
```

```
                             5E           14 C2 00009       SUBL2   #20, SP                                  ;
                             50    04     BC D0 0000C       MOVL    @CURR_DISPLAY_ID, R0                     ; 5731
                    04       BC    38     A0 D1 00010       CMPL    56(R0), @CURR_DISPLAY_ID                 ;
                                          06 12 00015       BNEQ    1$                                       ;
                    11       44           A0 91 00017       CMPB    68(R0), #17                              ;
                                          04 13 0001B       BEQL    2$                                       ;
                             50           59 D0 0001D 1$:   MOVL    R9, R0                                   ;
                                             04 00020       RET                                              ;
                             56    04     BC D0 00021 2$:   MOVL    @CURR_DISPLAY_ID, DCB                    ;
                             50    40     A6 D0 00025       MOVL    64(DCB), R0                              ; 5739
                                          56 12 00029       BNEQ    5$                                       ;
                    10       AE    30     A6 9A 0002B       MOVZBL  48(DCB), 16(SP)                          ; 5748
                                   10     AE 9F 00030       PUSHAB  16(SP)                                   ;
                    10       AE    2E     A6 9A 00033       MOVZBL  46(DCB), 16(SP)                          ; 5747
                                   10     AE 9F 00038       PUSHAB  16(SP)                                   ;
                    10       AE    2F     A6 9A 0003B       MOVZBL  47(DCB), 16(SP)                          ; 5746
                                   10     AE 9F 00040       PUSHAB  16(SP)                                   ;
                                   08     AC DD 00043       PUSHL   NEW_DISPLAY_ID                           ; 5745
                    14       AE    06     A6 3C 00046       MOVZWL  6(DCB), 20(SP)                           ; 5744
                                   14     AE 9F 0004B       PUSHAB  20(SP)                                   ;
                    14       AE    02     A6 3C 0004E       MOVZWL  2(DCB), 20(SP)                           ; 5743
                                   14     AE 9F 00053       PUSHAB  20(SP)                                   ;
                  FCD7       CF           06 FB 00056       CALLS   #6, SMG$$CREATE_VIRTUAL_DISPLAY          ;
                             58           50 D0 0005B       MOVL    R0, STATUS                               ;
                             5D           58 E9 0005E       BLBC    STATUS, 7$                               ; 5742
                             50    08     BC D0 00061       MOVL    @NEW_DISPLAY_ID, R0                      ; 5752
                    08       BC    38     A0 D1 00065       CMPL    56(R0), @NEW_DISPLAY_ID                  ;
                                          06 12 0006A       BNEQ    3$                                       ;
                    11       44           A0 91 0006C       CMPB    68(R0), #17                              ;
                                          04 13 00070       BEQL    4$                                       ;
                             50           59 D0 00072 3$:   MOVL    R9, R0                                   ;
                                             04 00075       RET                                              ;
                             57    08     BC D0 00076 4$:   MOVL    @NEW_DISPLAY_ID, DCB_NEW                 ;
                    38       A7    08     BC D0 0007A       MOVL    @NEW_DISPLAY_ID, 56(DCB_NEW)             ; 5757
                                          07 11 0007F       BRB     6$                                       ; 5739
                    08       BC           50 D0 00081 5$:   MOVL    R0, @NEW_DISPLAY_ID                      ; 5763
                             57           50 D0 00085       MOVL    R0, DCB_NEW                              ; 5764
        10   B7     10       B6    3C     A6 28 00088 6$:   MOVC3   60(DCB), @16(DCB), @16(DCB_NEW)          ; 5774
        14   B7     14       B6    3C     A6 28 0008F       MOVC3   60(DCB), @20(DCB), @20(DCB_NEW)          ; 5778
                             50    02     A6 3C 00096       MOVZWL  2(DCB), R0                               ; 5783
                                          50 D6 0009A       INCL    R0                                       ;
        4C   B7     4C       B6           50 28 0009C       MOVC3   R0, @76(DCB), @76(DCB_NEW)               ; 5785
                             31    2F     A7 E9 000A2       BLBC    47(DCB_NEW), 8$                          ; 5790
                             50    08     A6 9E 000A6       MOVAB   8(R6), DESC                              ; 5798
                                   04     A0 D5 000AA       TSTL    4(DESC)                                  ; 5803
                                          28 13 000AD       BEQL    8$                                       ;
                                   08     A7 9F 000AF       PUSHAB  8(DCB_NEW)                               ; 5807
                                          50 DD 000B2       PUSHL   DESC                                     ;
             00000000G       00           02 FB 000B4       CALLS   #2, LIB$SCOPY_DXDX                       ;
                             58           50 D0 000BB       MOVL    R0, STATUS                               ;
                             2E           58 E9 000BE 7$:   BLBC    STATUS, 9$                               ;
                    2C       A7    2C     A6 B0 000C1       MOVW    44(DCB), 44(DCB_NEW)                     ; 5811
                    31       A7    31     A6 B0 000C6       MOVW    49(DCB), 49(DCB_NEW)                     ; 5812
    50      34      A6       01    02     EF    000CB       EXTZV   #2, #1, 52(DCB), R0                      ; 5814
34  A7              01       02           50 F0 000D1       INSV    R0, #2, #1, 52(DCB_NEW)                  ;
                                   18     A7 D5 000D7 8$:   TSTL    24(DCB_NEW)                              ; 5822
                                          1E 13 000DA       BEQL    11$                                      ;
```

```
                                                                              D  8
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages      16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742              Page 162
1-096           SMG$$DUPL_VIRTUAL_DISPLAY - Duplicate a virtual 14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1               (33)

