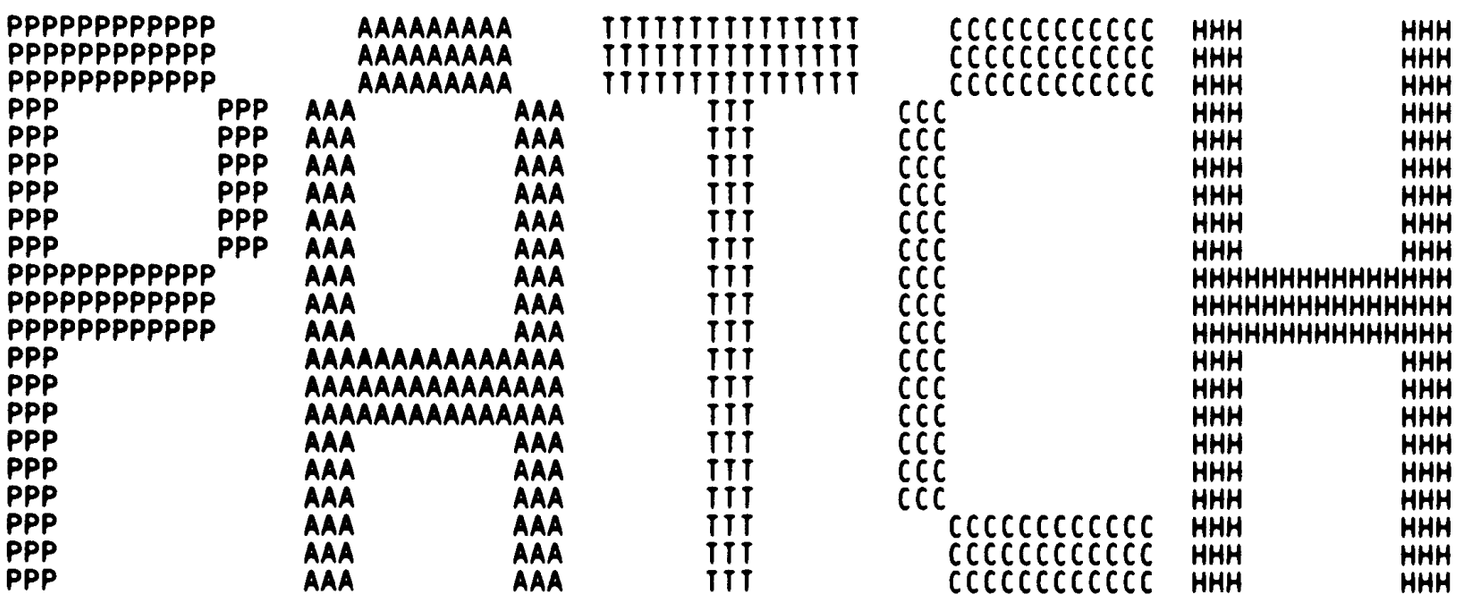
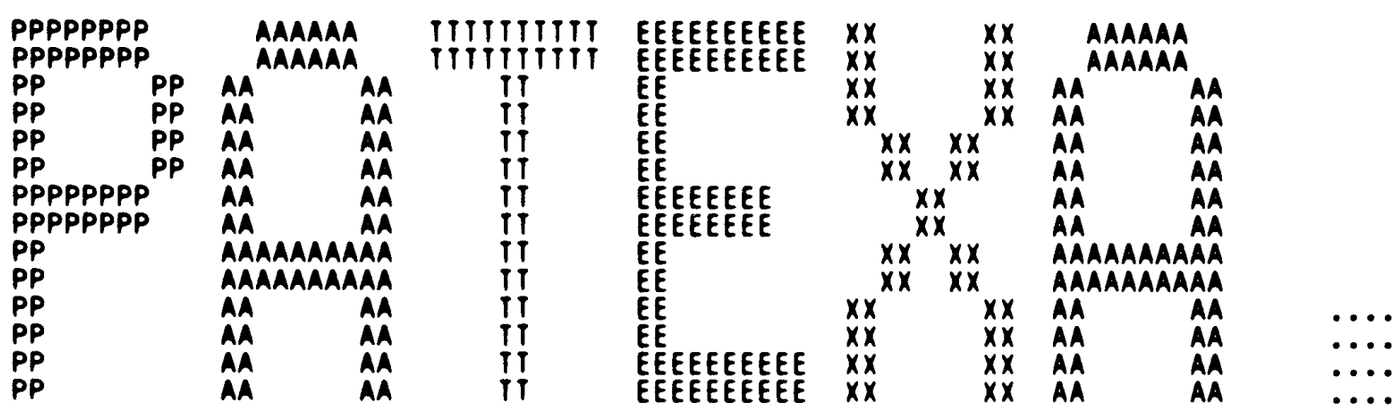
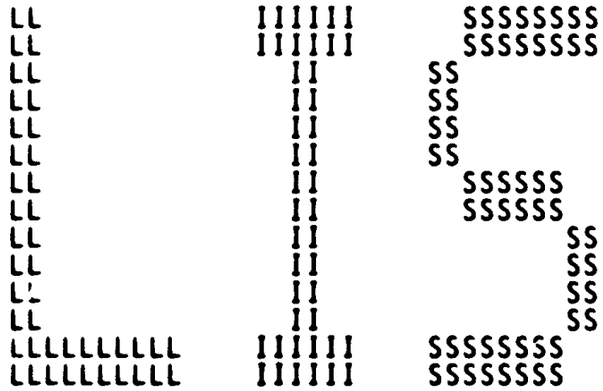

PPPPPPPPPPPP AAAAAAAAA TTTTTTTTTTTTTTT CCCCCCCCCCCC HHH HHH
PPP PPP AAA AAA TTT CCC HHH HHH
PPPPPPPPPPPP AAAAAAAAAAAAAAAA TTT CCC HHHHHHHHHHHHHHHH
PPP AAA AAA TTT CCC HHH HHH
PPP AAA AAA TTT CCCCCCCCCCCC HHH HHH


PPPPPPPP AAAAAA TTTTTTTTTT EEEEEEEEEE XX XX AAAAAA
PPPPPPPP AAAAAA TTTTTTTTTT EEEEEEEEEE XX XX AAAAAA
PP PP AA AA TT EE XX XX AA AA
PP PP AA AA TT EE XX XX AA AA
PP PP AA AA TT EE XX XX AA AA
PP PP AA AA TT EE XX XX AA AA
PPPPPPPP AA AA TT EEEEEEEE XX AA AA
PPPPPPPP AA AA TT EEEEEEEE XX AA AA
PP AAAAAAAAAA TT EE XX XX AAAAAAAAAA
PP AAAAAAAAAA TT EE XX XX AAAAAAAAAA
PP AA AA TT EE XX XX AA AA
PP AA AA TT EE XX XX AA AA
PP AA AA TT EEEEEEEEEE XX XX AA AA
PP AA AA TT EEEEEEEEEE XX XX AA AA


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

```
;     1          0001  0 MODULE PATEXA (
;     2        L 0002  0                 %IF %VARIANT EQL 1
;     3          0003  0                 %THEN
;     4          0004  0                         ADDRESSING_MODE (EXTERNAL = LONG_RELATIVE, NONEXTERNAL = LONG_RELATIVE),
;     5          0005  0                 %FI
;     6          0006  0                 IDENT = 'V04-000') =
;     7          0007  1 BEGIN
;     8          0008  1
;     9          0009  1 !*****************************************************************************
;    10          0010  1 !*                                                                           *
;    11          0011  1 !*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                                  *
;    12          0012  1 !*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.                    *
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;    23          0023  1 !*  AND  SHOULD  NOT  BE  CONSTRUED AS  A COMMITMENT BY DIGITAL EQUIPMENT     *
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;    25          0025  1 !*                                                                           *
;    26          0026  1 !*  DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE  OR  RELIABILITY OF ITS     *
;    27          0027  1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                   *
;    28          0028  1 !*                                                                           *
;    29          0029  1 !*                                                                           *
;    30          0030  1 !*****************************************************************************
;    31          0031  1 !
;    32          0032  1 ! FACILITY:     PATCH
;    33          0033  1 !
;    34          0034  1 !++
;    35          0035  1 ! FUNCTIONAL DESCRIPTION:
;    36          0036  1 !
;    37          0037  1 !       EXAMINE, DEPOSIT, AND DELETE ROUTINES FOR STARLET PATCH FACILITY
;    38          0038  1 !
;    39          0039  1 ! History:
;    40          0040  1 !       Author: Carol Peters, 21 Jul 1976: Version 01
;    41          0041  1 !
;    42          0042  1 !               Kathleen Morse, 19 Oct 1977: Version X01.00
;    43          0043  1 !
;    44          0044  1 ! Modified by:
;    45          0045  1 !
;    46          0046  1 !       V03-002 MTR0016         Mike Rhodes             02-Nov-1982
;    47          0047  1 !               Modify routine RELOCAT_INS to pass the address of the
;    48          0048  1 !               the instruction(s) to be relocated to the patch area.
