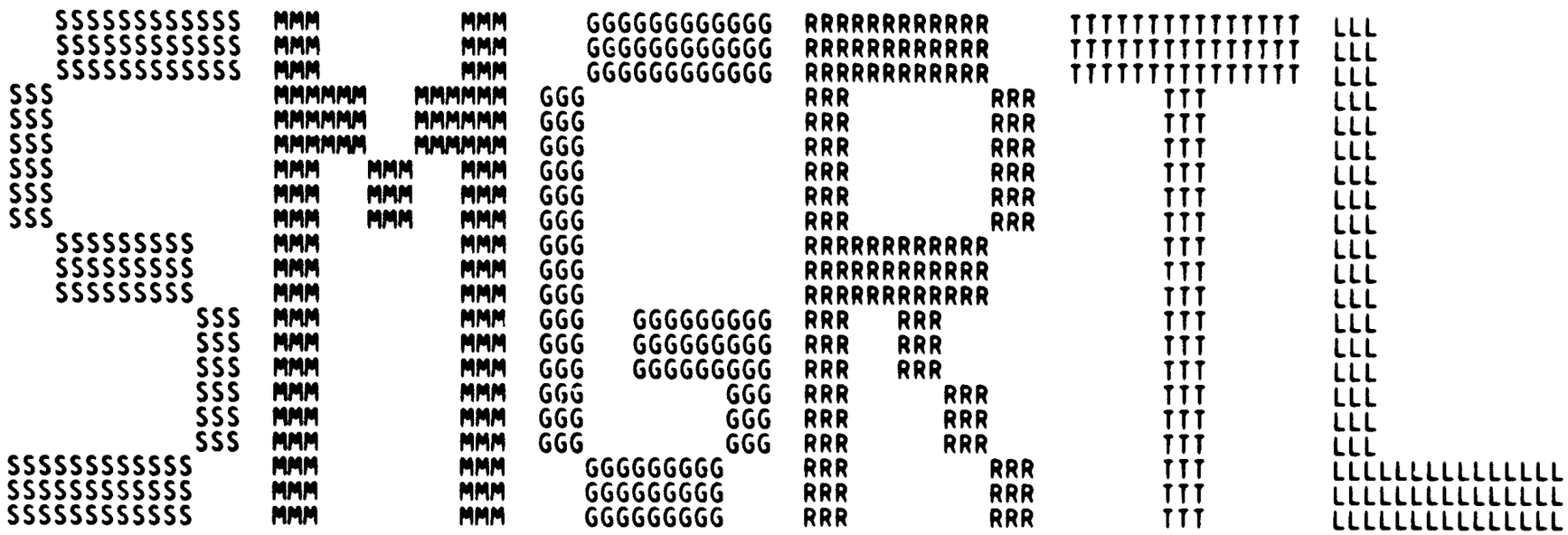

_$2

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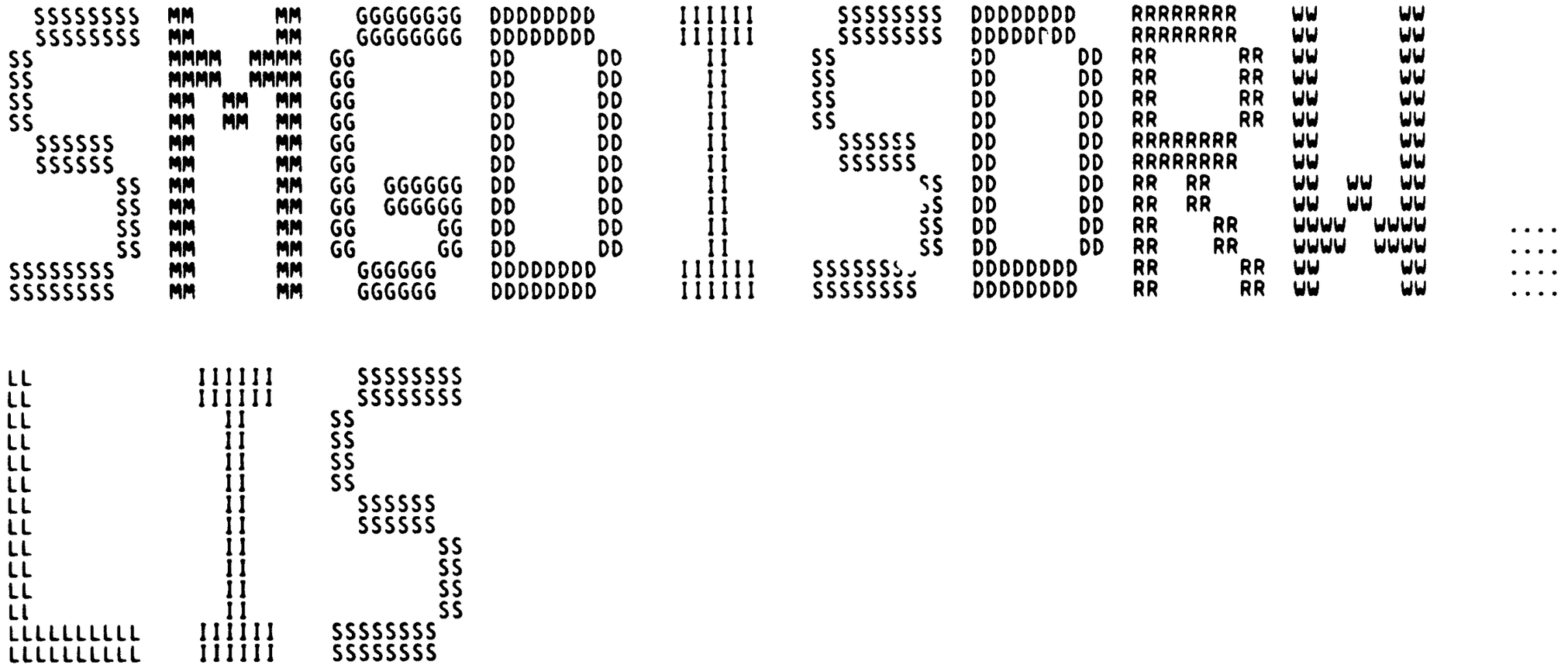
SSSSSSSS MM MM GGGGGGGG DDDDDDDD IIIIII SSSSSSSS DDDDDDDD RRRRRRRR WW WW
SSSSSSSS MM MM GGGGGGGG DDDDDDDD IIIIII SSSSSSSS DDDDDDDD RRRRRRRR WW WW
SS MMMM MMMM GG DD DD II SS DD DD RR RR WW WW
SS MMMM MMMM GG DD DD II SS DD DD RR RR WW WW
SS MM MM MM GG DD DD II SS DD DD RR RR WW WW
SS MM MM MM GG DD DD II SS DD DD RR RR WW WW
SSSSSS MM MM GG DD DD II SSSSSS DD DD RRRRRRRR WW WW
SSSSSS MM MM GG DD DD II SSSSSS DD DD RRRRRRRR WW WW
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SSSSSSSS MM MM GGGGGG DDDDDDDD IIIIII SSSSSSSS DDDDDDDD RR RR WW WW ....
SSSSSSSS MM MM GGGGGG DDDDDDDD IIIIII SSSSSSSS DDDDDDDD RR RR WW WW ....
LL IIIIII SSSSSSSS
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LL II SSSSSS
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LLLLLLLLLL IIIIII SSSSSSSS

```
;     1          0001  0 MODULE SMG$DISPLAY_DRAW ( %TITLE 'Display line drawing'
;     2          0002  0                      IDENT = '1-004'          ! File: SMGDISDRW.B32 Edit: PLL1004
;     3          0003  0                      ) =
;     4          0004  1 BEGIN
;     5          0005  1 !
;     6          0006  1 !******************************************************************************
;     7          0007  1 !*                                                                            *
;     8          0008  1 !*  COPYRIGHT (c) 1984 BY                                                     *
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;    24          0024  1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                    *
;    25          0025  1 !*                                                                            *
;    26          0026  1 !*                                                                            *
;    27          0027  1 !******************************************************************************
;    28          0028  1 !
;    29          0029  1
;    30          0030  1 !++
;    31          0031  1 ! FACILITY:     Screen Management
;    32          0032  1 !
;    33          0033  1 ! ABSTRACT:
;    34          0034  1 !
;    35          0035  1 !       This module contains routines that draw lines in a virtual display
;    36          0036  1 !       using the line drawing character set.
;    37          0037  1 !
;    38          0038  1 ! ENVIRONMENT:  User mode - AST reentrant
;    39          0039  1 !
;    40          0040  1 ! AUTHOR: P. Levesque, CREATION DATE: 21-Sep-1983
;    41          0041  1 !
;    42          0042  1 ! MODIFIED BY:
;    43          0043  1 !
;    44          0044  1 ! 1-001 - Original.  PLL 21-Sep-1983
;    45          0045  1 ! 1-002 - Fix to $INSERT_LINE_CHAR to set proper rendition when ORing
;    46          0046  1 !         line drawing characters.  PLL 13-Apr-1984
;    47          0047  1 ! 1-003 - Fix bug preventing drawing of one character lines. STAN 3-Jun-1984.
;    48          0048  1 ! 1-004 - Don't pass SMG$C_PUT_CHARS as the function code to check_for_output_db
;    49          0049  1 !         - this makes output believe the change is confined to 1 line.  PLL 6-Sep-1984
;    50          0050  1 !--
```

```
;    52          0051  1 %SBTTL 'Declarations'
;    53          0052  1 !
;    54          0053  1 ! SWITCHES:
;    55          0054  1 !
;    56          0055  1
;    57          0056  1 REQUIRE 'RTLIN:SMGPROLOG';
;    58          0134  1
;    59          0135  1 REQUIRE 'RTLIN:STRLNK';          ! JSB linkage for string routines
;    60          0320  1 !
;    61          0321  1 ! LINKAGES:
;    62          0322  1 !
;    63          0323  1 !       NONE
;    64          0324  1 !
;    65          0325  1 ! TABLE OF CONTENTS:
;    66          0326  1 !
;    67          0327  1
;    68          0328  1 FORWARD ROUTINE
;    69          0329  1         SMG$DRAW_LINE,
;    70          0330  1         SMG$DRAW_RECTANGLE;
;    71          0331  1
;    72          0332  1 !
;    73          0333  1 ! INCLUDE FILES:
;    74          0334  1 !
;    75          0335  1
;    76          0336  1
;    77          0337  1 !
;    78          0338  1 ! MACROS:
;    79          0339  1 !
;    80          0340  1 !+
;    81          0341  1 ! The following macro inserts a line drawing character into the text
;    82          0342  1 ! buffer and checks to see if the previous character was a line drawing
;    83          0343  1 ! character.  If it was, it ORs in the new character so that intersecting
;    84          0344  1 ! lines will appear correctly on the screen.  Notice that although border
;    85          0345  1 ! elements are line drawing characters, we ignore those here - we only want
;    86          0346  1 ! proper intersections with other lines the user drew.
;    87          0347  1 !-
;    88          0348  1     MACRO
;    89        M 0349  1         $INSERT_LINE_CHAR (CHAR) =
;    90        M 0350  1         BEGIN
;    91        M 0351  1         IF .(ATTR_BUF [.POS])<ATTR_V_USER_GRAPHIC, 1>
;    92        M 0352  1         THEN
;    93        M 0353  1             BEGIN
;    94        M 0354  1             TEXT_BUF [.POS] = .TEXT_BUF [.POS] OR CHAR;
;    95        M 0355  1             ATTR_BUF [.POS] = .ATTR_BUF [.POS] AND
;    96        M 0356  1                 (NOT (SMG$M_BLINK+SMG$M_BOLD+SMG$M_REVERSE+SMG$M_UNDERLINE))
;    97        M 0357  1                 OR .REND_CODE;
;    98        M 0358  1             END
;    99        M 0359  1         ELSE
;   100        M 0360  1             BEGIN
;   101        M 0361  1             TEXT_BUF [.POS] = CHAR;
;   102        M 0362  1             ATTR_BUF [.POS] = ATTR_M_USER_GRAPHIC OR .REND_CODE;
;   103        M 0363  1             END;
;   104        M 0364  1         END%;
;   105        M 0365  1
;   106        M 0366  1 !+
;   107        M 0367  1 ! This macro resets a line to single wide/high.  The line must be
;   108        M 0368  1 ! blanked first.
```

```
;  109          0369  1 !-
;  110          0370  1     MACRO
;  111        M 0371  1         $RESET_LINE  (LINE_NO) =
;  112        M 0372  1         BEGIN                       . reset/blank line
;  113        M 0373  1         LOCAL
;  114        M 0374  1             START_INDEX;
;  115        M 0375  1         START_INDEX = $SMG$LINEAR (LINE_NO, .DCB [DCB_W_COL_START]);
;  116        M 0376  1         $SMG$BLANK_FILL_DCB (.DCB [DCB_B_NO_COLS], .START_INDEX);
;  117        M 0377  1         LINE_CHAR [LINE_NO] = 0,
;  118        M 0378  1         END%;                       ! reset/blank line
;  119          0379  1
;  120          0380  1 !