                                      18   A7   9F 000DC         PUSHAB  24(DCB_NEW)                                      ; 5826
                                      3C   A6   9F 000DF         PUSHAB  60(DCB)                                          ; 5825
                      00000000G  00         02  FB 000E2         CALLS   #2, LIB$GET_VM                                   ; 5826
                                 58         50  D0 000E9         MOVL    R0, STATUS                                       ;
                                 04         58  E8 000EC         BLBS    STATUS, 10$                                      ;
                                 50         58  D0 000EF 9$:     MOVL    STATUS, R0                                       ; 5828
                                                04 000F2         RET                                                      ;
              18   B7       18   B6   3C   A6   28 000F3 10$:    MOVC3   60(DCB), @24(DCB), @24(DCB_NEW)                  ; 5832
                            28   A7   28   A6   D0 000FA 11$:    MOVL    40(DCB), 40(DCB_NEW)                             ; 5839
                                 50         01  D0 000FF         MOVL    #1, R0                                           ; 5842
                                                04 00102         RET                                                      ; 5843

; Routine Size:  259 bytes,    Routine Base:  _SMG$CODE + 1E6B

; 5615         5844  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$LOCATE_PP - Locate Pasting packet for given display and pasteboard'
1 GLOBAL ROUTINE SMG$$LOCATE_PP ( DCB  : REF $DCB_DECL,
1                                 PBCB : REF $PBCB_DECL,
1                                 PP ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       Locate the address of the pasting packet that joins this
1 !       virtual display to this pasteboard.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$LOCATE_PP (     DCB.rab.r,
1 !                                               PBCB.rab.r,
1 !                                               PP.wl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DCB.rab.r       Address of a virtual display control block.
1 !
1 !       PBCB.rab.r      Address of a pasteboard control block.
1 !
1 !       PP.wl.r         Return address of the pasting packet that
1 !                       represents the pasting of the given virtual
1 !                       display to the given pasteboard control block.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_NOTPASTED  Given display is not pasted to given pasteboard
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2         SEARCH_DCB : REF $DCB_DECL,     ! Addr of the DCB we'll actually
2                                         ! search for
2
2         CURR_PP : REF $PP_DECL;         ! Addr of pasting packet being
2                                         ! inspected.
2
2     CURR_PP = .DCB [DCB_A_PP_NEXT];     ! Start with 1st PP in chain
2
2 !+
2 ! If the virtual display is currently batched, the batch level will be non-zero.
2 ! This means a match needs to be found on the backup DCB address instead of the
2 ! DCB address.
```

```
; 5674          5902  2 !-
; 5675          5903  2       SEARCH_DCB = .DCB;
; 5676          5904  2
; 5677          5905  2       IF .DCB [DCB_L_BATCH_LEVEL] NEQ 0               ! Currently batched
; 5678          5906  2       THEN
; 5679          5907  2           SEARCH_DCB = .DCB [DCB_A_BACKUP_DCB];
; 5680          5908  2
; 5681          5909  2
; 5682          5910  2       WHILE .CURR_PP NEQ DCB [DCB_A_PP_NEXT]          ! While any remain
; 5683          5911  2       DO
; 5684          5912  3           BEGIN   ! Search for packet with matching PBCB addr
; 5685          5913  3           IF .CURR_PP [PP_A_DCB_ADDR]  EQL .SEARCH_DCB     AND
; 5686          5914  3              .CURR_PP [PP_A_PBCB_ADDR] EQL .PBCB
; 5687          5915  3           THEN
; 5688          5916  4               BEGIN       ! Desired packet found
; 5689          5917  4               .PP = .CURR_PP;
; 5690          5918  4               RETURN (SS$_NORMAL);        ! Return success
; 5691          5919  3               END;        ! Desired packet found
; 5692          5920  3
; 5693          5921  3           CURR_PP = .CURR_PP [PP_A_NEXT_DCB]; ! Otherwise step along DCB
; 5694          5922  3                                               ! side of chain
; 5695          5923  2           END;    ! Search for packet with matching PBCB addr
; 5696          5924  2
; 5697          5925  2 !+
; 5698          5926  2 ! If we fall out of the while loop, this virtual display is not pasted
; 5699          5927  2 ! to the specified pasteboard -- according to the pasting packets.
; 5700          5928  2 !-
; 5701          5929  2       .PP = 0;        ! To reduce liklihood someone will try to use it
; 5702          5930  2                       ! and disregard status.
; 5703          5931  2       RETURN (SMG$_NOTPASTED);        ! Return failure
; 5704          5932  1       END;                            ! Routine SMG$$LOCATE_PP




                                        000C 00000          .ENTRY  SMG$$LOCATE_PP, Save R2,R3                          ; 5846
                      50        04   AC  D0 00002          MOVL    DCB, R0                                             ; 5896
                      51        20   A0  D0 00006          MOVL    32(R0), CURR_PP                                     ;
                      53             50  D0 0000A          MOVL    R0, SEARCH_DCB                                      ; 5903
                                1C   A0  D5 0000D          TSTL    28(R0)                                              ; 5905
                                     04  13 00010          BEQL    1$                                                  ;
                      53        40   A0  D0 00012          MOVL    64(R0), SEARCH_DCB                                  ; 5907
                      52        20   A0  9E 00016 1$:      MOVAB   32(R0), R2                                          ; 5910
                      52             51  D1 0001A          CMPL    CURR_PP, R2                                         ;
                                     1A  13 0001D          BEQL    3$                                                  ;
                      53        10   A1  D1 0001F          CMPL    16(CURR_PP), SEARCH_DCB                             ; 5913
                                     0F  12 00023          BNEQ    2$                                                  ;
                08    AC        14   A1  D1 00025          CMPL    20(CURR_PP), PBCB                                   ; 5914
                                     08  12 0002A          BNEQ    2$                                                  ;
                0C    BC             51  D0 0002C          MOVL    CURR_PP, @PP                                        ; 5917
                      50             01  D0 00030          MOVL    #1, R0                                              ; 5918
                                         04 00033          RET                                                         ;
                      51             61  D0 00034 2$:      MOVL    (CURR_PP), CURR_PP                                  ; 5921
                                     DD  11 00037          BRB     1$                                                  ; 5910
                                0C   BC  D4 00039 3$:      CLRL    @PP                                                 ; 5929
                      50 00000000G   8F  D0 0003C          MOVL    #SMG$_NOTPASTED, R0                                 ; 5931
```