;    49          0049  1 !               This address will be passed initially to PAT$EXP_AREA
;    50          0050  1 !               which in turn may call routine PAT$BUILD_ISE (which is
;    51          0051  1 !               called to create the default patch area if one does not
;    52          0052  1 !               already exist).  PAT$BUILD_ISE will use this address to
;    53          0053  1 !               propagate the image section attributes of the patched
;    54          0054  1 !               image section to the newly created default patch area.
;    55          0055  1 !
;    56          0056  1 !       V03-001 MTR0012         Mike Rhodes             16-Aug-1982
;    57          0057  1 !               Modify file names to remove duplicate file name useage
```

```
;    58          0058  1 !                 between code and require files.
;    59          0059  1 !
;    60          0060  1 !       V02-023 PCG0001         Peter George            04-FEB-1981
;    61          0061  1 !                 Add require statement for LIB$:PATDEF.REQ
;    62          0062  1 !
;    63          0063  1 !       V0122   BLS0039         Benn Schreiber          3-Feb-1981
;    64          0064  1 !                 Correct handling of patch area.
;    65          0065  1 !
;    66          0066  1 !       V0121   CNH0014         Chris Hume              21-Sep-1979     11:00
;    67          0067  1 !                 Added relocation support for the ACBG and ACBH instructions.
;    68          0068  1 !
;    69          0069  1 !       V0120   CNH0008         Chris Hume              28-Jun-1979     14:00
;    70          0070  1 !                 Fix CASE replacement bug and disallow relocation of these
;    71          0071  1 !                 instructions.  (PATMAI.B32 V0222, PATACT.B32 V0124,
;    72          0072  1 !                 PATMAC.B32 V0217, PATMSG.MDL V0202)
;    73          0073  1 !
;    74          0074  1 ! Revision history:
;    75          0075  1 !  NO   DATE            PROGRAMMER              PURPOSE
;    76          0076  1 !  --   ----            ----------              -------
;    77          0077  1 !
;    78          0078  1 !  00   19-OCT-77       K.D. MORSE              ADAPT VERSION 49 FOR PATCH
;    79          0079  1 !  01   01-DEC-77       K.D. MORSE              ADD DELETE ROUTINE.
;    80          0080  1 !  02   27-DEC-77       K.D. MORSE              CHANGE PAT$OUT_VALUE CALLS. (57)
;    81          0081  1 !                                              ADD PAT$SYM_DEPOS. (58)
;    82          0082  1 !  03   2-JAN-78        K.D. MORSE              ADD CHECK FOR NO SYMBOLS IN IMAGE.
;    83          0083  1 !  04   3-JAN-78        K.D. MORSE              ADD CHECK FOR NO PATCHAREA
;    84          0084  1 !                                              ALLOCATED BEFORE DEPOSIT /PAT.
;    85          0085  1 !  05   4-JAN-78        K.D. MORSE              NO CHANGES FOR VERS 50-53.
;    86          0086  1 !  06   5-JAN-78        K.D. MORSE              CHANGE PAT$INS_DECODE CALLS. (54)
;    87          0087  1 !                                              NO CHANGES FOR VERS 55,56.
;    88          0088  1 !  07   24-JAN-78       K.D. MORSE              NO CHANGES FOR VERS 59.
;    89          0089  1 !  08   27-JAN-78       K.D. MORSE              ADD CHECK FOR EXIT_TOKEN IN
;    90          0090  1 !                                              PAT$REPLACE_CMD TO RECOGNIZE
;    91          0091  1 !                                              END OF OLD LIST.
;    92          0092  1 !  09   28-JAN-78       K.D. MORSE              BUILD REPLACEMENT CODE INTO
;    93          0093  1 !                                              TEMPORARY BUFFER.
;    94          0094  1 !  10   01-MAR-78       K.D. MORSE              CHANGE ERRONEOUS PAT$_DECODE
;    95          0095  1 !                                              ERROR MSGS TO PAT$_ENCODE.
;    96          0096  1 !  11   24-MAR-78       K.D. MORSE              NONE FOR VERS 60-61.
;    97          0097  1 !  12   04-APR-78       K.D. MORSE              NONE FOR VERS 62.
;    98          0098  1 !  13   25-APR-78       K.D. MORSE              CONVERT TO NATIVE COMPILER.
;    99          0099  1 !  14   28-APR-78       K.D. MORSE              ADD ASSEMBLER DIRECTIVE FLAG
;   100          0100  1 !                                              TO PAT$OUT_MEM_LOC.
;   101          0101  1 !  15   18-MAY-78       K.D. MORSE              NO CHANGES FOR VERS 63.
;   102          0102  1 !  16   26-MAY-78       K.D. MORSE              ADD CODE TO ALLOW FORWARD
;   103          0103  1 !                                              REFERENCING IN SYMBOLIC
;   104          0104  1 !                                              INSTRUCTION OPERANDS.
;   105          0105  1 !  17   13-JUN-78       K.D. MORSE              ADD FAO COUNTS TO SIGNALS.
;   106          0106  1 !  18   19-JUN-78       K.D. MORSE              NO CHANGES FOR VERS 64.
;   107          0107  1 !  19   28-JUN-78       K.D. MORSE              NO CHANGES FOR VERS 65-67.
;   108          0108  1 !                                              ADD CODE FOR EV/LITERAL AND
;   109          0109  1 !                                              ROUTINE DISPLAY LVTS. (66)
;   110          0110  1 !                                              NO CHANGES FOR VERS 69-74.
;   111          0111  1 !
;   112          0112  1 !--
```

```
;  114          0113  1 FORWARD ROUTINE
;  115          0114  1           PAT$DEPOSIT_CMD : NOVALUE,                  ! Deposits a datum into an address
;  116          0115  1           PAT$EXAMINE_CMD : NOVALUE,                  ! Examines a location
;  117          0116  1           PAT$REPLACE_CMD : NOVALUE,                  ! Replaces an instruction
;  118          0117  1           RELOCAT_INS : NOVALUE,                      ! Relocates instructions to patch area
;  119          0118  1           PAT$SUBST_INS,                              ! Substitutes instructions in patch area
;  120          0119  1           PAT$OUT_MEM_LOC,                            ! Outputs the contents of a memory location
;  121          0120  1           DISPLAY_LVTS : NOVALUE,                     ! Search LVT and display pathnames
;  122          0121  1           PAT$REG_MATCH,                              ! Matches a string to a register name
;  123          0122  1           PAT$FILL_BUF : NOVALUE;                     ! Writes data into temporary buffers
;  124          0123  1
;  125          0124  1 LIBRARY 'SYS$LIBRARY:LIB.L32';                        ! System definitions
;  126          0125  1 REQUIRE 'SRC$:VXSMAC.REQ';
;  127          0190  1 REQUIRE 'SRC$:BSTRUC.REQ';
;  128          0266  1 REQUIRE 'SRC$:LISTEL.REQ';
;  129          0308  1 REQUIRE 'SRC$:PATPCT.REQ';
;  130          0348  1 REQUIRE 'SRC$:PATGEN.REQ';
;  131          0570  1 REQUIRE 'LIB$:PATDEF.REQ';                                  . Defines literals
;  132          0624  1 REQUIRE 'LIB$:PATMSG.REQ';
;  133          0798  1 REQUIRE 'SRC$:SYSLIT.REQ';
;  134          0848  1 REQUIRE 'SRC$:PATRTS.REQ';
;  135          1944  1 REQUIRE 'SRC$:SYSSER.REQ';
```

```
;  R1976  1      SWITCHES LIST (SOURCE);
;  R1977  1
;  R1978  1      EXTERNAL ROUTINE
;  R1979  1              PAT$fao_out;            ! formats a line and outputs to the terminal
;  R1980  1
```

```
;  136          2026  1 REQUIRE 'SRC$:PATTER.REQ';
;  137          2233  1 REQUIRE 'SRC$:PREFIX.REQ';
;  138          2421  1 REQUIRE 'SRC$:PATPRE.REQ';
;  139          2584  1 REQUIRE 'SRC$:VAXOPS.REQ';
;  140          2798  1
;  141          2799  1 EXTERNAL
;  142          2800  1         PAT$GB_SYMBOLS,                     ! Indicator if image had symbols
;  143          2801  1         PAT$GL_OLD_ASD,                     ! Descriptor for old contents assembler dire
;  144          2802  1         PAT$GL_NEW_ASD,                     ! Descriptor for new contents assembler dire
;  145          2803  1         PAT$GL_TEMP_BUF : BLOCK[,BYTE],     ! Descriptor for temporary buffer for deposi
;  146          2804  1         PAT$GL_RLOC_BUF : BLOCK[,BYTE],     ! Descriptor for relocated instruction strea
;  147          2805  1         PAT$GB_SUBST_IN : VECTOR[,BYTE],    ! Buffer for substitution instruction stream
;  148          2806  1         PAT$GL_BR_DISPL,                    ! Branch displacement that does not fit
;  149          2807  1         PAT$GL_PATAREA : REF BLOCK[,BYTE],  ! Pointer to patch area descriptor
;  150          2808  1         PAT$GL_IMGHDR : REF BLOCK[,BYTE],   ! Pointer to image header
;  151          2809  1         PAT$GB_LOC_TYPE: BYTE,              ! Type of end range argument