;  121          0381  1 ! EQUATED SYMBOLS:
;  122          0382  1 !
;  123          0383  1 !       NONE
;  124          0384  1 !
;  125          0385  1 ! FIELDS:
;  126          0386  1 !
;  127          0387  1 !       NONE
;  128          0388  1 !
;  129          0389  1 ! PSECTS:
;  130          0390  1 !
;  131          0391  1
;  132          0392  1 !
;  133          0393  1 ! OWN STORAGE:
;  134          0394  1 !
;  135          0395  1 !       NONE
;  136          0396  1 !
;  137          0397  1 ! EXTERNAL REFERENCES:
;  138          0398  1 !
;  139          0399  1
;  140          0400  1 EXTERNAL ROUTINE
;  141          0401  1         SMG$$CHECK_FOR_OUTPUT_DCB;      ! check if time to repaint display
;  142          0402  1
;  143          0403  1 EXTERNAL LITERAL
;  144          0404  1         SMG$_INVDIS_ID,                 ! Invalid display id
;  145          0405  1         SMG$_INVARG,                    ! Invalid argument
;  146          0406  1         SMG$_INVCOL,                    ! Invalid column number
;  147          0407  1         SMG$_INVROW,                    ! Invalid row number
;  148          0408  1         SMG$_DIALINNOT,                 ! Diagonal line not allowed
;  149          0409  1         SMG$_WRONUMARG;                 ! Wrong number of arguments
```

```
;  151          0410  1 %SBTTL 'SMG$DRAW_LINE - Draw a line in a virtual display'
;  152          0411  1 GLOBAL ROUTINE SMG$DRAW_LINE (
;  153          0412  1                                 DISPLAY_ID,
;  154          0413  1                                 START_ROW,
;  155          0414  1                                 START_COL,
;  156          0415  1                                 END_ROW,
;  157          0416  1                                 END_COL,
;  158          0417  1                                 RENDITION_SET,
;  159          0418  1                                 RENDITION_COMPLEMENT
;  160          0419  1     ) =
;  161          0420  1
;  162          0421  1 !++
;  163          0422  1 ! FUNCTIONAL DESCRIPTION:
;  164          0423  1 !
;  165          0424  1 !       This routine draws a line from START_ROW, START_COL to END_ROW, END_COL.
;  166          0425  1 !       Device independent codes are moved to the display text and
;  167          0426  1 !       attributes buffers - output later figures out what characters
;  168          0427  1 !       to use based on the type of terminal.
;  169          0428  1 !
;  170          0429  1 !       The internal cursor position is not changed.
;  171          0430  1 !
;  172          0431  1 ! CALLING SEQUENCE:
;  173          0432  1 !
;  174          0433  1 !       ret_status.wlc.v  =   SMG$DRAW_LINE   (DISPLAY_ID.rl.r,
;  175          0434  1 !                                              START_ROW.rl.r, START_COL.rl.r,
;  176          0435  1 !                                              END_ROW.rl.r, END_COL.rl.r
;  177          0436  1 !                                              [,RENDITION_SET.r[,r]
;  178          0437  1 !                                              [,RENDITION_COMPLEMENT.rl.r])
;  179          0438  1 !
;  180          0439  1 ! FORMAL PARAMETERS:
;  181          0440  1 !
;  182          0441  1 !       DISPLAY_ID.rl.r         Display id of virtual display
;  183          0442  1 !
;  184          0443  1 !       START_ROW.rl.r          Address of row number at which
;  185          0444  1 !                               to start line.
;  186          0445  1 !
;  187          0446  1 !       START_COL.rl.r          Address of column number at which
;  188          0447  1 !                               to start line.
;  189          0448  1 !
;  190          0449  1 !       END_ROW.rl.r            Address of row number at which
;  191          0450  1 !                               to end line.
;  192          0451  1 !
;  193          0452  1 !       END_COL.rl.r            Address of column number at which
;  194          0453  1 !                               to end line.
;  195          0454  1 !
;  196          0455  1 !       RENDITION_SET.rl.r      Optional.  Each 1 bit in this parameter
;  197          0456  1 !                               causes the corresponding attribute to be
;  198          0457  1 !                               set in the display.  (See below for list
;  199          0458  1 !                               of settable attributes.)
;  200          0459  1 !
;  201          0460  1 !       RENDITION_COMPLEMENT.rl.r Optional.  Each 1 bit attribute in this
;  202          0461  1 !                                  parameter causes the corresponding attribute
;  203          0462  1 !                                  to be complemented in the display.  (See
;  204          0463  1 !                                  below for list of complementable attributes.)
;  205          0464  1 !
;  206          0465  1 !       If the same bit is specified in both the RENDITION_SET parameter
;  207          0466  1 !       and in the RENDITION_COMPLEMENT parameter, the application is
```

```
;  208          0467  1 !       RENDITION_SET followed by RENDITION complement.  Using these two
;  209          0468  1 !       parameters together the caller can exercise arbitrary and
;  210          0469  1 !       independent control over each attribute on a single call.  On an
;  211          0470  1 !       attribute by attribute basis he can cause the following
;  212          0471  1 !       transformations:
;  213          0472  1 !
;  214          0473  1 !               SET     COMPLEMENT      Action
;  215          0474  1 !               ---     ----------      ------
;  216          0475  1 !               0       0               Attribute unchanged.
;  217          0476  1 !               1       0               Attribute set to "on"
;  218          0477  1 !               0       1               Attribute set to complement of
;  219          0478  1 !                                       current setting.
;  220          0479  1 !               1       1               Attribute set to "off".
;  221          0480  1 !
;  222          0481  1 !
;  223          0482  1 !       Attributes which can be manipulated in this manner are:
;  224          0483  1 !
;  225          0484  1 !       SMG$M_BLINK  displays characters blinking.
;  226          0485  1 !       SMG$M_BOLD  displays characters in higher-than-normal
;  227          0486  1 !                   intensity.
;  228          0487  1 !       SMG$M_REVERSE  displays characters in reverse video -- that is,
;  229          0488  1 !                   using the opposite default rendition of the
;  230          0489  1 !                   virtual display.
;  231          0490  1 !       SMG$M_UNDERLINE  displays characters underlined.
;  232          0491  1 !
;  233          0492  1 !
;  234          0493  1 ! IMPLICIT INPUTS:
;  235          0494  1 !
;  236          0495  1 !       NONE
;  237          0496  1 !
;  238          0497  1 ! IMPLICIT OUTPUTS:
;  239          0498  1 !
;  240          0499  1 !       NONE
;  241          0500  1 !
;  242          0501  1 ! COMPLETION STATUS:
;  243          0502  1 !
;  244          0503  1 !       SS$_NORMAL      Normal successful completion
;  245          0504  1 !       SMG$_INVCOL     Invalid column number
;  246          0505  1 !       SMG$_INVROW     Invalid row number
;  247          0506  1 !       SMG$_DIALINNOT  Diagonal line not allowed
;  248          0507  1 !       SMG$_WRONUMARG  Wrong number of arguments
;  249          0508  1 !
;  250          0509  1 ! SIDE EFFECTS:
;  251          0510  1 !
;  252          0511  1 !       NONE
;  253          0512  1 !
;  254          0513  1 !--
;  255          0514  1
;  256          0515  2     BEGIN
;  257          0516  2
;  258          0517  2     LOCAL
;  259          0518  2         WORK_S_ROW,                     ! local temporaries
;  260          0519  2         WORK_S_COL,                     !   ''
;  261          0520  2         WORK_E_ROW,                     !   ''
;  262          0521  2         WORK_E_COL,                     !   ''
;  263          0522  2         TEXT_BUF : REF VECTOR [,BYTE],  ! ptr to dcb text buffer
;  264          0523  2         ATTR_BUF : REF VECTOR [,BYTE],  ! ptr to dcb attr buffer
```

```
;   265           0524  2          DIR : INITIAL (0),                  ! direction of line
;   266           0525  2          REND_CODE,                          ! rendition code to use
;   267           0526  2          DCB : REF BLOCK [,BYTE];            . addr of display control block
;   268           0527  2
;   269           0528  2      LITERAL
;   270           0529  2          K_SET_ARG = 6,                      ! arg number of rend set
;   271           0530  2          K_COMP_ARG = 7,                     ! arg number of rend complement
;   272           0531  2          K_HORIZ = 1;                        ! line is horizontal
;   273           0532  2
;   274           0533  2
;   275           0534  2      $SMG$GET_DCB (.DISPLAY_ID, DCB);        ! get addr of virtual display
;   276           0535  2                                              ! control block
;   277           0536  2      TEXT_BUF = .DCB [DCB_A_TEXT_BUF];
;   278           0537  2      ATTR_BUF = .DCB [DCB_A_ATTR_BUF];
;   279           0538  2
;   280           0539  2  !+
;   281           0540  2  ! Validate arguments passed.  Check for optionals.
;   282           0541  2  !-
;   283           0542  2
;   284           0543  2      $SMG$VALIDATE_ARGCOUNT (5, 7);
;   285           0544  2
;   286           0545  2      $SMG$VALIDATE_ROW_COL (..START_ROW, ..START_COL);
;   287           0546  2
;   288           0547  2      $SMG$VALIDATE_ROW_COL (..END_ROW, ..END_COL);
;   289           0548  2
;   290           0549  2      $SMG$SET_REND_CODE (K_SET_ARG, K_COMP_ARG);
;   291           0550  2                                              ! macro to use caller's args if present
;   292           0551  2
;   293           0552  2  !+
;   294           0553  2  ! Use local temporary storage for start and end points.  We don't know
;   295           0554  2  ! the order in which the points will be passed, but our code assumes
;   296           0555  2  ! left to right order for horizontal lines, and up to down order for vertical
;   297           0556  2  ! lines.
;   298           0557  2  !-
;   299           0558  2
;   300           0559  2      IF ..START_ROW EQL ..END_ROW
;   301           0560  2      THEN
;   302           0561  2          DIR = K_HORIZ
;   303           0562  2      ELSE
;   304           0563  2          IF ..START_COL NEQ ..END_COL
;   305           0564  2          THEN
;   306           0565  2              RETURN (SMG$_DIALINNOT);
;   307           0566  2
;   308           0567  2      IF .DIR EQL K_HORIZ
;   309           0568  2      THEN
;   310           0569  3          BEGIN
;   311           0570  3          IF ..START_COL LSS ..END_COL
;   312           0571  3          THEN
;   313           0572  4              BEGIN
;   314           0573  4              WORK_S_COL = ..START_COL;
;   315           0574  4              WORK_S_ROW = ..START_ROW;
;   316           0575  4              WORK_E_COL = ..END_COL;
;   317           0576  4              WORK_E_ROW = ..END_ROW;
;   318           0577  4              END
;   319           0578  3          ELSE
;   320           0579  4              BEGIN
;   321           0580  4              WORK_S_COL = ..END_COL;
```

```
;   322          0581  4              WORK_S_ROW = ..END_ROW;
;   323          0582  4              WORK_E_COL = ..START_COL;
;   324          0583  4              WORK_E_ROW = ..START_ROW;
;   325          0584  3              END;
;   326          0585  3          END
;   327          0586  2      ELSE                                    ! vertical line
;   328          0587  2          IF ..START_ROW LSS ..END_ROW
;   329          0588  2          THEN
;   330          0589  3              BEGIN
;   331          0590  3              WORK_S_COL = ..START_COL;
;   332          0591  3              WORK_S_ROW = ..START_ROW;
;   333          0592  3              WORK_E_COL = ..END_COL;
;   334          0593  3              WORK_E_ROW = ..END_ROW;
;   335          0594  3              END
;   336          0595  2          ELSE
;   337          0596  3              BEGIN
;   338          0597  3              WORK_S_COL = ..END_COL;
;   339          0598  3              WORK_S_ROW = ..END_ROW;
;   340          0599  3              WORK_E_COL = ..START_COL;
;   341          0600  3              WORK_E_ROW = ..START_ROW;
;   342          0601  2              END;
;   343          0602  2
;   344          0603  2 !+
;   345          0604  2 ! Reset the line characteristics vector in case there was previously
;   346          0605  2 ! some double high or double wide text.
;   347          0606  2 !
;   348          0607  2 ! We may be dealing with a vertical or horizontal line.  A vertical line
;   349          0608  2 ! will require re-setting multiple entries in the vector.