```
                                                04 00043        RET                                        ; 5932

; Routine Size:  68 bytes,    Routine Base:  _SMG$CODE + 1F6E


; 5705          5933  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$PASTE_VIRTUAL_DISPLAY - Paste virtual display to pasteboard'
1 GLOBAL ROUTINE SMG$$PASTE_VIRTUAL_DISPLAY (
1                                                       DCB : REF $DCB_DECL,
1                                                       PBCB : REF $PBCB_DECL,
1                                                       PASTEBOARD_ROW,
1                                                       PASTEBOARD_COL
1                                                     ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       The specified virtual display is "pasted" (oriented
1 !       with respect to) a pasteboard.  This makes the display visible.
1 !       This is the inner paste routine.  It assumes input parameters
1 !       are all present and valid.  Further assumes that display
1 !       specified by DCB is not already pasted to pasteboard specified
1 !       by PBCB.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$PASTE_VIRTUAL_DISPLAY (
1 !                                                       DCB.rab.r,
1 !                                                       PBCB.rab.r,
1 !                                                       PASTEBOARD_ROW.rl.r,
1 !                                                       PASTEBOARD_COL.rl.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DCB.rab.r               Address of virtual display to be pasted.
1 !
1 !       PBCB.rab.r              Address of the pasteboard on
1 !                               which the pasting is to take place.
1 !
1 !       PASTEBOARD_ROW.rl.r     Row on pasteboard which is to contain
1 !                               row 1 of the specified virtual display.
1 !
1 !       PASTEBOARD_COL.rl.r     Column on pasteboard which is to contain
1 !                               column 1 of the specified virtual
1 !                               display.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
```

```
2           STATUS,                         ! Status of subroutine calls
2
2           PP      : REF $PP_DECL,         ! Addr of the pasting packet
2                                           ! being created.
2
2           WCB     : REF $WCB_DECL;        ! Addr. of window control block
2
2    !+
2    ! Get space for pasting packet.
2    !-
3        IF NOT (STATUS = LIB$GET_VM ( %REF (PP_K_SIZE), PP))
2        THEN
2           RETURN (.STATUS);
2
2        CH$FILL (0, PP_K_SIZE, .PP);       ! Clear all fields to default 0
2
2    !+
2    ! Initialize pasting packet
2    !-
2        PP [PP_A_DCB_ADDR]  = .DCB;
2        PP [PP_A_PBCB_ADDR] = .PBCB;
2        PP [PP_W_ROW]       = ..PASTEBOARD_ROW;
2        PP [PP_W_COL]       = ..PASTEBOARD_COL;
2
2    !+
2    ! Plug this packet onto both queues.
2    !-
2        $SMG$INSERT_AT_HEAD ( PP [PP_A_NEXT_DCB],  DCB [DCB_A_PP_NEXT]);
2        $SMG$INSERT_AT_HEAD ( PP [PP_A_NEXT_PBCB], PBCB [PBCB_A_PP_NEXT]);
2
2    !+
2    ! If the display is batched, we want the backpointer in the PP to be
2    ! pointing to our backup DCB.
2    !-
2        IF .DCB [DCB_L_BATCH_LEVEL] NEQ 0
2        THEN
2           PP [PP_A_DCB_ADDR] = .DCB [DCB_A_BACKUP_DCB];
2
2    !+
2    ! Recalc. occlusions introduced by this new pasting.
2    !-
3        IF NOT ( STATUS = SMG$$CHECK_OCCLUSION_FIRST ( .PBCB))
2        THEN
2           RETURN (.STATUS);
2
2    !+
2    ! Calculate the transformation constants needed to copy this display's
2    ! buffers into the associated window's buffers.
2    !-
3        IF NOT ( STATUS = SMG$$CALC_PASTE_TRANSF (.PP))
2        THEN
2           RETURN (.STATUS);
2
2    !+
2    ! If pasteboard batching enabled, quit here.
2    !-
2        IF .PBCB [PBCB_L_BATCH_LEVEL] NEQ 0
```