;  152          2810  1         PAT$GB_MOD_PTR: REF VECTOR [, BYTE],! Pointer to mode level
;  153          2811  1         PAT$GL_IHPPTR : REF BLOCK[,BYTE],   ! Pointer to image header patch area
;  154          2812  1         PAT$CP_OUT_STR : REF VECTOR[,BYTE], ! Points into current output buffer
;  155          2813  1         PAT$GL_CONTEXT: BITVECTOR,          ! Context bits longword
;  156          2814  1         PAT$GL_BUF_SIZ,                     ! Holds count in output buffer
;  157          2815  1         PAT$GL_HEAD_LST,                    ! Head of linked list of expressions
;  158          2816  1         PAT$GL_LAST_LOC,                    ! Last location displayed
;  159          2817  1         PAT$GL_LAST_VAL,                    ! Last value displayed
;  160          2818  1         PAT$GL_NEXT_LOC,                    ! Next location to display
;  161          2819  1         PAT$GL_SYMTBPTR,                    ! Pointer to current symbol table
;  162          2820  1         PAT$GL_OLDLABLS,                    ! Listhead for old contents labels (from cur
;  163          2821  1         PAT$GL_NEWLABLS,                    ! Listhead for new contents un-relocated lab
;  164          2822  1         PAT$GL_RLCLABLS;                    ! List head for new contents relocated label
;  165          2823  1
;  166          2824  1 EXTERNAL ROUTINE
;  167          2825  1         PAT$ADD_LABELS : NOVALUE,           ! Adds labels to user-defined symbol table
;  168          2826  1         PAT$ADD_NT_T_PV : NOVALUE,          ! Build pathname vectors from NT_PTRs
;  169          2827  1         PAT$EXP_AREA : NOVALUE,             ! Expands patch area
;  170          2828  1         PAT$FAO_PUT : NOVALUE,              ! Formats buffered output
;  171          2829  1         PAT$FREERELEASE,                    ! Deallocates free memory
;  172          2830  1         PAT$FREEZ,                          ! Allocates and zeroes free memory
;  173          2831  1         PAT$GET_NXT_LVT,                    ! Provide access to the LVT
;  174          2832  1         PAT$GET_VALUE : NOVALUE,            ! Gets byte stream of values from image
;  175          2833  1         PAT$INS_DECODE,                     ! Routine to output memory as
;  176          2834  1                                             ! symbolic instructions
;  177          2835  1         PAT$INS_ENCODE,                     ! Routine to encode a symbolic instruction
;  178          2836  1         PAT$MAP_ADDR : NOVALUE,             ! Computes mapped addresses
;  179          2837  1         PAT$OUT_NUM_VAL,                    ! Outputs numeric values
;  180          2838  1         PAT$OUT_PUT : NOVALUE,              ! Actually does the terminal I/O
;  181          2839  1         PAT$OUT_SYM_VAL,                    ! Outputs symbol name with value
;  182          2840  1         PAT$PRINT_PATH : NOVALUE,           ! Print out pathnames
;  183          2841  1         PAT$RESOLVE_INS : NOVALUE,          ! Resolves forward references in symbolic in
;  184          2842  1         PAT$SYMBOL_VALU,                    ! Finds the value bound to a symbol name
;  185          2843  1         PAT$UNMAP_ADDR : NOVALUE,           ! Computes unmapped addresses
;  186          2844  1         PAT$VAL_TO_SYM,                     ! Translates a value to a symbol name
;  187          2845  1         PAT$WRITE_MEM;                      ! Routine to write to user's memory
```

```
;  189          2846  1 !++
;  190          2847  1 !
;  191          2848  1 ! REGISTER_TABLE holds one entry per register.  Each entry is made
;  192          2849  1 ! up of one longword.  The first byte holds the character count of
;  193          2850  1 ! the register name.  The second through fourth bytes hold the
;  194          2851  1 ! register name string.  A sample entry follows:
;  195          2852  1 !
;  196          2853  1 !       +-----------------------------------------------------------+
;  197          2854  1 !       !               !       0       !       R       !       2       !
;  198          2855  1 !       +-----------------------------------------------------------+
;  199          2856  1 !
;  200          2857  1 !--
;  201          2858  1
;  202          2859  1 MACRO
;  203        M 2860  1         REGISTER_ENTRY (STRING) =
;  204          2861  1                 %CHARCOUNT (STRING), %ASCII STRING, REP 3 - %CHARCOUNT (STRING) OF BYTE (0)%;
;  205          2862  1
;  206          2863  1 BIND
;  207          2864  1         REGISTER_TABLE = UPLIT BYTE (
;  208          2865  1                 REGISTER_ENTRY ('R0'),
;  209          2866  1                 REGISTER_ENTRY ('R1'),
;  210          2867  1                 REGISTER_ENTRY ('R2'),
;  211          2868  1                 REGISTER_ENTRY ('R3'),
;  212          2869  1                 REGISTER_ENTRY ('R4'),
;  213          2870  1                 REGISTER_ENTRY ('R5'),
;  214          2871  1                 REGISTER_ENTRY ('R6'),
;  215          2872  1                 REGISTER_ENTRY ('R7'),
;  216          2873  1                 REGISTER_ENTRY ('R8'),
;  217          2874  1                 REGISTER_ENTRY ('R9'),
;  218          2875  1                 REGISTER_ENTRY ('R10'),
;  219          2876  1                 REGISTER_ENTRY ('R11'),
;  220          2877  1                 REGISTER_ENTRY ('AP'),
;  221          2878  1                 REGISTER_ENTRY ('FP'),
;  222          2879  1                 REGISTER_ENTRY ('SP'),
;  223          2880  1                 REGISTER_ENTRY ('PC'),
;  224          2881  1                 REGISTER_ENTRY ('PSL')):
;  225          2882  1
;  226          2883  1         BLOCK [, LONG];
;  227          2884  1
;  228          2885  1 !++
;  229          2886  1 ! These field definitions control access to the register table.
;  230          2887  1 !--
;  231          2888  1 MACRO
;  232          2889  1         REG_NAME        =8, 24, 0%,
;  233          2890  1         CTD_REG_NAME    =0, 24, 0%,
;  234          2891  1         REG_CH_CNT      =0,  8, 0%;
;  235          2892  1
;  236          2893  1 !++
;  237          2894  1 ! Common ascii counted strings used in FAO calls.
;  238          2895  1 !--
;  239          2896  1
;  240          2897  1 BIND
;  241          2898  1         CS_ASCII        = UPLIT ( %ASCIC '''!AD'''),
;  242          2899  1         COLON_TAB_STG   = UPLIT ( %ASCIC ':  '),
;  243          2900  1         CAR_CTL_STG     = UPLIT ( %ASCIC '!/'),
;  244          2901  1         OLD_TAB_STG     = UPLIT ( %ASCIC 'old:  '),
;  245          2902  1         NEW_TAB_STG     = UPLIT ( %ASCIC 'new:  ');
```

```
;  246          2903  1
;  247          2904  1 LITERAL
;  248          2905  1         NO_CASE_TABLE   = 0,                    ! Don't print case dispatch table
;  249          2906  1         CASE_TABLE      = 1;                    ! Print CASE dispatch table
```

```
;  251          2907  1 SWITCHES NOOPTIMIZE;
;  252          2908  1 GLOBAL ROUTINE PAT$DEPOSIT_CMD : NOVALUE =
;  253          2909  1
;  254          2910  1 !++
;  255          2911  1 ! FUNCTIONAL DESCRIPTION:
;  256          2912  1 !
;  257          2913  1 !       This routine handles all delete and deposit commands, those for
;  258          2914  1 !       instructions and those for values.  The instruction(s)/value(s)
;  259          2915  1 !       specified in the delete command must be identical to those actually
;  260          2916  1 !       contained in the location(s), otherwise an error message is produced and
;  261          2917  1 !       the command ends prematurely.  For a deposit command, the instruction(s)
;  262          2918  1 !       /value(s) specified are written to consecutive locations.  The image is
;  263          2919  1 !       not modified in either case unless the entire command works.
;  264          2920  1 !
;  265          2921  1 !       The command argument list is made up of entries that are
;  266          2922  1 !       each three longwords long. The first is a forward link to the
;  267          2923  1 !       next entry. The second longword in the first entry in the list
;  268          2924  1 !       is the address into which some value(s) is (are) to be deleted or deposited.
;  269          2925  1 !       The third longword is unused. The second longword in the second
;  270          2926  1 !       and subsequent entries are the values to be deleted or deposited.
;  271          2927  1 !       The first value should be the contents of the specified location;
;  272          2928  1 !       the second, the contents of that location plus the current mode_length, etc.
;  273          2929  1 !