;   350          0609  2 !-
;   351          0610  2
;   352          0611  3      BEGIN
;   353          0612  3      BIND
;   354          0613  3          LINE_CHAR = .DCB [DCB_A_LINE_CHAR];
;   355          0614  3      MAP
;   356          0615  3          LINE_CHAR : VECTOR [,BYTE];
;   357          0616  3
;   358          0617  3      IF .DIR EQL K_HORIZ                     ! horiz line - reset 1 ele of vector
;   359          0618  3      THEN
;   360          0619  4          BEGIN
;   361          0620  4          IF .LINE_CHAR [.WORK_S_ROW] NEQ 0
;   362          0621  4          THEN
;   363          0622  4              $RESET_LINE (.WORK_S_ROW);
;   364          0623  4          END
;   365          0624  3      ELSE
;   366          0625  4          BEGIN                               ! vert line - reset multi elements
;   367          0626  4          INCR ROW FROM .WORK_S_ROW TO .WORK_E_ROW DO
;   368          0627  5              BEGIN
;   369          0628  5              IF .LINE_CHAR [.ROW] NEQ 0
;   370          0629  5              THEN
;   371          0630  5                  $RESET_LINE (.ROW);
;   372          0631  4              END;
;   373          0632  3          END;
;   374          0633  3
;   375          0634  2      END;
;   376          0635  2
;   377          0636  2 !+
;   378          0637  2 ! Insert the generic text byte for line drawing into the text buffer.
```

```
;  379          0638  2 ! (Notice that there are different representations for horizontal, vertical,
;  380          0639  2 ! corners, etc.)  Set a bit in the attribute byte so the output routines
;  381          0640  2 ! will re-interpret the generic text into the device specific character.
;  382          0641  2 !
;  383          0642  2 ! We move one character at a time since it may be necessary to OR elements
;  384          0643  2 ! (see description of macro above).
;  385          0644  2 !-
;  386          0645  2
;  387          0646  3     BEGIN
;  388          0647  3     LOCAL
;  389          0648  3         POS,                                ! linear index into text buffer
;  390          0649  3         LENGTH;                             . calc length of line
;  391          0650  3
;  392          0651  3     POS = $SMG$LINEAR (.WORK_S_ROW, .WORK_S_COL);
;  393          0652  3
;  394          0653  3     IF .DIR EQL K_HORIZ                     ! horizontal line
;  395          0654  3     THEN
;  396          0655  4         BEGIN
;  397          0656  4         LENGTH = .WORK_E_COL - .WORK_S_COL + 1;
;  398          0657  4
;  399          0658  4         $INSERT_LINE_CHAR (BORD_M_RIGHT);
;  400          0659  4         POS = .POS + 1;
;  401          0660  4
;  402          0661  4         INCR NUM_CHAR FROM 2 TO (.LENGTH - 1) DO
;  403          0662  5             BEGIN
;  404          0663  5             $INSERT_LINE_CHAR (BORD_M_HORIZ);
;  405          0664  5             POS = .POS + 1;
;  406          0665  4             END;
;  407          0666  4
;  408          0667  4         IF .LENGTH GTR 1
;  409          0668  4         THEN
;  410          0669  4             $INSERT_LINE_CHAR (BORD_M_LEFT);
;  411          0670  4
;  412          0671  4         END
;  413          0672  3     ELSE
;  414          0673  4         BEGIN                               ! vertical line
;  415          0674  4         LENGTH = .WORK_E_ROW - .WORK_S_ROW + 1;
;  416          0675  4
;  417          0676  4         $INSERT_LINE_CHAR (BORD_M_DOWN);
;  418          0677  4         POS = .POS + .DCB [DCB_W_NO_COLS];
;  419          0678  4
;  420          0679  4         INCR ROW FROM 2 TO (.LENGTH - 1) DO
;  421          0680  5             BEGIN
;  422          0681  5             $INSERT_LINE_CHAR (BORD_M_VERT);
;  423          0682  5             POS = .POS + .DCB [DCB_W_NO_COLS];
;  424          0683  4             END;
;  425          0684  4
;  426          0685  4         IF .LENGTH GTR 1
;  427          0686  4         THEN
;  428          0687  4             $INSERT_LINE_CHAR (BORD_M_UP);
;  429          0688  4
;  430          0689  3         END;
;  431          0690  3
;  432          0691  2     END;
;  433          0692  2
;  434          0693  2 !+
;  435          0694  2 ! See if this change should be reflected on the screen immediately.
```

```
;  436          0695  2 !-
;  437          0696  2
;  438          0697  3     RETURN (SMG$$CHECK_FOR_OUTPUT_DCB (.DCB,
;  439          0698  3                                        0,
;  440          0699  2                                        .WORK_S_ROW));
;  441          0700  2
;  442          0701  2
;  443          0702  1     END;                                ! End of routine SMG$DRAW_LINE


                                                               .TITLE  SMG$DISPLAY_DRAW Display line drawing
                                                               .IDENT  \1-004\

                                                               .EXTRN  SMG$$CHECK_FOR_OUTPUT_DCB
                                                               .EXTRN  SMG$_INVDIS_ID, SMG$_INVARG
                                                               .EXTRN  SMG$_INVCOL, SMG$_INVROW
                                                               .EXTRN  SMG$_DIALINNOT, SMG$_WRONUMARG

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

                                        0FFC 00000             .ENTRY  SMG$DRAW_LINE, Save R2,R3,R4,R5,R6,R7,R8,-  ; 0411
                                                                       R9,R10,R11
                                5E              20  C2 00002           SUBL2   #32, SP                             ;
                                                54  D4 00005           CLRL    DIR                                 ; 0515
                                50        04    BC  D0 00007           MOVL    @DISPLAY_ID, R0                     ; 0534
                           04   BC        38    A0  D1 0000B           CMPL    56(R0), @DISPLAY_ID                 ;
                                                06  12 00010           BNEQ    1$                                  ;
                                11        44    A0  91 00012           CMPB    68(R0), #17                         ;
                                                08  13 00016           BEQL    2$                                  ;
                                50 00000000G    8F  D0 00018 1$:       MOVL    #SMG$_INVDIS_ID, R0                 ;
                                                    04 0001F           RET                                         ;
                                5B        04    BC  D0 00020 2$:       MOVL    @DISPLAY_ID, DCB                    ;
                           04   AE        10    AB  D0 00024           MOVL    16(DCB), TEXT_BUF                   ; 0536
                                5A        14    AB  D0 00029           MOVL    20(DCB), ATTR_BUF                   ; 0537
                     50         6C              05  83 0002D           SUBB3   #5, (AP), DIFF                      ; 0543
                                02              50  91 00031           CMPB    DIFF, #2                            ;
                                                08  1B 00034           BLEQU   3$                                  ;
                                50 00000000G    8F  D0 00036           MOVL    #SMG$_WRONUMARG, R0                 ;
                                                    04 0003D           RET                                         ;
                                53        08    BC  D0 0003E 3$:       MOVL    @START_ROW, R3                      ; 0545
                                                08  15 00042           BLEQ    4$                                  ;
                53        02    AB              10  00 ED 00044        CMPZV   #0, #16, 2(DCB), R3                 ;
                                                08  18 0004A           BGEQ    5$                                  ;
                                50 00000000G    8F  D0 0004C 4$:       MOVL    #SMG$_INVROW, R0                    ;
                                                    04 00053           RET                                         ;
                                52        0C    BC  D0 00054 5$:       MOVL    @START_COL, R2                      ;
                                                08  15 00058           BLEQ    6$                                  ;
                52        06    AB              10  00 ED 0005A        CMPZV   #0, #16, 6(DCB), R2                 ;
                                                08  18 00060           BGEQ    7$                                  ;
                                50 00000000G    8F  D0 00062 6$:       MOVL    #SMG$_INVCOL, R0                    ;
                                                    04 00069           RET                                         ;
                                51        10    BC  D0 0006A 7$:       MOVL    @END_ROW, R1                        ; 0547
                                                08  15 0006E           BLEQ    8$                                  ;
                51        02    AB              10  00 ED 00070        CMPZV   #0, #16, 2(DCB), R1                 ;
                                                08  18 00076           BGEQ    9$                                  ;
                                50 00000000G    8F  D0 00078 8$:       MOVL    #SMG$_INVROW, R0                    ;
                                                    04 0007F           RET                                         ;
```

```
                                50        14    BC   D0 00080 9$.      MOVL    @END_COL, R0                                    ;
                                                 08   15 00084         BLEQ    10$                                             ;
          50        06    AB                   00   ED 00086         CMPZV   #0, #16, 6(DCB), R0                             ;
                                                 08   18 0008C         BGEQ    11$                                             ;
                                50 00000000G     8F   D0 0008E 10$:    MOVL    #SMG$_INVCOL, R0                                ;
                                                      04 00095         RET                                                     ;
                              10  AE        2E   AB   9A 00096 11$:    MOVZBL  46(DCB), REND_CODE                              ; 0549
                                06                   6C   91 0009B         CMPB    (AP), #6                                        ;
                                                     0A   1F 0009E         BLSSU   12$                                             ;
                                          18         AC   D5 000A0         TSTL    24(AP)                                          ;
                                                     05   13 000A3         BEQL    12$                                             ;
                              10  AE        18         BC   C8 000A5         BISL2   @RENDITION_SET, REND_CODE                       ;
                                07                   6C   91 000AA 12$:    CMPB    (AP), #7                                        ;
                                                     0A   1F 000AD         BLSSU   13$                                             ;
                                          1C         AC   D5 000AF         TSTL    28(AP)                                          ;
                                                     05   13 000B2         BEQL    13$                                             ;
                              10  AE        1C         BC   CC 000B4         XORL2   @RENDITION_COMPLEMENT, REND_CODE                ;
                                51                   53   D1 000B9 13$:    CMPL    R3, R1                                          ; 0559
                                                     05   12 000BC         BNEQ    14$                                             ;
                                54                   01   D0 000BE         MOVL    #1, DIR                                         ; 0561
                                                     0D   11 000C1         BRB     15$                                             ;
                                50                   52   D1 000C3 14$:    CMPL    R2, R0                                          ; 0563
                                                     08   13 000C6         BEQL    15$                                             ;
                                50 00000000G     8F   D0 000C8         MOVL    #SMG$_DIALINNOT, R0                             ; 0565
                                                      04 000CF         RET                                                     ;
                                          1C         AE   D4 000D0 15$:    CLRL    28(SP)                                          ; 0567
                                01                   54   D1 000D3         CMPL    DIR, #1                                         ;
                                                     08   12 000D6         BNEQ    16$                                             ;
                                          1C         AE   D6 000D8         INCL    28(SP)                                          ;
                                50                   52   D1 000DB         CMPL    R2, R0                                          ; 0570
                                                     03   11 000DE         BRB     17$                                             ;
                                51                   53   D1 000E0 16$:    CMPL    R3, R1                                          ; 0587
                                                     0F   18 000E3 17$:    BGEQ    18$                                             ;
                              14  AE                 52   D0 000E5         MOVL    R2, WORK_S_COL                                  ; 0590
                                57                   53   D0 000E9         MOVL    R3, WORK_S_ROW                                  ; 0591
                                59                   50   D0 000EC         MOVL    R0, WORK_E_COL                                  ; 0592
                                58                   51   D0 000EF         MOVL    R1, WORK_E_ROW                                  ; 0593
                                                     0D   11 000F2         BRB     19$                                             ; 0587
                              14  AE                 50   D0 000F4 18$:    MOVL    R0, WORK_S_COL                                  ; 0597
                                57                   51   D0 000F8         MOVL    R1, WORK_S_ROW                                  ; 0598
                                59                   52   D0 000FB         MOVL    R2, WORK_E_COL                                  ; 0599
                                58                   53   D0 000FE         MOVL    R3, WORK_E_ROW                                  ; 0600
                                54        1C         AE   E9 00101 19$:    BLBC    28(SP), 22$                                     ; 0620
                                          4C   BB47  95   00105         TSTB    @76(DCB)[WORK_S_ROW]                            ;
                                               4C    13   00109         BEQL    21$                                             ;
                                56        FF         A7   9E 0010B         MOVAB   -1(R7), R6                                      ; 062c
                                50        06         AB   3C 0010F         MOVZWL  6(DCB), R0                                      ;
                                56                   50   C4 00113         MULL2   R0, R6                                          ;
                                50        04         AB   3C 00116         MOVZWL  4(DCB), R0                                      ;
                              18  AE      FF   A046  9E   0011A         MOVAB   -1(R0)[R6], START_INDEX                         ;
                                50        10         AB   D0 00120         MOVL    16(DCB), TEXT_BUF                               ;
                                56        14         AB   D0 00124         MOVL    20(DCB), ATTR_BUF                               ;
                              0C  AE      18         AB   D0 00128         MOVL    24(DCB), CHAR_BUF                               ;