```
; 5821       6048 2         THEN
; 5822       6049 2             RETURN ( SMG$_BATWAS_ON);
; 5823       6050 2
; 5824       6051 2     !+
; 5825       6052 2     ! Force physical display's cursor to be where this virtual display's
; 5826       6053 2     ! cursor is.
; 5827       6054 2     ! Chose between current DCB and backup DCB.
; 5828       6055 2     !-
; 5829       6056 2         WCB = .PBCB [PBCB_A_WCB];
; 5830       6057 2
; 5831       6058 2         IF .DCB [DCB_L_BATCH_LEVEL] EQL 0
; 5832       6059 2         THEN
; 5833       6060 3             BEGIN   ! Get from current DCB
; 5834       6061 3             WCB [WCB_W_CURR_CUR_ROW] = .DCB [DCB_W_CURSOR_ROW] - 1 + .PP [PP_W_ROW];
; 5835       6062 3             WCB [WCB_W_CURR_CUR_COL] = .DCB [DCB_W_CURSOR_COL] - 1 + .PP [PP_W_COL];
; 5836       6063 3             END     ! Get from current DCB
; 5837       6064 3
; 5838       6065 2         ELSE
; 5839       6066 2
; 5840       6067 3             BEGIN   ! Get from backup DCB
; 5841       6068 3             LOCAL
; 5842       6069 3                 BACK_DCB : REF $DCB_DECL; ! Addr of backup DCB
; 5843       6070 3
; 5844       6071 3             BACK_DCB = .DCB [DCB_A_BACKUP_DCB];
; 5845       6072 3             WCB [WCB_W_CURR_CUR_ROW] = .BACK_DCB [DCB_W_CURSOR_ROW] - 1 + .PP [PP_W_ROW];
; 5846       6073 3             WCB [WCB_W_CURR_CUR_COL] = .BACK_DCB [DCB_W_CURSOR_COL] - 1 + .PP [PP_W_COL];
; 5847       6074 2             END;    ! Get from backup DCB
; 5848       6075 2
; 5849       6076 2     !+
; 5850       6077 2     ! Move stuff from virtual display to pasteboard buffer and caused it
; 5851       6078 2     ! to be output if pasteboard is not batched.
; 5852       6079 2     !-
; 5853       6080 2         IF .PBCB [PBCB_L_BATCH_LEVEL] EQL 0
; 5854       6081 2         THEN
; 5855       6082 3             BEGIN
; 5856       6083 3             PBCB [PBCB_W_FIRST_CHANGED_ROW] = 1;
; 5857       6084 3             PBCB [PBCB_W_LAST_CHANGED_ROW]  = .PBCB [PBCB_B_ROWS];
; 5858       6085 3             PBCB [PBCB_W_FIRST_CHANGED_COL] = 1;
; 5859       6086 3             PBCB [PBCB_W_LAST_CHANGED_COL]  = .PBCB [PBCB_W_WIDTH];
; 5860       6087 3             RETURN (SMG$$FILL_WINDOW_BUFFER (.PP));
; 5861       6088 2             END;
; 5862       6089 2
; 5863       6090 2     !+
; 5864       6091 2     ! Else just return Batch-was-On status.
; 5865       6092 2     !-
; 5866       6093 2         RETURN ( SMG$_BATWAS_ON);
; 5867       6094 2
; 5868       6095 1         END;                        ! Routine SMG$$PASTE_VIRTUAL_DISPLAY


                                00FC 00000         .ENTRY  SMG$$PASTE_VIRTUAL_DISPLAY, Save R2,R3,R4,- ; 5935
                                                           R5,R6,R7                                    ;
                  5E         08  C2 00002          SUBL2   #8, SP                                      ;
                       04    AE  9F 00005          PUSHAB  PP                                          ; 6001
```

```
                    04  AE            37  D0 00008       MOVL    #55, 4(SP)
                                04    AE  9F 0000C       PUSHAB  4(SP)
             00000000G  00            02  FB 0000F       CALLS   #2, LIB$GET_VM
                        57            50  D0 00016       MOVL    R0, STATUS
                        5B            57  E9 00019       BLBC    STATUS, 2$
                        56      04    AE  D0 0001C       MOVL    PP, R6                                  : 6005
  37    00              6E            00  2C 00020       MOVC5   #0, (SP), #0, #55, (R6)
                                      66     00025
                    10  A6      04    AC  7D 00026       MOVQ    DCB, 16(R6)                             : 6010
                    18  A6      0C    BC  B0 0002B       MOVW    @PASTEBOARD_ROW, 24(R6)                 : 6012
                    1A  A6      10    BC  B0 00030       MOVW    @PASTEBOARD_COL, 26(R6)                 : 6013
        50          04  AC            20  C1 00035       ADDL3   #32, DCB, R0                            : 6018
                        60            66  0E 0003A       INSQUE  (R6), (R0)
                        50      04    AE  D0 0003D       MOVL    PP, R0                                  : 6019
                    08  BC      08    A0  0E 00041       INSQUE  8(R0), @PBCB
                        52      04    AC  D0 00046       MOVL    DCB, R2                                 : 6025
                                1C    A2  D5 0004A       TSTL    28(R2)
                                      09  13 0004D       BEQL    1$
                        50      04    AE  D0 0004F       MOVL    PP, R0                                  : 6027
                    10  A0      40    A2  D0 00053       MOVL    64(R2), 16(R0)
                        53      08    AC  D0 00058 1$:   MOVL    PBCB, R3                                : 6032
                                      53  DD 0005C       PUSHL   R3
                  FA33  CF            01  FB 0005E       CALLS   #1, SMG$$CHECK_OCCLUSION_FIRST
                        57            50  D0 00063       MOVL    R0, STATUS
                        0E            57  E9 00066       BLBC    STATUS, 2$
                                04    AE  DD 00069       PUSHL   PP                                      : 6040
                  F649  CF            01  FB 0006C       CALLS   #1, SMG$$CALC_PASTE_TRANSF
                        57            50  D0 00071       MOVL    R0, STATUS
                        04            57  E8 00074       BLBS    STATUS, 3$
                        50            57  D0 00077 2$:   MOVL    STATUS, R0                              : 6042
                                      04     0007A       RET
                        56    00A4    C3  D0 0007B 3$:   MOVL    164(R3), R6                             : 6047
                                      7C  12 00080       BNEQ    6$
                        51      08    A3  D0 00082       MOVL    8(R3), WCB                              : 6056
                        55      04    AE  D0 00086       MOVL    PP, R5                                  : 6061
                        54      04    AE  D0 0008A       MOVL    PP, R4                                  : 6062
                                1C    A2  D5 0008E       TSTL    28(R2)                                  : 6058
                                      22  12 00091       BNEQ    4$
                        50      28    A2  3C 00093       MOVZWL  40(R2), R0                              : 6061
                        57      18    A5  32 00097       CVTWL   24(R5), R7
                        50            57  C0 0009B       ADDL2   R7, R0
  20    A1              50            01  A3 0009E       SUBW3   #1, R0, 32(WCB)
                        52      2A    A2  3C 000A3       MOVZWL  42(R2), R2                              : 6062
                        50      1A    A4  32 000A7       CVTWL   26(R4), R0
                        52            50  C0 000AB       ADDL2   R0, R2
  22    A1              52            01  A3 000AE       SUBW3   #1, R2, 34(WCB)
                                      24  11 000B3       BRB     5$                                      : 6058
                        50      40    A2  D0 000B5 4$:   MOVL    64(R2), BACK_DCB                        : 6071
                        52      28    A0  3C 000B9       MOVZWL  40(BACK_DCB), R2                        : 6072
                        57      18    A5  32 000BD       CVTWL   24(R5), R7
                        52            57  C0 000C1       ADDL2   R7, R2
  20    A1              52            01  A3 000C4       SUBW3   #1, R2, 32(WCB)
                        50      2A    A0  3C 000C9       MOVZWL  42(BACK_DCB), R0                        : 6073
                        52      1A    A4  32 000CD       CVTWL   26(R4), R2
                        50            52  C0 000D1       ADDL2   R2, R0
  22    A1              50            01  A3 000D4       SUBW3   #1, R0, 34(WCB)
                                      56  D5 000D9 5$:   TSTL    R6                                      : 6080
```