;  274          2930  1 !       For instructions, the increment is the length of each subsequent
;  275          2931  1 !       instruction. The second longword contains the address of a counted byte
;  276          2932  1 !       stream that is to be translated into a binary instruction which is the
;  277          2933  1 !       old contents of that location.
;  278          2934  1 !
;  279          2935  1 ! CALLING SEQUENCE:
;  280          2936  1 !
;  281          2937  1 !       PAT$DEPOSIT_CMD ()
;  282          2938  1 !
;  283          2939  1 ! INPUTS:
;  284          2940  1 !
;  285          2941  1 !       none
;  286          2942  1 !
;  287          2943  1 ! IMPLICIT INPUTS:
;  288          2944  1 !
;  289          2945  1 !       PAT$GL_HEAD_LST, the head of the linked PATCH command argument list.
;  290          2946  1 !       The current mode.
;  291          2947  1 !
;  292          2948  1 ! OUTPUTS:
;  293          2949  1 !
;  294          2950  1 !       none
;  295          2951  1 !
;  296          2952  1 ! IMPLICIT OUTPUTS:
;  297          2953  1 !
;  298          2954  1 !       The values PAT$GL_LAST_LOC, PAT$GL_LAST_VAL, and PAT$GL_NEXT_LOC
;  299          2955  1 !       are set after each deposit is done.
;  300          2956  1 !
;  301          2957  1 ! ROUTINE VALUE:
;  302          2958  1 !
;  303          2959  1 !       novalue
;  304          2960  1 !
;  305          2961  1 ! SIDE EFFECTS:
;  306          2962  1 !
;  307          2963  1 !       The specified addresses have their values changed.
```

```
;  308          2964  1 !       If a failure in a write occurs, the routine SIGNALs an error.
;  309          2965  1 !
;  310          2966  1 !--
;  311          2967  1
;  312          2968  2 BEGIN
;  313          2969  2
;  314          2970  2 LITERAL
;  315          2971  2         NOP_INSTR       = 1,                    ! Fill char for instructions
;  316          2972  2         ZERO_BYTE       = 0,                    ! Fill char for data
;  317          2973  2         ONE_PAGE        = 1,                    ! Number of pages to expand patch area
;  318          2974  2         MAX_INST_LEN    = 80;                   ! Maximum number of binary bytes in an instr
;  319          2975  2
;  320          2976  2 LOCAL
;  321          2977  2         INSTRUC_BUF: VECTOR [MAX_INST_LEN, BYTE],
;  322          2978  2         FILL_CHAR: BYTE,                        ! Fill character for delete command
;  323          2979  2         OLD_CONTENTS:   VECTOR[TTY_OUT_WIDTH, BYTE],    ! Buffer to hold old contents of location
;  324          2980  2         MAPPED_LOC,                             ! Mapped address of deposit destination
;  325          2981  2         UNMAPPED_LOC,                           ! Unmapped address of deposit destination
;  326          2982  2         ISE_ADDR,                               ! Image section entry for deposit destinatio
;  327          2983  2         DEP_SRC_ADR,                            ! Pointer to deposit source
;  328          2984  2         DEP_SIZ,                                ! Size of deposit to be made
;  329          2985  2         POINTER;
;  330          2986  2
;  331          2987  2 !++
;  332          2988  2 ! Check that all parameters were specified on the command.
;  333          2989  2 !--
;  334          2990  2 POINTER = .PAT$GL_HEAD_LST;
;  335          2991  3 IF (.POINTER EQLA 0) OR (.LIST_ELEM_FLINK(.POINTER) EQLA 0)
;  336          2992  2 THEN
;  337          2993  2         SIGNAL (PAT$_INVCMD);
;  338          2994  2
;  339          2995  2 !++
;  340          2996  2 ! Initialize unmapped address and PAT$GL_CONTEXT.  The context bit causes
;  341          2997  2 ! the routine PAT$OUT_MEM_LOC to display a location instead of evaluating
;  342          2998  2 ! a numeric expression.
;  343          2999  2 !--
;  344          3000  2 UNMAPPED_LOC = .LIST_ELEM_EXP1 (.POINTER);
;  345          3001  2 PAT$GL_CONTEXT[EXAMINE_BIT] = TRUE;
;  346          3002  2
;  347          3003  2 !++
;  348          3004  2 ! For DEPOSIT commands only:
;  349          3005  2 !
;  350          3006  2 ! Check if DEPOSIT qualifier, "/PATCH_AREA", was specified.
;  351          3007  2 ! If so, check that the address specified is identical to the
;  352          3008  2 ! start of the current patch area.  If it is not, report an
;  353          3009  2 ! error and abort the DEPOSIT command.
;  354          3010  2 !--
;  355          3011  2 IF .PAT$GL_CONTEXT [PAT_AREA_BIT]
;  356          3012  2 THEN
;  357          3013  3         BEGIN
;  358          3014  4         IF (.PAT$GL_PATAREA[DSC$W_LENGTH] EQL 0)
;  359          3015  3         THEN
;  360          3016  4                 IF (.PAT$GL_PATAREA [DSC$A_POINTER] EQLA .PAT$GL_IHPPTR[IHP$L_RW_PATADR])
;  361          3017  3                 THEN
;  362          3018  3                         PAT$EXP_AREA(ONE_PAGE);
;  363          3019  4         IF (.PAT$GL_PATAREA [DSC$A_POINTER] NEQA .UNMAPPED_LOC)
;  364          3020  3         THEN
```

```
;  365     3021  3                    SIGNAL(PAT$_NOTPATADR, 2, .PAT$GL_PATAREA[DSC$A_POINTER], .UNMAPPED_LOC);
;  366     3022  2            END;
;  367     3023  2
;  368     3024  2        !++
;  369     3025  2        ! Set the fill character for DELETE commands.
;  370     3026  2        !--
;  371     3027  3        IF (.PAT$GB_MOD_PTR [MODE_INSTRUC])
;  372     3028  2        THEN
;  373     3029  3            BEGIN
;  374     3030  3            PAT$GL_SYMTBPTR = .PAT$GL_NEWLABLS;                 ! Use new contents label table
;  375     3031  3            FILL_CHAR = NOP_INSTR;                              ! Fill character for instructions
;  376     3032  3            END
;  377     3033  2        ELSE
;  378     3034  2            FILL_CHAR = ZERO_BYTE;                              ! Fill character for data
;  379     3035  2
;  380     3036  2        !++
;  381     3037  2        ! Loop to DEPOSIT (DELETE) all parameters specified in the command.
;  382     3038  2        !--
;  383     3039  2        REPEAT
;  384     3040  3            BEGIN
;  385     3041  3            POINTER = .LIST_ELEM_FLINK (.POINTER);
;  386     3042  3
;  387     3043  3            !++
;  388     3044  3            ! Now determine the length of the instruction or data
;  389     3045  3            ! which is to be deposited or deleted.
;  390     3046  3            !--
;  391     3047  3            IF .PAT$GB_MOD_PTR [MODE_INSTRUC]
;  392     3048  3            THEN
;  393     3049  4                BEGIN
;  394     3050  4                !++
;  395     3051  4                ! This is a symbolic instruction to be deposited or deleted.
;  396     3052  4                ! It is currently in the form of a counted ASCII string that
;  397     3053  4                ! must be translated into binary form. The call to PAT$INS_ENCODE
;  398     3054  4                ! needs the address for which the instruction is encoded in
;  399     3055  4                ! order to resolve branches correctly.
;  400     3056  4                !--
;  401     3057  4                IF NOT PAT$INS_ENCODE (.LIST_ELEM_EXP1 (.POINTER),
;  402     3058  4                        INSTRUC_BUF, .UNMAPPED_LOC,
;  403     3059  5                        (IF .PAT$GL_CONTEXT[DELETE_BIT]
;  404     3060  5                            THEN PAT$GL_OLD_ASD
;  405     3061  4                            ELSE PAT$GL_NEW_ASD),
;  406     3062  4                        PAT$GL_TEMP_BUF)
;  407     3063  4                THEN
;  408     3064  4                    SIGNAL (PAT$_NOENCODE, 1, .LIST_ELEM_EXP1(.POINTER)); ! This instruction is invalid.
;  409     3065  4                DEP_SRC_ADR = INSTRUC_BUF [1];
;  410     3066  4                DEP_SIZ = .INSTRUC_BUF [0];
;  411     3067  4                END
;  412     3068  3            ELSE
;  413     3069  4                BEGIN
;  414     3070  4                !++
;  415     3071  4                ! Determine length and address for deposits or deletes which are
;  416     3072  4                ! not symbolic instructions.  Then check for truncation of new value.