06    AB                20              6E             00   2C 0012D         MOVC5   #0, (SP), #32, 6(DCB), @START_INDEX-            ;
                                                   18 BE40    00133                 [TEXT_BUF]                                      ;
06    AB        2E      AB              6E             00   2C 00136         MOVC5   #0, (SP), 46(DCB), 6(DCB), @START_INDEX-        ;
                                                   18 BE46    0013D                 [ATTR_BUF]                                      ;
```

```
                                    0C    AE  D5 00140          TSTL    CHAR_BUF                                  ;
                                    0E    13  00143             BEQL    20$                                       ;
                          56        0C    AE  D0 00145          MOVL    CHAR_BUF, R6                              ;
  06   AB      30   AB    6E              00  2C 00149          MOVC5   #0, (SP), 48(DCB), 6(DCB), @START_INDEX[R6] ;
                                    18 BE46      00150                                                            ;
                                    4C BB47   94 00153 20$:     CLRB    @76(DCB)[WORK_S_ROW]                      ;
                                          5F  11 00157 21$:     BRB     26$                                       ; 0617
                          56        FF    A7  9E 00159 22$:     MOVAB   -1(R7), ROW                               ; 0626
                                          55  11 0015D          BRB     25$                                       ;
                                    4C BB46   95 0015F 23$:     TSTB    @76(DCB)[ROW]                             ; 0628
                                          4F  13 00163          BEQL    25$                                       ;
                          50        FF    A6  9E 00165          MOVAB   -1(R6), R0                                ; 0630
                          51        06    AB  3C 00169          MOVZWL  6(DCB), R1                                ;
                          50              51  C4 0016D          MULL2   R1, R0                                    ;
                          51        04    AB  3C 00170          MOVZWL  4(DCB), R1                                ;
                     18   AE        FF A140   9E 00174          MOVAB   -1(R1)[R0], START_INDEX                   ;
                          50        10    AB  D0 0017A          MOVL    16(DCB), TEXT_BUF                         ;
                     08   AE        14    AB  7D 0017E          MOVQ    20(DCB), ATTR_BUF                         ;
  06   AB           20    6E              00  2C 00183          MOVC5   #0, (SP), #32, 6(DCB), @START_INDEX-      ;
                                    18 BE40      00189                  [TEXT_BUF]                                ;
                6E   18   AE        08    AE  C1 0018C          ADDL3   ATTR_BUF, START_INDEX, (SP)               ;
  06    3      2E   AB    6E              00  2C 00192          MOVC5   #0, (SP), 46(DCB), 6(DCB), @0(SP)         ;
                                    00    BE     00199                                                            ;
                                    0C    AE  D5 0019B          TSTL    CHAR_BUF                                  ;
                                          10  13 0019E          BEQL    24$                                       ;
               08   AE   18   AE    0C    AE  C1 001A0          ADDL3   CHAR_BUF, START_INDEX, 8(SP)              ;
  06   AB      30   AB    6E              00  2C 001A7          MOVC5   #0, (SP), 48(DCB), 6(DCB), @8(SP)         ;
                                    08    BE     001AE                                                            ;
                                    4C BB46   94 001B0 24$:     CLRB    @76(DCB)[ROW]                             ;
                    A7    56              58  F3 001B4 25$:     AOBLEQ  WORK_E_ROW, ROW, 23$                      ; 0626
                          56        FF    A7  9E 001B8 26$:     MOVAB   -1(R7), R6                                ; 0651
                          50        06    AB  3C 001BC          MOVZWL  6(DCB), R0                                ;
                          56              50  C4 001C0          MULL2   R0, R6                                    ;
                51   14   AE              01  C3 001C3          SUBL3   #1, WORK_S_COL, R1                        ;
                50        56              51  C1 001C8          ADDL3   R1, R6, POS                               ;
                52        5A              50  C1 001CC          ADDL3   POS, ATTR_BUF, R2                         ; 0658
                53        50        04    AE  C1 001D0          ADDL3   TEXT_BUF, POS, R3                         ;
                          03        1C    AE  E8 001D5          BLBS    28(SP), 27$                               ;
                                        008A  31 001D9          BRW     36$                                       ;
                          59        14    AE  C2 001DC 27$:     SUBL2   WORK_S_COL, R9                            ; 0656
                          51        01    A9  9E 001E0          MOVAB   1(R9), LENGTH                             ;
                10        62              06  E1 001E4          BBC     #6, (R2), 28$                             ; 0658
                          63              01  88 001E8          BISB2   #1, (R3)                                  ;
                          53              62  9A 001EB          MOVZBL  (R2), R3                                  ;
                          53              0F  CA 001EE          BICL2   #15, R3                                   ;
                62        53        10    AE  89 001F1          BISB3   REND_CODE, R3, (R2)                       ;
                                          09  11 001F6          BRB     29$                                       ;
                          63              01  90 001F8 28$:     MOVB    #1, (R3)                                  ;
                62   10   AE        40    8F  89 001FB          BISB3   #64, REND_CODE, (R2)                      ;
                                          50  D6 00201 29$:     INCL    POS                                       ; 0659
                          53              01  D0 00203          MOVL    #1, NUM_CHAR                              ; 0661
                                          2D  11 00206          BRB     33$                                       ;
                17      604A              06  E1 00208 30$:     BBC     #6, (POS)[ATTR_BUF], 31$                  ; 0663
                          52        04    AE  D0 0020D          MOVL    TEXT_BUF, R2                              ;
                        6042              05  88 00211          BISB2   #5, (POS)[R2]                             ;
                          52            604A  9A 00215          MOVZBL  (POS)[ATTR_BUF], R2                       ;
                          52              0F  CA 00219          BICL2   #15, R2                                   ;
```

```
                604A            52      10  AE  89 0021C          BISB3   REND_CODE, R2, (POS)[ATTR_BUF]
                                            0F  11 00222          BRB     32$
                                52      04  AE  D0 00224 31$:     MOVL    TEXT_BUF, R2
                              6042          05  90 00228          MOVB    #5, (POS)[R2]
                604A        10  AE      40  8F  89 0022C          BISB3   #64, REND_CODE, (POS)[ATTR_BUF]
                                            50  D6 00233 32$:     INCL    POS                                     ; 0664
                  CF            53          51  F2 00235 33$:     AOBLSS  LENGTH, NUM_CHAR, 30$                   ; 0661
                                01          51  D1 00239          CMPL    LENGTH, #1                              ; 0667
                                            1A  15 0023C          BLEQ    34$
                  18          604A          06  E1 0023E          BBC     #6, (POS)[ATTR_BUF], 35$                ; 0669
                                51      04  AE  DC 00243          MOVL    TEXT_BUF, R1
                              6041          04  88 00247          BISB2   #4, (POS)[R1]
                                52        604A  9A 0024B          MOVZBL  (POS)[ATTR_BUF], R2
                                52          0F  CA 0024F          BICL2   #15, R2
                604A            52      10  AE  89 00252          BISB3   REND_CODE, R2, (POS)[ATTR_BUF]
                                          00A1  31 00258 34$:     BRW     45$
                                51      04  AE  D0 0025B 35$:     MOVL    TEXT_BUF, R1
                              6041          04  90 0025F          MOVB    #4, (POS)[R1]
                                          008F  31 00263          BRW     44$
                                58          57  C2 00266 36$:     SUBL2   WORK_S_ROW, R8                          ; 0674
                                51      01  A8  9E 00269          MOVAB   1(R8), LENGTH
                  10            62          06  E1 0026D          BBC     #6, (R2), 37$                           ; 0676
                                63          08  88 00271          BISB2   #8, (R3)
                                53          62  9A 00274          MOVZBL  (R2), R3
                                53          0F  CA 00277          BICL2   #15, R3
                  62            53      10  AE  89 0027A          BISB3   REND_CODE, R3, (R2)
                                            09  11 0027F          BRB     38$
                                63          08  90 00281 37$:     MOVB    #8, (R3)
                  62        10  AE      40  8F  89 00284          BISB3   #64, REND_CODE, (R2)
                                52      06  AB  3C 0028A 38$:     MOVZWL  6(DCB), R2                              ; 0677
                                50          52  C0 0028E          ADDL2   R2, POS
                                53          01  D0 00291          MOVL    #1, ROW                                 ; 0679
                                            32  11 00294          BRB     42$
                  17          604A          06  E1 00296 39$:     BBC     #6, (POS)[ATTR_BUF], 40$                ; 0681
                                52      04  AE  D0 0029B          MOVL    TEXT_BUF, R2
                              6042          0A  88 0029F          BISB2   #10, (POS)[R2]
                                52        604A  9A 002A3          MOVZBL  (POS)[ATTR_BUF], R2
                                52          0F  CA 002A7          BICL2   #15, R2
                604A            52      10  AE  89 002AA          BISB3   REND_CODE, R2, (POS)[ATTR_BUF]
                                            0F  11 002B0          BRB     41$
                                52      04  AE  D0 002B2 40$:     MOVL    TEXT_BUF, R2
                              6042          0A  90 002B6          MOVB    #10, (POS)[R2]
                604A        10  AE      40  8F  89 002BA          BISB3   #64, REND_CODE, (POS)[ATTR_BUF]
                                52      06  AB  3C 002C1 41$:     MOVZWL  6(DCB), R2                              ; 0682
                                50          52  C0 002C5          ADDL2   R2, POS
                  CA            53          51  F2 002C8 42$:     AOBLSS  LENGTH, ROW, 39$                        ; 0679
                                01          51  D1 002CC          CMPL    LENGTH, #1                              ; 0685
                                            2B  15 002CF          BLEQ    45$
                  17          604A          06  E1 002D1          BBC     #6, (POS)[ATTR_BUF], 43$                ; 0687
                                51      04  AE  D0 002D6          MOVL    TEXT_BUF, R1
                              6041          02  88 002DA          BISB2   #2, (POS)[R1]
                                51        604A  9A 002DE          MOVZBL  (POS)[ATTR_BUF], R1
                                51          0F  CA 002E2          BICL2   #15, R1
                604A            51      10  AE  89 002E5          BISB3   REND_CODE, R1, (POS)[ATTR_BUF]
                                            0F  11 002EB          BRB     45$
                                51      04  AE  D0 002ED 43$:     MOVL    TEXT_BUF, R1
                              6041          02  90 002F1          MOVB    #2, (POS)[R1]
```

```
                 604A      10   AE      40   8F  89 002F5 44$:    BISB3   #64, REND_CODE, (POS)[ATTR_BUF]
                                             57  DD 002FC 45$:    PUSHL   WORK_S_ROW                          ; 0699
                                             7E  D4 002FE         CLRL    -(SP)                               ; 0697
                                             5B  DD 00300         PUSHL   DCB
                      00000000G  00           03  FB 00302         CALLS   #3, SMG$$CHECK_FOR_OUTPUT_DCB       ;
                                                 04 00309         RET                                         ; 0702

; Routine Size:  778 bytes,    Routine Base:  _SMG$CODE + 0000
```

```
;  445          0703  1 %SBTTL 'SMG$DRAW_RECTANGLE - Draw a rectangle in a virtual display'
;  446          0704  1 GLOBAL ROUTINE SMG$DRAW_RECTANGLE   (
;  447          0705  1                                       DISPLAY_ID,
;  448          0706  1                                       TOP_LEFT_ROW,
;  449          0707  1                                       TOP_LEFT_COL,
;  450          0708  1                                       BOTTOM_RIGHT_ROW,
;  451          0709  1                                       BOTTOM_RIGHT_COL,
;  452          0710  1                                       RENDITION_SET,
;  453          0711  1                                       RENDITION_COMPLEMENT
;  454          0712  1     ) =
;  455          0713  1
;  456          0714  1 !++
;  457          0715  1 ! FUNCTIONAL DESCRIPTION:
;  458          0716  1 !
;  459          0717  1 !       This routine draws a rectangle in a virtual display.  Given
;  460          0718  1 !       two points in opposite corners of the rectangle, it determines
;  461          0719  1 !       the desired width and height.
;  462          0720  1 !
;  463          0721  1 ! Top left row, col *-----------------------
;  464          0722  1 !                    |                      |
;  465          0723  1 !                    |                      |
;  466          0724  1 !                    |                      |
;  467          0725  1 !                    |                      |
;  468          0726  1 !                    -----------------------* Bottom right row, col
;  469          0727  1 !
;  470          0728  1 !       Device independent codes are placed in the display text and
;  471          0729  1 !       attribute buffers.  Output decides which line drawing characters
;  472          0730  1 !       to use based on the type of terminal.
;  473          0731  1 !
;  474          0732  1 !       The internal cursor position is not changed.
;  475          0733  1 !
;  476          0734  1 ! CALLING SEQUENCE:
;  477          0735  1 !
;  478          0736  1 !       ret_status.wlc.v = SMG$DRAW_RECTANGLE (DISPLAY_ID.rl.r,
;  479          0737  1 !                                              TOP_LEFT_ROW.rl.r,
;  480          0738  1 !                                              TOP_LEFT_COL.rl.r,
;  481          0739  1 !                                              BOTTOM_RIGHT_ROW.rl.r,
;  482          0740  1 !                                              BOTTOM_RIGHT_COL.rl.r,
;  483          0741  1 !                                              [,RENDITION_SET.rl.r]
;  484          0742  1 !                                              [,RENDITION_COMPLEMENT.rl.r]
;  485          0743  1 !
;  486          0744  1 ! FORMAL PARAMETERS:
;  487          0745  1 !
;  488          0746  1 !       DISPLAY_ID.rl.r         Display id of virtual display
;  489          0747  1 !
;  490          0748  1 !       TOP_LEFT_ROW.rl.r       Address of the row number of the top left
;  491          0749  1 !                               hand corner of the rectangle.
;  492          0750  1 !
;  493          0751  1 !       TOP_LEFT_COL.rl.r       Address of the column number of the top
;  494          0752  1 !                               left hand corner of the rectangle.
;  495          0753  1 !