```
                                        21  12 000DB          BNEQ    6$                                       ;
                     00A8   C3              01  B0 000DD          MOVW    #1, 168(R3)                              ; 6083
                     00AA   C3        5F    A3  9B 000E2          MOVZBW  95(R3), 170(R3)                          ; 6084
                     00AC   C3              01  B0 000E8          MOVW    #1, 172(R3)                              ; 6085
                     00AE   C3        5A    A3  B0 000ED          MOVW    90(R3), 174(R3)                          ; 6086
                                      04    AE  DD 000F3          PUSHL   PP                                       ; 6087
                00000000G   00              01  FB 000F6          CALLS   #1, SMG$$FILL_WINDOW_BUFFER              ;
                                                04 000FD          RET                                              ;
                            50 00000000G    8F  D0 000FE 6$:      MOVL    #SMG$_BATWAS_ON, R0                      ; 6093
                                                04 00105          RET                                              ; 6095

; Routine Size:  262 bytes,    Routine Base:  _SMG$CODE + 1FB2


; 5869          6096  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$RECALC_PP_FIELDS - Recalc. Pasting Packet fields'
1 GLOBAL ROUTINE SMG$$RECALC_PP_FIELDS (
1                                        DCB  : REF $DCB_DECL
1                                     )=
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       This routine recalculates fields in the pasting packet that
1 !       need to change.
1 !       It walks the chain of pasting packets associated with the
1 !       given Display Control Block, updating each.
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$RECALC_PP_FIELDS ( DCB.rab.r )
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DCB.rab.r        Address of a virtual display control block.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL       Normal successful completion
1 !       Statuses returned by SMG$$CHECK_OCCLUSION and
1 !                            SMG$$CALC_PASTE_TRANF
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2         PP : REF $PP_DECL;                 ! Addr. of a pasting packet
2
2 !+
2 ! Step through all associated pasting packets, updating each.
2 !-
2     PP = .DCB [DCB_A_PP_NEXT];  ! get 1st packet in DCB-oriented chain
2     WHILE .PP NEQ DCB [DCB_A_PP_NEXT]   ! While any remain...
2     DO
3         BEGIN
3         LOCAL
3             STATUS,                        ! Status of subroutine calls
3             PBCB : REF $PBCB_DECL;         ! Addr of pasteboard control blk
3
3         PBCB = .PP [PP_A_PBCB_ADDR];
3         !+
3         ! Calculate who occludes who in current pasting chain.
3         !-
```

```
; 5928          6154  4             IF NOT (STATUS =SMG$$CHECK_OCCLUSION ( .PBCB))  ! Recalc. occlusion
; 5929          6155  3             THEN
; 5930          6156  3                RETURN (.STATUS);
; 5931          6157  3
; 5932          6158  3             !+
; 5933          6159  3             ! Calculate critical constants used to map virtual displays
; 5934          6160  3             ! to their correct position within the pasteboard buffer.
; 5935          6161  3             !-
; 5936          6162  4             IF NOT ( STATUS = SMG$$CALC_PASTE_TRANSF ( .PP)) ! Clean up packet
; 5937          6163  3             THEN
; 5938          6164  3                RETURN (.STATUS);
; 5939          6165  3
; 5940          6166  3             PP = .PP [PP_A_NEXT_DCB];          ! Step to next packet
; 5941          6167  2             END;
; 5942          6168  2
; 5943          6169  2          RETURN ( SS$_NORMAL);
; 5944          6170  1          END;                           ! Routine SMG$$RECALC_PP_FIELDS