;  417     3073  4                !--
;  418     3074  4                DEP_SRC_ADR = LIST_ELEM_EXP1 (.POINTER);
;  419     3075  4                DEP_SIZ = .PAT$GB_MOD_PTR [MODE_LENGTH];
;  420     3076  5                IF (.LIST_ELEM_EXP1(.POINTER) LSS 0)
;  421     3077  4                THEN
```

```
;  422     3078  5                    BEGIN
;  423     3079  5                    IF .(LIST_ELEM_EXP1(.POINTER))<0, .DEP_SIZ*8, 1> NEQ .LIST_ELEM_EXP1(.POINTER)
;  424     3080  5                    THEN
;  425     3081  5                        SIGNAL(PAT$_NUMTRUNC);
;  426     3082  5                    END
;  427     3083  4                ELSE
;  428     3084  4                    IF .(LIST_ELEM_EXP1(.POINTER))<0, .DEP_SIZ*8, 0> NEQ .LIST_ELEM_EXP1(.POINTER)
;  429     3085  4                    THEN
;  430     3086  4                        SIGNAL(PAT$_NUMTRUNC);
;  431     3087  4                END;
;  432     3088
;  433     3089              !++
;  434     3090              ! Now write the new values into a temporary buffer.  They are not
;  435     3091              ! written directly into memory in case part of the command fails.
;  436     3092              !--
;  437     3093              PAT$FILL_BUF (PAT$GL_TEMP_BUF, .DEP_SRC_ADR, .DEP_SIZ);
;  438     3094
;  439     3095              !++
;  440     3096              ! Finished with current value.  Reset last location,
;  441     3097              ! next location, and last value, and exitloop.
;  442     3098              !--
;  443     3099              PAT$GL_LAST_LOC = .UNMAPPED_LOC;
;  444     3100              UNMAPPED_LOC = .UNMAPPED_LOC + .DEP_SIZ;
;  445     3101              IF NOT .PAT$GB_MOD_PTR [MODE_INSTRUC]
;  446     3102              THEN
;  447     3103                  PAT$GL_LAST_VAL = .LIST_ELEM_EXP1 (.POINTER);
;  448     3104
;  449     3105              !++
;  450     3106              ! If there are no more values, then exit loop which builds
;  451     3107              ! temporary deposit buffer.
;  452     3108  3           !--
;  453     3109  4           IF (.LIST_ELEM_FLINK (.POINTER) EQLA 0)
;  454     3110  3           THEN
;  455     3111  3               EXITLOOP;
;  456     3112  2           END;
;  457     3113  2
;  458     3114  2       !++
;  459     3115  2       ! For DEPOSIT command only:
;  460     3116  2       !
;  461     3117  2       ! First check if this is writing into the patch area.  If so, check that there
;  462     3118  2       ! is enough room in the patch area.  If not, then expand the patch area if
;  463     3119  2       ! possible (that is, if the current patch area is the one defined int the image
;  464     3120  2       ! header).  Otherwise, report an error and abort this command.
;  465     3121  2       !--
;  466     3122  2       IF .PAT$GL_CONTEXT[PAT_AREA_BIT]
;  467     3123  2       THEN
;  468     3124  3           BEGIN
;  469     3125  4           IF (.PAT$GL_PATAREA[DSC$W_LENGTH] LSS .PAT$GL_TEMP_BUF[DSC$W_LENGTH])
;  470     3126  3           THEN
;  471     3127  4               BEGIN
;  472     3128  5               IF (.PAT$GL_PATAREA[DSC$A_POINTER] EQLA .PAT$GL_IHPPTR[IHP$L_RW_PATADR])
;  473     3129  4               THEN
;  474     3130  5                   PAT$EXP_AREA((.PAT$GL_TEMP_BUF[DSC$W_LENGTH] +
;  475     3131  4                                 A_PAGE - 1)/A_PAGE)
;  476     3132  4               ELSE
;  477     3133  4                   SIGNAL(PAT$_INSUFPAT, 2, .PAT$GL_TEMP_BUF[DSC$W_LENGTH],
;  478     3134  4                          .PAT$GL_PATAREA[DSC$A_POINTER],
```

```
;  479     3135  4                                .PAT$GL_PATAREA[DSC$W_LENGTH]);
;  480     3136  3                    END;
;  481     3137  2            END;
;  482     3138  2
;  483     3139  2 !++
;  484     3140  2 ! Now resolve any forward references inside the symbolic instruction operands.
;  485     3141  2 !--
;  486     3142  2 PAT$RESOLVE_INS(PAT$GL_TEMP_BUF);
;  487     3143  2
;  488     3144  2 !++
;  489     3145  2 ! Output the old values.
;  490     3146  2 !--
;  491     3147  2 PAT$GL_NEXT_LOC = .LIST_ELEM_EXP1(.PAT$GL_HEAD_LST);
;  492     3148  2 WHILE .PAT$GL_NEXT_LOC [SSA .UNMAPPED_LOC
;  493     3149  2 DO
;  494     3150  2            PAT$OUT_MEM_LOC(.PAT$GL_NEXT_LOC, OLD_TAB_STG, PAT$GL_OLD_ASD, CASE_TABLE);
;  495     3151  2
;  496     3152  2 !++
;  497     3153  2 ! For DELETE commands only:
;  498     3154  2 !
;  499     3155  2 ! Verify that the old values were actually in memory for DELETE commands.
;  500     3156  2 ! Then fill the temporary buffer with the appropriate fill character.
;  501     3157  2 !--
;  502     3158  2 IF .PAT$GL_CONTEXT[DELETE_BIT]
;  503     3159  2 THEN
;  504     3160  3            BEGIN
;  505     3161  3            !++
;  506     3162  3            ! Now get the actual value in the location and
;  507     3163  3            ! check that it equals the specified value.
;  508     3164  3            !--
;  509     3165  3            LOCAL
;  510     3166  3                    BYTE_COUNT,                                     ! Count of bytes verified
;  511     3167  3                    BUF_SIZE;                                       ! Size of old contents buffer to get
;  512     3168  3            BYTE_COUNT = 0;
;  513     3169  4            WHILE (.BYTE_COUNT LSS .PAT$GL_TEMP_BUF[DSC$W_LENGTH])
;  514     3170  3            DO
;  515     3171  4                    BEGIN
;  516     3172  5                    IF ((BUF_SIZE = .PAT$GL_TEMP_BUF[DSC$W_LENGTH] - .BYTE_COUNT) GTR TTY_OUT_WIDTH)
;  517     3173  4                    THEN
;  518     3174  4                            BUF_SIZE = TTY_OUT_WIDTH;               ! Request only as much as buffer can hold
;  519     3175  4                    PAT$GET_VALUE(.LIST_ELEM_EXP1(.PAT$GL_HEAD_LST)+.BYTE_COUNT,
;  520     3176  4                                  .BUF_SIZE, OLD_CONTENTS);
;  521     3177  4                    IF CH$NEQ(.BUF_SIZE, .PAT$GL_TEMP_BUF[DSC$A_POINTER]+.BYTE_COUNT,
;  522     3178  4                                  .BUF_SIZE, OLD_CONTENTS)
;  523     3179  4                    THEN
;  524     3180  4                            SIGNAL(PAT$_DIFVAL+MSG$K_WARN);
;  525     3181  4                    BYTE_COUNT = .BYTE_COUNT + .BUF_SIZE;
;  526     3182  3                    END;
;  527     3183  3            CH$FILL(.FILL_CHAR, .PAT$GL_TEMP_BUF[DSC$W_LENGTH],
;  528     3184  3                     .PAT$GL_TEMP_BUF[DSC$A_POINTER]);
;  529     3185  2            END;
;  530     3186  2
;  531     3187  2 !++
;  532     3188  2 ! Now write the temporary buffer into memory.
;  533     3189  2 !--
;  534     3190  2 PAT$GL_NEXT_LOC = .LIST_ELEM_EXP1(.PAT$GL_HEAD_LST);
;  535     3191  2 PAT$WRITE_MEM (.PAT$GL_NEXT_LOC, .PAT$GL_TEMP_BUF[DSC$A_POINTER],
```

```
;  536          3192  2                          .PAT$GL_TEMP_BUF[DSC$W_LENGTH]);
;  537          3193  2
;  538          3194  2 !++
;  539          3195  2 ! Output the new values.
;  540          3196  2 !--
;  541          3197  2 WHILE .PAT$GL_NEXT_LOC LSSA .UNMAPPED_LOC
;  542          3198  2 DO
;  543          3199  2         PAT$OUT_MEM_LOC(.PAT$GL_NEXT_LOC, NEW_TAB_STG, PAT$GL_NEW_ASD, CASE_TABLE);
;  544          3200  2 !++
;  545          3201  2 ! Now check if the deposit was into the current patch area.  If so,
;  546          3202  2 ! update the patch area descriptor.
;  547          3203  2 !--
;  548          3204  2 IF .PAT$GL_CONTEXT [PAT_AREA_BIT]
;  549          3205  2 THEN
;  550          3206  3         BEGIN
;  551          3207  3         PAT$GL_PATAREA[DSC$A_POINTER] = .PAT$GL_PATAREA[DSC$A_POINTER] +
;  552          3208  3                                         .PAT$GL_TEMP_BUF[DSC$W_LENGTH];
;  553          3209  3         PAT$GL_PATAREA[DSC$W_LENGTH] = .PAT$GL_PATAREA[DSC$W_LENGTH] -
;  554          3210  3                                         .PAT$GL_TEMP_BUF[DSC$W_LENGTH];
;  555          3211  2         END;
;  556          3212  2 !++
;  557          3213  2 ! Now add the new labels to the user-defined symbol table.