;  496          0754  1 !       BOTTOM_RIGHT_ROW.rl.r   Address of the row number of the bottom right
;  497          0755  1 !                               hand corner of the rectangle.
;  498          0756  1 !
;  499          0757  1 !       BOTTOM_RIGHT_COL.rl.r   Address of the column number of the bottom
;  500          0758  1 !                               right hand corner of the rectangle.
;  501          0759  1 !
```

```
;  502          0760  1 !       RENDITION_SET.rl.r      Optional.  Each 1 bit in this parameter
;  503          0761  1 !                               causes the corresponding attribute to be
;  504          0762  1 !                               set in the display.  (See below for list
;  505          0763  1 !                               of settable attributes.)
;  506          0764  1 !
;  507          0765  1 !       RENDITION_COMPLEMENT.rl.r Optional.  Each 1 bit attribute in this
;  508          0766  1 !                                  parameter causes the corresponding attribute
;  509          0767  1 !                                  to be complemented in the display.  (See
;  510          0768  1 !                                  below for list of complementable attributes.)
;  511          0769  1 !
;  512          0770  1 !
;  513          0771  1 !       If the same bit is specified in both the RENDITION_SET parameter
;  514          0772  1 !       and in the RENDITION_COMPLEMENT parameter, the application is
;  515          0773  1 !       RENDITION_SET followed by RENDITION complement.  Using these two
;  516          0774  1 !       parameters together the caller can exercise arbitrary and
;  517          0775  1 !       independent control over each attribute on a single call.  On an
;  518          0776  1 !       attribute by attribute basis he can cause the following
;  519          0777  1 !       transformations:
;  520          0778  1 !
;  521          0779  1 !               SET     COMPLEMENT      Action
;  522          0780  1 !               ---     ----------      ------
;  523          0781  1 !               0       0               Attribute unchanged.
;  524          0782  1 !               1       0               Attribute set to "on"
;  525          0783  1 !               0       1               Attribute set to complement of
;  526          0784  1 !                                       current setting.
;  527          0785  1 !               1       1               Attribute set to "off".
;  528          0786  1 !
;  529          0787  1 !
;  530          0788  1 !       Attributes which can be manipulated in this manner are:
;  531          0789  1 !
;  532          0790  1 !       SMG$M_BLINK  displays characters blinking.
;  533          0791  1 !       SMG$M_BOLD  displays characters in higher-than-normal
;  534          0792  1 !                    intensity.
;  535          0793  1 !       SMG$M_REVERSE  displays characters in reverse video -- that is,
;  536          0794  1 !                     using the opposite default rendition of the
;  537          0795  1 !                     virtual display.
;  538          0796  1 !       SMG$M_UNDERLINE  displays characters underlined.
;  539          0797  1 !
;  540          0798  1 !
;  541          0799  1 ! IMPLICIT INPUTS:
;  542          0800  1 !
;  543          0801  1 !       NONE
;  544          0802  1 !
;  545          0803  1 ! IMPLICIT OUTPUTS:
;  546          0804  1 !
;  547          0805  1 !       NONE
;  548          0806  1 !
;  549          0807  1 ! COMPLETION STATUS:
;  550          0808  1 !
;  551          0809  1 !       SS$_NORMAL      Normal successful completion
;  552          0810  1 !       SMG$_INVCOL     Invalid column number
;  553          0811  1 !       SMG$_INVROW     Invalid row number
;  554          0812  1 !       SMG$_WRONUMARG  Wrong number of arguments
;  555          0813  1 !
;  556          0814  1 ! SIDE EFFECTS:
;  557          0815  1 !
;  558          0816  1 !       NONE
```

```
;  559          0817  1 !
;  560          0818  1 !--
;  561          0819  1
;  562          0820  2     BEGIN
;  563          0821  2
;  564          0822  2     LOCAL
;  565          0823  2         BLROW,                          ! bottom left row
;  566          0824  2         BLCOL,                          ! bottom left column
;  567          0825  2         TRROW,                          ! top right row
;  568          0826  2         TRCOL,                          ! top right column
;  569          0827  2         POS,                            ! linear index into buffers
;  570          0828  2         LENGTH,                         ! length of line to draw
;  571          0829  2         TEXT_BUF : REF VECTOR [,BYTE],  ! ptr to dcb text buffer
;  572          0830  2         ATTR_BUF : REF VECTOR [,BYTE],  ! ptr to dcb attr buffer
;  573          0831  2         REND_CODE,                      ! rendition code to use
;  574          0832  2         DCB : REF BLOCK [,BYTE];        ! addr of display control block
;  575          0833  2
;  576          0834  2     BIND
;  577          0835  2         BRROW = .BOTTOM_RIGHT_ROW,
;  578          0836  2         BRCOL = .BOTTOM_RIGHT_COL,
;  579          0837  2         TLROW = .TOP_LEFT_ROW,
;  580          0838  2         TLCOL = .TOP_LEFT_COL;
;  581          0839  2
;  582          0840  2     LITERAL
;  583          0841  2         K_SET_ARG = 6,                  ! arg number of rend set
;  584          0842  2         K_COMP_ARG = 7;                 ! arg number of rend complement
;  585          0843  2
;  586          0844  2
;  587          0845  2     $SMG$GET_DCB (.DISPLAY_ID, DCB);    ! get addr of virtual display
;  588          0846  2                                         ! control block
;  589          0847  2     TEXT_BUF = .DCB [DCB_A_TEXT_BUF];
;  590          0848  2     ATTR_BUF = .DCB [DCB_A_ATTR_BUF];
;  591          0849  2
;  592          0850  2 !+
;  593          0851  2 ! Validate arguments passed.  Check for optionals.
;  594          0852  2 !-
;  595          0853  2
;  596          0854  2     $SMG$VALIDATE_ARGCOUNT (5, 7);
;  597          0855  2
;  598          0856  2     $SMG$VALIDATE_ROW_COL (.TLROW, .TLCOL);
;  599          0857  2
;  600          0858  2     $SMG$VALIDATE_ROW_COL (.BRROW, .BRCOL);
;  601          0859  2
;  602          0860  2     $SMG$SET_REND_CODE (K_SET_ARG, K_COMP_ARG);
;  603          0861  2                                         ! macro to use caller's args if present
;  604          0862  2
;  605          0863  2 !+
;  606          0864  2 ! The caller passed us two of four points needed to construct a rectangle.
;  607          0865  2 ! Compute the other two and make sure they are within the display.
;  608          0866  2 !-
;  609          0867  2
;  610          0868  2     BLROW = .BRROW;
;  611          0869  2     BLCOL = .TLCOL;
;  612          0870  2     TRROW = .TLROW;
;  613          0871  2     TRCOL = .BRCOL;
;  614          0872  2
;  615          0873  2     $SMG$VALIDATE_ROW_COL (.BLROW, .BLCOL);
```

```
;  616     0874  2     $SMG$VALIDATE_ROW_COL (.TRROW, .TRCOL);
;  617     0875  2
;  618     0876  2 !+
;  619     0877  2 ! We need to draw 4 lines, 2 horizontal and 2 vertical.
;  620     0878  2 !
;  621     0879  2 ! Draw the top.
;  622     0880  2 !-
;  623     0881  2
;  624     0882  3     BEGIN
;  625     0883  3     BIND
;  626     0884  3         LINE_CHAR = .DCB [DCB_A_LINE_CHAR];
;  627     0885  3     MAP
;  628     0886  3         LINE_CHAR : VECTOR [,BYTE];
;  629     0887  3
;  630     0888  3     !+
;  631     0889  3     ! Reset the line characteristics vector if there was previously
;  632     0890  3     ! some double high or double wide text.
;  633     0891  3     !-
;  634     0892  3
;  635     0893  3     IF .LINE_CHAR [.TLROW] NEQ 0
;  636     0894  3     THEN
;  637     0895  3         $RESET_LINE (.TLROW);
;  638     0896  3
;  639     0897  3     !+
;  640     0898  3     ! Move horizontal characters to text buffer.  Horizontal chars consist
;  641     0899  3     ! of a left & right segment - the left end of the line needs only a right
;  642     0900  3     ! segment, the right end of the line needs a left segment, and all the
;  643     0901  3     ! positions in between need both.  Corners will automatically form the
;  644     0902  3     ! correct characters by ORing the up/down and right/left elements.
;  645     0903  3     !-
;  646     0904  3
;  647     0905  3     POS = $SMG$LINEAR (.TLROW, .TLCOL);
;  648     0906  3     LENGTH = .TRCOL - .TLCOL + 1;
;  649     0907  3
;  650     0908  3     $INSERT_LINE_CHAR (BORD_M_RIGHT);
;  651     0909  3     POS = .POS + 1;
;  652     0910  3
;  653     0911  3     INCR NUM_CHAR FROM 2 TO (.LENGTH - 1) DO
;  654     0912  4     BEGIN
;  655     0913  4         $INSERT_LINE_CHAR (BORD_M_HORIZ);
;  656     0914  4         POS = .POS + 1;
;  657     0915  3     END;
;  658     0916  3
;  659     0917  3     $INSERT_LINE_CHAR (BORD_M_LEFT);
;  660     0918  3
;  661     0919  3 !+
;  662     0920  3 ! Draw the bottom.
;  663     0921  3 !-
;  664     0922  3
;  665     0923  3     IF .LINE_CHAR [.BLROW] NEQ 0
;  666     0924  3     THEN
;  667     0925  3         $RESET_LINE (.BLROW);           ! reset if prev. dbl hi/wide
;  668     0926  3
;  669     0927  3     POS = $SMG$LINEAR (.BLROW, .BLCOL);
;  670     0928  3     LENGTH = .BRCOL - .BLCOL + 1;
;  671     0929  3
;  672     0930  3     $INSERT_LINE_CHAR (BORD_M_RIGHT);   ! left end of line
```

```
;  673          0931  3     POS = .POS + 1;
;  674          0932  3
;  675          0933  3     INCR NUM_CHAR FROM 2 TO (.LENGTH - 1) DO  ! middle of line
;  676          0934  4     BEGIN
;  677          0935  4         $INSERT_LINE_CHAR (BORD_M_HORIZ);
;  678          0936  4         POS = .POS + 1;
;  679          0937  3     END;
;  680          0938  3
;  681          0939  3     $INSERT_LINE_CHAR (BORD_M_LEFT);    ! right end of line
;  682          0940  3
;  683          0941  3 !+
;  684          0942  3 ! Draw the right.
;  685          0943  3 !-
;  686          0944  3
;  687          0945  3     !+
;  688          0946  3     ! A vertical line requires resetting multi elements in
;  689          0947  3     ! the line characteristics vector.
;  690          0948  3     !-
;  691          0949  3
;  692          0950  3     INCR ROW FROM .TRROW TO .BRROW DO
;  693          0951  4     BEGIN
;  694          0952  4         IF .LINE_CHAR [.ROW] NEQ 0
;  695          0953  4         THEN
;  696          0954  4             $RESET_LINE (.ROW);
;  697          0955  3     END;
;  698          0956  3
;  699          0957  3     POS = $SMG$LINEAR (.TRROW, .TRCOL);
;  700          0958  3     LENGTH = .BRROW - .TRROW + 1;
;  701          0959  3
;  702          0960  3     $INSERT_LINE_CHAR (BORD_M_DOWN);
;  703          0961  3     POS = .POS + .DCB [DCB_W_NO_COLS];
;  704          0962  3
;  705          0963  3     INCR ROW FROM 2 TO (.LENGTH - 1) DO
;  706          0964  4     BEGIN
;  707          0965  4         $INSERT_LINE_CHAR (BORD_M_VERT);
;  708          0966  4         POS = .POS + .DCB [DCB_W_NO_COLS];
;  709          0967  3     END;
;  710          0968  3
;  711          0969  3     $INSERT_LINE_CHAR (BORD_M_UP);
;  712          0970  3
;  713          0971  3 !+
;  714          0972  3 ! Draw the left.
;  715          0973  3 !-
;  716          0974  3
;  717          0975  3     INCR ROW FROM .TLROW TO .BLROW DO
;  718          0976  4     BEGIN
;  719          0977  4         IF .LINE_CHAR [.ROW] NEQ 0
;  720          0978  4         THEN
;  721          0979  4             $RESET_LINE (.ROW);
;  722          0980  3     END;
;  723          0981  3
;  724          0982  3     POS = $SMG$LINEAR (.TLROW, .TLCOL);
;  725          0983  3     LENGTH = .BLROW - .TLROW + 1;
;  726          0984  3
;  727          0985  3     $INSERT_LINE_CHAR (BORD_M_DOWN);
;  728          0986  3     POS = .POS + .DCB [DCB_W_NO_COLS];
;  729          0987  3
```

```
;  730     0988  3     INCR ROW FROM 2 TO (.LENGTH - 1) DO
;  731     0989  4     BEGIN
;  732     0990  4         $INSERT_LINE_CHAR (BORD_M_VERT);
;  733     0991  4         POS = .POS + .DCB [DCB_W_NO_COLS];
;  734     0992  3     END;
;  735     0993  3
;  736     0994  3     $INSERT_LINE_CHAR (BORD_M_UP);
;  737     0995  3
;  738     0996  2     END;
;  739     0997  2
;  740     0998  2
;  741     0999  2 !+
;  742     1000  2 ! See if this change should be reflected on the screen immediately.