                                         000C 00000          .ENTRY  SMG$$RECALC_PP_FIELDS, Save R2,R3          ; 6098
                    52        04    AC   D0 00002          MOVL    DCB, R2                                      ; 6142
                    53        20    A2   D0 00006          MOVL    32(R2), PP
                    50        20    A2   9E 0000A 1$:      MOVAB   32(R2), R0                                   ; 6143
                    50              53   D1 0000E          CMPL    PP, R0
                                    1D   13 00011          BEQL    2$
                    50        14    A3   D0 00013          MOVL    20(PP), PBCB                                 ; 6150
                                    50   DD 00017          PUSHL   PBCB                                         ; 6154
              F885  CF              01   FB 00019          CALLS   #1, SMG$$CHECK_OCCLUSION
                    12              50   E9 0001E          BLBC    STATUS, 3$
                                    53   DD 00021          PUSHL   PP                                           ; 6162
              F58C  CF              01   FB 00023          CALLS   #1, SMG$$CALC_PASTE_TRANSF
                    08              50   E9 00028          BLBC    STATUS, 3$
                    53              63   D0 0002B          MOVL    (PP), PP                                     ; 6166
                                    DA   11 0002E          BRB     1$                                           ; 6143
                    50              01   D0 00030 2$:      MOVL    #1, R0                                       ; 6169
                                         04 00033 3$:      RET                                                  ; 6170

; Routine Size:  52 bytes,    Routine Base:  _SMG$CODE + 20B8


; 5945          6171  1 !<BLF/PAGE>
```

```
1 %SBTTL 'SMG$$UNPASTE_VIRTUAL_DISPLAY - Unpaste virtual display from pasteboard'
1 GLOBAL ROUTINE SMG$$UNPASTE_VIRTUAL_DISPLAY (
1                                                       DCB :  REF $DCB_DECL,
1                                                       PBCB : REF $PBCB_DECL
1                                                       ) =
1 !++
1 ! FUNCTIONAL DESCRIPTION:
1 !
1 !       The specified virtual display is "unpasted" from a pasteboard
1 !       if a pasting packet can be found.
1 !       This is the inner-most unpasting routine.  It assumes both
1 !       parameters are present and that they are valid (not necessarily
1 !       that the pasting packet which joins these two exists).
1 !
1 ! CALLING SEQUENCE:
1 !
1 !       ret_status.wlc.v = SMG$$UNPASTE_VIRTUAL_DISPLAY (
1 !                                               DCB.rab.r,
1 !                                               PBCB.rab.r)
1 !
1 ! FORMAL PARAMETERS:
1 !
1 !       DCB.rab.r                       Address of DCB of virtual display to be
1 !                                       unpasted.
1 !
1 !       PBCB.rab.r                      Address of the pasteboard from
1 !                                       which the unpasting is to take place.
1 !
1 ! IMPLICIT INPUTS:
1 !
1 !       None
1 !
1 ! IMPLICIT OUTPUTS:
1 !
1 !       None
1 !
1 ! COMPLETION STATUS:
1 !
1 !       SS$_NORMAL      Normal successful completion
1 !       SMG$_NOTPASTED  Specified virtual display is not currently
1 !                       pasted to the specified pasteboard.
1 !
1 ! SIDE EFFECTS:
1 !
1 !       NONE
1 !--
2     BEGIN
2     LOCAL
2         STATUS,                               ! Status of subroutine call
2         PP        : REF $PP_DECL;             ! Addr of pasting packet being
2                                               ! inspected.
2
2 !+
2 ! Try to find the pasting packet joining this DCB and PBCB.
2 ! Exit with SMG$_NOTPASTED if we can't.
2 !-
2
```

```
; 6004          6229  3      IF NOT (STATUS = SMG$$LOCATE_PP ( .DCB, .PBCB, PP))
; 6005          6230  2      THEN
; 6006          6231  2          RETURN (.STATUS);    ! No common pasting packet exists
; 6007          6232  2
; 6008          6233  2   !+
; 6009          6234  2   ! Located desired packet.  Remove it from both queues.
; 6010          6235  2   !-
; 6011          6236  2      $SMG$REMOVE_FROM_QUEUE ( PP [PP_A_NEXT_DCB] );
; 6012          6237  2      $SMG$REMOVE_FROM_QUEUE ( PP [PP_A_NEXT_PBCB] );
; 6013          6238  2
; 6014          6239  2   !+
; 6015          6240  2   ! Give back the pasting packet space
; 6016          6241  2   !-
; 6017          6242  3      IF NOT (STATUS = LIB$FREE_VM ( %REF(PP_K_SIZE), PP))
; 6018          6243  2      THEN
; 6019          6244  2          RETURN (.STATUS);
; 6020          6245  2
; 6021          6246  2   !+
; 6022          6247  2   ! If other virtual displays are still pasted to this pasteboard, we need
; 6023          6248  2   ! to recalculate their occlusion bits since they may have changed by
; 6024          6249  2   ! removing this virtual display.
; 6025          6250  2   !-
; 6026          6251  2      IF .PBCB [ PBCB_A_PP_NEXT] NEQ PBCB [ PBCB_A_PP_NEXT]
; 6027          6252  2      THEN
; 6028          6253  3          IF NOT ( STATUS = SMG$$CHECK_OCCLUSION ( .PBCB ))
; 6029          6254  2          THEN
; 6030          6255  2              RETURN (.STATUS);
; 6031          6256  2
; 6032          6257  2   !+
; 6033          6258  2   ! Cause pasteboard to reflect this change.
; 6034          6259  2   !-
; 6035          6260  2
; 6036          6261  2      RETURN ( SMG$$CHECK_FOR_OUTPUT_PBCB ( .PBCB ));
; 6037          6262  2
; 6038          6263  1      END;                          ! Routine SMG$$UNPASTE_VIRTUAL_DISPLAY