;  558          3214  2 !--
;  559          3215  2 PAT$ADD_LABELS(PAT$GL_NEWLABLS);
;  560          3216  2
;  561          3217  2
;  562          3218  2 RETURN;
;  563          3219  1 END;


                                                        .TITLE  PATEXA
                                                        .IDENT  \V04-000\

                                                        .PSECT  _PAT$PLIT,NOWRT,NOEXE,0

                    02  00000 P.AAA:                   .BYTE   2
                30  52  00001                          .ASCII  \R0\
                    00  00003                          .BYTE   0
                    02  00004                          .BYTE   2
                31  52  00005                          .ASCII  \R1\
                    00  00007                          .BYTE   0
                    02  00008                          .BYTE   2
                32  52  00009                          .ASCII  \R2\
                    00  0000B                          .BYTE   0
                    02  0000C                          .BYTE   2
                33  52  0000D                          .ASCII  \R3\
                    00  0000F                          .BYTE   0
                    02  00010                          .BYTE   2
                34  52  00011                          .ASCII  \R4\
                    00  00013                          .BYTE   0
                    02  00014                          .BYTE   2
                35  52  00015                          .ASCII  \R5\
                    00  00017                          .BYTE   0
                    02  00018                          .BYTE   2
                36  52  00019                          .ASCII  \R6\
                    00  00018                          .BYTE   0
                    02  0001C                          .BYTE   2
```

```
                                 37  52 0001D          .ASCII  \R7\                ;
                                     00 0001F          .BYTE   0                   ;
                                     02 00020          .BYTE   2                   ;
                                 38  52 00021          .ASCII  \R8\                ;
                                     00 00023          .BYTE   0                   ;
                                     02 00024          .BYTE   2                   ;
                                 39  52 00025          .ASCII  \R9\                ;
                                     00 00027          .BYTE   0                   ;
                                     03 00028          .BYTE   3                   ;
                             30  31  52 00029          .ASCII  \R10\               ;
                                     03 0002C          .BYTE   3                   ;
                             31  31  52 0002D          .ASCII  \R11\               ;
                                     02 00030          .BYTE   2                   ;
                                 50  41 00031          .ASCII  \AP\                ;
                                     00 00033          .BYTE   0                   ;
                                     02 00034          .BYTE   2                   ;
                                 50  46 00035          .ASCII  \FP\                ;
                                     00 00037          .BYTE   0                   ;
                                     02 00038          .BYTE   2                   ;
                                 50  53 00039          .ASCII  \SP\                ;
                                     00 0003B          .BYTE   0                   ;
                                     02 0003C          .BYTE   2                   ;
                                 43  50 0003D          .ASCII  \PC\                ;
                                     00 0003F          .BYTE   0                   ;
                                     03 00040          .BYTE   3                   ;
                         4C  53  50 00041          .ASCII  \PSL\               ;
 00  00  27  44  41  21  27  05 00044 P.AAB:   .ASCII  <5>\'!AD'\<0><0>     ;
                 20  20  3A  03 0004C P.AAC:   .ASCII  <3>\:  \             ;
                 00  2F  21  02 00050 P.AAD:   .ASCII  <2>\!/\<0>           ;
 00  00  09  3A  64  6C  6F  05 00054 P.AAE:   .ASCII  <5>\old:\<9><0><0>   ;
 00  00  09  3A  77  65  6E  05 0005C P.AAF:   .ASCII  <5>\new:\<9><0><0>   ;

                                       ISE$C_SIZE==        20
                                       TXT$C_SIZE==        4
                                       PAL$C_SIZE==        16
                                       ASD$C_SIZE==        9
                                       FWR$C_SIZE==        24
                                       REGISTER_TABLE=     P.AAA
                                       CS_ASCII=           P.AAB
                                       COLON_TAB_STG=      P.AAC
                                       CAR_CTL_STG=        P.AAD
                                       OLD_TAB_STG=        P.AAE
                                       NEW_TAB_STG=        P.AAF
                                               .EXTRN  PAT$FAO_OUT, PAT$GB_SYMBOLS
                                               .EXTRN  PAT$GL_OLD_ASD, PAT$GL_NEW_ASD
                                               .EXTRN  PAT$GL_TEMP_BUF
                                               .EXTRN  PAT$GL_RLOC_BUF
                                               .EXTRN  PAT$GB_SUBST_IN
                                               .EXTRN  PAT$GL_BR_DISPL
                                               .EXTRN  PAT$GL_PATAREA, PAT$GL_IMGHDR
                                               .EXTRN  PAT$GB_LOC_TYPE
                                               .EXTRN  PAT$GB_MOD_PTR, PAT$GL_IHPPTR
                                               .EXTRN  PAT$CP_OUT_STR, PAT$GL_CONTEXT
                                               .EXTRN  PAT$GL_BUF_SIZ, PAT$GL_HEAD_LST
                                               .EXTRN  PAT$GL_LAST_LOC
                                               .EXTRN  PAT$GL_LAST_VAL
                                               .EXTRN  PAT$GL_NEXT_LOC
```

```
                        .EXTRN  PAT$GL_SYMTBPTR
                        .EXTRN  PAT$GL_OLDLABLS
                        .EXTRN  PAT$GL_NEWLABLS
                        .EXTRN  PAT$GL_RLCLABLS
                        .EXTRN  PAT$ADD_LABELS, PAT$ADD_NT_T_PV
                        .EXTRN  PAT$EXP_AREA, PAT$FAO_PUT
                        .EXTRN  PAT$FREERELEASE
                        .EXTRN  PAT$FREEZ, PAT$GET_NXT_LVT
                        .EXTRN  PAT$GET_VALUE, PAT$INS_DECODE
                        .EXTRN  PAT$INS_ENCODE, PAT$MAP_ADDR
                        .EXTRN  PAT$OUT_NUM_VAL
                        .EXTRN  PAT$OUT_PUT, PAT$OUT_SYM_VAL
                        .EXTRN  PAT$PRINT_PATH, PAT$RESOLVE_INS
                        .EXTRN  PAT$SYMBOL_VALU
                        .EXTRN  PAT$UNMAP_ADDR, PAT$VAL_TO_SYM
                        .EXTRN  PAT$WRITE_MEM
                        .WEAK   ACCESS_CHECK

                        .PSECT  _PAT$CODE,NOWRT,2

                  0FFC 00000    .ENTRY  PAT$DEPOSIT_CMD, Save R2,R3,R4,R5,R6,R7,R8,-; 2908
                                        R9,R10,R11                                  ;
5B 00000000G   00   9E 00002    MOVAB   LIB$SIGNAL, R11                             ;
5A 00000000G   EF   9E 00009    MOVAB   PAT$GL_NEXT_LOC, R10                        ;
59 00000000G   EF   9E 00010    MOVAB   PAT$GL_PATAREA, R9                          ;
58 00000000G   EF   9E 00017    MOVAB   PAT$GL_TEMP_BUF, R8                         ;
5E      FF2C   CE   9E 0001E    MOVAB   -212(SP), SP                                ;
52 00000000G   EF   D0 00023    MOVL    PAT$GL_HEAD_LST, POINTER                    ; 2990
                04   13 0002A    BEQL    1$                                          ; 2991
                62   D5 0002C    TSTL    (POINTER)                                   ;
                09   12 0002E    BNEQ    2$                                          ;
                    006D80DA 8F   DD 00030 1$:     PUSHL   #7176410                ; 2993
                6B       01   FB 00036           CALLS   #1, LIB$SIGNAL              ;
                56       04   A2 D0 00039 2$:     MOVL    4(POINTER), UNMAPPED_LOC    ; 3000
    00000000G   EF           01   88 0003D       BISB2   #1, PAT$GL_CONTEXT+1        ; 3001
3B  00000000G   EF           03   E1 00044       BBC     #3, PAT$GL_CONTEXT+2, 4$    ; 3011
                      00     B9   B5 0004C       TSTW    @PAT$GL_PATAREA             ; 3014
                             1A   12 0004F       BNEQ    3$                          ;
                51           69   D0 00051       MOVL    PAT$GL_PATAREA, R1          ; 3016
                50 00000000G EF   D0 00054       MOVL    PAT$GL_IHPPTR, R0           ;
          14    A0       04   A1   D1 0005B       CMPL    4(R1), 20(R0)               ;
                             09   12 00060       BNEQ    3$                          ;
                             01   DD 00062       PUSHL   #1                          ; 3018
    00000000G   EF           01   FB 00064       CALLS   #1, PAT$EXP_AREA            ;
                50           69   D0 0006B 3$:    MOVL    PAT$GL_PATAREA, R0          ; 3019
                56       04   A0   D1 0006E       CMPL    4(R0), UNMAPPED_LOC         ;
                             13   13 00072       BEQL    4$                          ;
                             56   DD 00074       PUSHL   UNMAPPED_LOC                ; 3021
                50           69   D0 00076       MOVL    PAT$GL_PATAREA, R0          ;
                      04     A0   DD 00079       PUSHL   4(R0)                       ;