;  743     1001  2 !-
;  744     1002  2
;  745     1003  3     RETURN (SMG$$CHECK_FOR_OUTPUT_DCB (.DCB,
;  746     1004  3                                        0,          ! no function code for this
;  747     1005  2                                        .TLROW));
;  748     1006  2
;  749     1007  2
;  750     1008  1     END;                                ! End of routine SMG$DRAW_RECTANGLE


                                    0FFC 00000          .ENTRY  SMG$DRAW_RECTANGLE, Save R2,R3,R4,R5,R6,R7,-; 0704
                                                                R8,R9,R10,R11                                    ;
                                5E      C0  AE  9E 00002        MOVAB   -64(SP), SP                              ;
                                50      04  BC  D0 00006        MOVL    @DISPLAY_ID, R0                          ; 0845
                            04  BC      38  A0  D1 0000A        CMPL    56(R0), @DISPLAY_ID                      ;
                                                06  12 0000F  BNEQ    1$                                       ;
                                11          44  A0  91 00011  CMPB    68(R0), #17                              ;
                                                08  13 00015  BEQL    2$                                       ;
                                    50 00000000G    8F  D0 00017 1$:    MOVL    #SMG$_INVDIS_ID, R0          ;
                                                        04 0C01E        RET                                      ;
                                0C      AE      04  BC  D0 0001F 2$:    MOVL    @DISPLAY_ID, DCB             ;
                            50  0C      AE          10  C1 00024        ADDL3   #16, DCB, R0                     ; 0847
                                3C      AE          60  D0 00029        MOVL    (R0), 60(SP)                     ;
                            50  0C      AE          14  C1 0002D        ADDL3   #20, DCB, R0                     ; 0848
                                38      AE          60  D0 00032        MOVL    (R0), 56(SP)                     ;
                                04      AE      38  AE  7D 00036        MOVQ    56(SP), ATTR_BUF                 ;
                            50          6C          05  83 0003B        SUBB3   #5, (AP), DIFF                   ; 0854
                                        02          50  91 0003F        CMPB    DIFF, #2                         ;
                                                    08  1B 00042        BLEQU   3$                               ;
                                    50 00000000G    8F  D0 00044        MOVL    #SMG$_WRONUMARG, R0              ;
                                                        04 0004B        RET                                      ;
                                24      AE      08  BC  D0 0004C 3$:    MOVL    @TOP_LEFT_ROW, 36(SP)        ; 0856
                                                    0D  15 00051        BLEQ    4$                               ;
                            50  0C      AE          02  C1 00053        ADDL3   #2, DCB, R0                      ;
24  AE                      60          10          00  ED 00058        CMPZV   #0, #16, (R0), 36(SP)            ;
                                                    08  18 0005E        BGEQ    5$                               ;
                                    50 00000000G    8F  D0 00060 4$:    MOVL    #SMG$_INVROW, R0             ;
                                                        04 00067        RET                                      ;
                                59      0C      BC  D0 00068 5$:    MOVL    @TOP_LEFT_COL, R9            ;
                                                    0C  15 0006C        BLEQ    6$                               ;
                            50  0C      AE          06  C1 0006E        ADDL3   #6, DCB, R0                      ;
```

```
                59              60              10              00 ED 00073          CMPZV   #0, #16, (R0), R9                                   ;
                                                                08 18 00078          BGEQ    7$                                                  ;
                                                50 00000000G    8F D0 0007A 6$:      MOVL    #SMG$_INVCOL, R0                                    ;
                                                                04 00081             RET                                                         ;
                                        28  AE          10      BC D0 00082 7$:      MOVL    @BOTTOM_RIGHT_ROW, 40(SP)                           ; 0858
                                                                0D 15 00087          BLEQ    8$                                                  ;
                        50      0C      AE                      02 C1 00089          ADDL3   #2, DCB, R0                                         ;
            28  AE          60              10                  00 ED 0008E          CMPZV   #0, #16, (R0), 40(SP)                               ;
                                                                08 18 00094          BGEQ    9$                                                  ;
                                                50 00000000G    8F D0 00096 8$:      MOVL    #SMG$_INVROW, R0                                    ;
                                                                04 0009D             RET                                                         ;
                                        2C  AE          14      BC D0 0009E 9$:      MOVL    @BOTTOM_RIGHT_COL, 44(SP)                           ;
                                                                0D 15 000A3          BLEQ    10$                                                 ;
                        50      0C      AE                      06 C1 000A5          ADDL3   #6, DCB, R0                                         ;
            2C  AE          60              10                  00 ED 000AA          CMPZV   #0, #16, (R0), 44(SP)                               ;
                                                                08 18 000B0          BGEQ    11$                                                 ;
                                                50 00000000G    8F D0 000B2 10$:     MOVL    #SMG$_INVCOL, R0                                    ;
                                                                04 000B9             RET                                                         ;
                        50      0C      AE                      2E C1 000BA 11$:     ADDL3   #46, DCB, R0                                        ; 0860
                                34      AE                      60 9A 000BF          MOVZBL  (R0), 52(SP)                                        ;
                                18      AE          34      AE  D0 000C3             MOVL    52(SP), REND_CODE                                   ;
                                        06                      6C 91 000C8          CMPB    (AP), #6                                            ;
                                                                0A 1F 000CB          BLSSU   12$                                                 ;
                                                    18      AC  D5 000CD             TSTL    24(AP)                                              ;
                                                                05 13 000D0          BEQL    12$                                                 ;
                                18      AE          18      BC  C8 000D2             BISL2   @RENDITION_SET, REND_CODE                           ;
                                        07                      6C 91 000D7 12$:     CMPB    (AP), #7                                            ;
                                                                0A 1F 000DA          BLSSU   13$                                                 ;
                                                    1C      AC  D5 000DC             TSTL    28(AP)                                              ;
                                                                05 13 000DF          BEQL    13$                                                 ;
                                18      AE          1C      BC  CC 000E1             XORL2   @RENDITION_COMPLEMENT, REND_CODE                    ;
                                58              28      AE  D0 000E6 13$:        MOVL    40(SP), BLROW                                       ; 0868
                                20      AE                  59 D0 000EA          MOVL    R9, BLCOL                                           ; 0869
                                5B              24      AE  D0 000EE             MOVL    36(SP), TRROW                                       ; 0870
                                5A              2C      AE  DC 000F2             MOVL    44(SP), TRCOL                                       ; 0871
                                                            58 D5 000F6          TSTL    BLROW                                               ; 0873
                                                            0C 15 000F8          BLEQ    14$                                                 ;
                        50      0C      AE                  02 C1 000FA          ADDL3   #2, DCB, R0                                         ;
            58          60              10                  00 ED 000FF          CMPZV   #0, #16, (R0), BLROW                                ;
                                                            08 18 00104          BGEQ    15$                                                 ;
                                                50 00000000G    8F D0 00106 14$:     MOVL    #SMG$_INVROW, R0                                    ;
                                                                04 0010D             RET                                                         ;
                                                        20  AE  D5 0010E 15$:        TSTL    BLCOL                                               ;
                                                                0D 15 00111          BLEQ    16$                                                 ;
                        50      0C      AE                      06 C1 00113          ADDL3   #6, DCB, R0                                         ;
    20  AE          60              10                  00 ED 00118          CMPZV   #0, #16, (R0), BLCOL                                ;
                                                            08 18 0011E          BGEQ    17$                                                 ;
                                                50 00000000G    8F D0 00120 16$:     MOVL    #SMG$_INVCOL, R0                                    ;
                                                                04 00127             RET                                                         ;
                                                            5B D5 00128 17$:         TSTL    TRROW                                               ; 0874
                                                            0C 15 0012A          BLEQ    18$                                                 ;
                        50      0C      AE                  02 C1 0012C          ADDL3   #2, DCB, R0                                         ;
            5B          60              10                  00 ED 00131          CMPZV   #0, #16, (R0), TRROW                                ;
                                                            08 18 00136          BGEQ    19$                                                 ;
                                                50 00000000G    8F D0 00138 18$:     MOVL    #SMG$_INVROW, R0                                    ;
                                                                04 0013F             RET                                                         ;
                                                            5A D5 00140 19$:         TSTL    TRCOL                                               ;
```

```
                                 0C   15 00142         BLEQ    20$                                      ;
              50    0C   AE      06   C1 00144         ADDL3   #6, DCB, R0                              ;
     5A       60         10      00   ED 00149         CMPZV   #0, #16, (R0), TRCOL                     ;
                                 08   18 0014E         BGEQ    21$                                      ;
                         50 00000000G 8F   D0 00150 20$: MOVL  #SMG$_INVCOL, R0                         ;
                                      04 00157         RET                                              ;
              50    0C   AE 0000004C  8F   C1 00158 21$: ADDL3 #76, DCB, R0                             ; 0893
              50         60      24   AE   C1 00161    ADDL3   36(SP), (R0), R0                         ;
                                 60   95 00166         TSTB    (R0)                                     ;
                                 75   13 00168         BEQL    23$                                      ;
              50    24   AE      01   C3 0016A         SUBL3   #1, 36(SP), R0                           ; 0895
              52    0C   AE      06   C1 0016F         ADDL3   #6, DCB, R2                              ;
                         51      62   3C 00174         MOVZWL  (R2), R1                                 ;
                         50      51   C4 00177         MULL2   R1, R0                                   ;
              52    0C   AE      04   C1 0017A         ADDL3   #4, DCB, R2                              ;
                         51      62   3C 0017F         MOVZWL  (R2), R1                                 ;
                    30   AE   FF A140 9E 00182         MOVAB   -1(R1)[R0], START_INDEX                  ;
                         50   3C   AE D0 00188         MOVL    60(SP), TEXT_BUF                         ;
                         56   38   AE D0 0018C         MOVL    56(SP), ATTR_BUF                         ;
              51    0C   AE      18   C1 00190         ADDL3   #24, DCB, R1                             ;
                         57      61   D0 00195         MOVL    (R1), CHAR_BUF                           ;
         1C   AE    0C   AE      06   C1 00198         ADDL3   #6, DCB, 28(SP)                          ;
1C   BE       20         6E      00   2C 0019E         MOVC5   #0, (SP), #32, @28(SP), @START_INDEX-    ;
                           30 BE40       001A4                 [TEXT_BUF]                               ;
         1C   AE    0C   AE      06   C1 001A7         ADDL3   #6, DCB, 28(SP)                          ;
1C   BE  34   AE         6E      00   2C 001AD         MOVC5   #0, (SP), 52(SP), @28(SP), @START_INDEX- ;
                           30 BE46       001B4                 [ATTR_BUF]                               ;
                                 57   D5 001B7         TSTL    CHAR_BUF                                 ;
                                 14   13 001B9         BEQL    22$                                      ;
              56    0C   AE      06   C1 001BB         ADDL3   #6, DCB, R6                              ;
         1C   AE    0C   AE      30   C1 001C0         ADDL3   #48, DCB, 28(SP)                         ;
     66  1C   BE         6E      00   2C 001C6         MOVC5   #0, (SP), @28(SP), (R6), @START_INDEX-   ;
                           30 BE47       001CC                 [CHAR_BUF]                               ;
              50    0C   AE 0000004C  8F   C1 001CF 22$: ADDL3 #76, DCB, R0                             ;
              50         60      24   AE   C1 001D8    ADDL3   36(SP), (R0), R0                         ;
                                 60   94 001DD         CLRB    (R0)                                     ;
              50    24   AE      01   C3 001DF 23$:    SUBL3   #1, 36(SP), R0                           ; 0905
              51    0C   AE      06   C1 001E4         ADDL3   #6, DCB, R1                              ;
                    14   AE      61   3C 001E9         MOVZWL  (R1), 20(SP)                             ;
                         50   14   AE C4 001ED         MULL2   20(SP), R0                               ;
                    30   AE   FF A940 9E 001F1         MOVAB   -1(R9)[R0], 48(SP)                       ;
                         56   30   AE D0 001F7         MOVL    48(SP), POS                              ;
              59         5A      59   C3 001FB         SUBL3   R9, TRCOL, R9                            ; 0906
                                 59   D6 001FF         INCL    LENGTH                                   ;
                         51   04   AE D0 00201         MOVL    ATTR_BUF, R1                             ; 0908
              1F       6641      06   E1 00205         BBC     #6, (POS)[R1], 24$                       ;
                         50   08   AE D0 0020A         MOVL    TEXT_BUF, R0                             ;
                       6640      01   88 0020E         BISB2   #1, (POS)[R0]                            ;
                         52   04   AE D0 00212         MOVL    ATTR_BUF, R2                             ;
                         50    6642   9A 00216         MOVZBL  (POS)[R2], R0                            ;