                                          0004 00000         .ENTRY  SMG$$UNPASTE_VIRTUAL_DISPLAY, Save R2        ; 6173
                       5E              08   C2 00002         SUBL2   #8, SP
                                  04   AE   9F 00005         PUSHAB  PP                                           ; 6229
                       7E         04   AC   7D 00008         MOVQ    DCB, -(SP)
               FE71    CF              03   FB 0000C         CALLS   #3, SMG$$LOCATE_PP
                       3C              50   E9 00011         BLBC    STATUS, 2$
                       51         04   BE   0F 00014         REMQUE  @PP, FOO                                     ; 6236
         51      04    AE              08   C1 00018         ADDL3   #8, PP, R1                                   ; 6237
                       52              61   0F 0001D         REMQUE  (R1), FOO
                                  04   AE   9F 00020         PUSHAB  PP                                           ; 6242
                 04    AE              37   D0 00023         MOVL    #55, 4(SP)
                                  04   AE   9F 00027         PUSHAB  4(SP)
          00000000G    00              02   FB 0002A         CALLS   #2, LIB$FREE_VM
                       1C              50   E9 00031         BLBC    STATUS, 2$
                 08    AC         08   BC   D1 00034         CMPL    @PBCB, PBCB                                  ; 6251
                                       0B   13 00039         BEQL    1$
                                  08   AC   DD 0003B         PUSHL   PBCB                                         ; 6253
```

```
                  F82C  CF             01  FB 0003E          CALLS   #1, SMG$$CHECK_OCCLUSION               ;
                        0A             50  E9 00043          BLBC    STATUS, 2$                             ;
                                 08    AC  DD 00046 1$:      PUSHL   PBCB                                   ; 6261
             00000000G  00             01  FB 00049          CALLS   #1, SMG$$CHECK_FOR_OUTPUT_PBCB         ;
                                           04 00050 2$:      RET                                            ; 6263

; Routine Size:  81 bytes,    Routine Base:  _SMG$CODE + 20EC


; 6039          6264  1 !<BLF/PAGE>
```

```
                                                                  E  9
SMG$DISPLAY_LIN SMG$DISPLAY_LINKS - Virtual Display Linkages     16-Sep-1984 00:29:22    VAX-11 Bliss-32 V4.0-742              Page 176
1-096           SMG$$UNPASTE_VIRTUAL_DISPLAY - Unpaste virtual   14-Sep-1984 13:09:43    [SMGRTL.SRC]SMGDISLIN.B32;1               (38)

; 6041          6265  1 END                           ! End of module SMG$DISPLAY_LINKS
; 6042          6266  1
; 6043          6267  0 ELUDOM



                                                                          .EXTRN  LIB$SIGNAL

;                                     PSECT SUMMARY
;
;       Name                    Bytes                     Attributes
;
;    _SMG$DATA                       80  NOVEC,  WRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,  PIC,ALIGN(2)
;    _SMG$CODE                     8509  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)



;                              Library Statistics
;
;                                          -------- Symbols --------        Pages       Processing
;       File                               Total    Loaded   Percent        Mapped      Time
;
;    _$255$DUA28:[SYSLIB]STARLET.L32;1       9776       101         1          581       00:00.9
;    _$255$DUA28:[SMGRTL.OBJ]RTLLIB.L32;1      36         0         0            8       00:00.1
;    _$255$DUA28:[SMGRTL.OBJ]SMGLIB.L32;1     469       152        32           38       00:00.4