                             02   DD 0007C       PUSHL   #2                          ;
                    006D8122 8F   DD 0007E       PUSHL   #7176482                    ;
                6B           04   FB 00084       CALLS   #4, LIB$SIGNAL              ;
                50 00000000G EF   D0 00087 4$:    MOVL    PAT$GB_MOD_PTR, R0          ; 3027
                10       03   A0   E9 0008E       BLBC    3(R0), 5$                   ;
    00000000G   EF 00000000G EF   D0 00092       MOVL    PAT$GL_NEWLABLS, PAT$GL_SYMTBPTR ; 3030
                57           01   90 0009D       MOVB    #1, FICL_CHAR               ; 3031
```

```
                                     02  11 000A0       BRB     6$                                        ; 3027
                                     57  94 000A2 5$:   CLRB    FILL_CHAR                                 ; 3034
                       52            62  D0 000A4 6$:   MOVL    (POINTER), POINTER                        ; 3041
                       50 00000000G  EF  D0 000A7       MOVL    PAT$GB_MOD_PTR, R0                        ; 3047
                       46        03  A0  E9 000AE       BLBC    3(R0), 10$                                ;
                                     58  DD 000B2       PUSHL   R8                                        ; 3057
             09 00000000G  EF        06  E1 000B4       BBC     #6, PAT$GL_CONTEXT+2, 7$                  ; 3059
                       50 00000000G  EF  9E 000BC       MOVAB   PAT$GL_OLD_ASD, R0                        ;
                                     07  11 000C3       BRB     8$                                        ;
                       50 00000000G  EF  9E 000C5 7$:   MOVAB   PAT$GL_NEW_ASD, R0                        ;
                                     50  DD 000CC 8$:   PUSHL   R0                                        ;
                                     56  DD 000CE       PUSHL   UNMAPPED_LOC                              ; 3058
                                 B0  AD  9F 000D0       PUSHAB  INSTRUC_BUF                               ; 3057
                                 04  A2  DD 000D3       PUSHL   4(POINTER)                                ;
                00000000G  EF        05  FB 000D6       CALLS   #5, PAT$INS_ENCODE                        ;
                           0E        50  E8 000DD       BLBS    R0, 9$                                    ;
                                 04  A2  DD 000E0       PUSHL   4(POINTER)                                ; 3064
                                     01  DD 000E3       PUSHL   #1                                        ;
                          006D810A   8F  DD 000E5       PUSHL   #7176458                                  ;
                       6B            03  FB 000EB       CALLS   #3, LIB$SIGNAL                            ;
                       54        B1  AD  9E 000EE 9$:   MOVAB   INSTRUC_BUF+1, DEP_SRC_ADR                ; 3065
                       53        B0  AD  9A 000F2       MOVZBL  INSTRUC_BUF, DEP_SIZ                      ; 3066
                                     39  11 000F6       BRB     13$                                       ; 3047
                       54        04  A2  9E 000F8 10$:  MOVAB   4(R2), DEP_SRC_ADR                        ; 3074
                       50 00000000G  EF  D0 000FC       MOVL    PAT$GB_MOD_PTR, R0                        ; 3075
                       53        01  A0  9A 00103       MOVZBL  1(R0), DEP_SIZ                            ;
                                 04  A2  D5 00107       TSTL    4(POINTER)                                ; 3076
                                     0C  18 0010A       BGEQ    11$                                       ;
             50                  53  03  78 0010C       ASHL    #3, DEP_SIZ, R0                           ; 3079
 51      04  A2                  50  00  EE 00110       EXTV    #0, R0, 4(POINTER), R1                    ;
                                     0A  11 00116       BRB     12$                                       ;
             50                  53  03  78 00118 11$:  ASHL    #3, DEP_SIZ, R0                           ; 3084
 51      04  A2                  50  00  EF 0011C       EXTZV   #0, R0, 4(POINTER), R1                    ;
                    04  A2           51  D1 00122 12$:  CMPL    R1, 4(POINTER)                            ;
                                     09  13 00126       BEQL    13$                                       ;
                          006D8023   8F  DD 00128       PUSHL   #7176227                                  ; 3086
                       6B            01  FB 0012E       CALLS   #1, LIB$SIGNAL                            ;
                                     53  DD 00131 13$:  PUSHL   DEP_SIZ                                   ; 3093
                                     54  DD 00133       PUSHL   DEP_SRC_ADR                               ;
                                     58  DD 00135       PUSHL   R8                                        ;
                00000000V  EF        03  FB 00137       CALLS   #3, PAT$FILL_BUF                          ;
                00000000G  EF        56  D0 0013E       MOVL    UNMAPPED_LOC, PAT$GL_LAST_LOC             ; 3099
                           56        53  C0 00145       ADDL2   DEP_SIZ, UNMAPPED_LOC                     ; 3100
                       50 00000000G  EF  D0 00148       MOVL    PAT$GB_MOD_PTR, R0                        ; 3101
                       08        03  A0  E8 0014F       BLBS    3(R0), 14$                                ;
                00000000G  EF    04  A2  D0 00153       MOVL    4(POINTER), PAT$GL_LAST_VAL               ; 3103
                                     62  D5 0015B 14$:  TSTL    (POINTER)                                 ; 3109
                                     03  13 0015D       BEQL    15$                                       ;
                                   FF42  31 0015F       BRW     6$                                        ;
             48 00000000G  EF        03  E1 00162 15$:  BBC     #3, PAT$GL_CONTEXT+2, 17$                 ; 3122
                       68        00  B9  B1 0016A       CMPW    @PAT$GL_PATAREA, PAT$GL_TEMP_BUF          ; 3125
                                     42  1E 0016E       BGEQU   17$                                       ;
                       51            69  D0 00170       MOVL    PAT$GL_PATAREA, R1                        ; 3128
                       50 00000000G  EF  D0 00173       MOVL    PAT$GL_IHPPTR, R0                         ;
                    14  A0       04  A1  D1 0017A       CMPL    4(R1), 20(R0)                             ;
                                     19  12 0017F       BNEQ    16$                                       ;
                       50            68  3C 00181       MOVZWL  PAT$GL_TEMP_BUF, R0                       ; 3130
```

```
                              50       01FF   C0  9E 00184          MOVAB   511(R0), R0                                      ;
                  7E          50 00000200   8F  C7 00189          DIVL3   #512, R0, -(SP)                                  ; 3131
                     00000000G  EF          01  FB 00191          CALLS   #1, PAT$EXP_AREA                                 ;
                                            18  11 00198          BRB     17$                                              ; 3130
                              7E       00   B9  3C 0019A  16$:    MOVZWL  @PAT$GL_PATAREA, -(SP)                           ; 3135
                              50            69  D0 0019E          MOVL    PAT$GL_PATAREA, R0                               ; 3134
                                       04   A0  DD 001A1          PUSHL   4(R0)                                            ;
                              7E            68  3C 001A4          MOVZWL  PAT$GL_TEMP_BUF, -(SP)                           ; 3133
                                            02  DD 001A7          PUSHL   #2                                               ;
                                 006D80C2   8F  DD 001A9          PUSHL   #7176386                                         ;
                              6B            05  FB 001AF          CALLS   #5, LIB$SIGNAL                                   ;
                                            58  DD 001B2  17$:    PUSHL   R8                                               ; 3142
                     00000000G  EF          01  FB 001B4          CALLS   #1, PAT$RESOLVE_INS                              ;
                              50 00000000G  EF  D0 001BB          MOVL    PAT$GL_HEAD_LST, R0                              ; 3147
                              6A       04   A0  D0 001C2          MOVL    4(R0), PAT$GL_NEXT_LOC                           ;
                              56            6A  D1 001C6  18$:    CMPL    PAT$GL_NEXT_LOC, UNMAPPED_LOC                    ; 3148
                                            19  1E 001C9          BGEQU   19$                                              ;
                                            01  DD 001CB          PUSHL   #1                                               ; 3150
                                 00000000G  EF  9F 001CD          PUSHAB  PAT$GL_OLD_ASD                                   ;
                                 00000000'  EF  9F 001D3          PUSHAB  OLD_TAB_STG                                      ;
                                            6A  DD 001D9          PUSHL   PAT$GL_NEXT_LOC                                  ;
                     00000000V  EF          04  FB 001DB          CALLS   #4, PAT$OUT_MEM_LOC                              ;
                                            E2  11 001E2          BRB     18$                                              ;
                  4F 00000000G  EF          06  E1 001E4  19$:    BBC     #6, PAT$GL_CONTEXT+2, 24$                        ; 3158