                         50      0F   CA 0021A         BICL2   #15, R0                                  ;
                         53   04   AE D0 0021D         MOVL    ATTR_BUF, R3                             ;
            6643         50   18   AE 89 00221         BISB3   REND_CODE, R0, (POS)[R3]                 ;
                         13      11 00227              BRB     25$                                      ;
                         50   08   AE D0 00229 24$:    MOVL    TEXT_BUF, R0                             ;
                       6640      01   90 0022D         MOVB    #1, (POS)[R0]                            ;
                         50   04   AE D0 00231         MOVL    ATTR_BUF, R0                             ;
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                6640        18   AE        40   8F  89 00235          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                              56  D6 0023C 25$:       INCL    POS                                             ; 0909
                              51              01  D0 0023E           MOVL    #1, NUM_CHAR                                    ; 0911
                                              3D  11 00241           BRB     29$                                             ;
                              52        04    AE  D0 00243 26$:      MOVL    ATTR_BUF, R2                                    ; 0913
                1F                  6642      06  E1 00247           BBC     #6, (POS)[R2], 27$                              ;
                              50        08    AE  D0 0024C           MOVL    TEXT_BUF, R0                                    ;
                            6640              05  88 00250           BISB2   #5, (POS)[R0]                                   ;
                              53        04    AE  D0 00254           MOVL    ATTR_BUF, R3                                    ;
                              50           6643  9A 00258           MOVZBL  (POS)[R3], R0                                   ;
                              50              0F  CA 0025C           BICL2   #15, R0                                         ;
                              54        04    AE  D0 0025F           MOVL    ATTR_BUF, R4                                    ;
                6644          50        18    AE  89 00263           BISB3   REND_CODE, R0, (POS)[R4]                        ;
                                              13  11 00269           BRB     28$                                             ;
                              50        08    AE  D0 0026B 27$:      MOVL    TEXT_BUF, R0                                    ;
                            6640              05  90 0026F           MOVB    #5, (POS)[R0]                                   ;
                              50        04    AE  D0 00273           MOVL    ATTR_BUF, R0                                    ;
                6640        18   AE        40   8F  89 00277           BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                              56  D6 0027E 28$:       INCL    POS                                             ; 0914
                1F                51          59  F2 00280 29$:      AOBLSS  LENGTH, NUM_CHAR, 26$                           ; 0911
                              51        04    AE  D0 00284           MOVL    ATTR_BUF, R1                                    ; 0917
                1F                  6641      06  E1 00288           BBC     #6, (POS)[R1], 30$                              ;
                              50        08    AE  D0 0028D           MOVL    TEXT_BUF, R0                                    ;
                            6640              04  88 00291           BISB2   #4, (POS)[R0]                                   ;
                              52        04    AE  D0 00295           MOVL    ATTR_BUF, R2                                    ;
                              50           6642  9A 00299           MOVZBL  (POS)[R2], R0                                   ;
                              50              0F  CA 0029D           BICL2   #15, R0                                         ;
                              53        04    AE  D0 002A0           MOVL    ATTR_BUF, R3                                    ;
                6643          50        18    AE  89 002A4           BISB3   REND_CODE, R0, (POS)[R3]                        ;
                                              13  11 002AA           BRB     31$                                             ;
                              50        08    AE  D0 002AC 30$:      MOVL    TEXT_BUF, R0                                    ;
                            6640              04  90 002B0           MOVB    #4, (POS)[R0]                                   ;
                              50        04    AE  D0 002B4           MOVL    ATTR_BUF, R0                                    ;
                    6640        18    AE        40   8F  89 002B8           BISB3   #64, REND_CODE, (POS)[R0]                       ;
                      50        0C    AE 0000004C   8F  C1 002BF 31$:      ADDL3   #76, DCB, R0                            ; 0923
                                            00 B048  95 002C8           TSTB    @0(R0)[BLROW]                                   ;
                                              5F  13 002CC           BEQL    33$                                             ;
                              50        FF    A8  9E 002CE           MOVAB   -1(R8), R0                                      ; 0925
                              50        14    AE  C4 002D2           MULL2   20(SP), R0                                      ;
                        52        0C    AE        04  C1 002D6           ADDL3   #4, DCB, R2                                     ;
                              51              62  3C 002DB           MOVZWL  (R2), R1                                        ;
                        1C    AE        FF  A140  9E 002DE           MOVAB   -1(R1)[R0], START_INDEX                         ;
                              50        3C    AE  D0 002E4           MOVL    60(SP), TEXT_BUF                                ;
                              57        38    AE  D0 002E8           MOVL    56(SP), ATTR_BUF                                ;
                        51        0C    AE        18  C1 002EC           ADDL3   #24, DCB, R1                                    ;
                        10    AE              61  D0 002F1           MOVL    (R1), CHAR_BUF                                  ;
    14  AE              20              6E        00  2C 002F5           MOVC5   #0, (SP), #32, 20(SP), @START_INDEX-            ;
                                            1C BE40     002FB                   [TEXT_BUF]                                      ;
    14  AE        34    AE              6E        00  2C 002FE           MOVC5   #0, (SP), 52(SP), 20(SP), @START_INDEX-         ;
                                            1C BE47     00305                   [ATTR_BUF]                                      ;
                                            10    AE  D5 00308           TSTL    CHAR_BUF                                        ;
                                              13  13 0030B           BEQL    32$                                             ;
                              57        10    AE  D0 0030D           MOVL    CHAR_BUF, R7                                    ;
                    6E        0C    AE        30  C1 00311           ADDL3   #48, DCB, (SP)                                  ;
    14  AE        00  BE              6E        00  2C 00316           MOVC5   #0, (SP), @0(SP), 20(SP), @START_INDEX[R7]      ;
                                            1C BE47     0031D                                                                   ;
                      50        0C    AE 0000004C   8F  C1 00320 32$:      ADDL3   #76, DCB, R0                            ;
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                                00 B048   94 00329        CLRB    @0(R0)[BLROW]                    ;
                  50            FF   A8   9E 0032D 33$:   MOVAB   -1(R8), R0                       ; 0927
                  50            14   AE   C4 00331        MULL2   20(SP), R0                       ;
     51      20   AE                 01   C3 00335        SUBL3   #1, BLCOL, R1                    ;
     56           50                 51   C1 0033A        ADDL3   R1, R0, POS                      ;
     50      2C   AE            20   AE   C3 0033E        SUBL3   BLCOL, 44(SP), R0                ; 0928
                  59            01   A0   9E 00344        MOVAB   1(R0), LENGTH                    ;
                  51            04   AE   D0 00348        MOVL    ATTR_BUF, R1                     ; 0930
     1F         6641                 06   E1 0034C        BBC     #6, (POS)[R1], 34$               ;
                  50            08   AE   D0 00351        MOVL    TEXT_BUF, R0                     ;
                6640                 01   88 00355        BISB2   #1, (POS)[R0]                    ;
                  52            04   AE   D0 00359        MOVL    ATTR_BUF, R2                     ;
                  50               6642   9A 0035D        MOVZBL  (POS)[R2], R0                    ;
                  50                 0F   CA 00361        BICL2   #15, R0                          ;
                  53            04   AE   D0 00364        MOVL    ATTR_BUF, R3                     ;
   6643           50            18   AE   89 00368        BISB3   REND_CODE, R0, (POS)[R3]         ;
                                     13   11 0036E        BRB     35$                              ;
                  50            08   AE   D0 00370 34$:   MOVL    TEXT_BUF, R0                     ;
                6640                 01   90 00374        MOVB    #1, (POS)[R0]                    ;
                  50            04   AE   D0 00378        MOVL    ATTR_BUF, R0                     ;
   6640      18   AE            40   8F   89 0037C        BISB3   #64, REND_CODE, (POS)[R0]        ;
                                     56   D6 00383 35$:   INCL    POS                              ; 0931
                  51                 01   D0 00385        MOVL    #1, NUM_CHAR                     ; 0933
                                     3D   11 00388        BRB     39$                              ;
                  52            04   AE   D0 0038A 36$:   MOVL    ATTR_BUF, R2                     ; 0935
     1F         6642                 06   E1 0038E        BBC     #6, (POS)[R2], 37$               ;
                  50            08   AE   D0 00393        MOVL    TEXT_BUF, R0                     ;
                6640                 05   88 00397        BISB2   #5, (POS)[R0]                    ;
                  53            04   AE   D0 0039B        MOVL    ATTR_BUF, R3                     ;
                  50               6643   9A 0039F        MOVZBL  (POS)[R3], R0                    ;
                  50                 0F   CA 003A3        BICL2   #15, R0                          ;
                  54            04   AE   D0 003A6        MOVL    ATTR_BUF, R4                     ;
   6644           50            18   AE   89 003AA        BISB3   REND_CODE, R0, (POS)[R4]         ;
                                     13   11 003B0        BRB     38$                              ;
                  50            08   AE   D0 003B2 37$:   MOVL    TEXT_BUF, R0                     ;
                6640                 05   90 003B6        MOVB    #5, (POS)[R0]                    ;
                  50            04   AE   D0 003BA        MOVL    ATTR_BUF, R0                     ;
   6640      18   AE            40   8F   89 003BE        BISB3   #64, REND_CODE, (POS)[R0]        ;
                                     56   D6 003C5 38$:   INCL    POS                              ; 0936
     BF           51                 59   F2 003C7 39$:   AOBLSS  LENGTH, NUM_CHAR, 36$            ; 0933
                  51            04   AE   D0 003CB        MOVL    ATTR_BUF, R1                     ; 0939
     1F         6641                 06   E1 003CF        BBC     #6, (POS)[R1], 40$               ;
                  50            08   AE   D0 003D4        MOVL    TEXT_BUF, R0                     ;
                6640                 04   88 003D8        BISB2   #4, (POS)[R0]                    ;
                  52            04   AE   D0 003DC        MOVL    ATTR_BUF, R2                     ;
                  50               6642   9A 003E0        MOVZBL  (POS)[R2], R0                    ;
                  50                 0F   CA 003E4        BICL2   #15, R0                          ;
                  53            04   AE   D0 003E7        MOVL    ATTR_BUF, R3                     ;
   6643           50            18   AE   89 003EB        BISB3   REND_CODE, R0, (POS)[R3]         ;
                                     13   11 003F1        BRB     41$                              ;
                  50            08   AE   D0 003F3 40$:   MOVL    TEXT_BUF, R0                     ;
                6640                 04   90 003F7        MOVB    #4, (POS)[R0]                    ;
                  50            04   AE   D0 003FB        MOVL    ATTR_BUF, R0                     ;
   6640      18   AE            40   8F   89 003FF        BISB3   #64, REND_CODE, (POS)[R0]        ;
                  57            FF   AB   9E 00406 41$:   MOVAB   -1(R11), ROW                     ; 0950
                                     78   11 0040A        BRB     44$                              ;
     50      0C   AE 0000004C        8F   C1 0040C 42$:   ADDL3   #76, DCB, R0                     ; 0952
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                                                00 B047   95 00415          TSTB    @0(R0)[ROW]                                     ;
                                                   69     13 00419          BEQL    44$                                             ;
                                          50       FF     A7 9E 0041B       MOVAB   -1(R7), R0                                      ; 0954
                                          50       14     AE C4 0041F       MULL2   20(SP), R0                                      ;
                                    52    0C     AE        04 C1 00423       ADDL3   #4, DCB, R2                                     ;
                                          51           62 3C 00428          MOVZWL  (R2), R1                                        ;
                                    2C    AE     FF A140   9E 0042B          MOVAB   -1(R1)[R0], START_INDEX                         ;
                                          50     3C     AE D0 00431          MOVL    60(SP), TEXT_BUF                                ;
                                    1C    AE     38     AE D0 00435          MOVL    56(SP), ATTR_BUF                                ;
                                    51    0C     AE        18 C1 0043A       ADDL3   #24, DCB, R1                                    ;
                                    20    AE           61 D0 0043F          MOVL    (R1), CHAR_BUF                                  ;
    14  AE                  20                 6E        00 2C 00443       MOVC5   #0, (SP), #32, 20(SP), @START_INDEX-            ;
                                                2C BE40      00449          [TEXT_BUF]                                      ;
                10  AE      2C    AE           1C AE C1 0044C             ADDL3   ATTR_BUF, START_INDEX, 16(SP)                   ;
    14  AE      34  AE                 6E        00 2C 00453       MOVC5   #0, (SP), 52(SP), 20(SP), @16(SP)               ;
                                                10 BE        0045A          
                                                20 AE  D5 0045C             TSTL    CHAR_BUF                                        ;
                                                   16     13 0045F          BEQL    43$                                             ;
                1C  AE      2C    AE           2C AE C1 00461             ADDL3   CHAR_BUF, START_INDEX, 28(SP)                   ;
                10  AE      0C    AE              30 C1 00468             ADDL3   #48, DCB, 16(SP)                                ;
    14  AE      10  BE                 6E        00 2C 0046E       MOVC5   #0, (SP), @16(SP), 20(SP), @28(SP)              ;
                                                1C BE        00475          
                    50      0C     AE 0000004C   8F C1 00477 43$:  ADDL3   #76, DCB, R0                                    ;
                                                00 B047   94 00480          CLRB    @0(R0)[ROW]                                     ;
                    83                 57        28 AE F3 00484 44$:  AOBLEQ  40(SP), ROW, 42$                                ; 0950
                                          57     FF     AB 9E 00489          MOVAB   -1(R11), R7                                     ; 0957
                                          57     14     AE C4 0048D          MULL2   20(SP), R7                                      ;
                                          56     FF AA47   9E 00491          MOVAB   -1(TRCOL)[R7], POS                              ;