;                                      COMMAND QUALIFIERS

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

; Size:          8471 code + 118 data bytes
; Run Time:         02:45.3
; Elapsed Time:     08:00.6
; Lines/CPU Min:     2275
; Lexemes/CPU-Min: 20356
; Memory Used:  435 pages
; Compilation Complete
```

0356 AH-BT13A-SE
VAX/VMS V4.0

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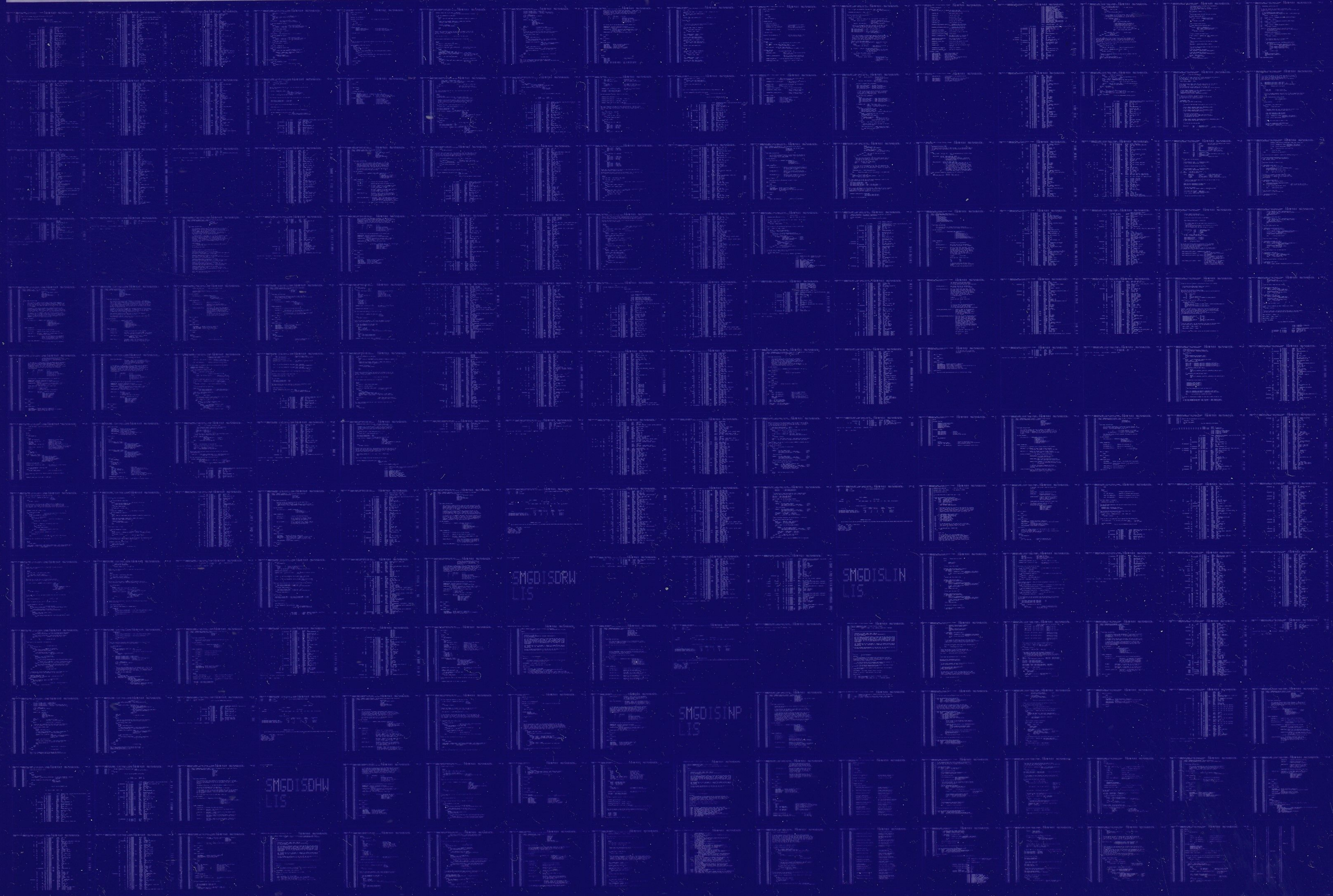

0357 AH-BT13A-SE
VAX/VMS V4.0

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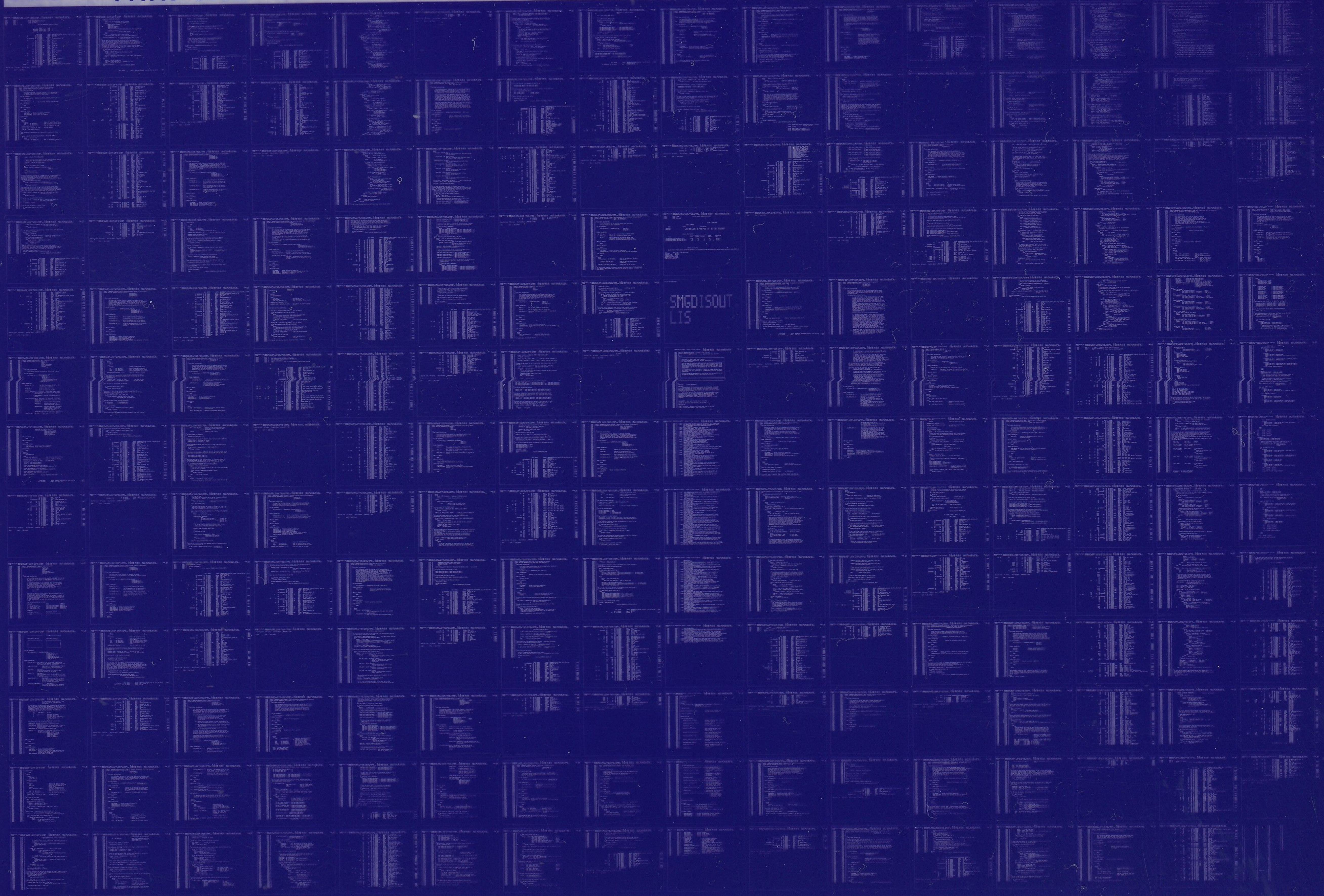
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LIS