                    5A      28     AE                 5B C3 00496          SUBL3   TRROW, 40(SP), R10                              ; 0958
                                          59     01     AA 9E 0049B          MOVAB   1(R10), LENGTH                                  ;
                                          51     04     AE D0 0049F          MOVL    ATTR_BUF, R1                                    ; 0960
                    1F                 6641              06 E1 004A3          BBC     #6, (POS)[R1], 45$                              ;
                                          50     08     AE D0 004A8          MOVL    TEXT_BUF, R0                                    ;
                                       6640              08 88 004AC          BISB2   #8, (POS)[R0]                                   ;
                                          52     04     AE D0 004B0          MOVL    ATTR_BUF, R2                                    ;
                                          50        6642   9A 004B4          MOVZBL  (POS)[R2], R0                                   ;
                                          50           0F CA 004B8          BICL2   #15, R0                                         ;
                                          53     04     AE D0 004BB          MOVL    ATTR_BUF, R3                                    ;
                    6643                  50           18 AE 89 004BF       BISB3   REND_CODE, R0, (POS)[R3]                        ;
                                                       13 11 004C5          BRB     46$                                             ;
                                          50     08     AE D0 004C7 45$:     MOVL    TEXT_BUF, R0                                    ;
                                       6640              08 90 004CB          MOVB    #8, (POS)[R0]                                   ;
                                          50     04     AE D0 004CF          MOVL    ATTR_BUF, R0                                    ;
                    6640          18     AE        40 8F 89 004D3          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                          56     14     AE C0 004DA 46$:     ADDL2   20(SP), POS                                     ; 0961
                                          51           01 D0 004DE          MOVL    #1, ROW                                         ; 0963
                                                       3F 11 004E1          BRB     50$                                             ;
                                          52     04     AE D0 004E3 47$:     MOVL    ATTR_BUF, R2                                    ; 0965
                    1F                 6642              06 E1 004E7          BBC     #6, (POS)[R2], 48$                              ;
                                          50     08     AE D0 004EC          MOVL    TEXT_BUF, R0                                    ;
                                       6640              0A 88 004F0          BISB2   #10, (POS)[R0]                                  ;
                                          53     04     AE D0 004F4          MOVL    ATTR_BUF, R3                                    ;
                                          50        6643   9A 004F8          MOVZBL  (POS)[R3], R0                                   ;
                                          50           0F CA 004FC          BICL2   #15, R0                                         ;
                                          54     04     AE D0 004FF          MOVL    ATTR_BUF, R4                                    ;
                    6644                  50           18 AE 89 00503       BISB3   REND_CODE, R0, (POS)[R4]                        ;
                                                       13 11 00509          BRB     49$                                             ;
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                                50        08    AE   D0 0050B 48$:    MOVL    TEXT_BUF, R0                                    ;
                              6640          0A   90 0050F           MOVB    #10, (POS)[R0]                                  ;
                                50        04    AE   D0 00513           MOVL    ATTR_BUF, R0                                    ;
                      6640      18          AE   40   8F   89 00517           BISB3   #64, REND_CODE, (POS)[R0]               ;
                                56        14    AE   C0 0051E 49$:    ADDL2   20(SP), POS                             ; 0966
                        BD                  51       59   F2 00522 50$:    AOBLSS  LENGTH, ROW, 47$                        ; 0963
                                51        04    AE   D0 00526           MOVL    ATTR_BUF, R1                            ; 0969
                        1F              6641          06   E1 0052A           BBC     #6, (POS)[R1], 51$                      ;
                                50        08    AE   D0 0052F           MOVL    TEXT_BUF, R0                            ;
                              6640          02   88 00533           BISB2   #2, (POS)[R0]                           ;
                                52        04    AE   D0 00537           MOVL    ATTR_BUF, R2                            ;
                                50            6642   9A 0053B           MOVZBL  (POS)[R2], R0                           ;
                                50              0F   CA 0053F           BICL2   #15, R0                                 ;
                                53        04    AE   D0 00542           MOVL    ATTR_BUF, R3                            ;
                      6643      50          18    AE   89 00546           BISB3   REND_CODE, R0, (POS)[R3]                ;
                                                13   11 0054C           BRB     52$                                     ;
                                50        08    AE   D0 0054E 51$:    MOVL    TEXT_BUF, R0                            ;
                              6640          02   90 00552           MOVB    #2, (POS)[R0]                           ;
                                50        04    AE   D0 00556           MOVL    ATTR_BUF, R0                            ;
                      6640      18          AE   40   8F   89 0055A           BISB3   #64, REND_CODE, (POS)[R0]               ;
                        5A      24          AE             01   C3 00561 52$:    SUBL3   #1, 36(SP), ROW                 ; 0975
                                                67   11 00566           BRB     55$                                     ;
                        50      0C    AE 0000004C   8F   C1 00568 53$:    ADDL3   #76, DCB, R0                    ; 0977
                                          00 B04A   95   00571           TSTB    @0(R0)[ROW]                             ;
                                                58   13 00575           BEQL    55$                                     ;
                                50        FF    AA   9E 00577           MOVAB   -1(R10), R0                             ; 0979
                                50        14    AE   C4 0057B           MULL2   20(SP), R0                              ;
                        52      0C    AE             04   C1 0057F           ADDL3   #4, DCB, R2                             ;
                                51                     62   3C 00584           MOVZWL  (R2), R1                        ;
                                2C    AE        FF A140   9E 00587           MOVAB   -1(R1)[R0], START_INDEX                 ;
                                50        3C    AE   D0 0058D           MOVL    60(SP), TEXT_BUF                        ;
                                57        38    AE   D0 00591           MOVL    56(SP), ATTR_BUF                        ;
                        51      0C    AE             18   C1 00595           ADDL3   #24, DCB, R1                            ;
                                5B                     61   D0 0059A           MOVL    (R1), CHAR_BUF                  ;
          14    AE              20                     6E             00   2C 0059D           MOVC5   #0, (SP), #32, 20(SP), @START_INDEX-    ;
                                                                2C BE40      005A3                   [TEXT_BUF]              ;
          14    AE        34    AE                     6E             00   2C 005A6           MOVC5   #0, (SP), 52(SP), 20(SP), @START_INDEX- ;
                                                                2C BE47      005AD                   [ATTR_BUF]              ;
                                                                   5B   D5 005B0           TSTL    CHAR_BUF                ;
                                                                   0E   13 005B2           BEQL    54$                     ;
                                57        0C    AE             3C   C1 005B4           ADDL3   #48, DCB, R7            ;
          14    AE              67                     6E             00   2C 005B9           MOVC5   #0, (SP), (R7), 20(SP), @START_INDEX-   ;
                                                                2C BE4B      005BF                   [CHAR_BUF]              ;
                                50        0C    AE 0000004C   8F   C1 005C2 54$:    ADDL3   #76, DCB, R0            ;
                                          00 B04A   94   005CB           CLRB    @0(R0)[ROW]                             ;
                                95                     5A             58   F3 005CF 55$:    AOBLEQ  BLROW, ROW, 53$         ; 0975
                                56        30    AE   D0 005D3           MOVL    48(SP), POS                             ; 0982
                                58        24    AE   C2 005D7           SUBL2   36(SP), R8                              ; 0983
                                59        01    A8   9E 005DB           MOVAB   1(R8), LENGTH                           ;
                                51        04    AE   D0 005DF           MOVL    ATTR_BUF, R1                            ; 0985
                                1F              6641          06   E1 005E3           BBC     #6, (POS)[R1], 56$              ;
                                50        08    AE   D0 005E8           MOVL    TEXT_BUF, R0                            ;
                              6640          08   88 005EC           BISB2   #8, (POS)[R0]                           ;
                                52        04    AE   D0 005F0           MOVL    ATTR_BUF, R2                            ;
                                50            6642   9A 005F4           MOVZBL  (POS)[R2], R0                           ;
                                50              0F   CA 005F8           BICL2   #15, R0                                 ;
                                53        04    AE   D0 005FB           MOVL    ATTR_BUF, R3                            ;
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                6643            50      18   AE  89 005FF          BISB3   REND_CODE, R0, (POS)[R3]                        ;
                                        13   11  00605          BRB     57$                                             ;
                                50      08   AE  D0 00607 56$:    MOVL    TEXT_BUF, R0                                    ;
                             6640               08  90 0060B          MOVB    #8, (POS)[R0]                               ;
                                50      04   AE  D0 0060F          MOVL    ATTR_BUF, R0                                    ;
                6640    18      AE      40   8F  89 00613          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                56      14   AE  C0 0061A 57$:    ADDL2   20(SP), POS                                     ; 0986
                                51               01  D0 0061E          MOVL    #1, ROW                                     ; 0988
                                                 3F  11 00621          BRB     61$                                         ;
                                52      04   AE  D0 00623 58$:    MOVL    ATTR_BUF, R2                                    ; 0990
                  1F                 6642         06  E1 00627          BBC     #6, (POS)[R2], 59$                          ;
                                50      08   AE  D0 0062C          MOVL    TEXT_BUF, R0                                    ;
                             6640               0A  88 00630          BISB2   #10, (POS)[R0]                              ;
                                53      04   AE  D0 00634          MOVL    ATTR_BUF, R3                                    ;
                                50           6643  9A 00638          MOVZBL  (POS)[R3], R0                               ;
                                50               0F  CA 0063C          BICL2   #15, R0                                     ;
                                54      04   AE  D0 0063F          MOVL    ATTR_BUF, R4                                    ;
                6644            50      18   AE  89 00643          BISB3   REND_CODE, R0, (POS)[R4]                        ;
                                                 13  11 00649          BRB     60$                                         ;
                                50      08   AE  D0 0064B 59$:    MOVL    TEXT_BUF, R0                                    ;
                             6640               0A  90 0064F          MOVB    #10, (POS)[R0]                              ;
                                50      04   AE  D0 00653          MOVL    ATTR_BUF, R0                                    ;
                6640    18      AE      40   8F  89 00657          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                56      14   AE  C0 0065E 60$:    ADDL2   20(SP), POS                                     ; 0991
                  BD                51               59  F2 00662 61$:    AOBLSS  LENGTH, ROW, 58$                        ; 0988
                                51      04   AE  D0 00666          MOVL    ATTR_BUF, R1                                    ; 0994
                  1F                 6641         06  E1 0066A          BBC     #6, (POS)[R1], 62$                          ;
                                50      08   AE  D0 0066F          MOVL    TEXT_BUF, R0                                    ;
                             6640               02  88 00673          BISB2   #2, (POS)[R0]                               ;
                                52      04   AE  D0 00677          MOVL    ATTR_BUF, R2                                    ;
                                50           6642  9A 0067B          MOVZBL  (POS)[R2], R0                               ;
                                50               0F  CA 0067F          BICL2   #15, R0                                     ;
                                53      04   AE  D0 00682          MOVL    ATTR_BUF, R3                                    ;
                6643            50      18   AE  89 00686          BISB3   REND_CODE, R0, (POS)[R3]                        ;
                                                 13  11 0068C          BRB     63$                                         ;
                                50      08   AE  D0 0068E 62$:    MOVL    TEXT_BUF, R0                                    ;
                             6640               02  90 00692          MOVB    #2, (POS)[R0]                               ;
                                50      04   AE  D0 00696          MOVL    ATTR_BUF, R0                                    ;
                6640    18      AE      40   8F  89 0069A          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                24      AE      DD  006A1 63$:    PUSHL   36(SP)                                          ; 1005
                                               7E  D4 006A4          CLRL    -(SP)                                       ; 1003
                                14      AE      DD  006A6          PUSHL   DCB                                             ;
                     00000000G  00              03  FB 006A9          CALLS   #3, SMG$$CHECK_FOR_OUTPUT_DCB               ;
                                                    04 006B0          RET                                                 ; 1008

; Routine Size:  1713 bytes,    Routine Base:  _SMG$CODE + 030A

;  751          1009  1 !<BLF/PAGE>
```

```
;  753          1010  1 END                                   . End of module SMG$DISPLAY_DRAW
;  754          1011  1
;  755          1012  0 ELUDOM
```

```
;                                PSECT SUMMARY
;
;      Name                      Bytes                         Attributes
;
;  _SMG$CODE                       2491  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         6         0         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        26         5          38        00:00.4
```

```
;                                   COMMAND QUALIFIERS

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

; Size:          2491 code + 0 data bytes
; Run Time:         00:47.0
; Elapsed Time:     02:30.3
; Lines/CPU Min:     1292
; Lexemes/CPU-Min: 18845
; Memory Used:  474 pages
; Compilation Complete
```

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

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SMGDISDRW
LIS

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