                                            54  D4 001EC          CLRL    BYTE_COUNT                                       ; 3168
       54         68            10          00  ED 001EE  20$:    CMPZV   #0, #16, PAT$GL_TEMP_BUF, BYTE_COUNT             ; 3169
                                            3F  15 001F3          BLEQ    23$                                              ;
                              55            68  3C 001F5          MOVZWL  PAT$GL_TEMP_BUF, BUF_SIZE                        ; 3172
                              55            54  C2 001F8          SUBL2   BYTE_COUNT, BUF_SIZE                             ;
                     00000084   8F          55  D1 001FB          CMPL    BUF_SIZE, #132                                   ;
                                            04  15 00202          BLEQ    21$                                              ;
                              55       84   8F  9A 00204          MOVZBL  #132, BUF_SIZE                                   ; 3174
                                     4020   8F  BB 00208  21$:    PUSHR   #^M<R5,SP>                                       ; 3176
                              50 00000000G  EF  D0 0020C          MOVL    PAT$GL_HEAD_LST, R0                              ; 3175
                                  04 B044   9F     00213          PUSHAB  @4(R0)[BYTE_COUNT]                               ;
                     00000000G  EF          03  FB 00217          CALLS   #3, PAT$GET_VALUE                                ;
                  6E       04 B844          55  29 0021E          CMPC3   BUF_SIZE, @PAT$GL_TEMP_BUF+4[BYTE_COUNT], -      ; 3177
                                                                          OLD_CONTENTS                                     ;
                                            09  13 00224          BEQL    22$                                              ;
                                 006D8290   8F  DD 00226          PUSHL   #7176848                                         ; 3180
                              6B            01  FB 0022C          CALLS   #1, LIB$SIGNAL                                   ;
                              54            55  C0 0022F  22$:    ADDL2   BUF_SIZE, BYTE_COUNT                             ; 3181
                                            BA  11 00232          BRB     20$                                              ; 3169
       68         57          6E            00  2C 00234  23$:    MOVC5   #0, (SP), FILL_CHAR, PAT$GL_TEMP_BUF, -          ; 3184
                                       04   B8     00239                  @PAT$GL_TEMP_BUF+4                               ;
                              50 00000000G  EF  D0 0023B  24$:    MOVL    PAT$GL_HEAD_LST, R0                              ; 3190
                              6A       04   A0  D0 00242          MOVL    4(R0), PAT$GL_NEXT_LOC                           ;
                              7E            68  3C 00246          MOVZWL  PAT$GL_TEMP_BUF, -(SP)                           ; 3192
                                       04   A8  DD 00249          PUSHL   PAT$GL_TEMP_BUF+4                                ; 3191
                                            6A  DD 0024C          PUSHL   PAT$GL_NEXT_LOC                                  ;
                     00000000G  EF          03  FB 0024E          CALLS   #3, PAT$WRITE_MEM                                ;
                              56            6A  D1 00255  25$:    CMPL    PAT$GL_NEXT_LOC, UNMAPPED_LOC                    ; 3197
                                            19  1E 00258          BGEQU   26$                                              ;
                                            01  DD 0025A          PUSHL   #1                                               ; 3199
                                 00000000G  EF  9F 0025C          PUSHAB  PAT$GL_NEW_ASD                                   ;
                                 00000000'  EF  9F 00262          PUSHAB  NEW_TAB_STG                                      ;
                                            6A  DD 00268          PUSHL   PAT$GL_NEXT_LOC                                  ;
```

```
                    00000000V  EF              04  FB 0026A             CALLS   #4, PAT$OUT_MEM_LOC                          ;
                                                E2  11 00271             BRB     25$                                         ;
                 13 00000000G  EF              03  E1 00273 26$:        BBC     #3, PAT$GL_CONTEXT+2, 27$                   ; 3204
                               50              69  D0 0027B             MOVL    PAT$GL_PATAREA, R0                          ; 3207
                               51              69  D0 0027E             MOVL    PAT$GL_PATAREA, R1                          ;
                               52              68  3C 00281             MOVZWL  PAT$GL_TEMP_BUF, R2                         ; 3208
                            04 A0          04 B142  9E 00284             MOVAB   @4(R1)[R2], 4(R0)                           ;
                            00 B9                   68  A2 0028A         SUBW2   PAT$GL_TEMP_BUF, @PAT$GL_PATAREA            ; 3210
                                     00000000G  EF  9F 0028E 27$:         PUSHAB  PAT$GL_NEWLABLS                             ; 3215
                    00000000G  EF                   01  FB 00294         CALLS   #1, PAT$ADD_LABELS                          ;
                                                    04 0029B             RET                                                 ; 3219

; Routine Size:  668 bytes,    Routine Base:  _PAT$CODE + 0000

;  564          3220  1 SWITCHES OPTIMIZE;
```

```
;  566     3221  1 GLOBAL ROUTINE PAT$EXAMINE_CMD : NOVALUE =
;  567     3222  1
;  568     3223  1 !++
;  569     3224  1 ! FUNCTIONAL DESCRIPTION:
;  570     3225  1 !
;  571     3226  1 !       Examines a list of addresses.
;  572     3227  1 !
;  573     3228  1 ! CALLING SEQUENCE:
;  574     3229  1 !
;  575     3230  1 !       PAT$EXAMINE_CMD ()
;  576     3231  1 !
;  577     3232  1 ! INPUTS:
;  578     3233  1 !
;  579     3234  1 !       none
;  580     3235  1 !
;  581     3236  1 ! IMPLICIT INPUTS:
;  582     3237  1 !
;  583     3238  1 !       The address of the first element of a list of addresses.
;  584     3239  1 !       The last address examined, and the next logical address to examine.
;  585     3240  1 !
;  586     3241  1 ! OUTPUTS:
;  587     3242  1 !
;  588     3243  1 !       none
;  589     3244  1 !
;  590     3245  1 ! IMPLICIT OUTPUTS:
;  591     3246  1 !
;  592     3247  1 !       New values for last and next location, and last value
;  593     3248  1 !
;  594     3249  1 ! ROUTINE VALUE:
;  595     3250  1 !
;  596     3251  1 !       novalue
;  597     3252  1 !
;  598     3253  1 ! SIDE EFFECTS:
;  599     3254  1 !
;  600     3255  1 !       The values of various addresses are output.
;  601     3256  1 !       If an error occurs, the routine returns without further
;  602     3257  1 !       processing except to output an error message to the output
;  603     3258  1 !       device.
;  604     3259  1 !
;  605     3260  1 !--
;  606     3261  1
;  607     3262  2 BEGIN
;  608     3263  2
;  609     3264  2 LOCAL
;  610     3265  2         MAPPED_NEXT_LOC,                                        ! Mapped address of next location
;  611     3266  2         ISE_ADDR,                                               ! ISE address for mapped address
;  612     3267  2         POINTER;
;  613     3268  2
;  614     3269  2 POINTER = .PAT$GL_HEAD_LST;
;  615     3270  3 IF (.POINTER EQL 0)
;  616     3271  2 THEN
;  617     3272  2
;  618     3273  2         !++
;  619     3274  2         ! No location was specified. Examine the next location in sequence.
;  620     3275  2         !--
;  621     3276  2         PAT$OUT_MEM_LOC (.PAT$GL_NEXT_LOC, 0, PAT$GL_OLD_ASD, CASE_TABLE)
;  62c     3277  2 ELSE DO
```

```
;  623          3278  3          BEGIN
;  624          3279  3
;  625          3280  3          LOCAL
;  626          3281  3                  LAST_LOC;
;  627          3282  3
;  628          3283  3          !++
;  629          3284  3          ! Pick up the next value which we will try to
;  630          3285  3          ! display and copy it into LAST_LOC.
;  631          3286  3          !--
;  632          3287  3          LAST_LOC = .LIST_ELEM_EXP1 (.POINTER);
;  633          3288  3
;  634          3289  3          !++
;  635          3290  3          ! If the end range argument is null, then make it the same as the start
;  636          3291  3          ! range argument so that only one location will be displayed.
;  637          3292  3          !--
;  638          3293  3          IF .LIST_ELEM_EXP2 (.POINTER) EQL 0
;  639          3294  3          THEN LIST_ELEM_EXP2 (.POINTER) = .LIST_ELEM_EXP1 (.POINTER);
;  640          3295  3
;  641          3296  3          !++
;  642          3297  3          ! Check for range reversal.
;  643          3298  3          !--
;  644          3299  4          IF( .LIST_ELEM_EXP2(.POINTER) LSSA .LIST_ELEM_EXP1(.POINTER) )
;  645          3300  3          THEN
;  646          3301  4                  BEGIN
;  647          3302  4                  SIGNAL (PAT$_EXARANGE);
;  648          3303  4                  RETURN;
;  649          3304  3                  END;
;  650          3305  3          WHILE (.LAST_LOC LEQ .LIST_ELEM_EXP2 (.POINTER)) DO
;  651          3306  4                  BEGIN
;  652          3307  4                  IF NOT PAT$OUT_MEM_LOC (.LAST_LOC, 0, PAT$GL_OLD_ASD, CASE_TABLE)
;  653          3308  4                  THEN RETURN;
;  654          3309  4                  LAST_LOC = .PAT$GL_NEXT_LOC;
;  655          3310  3                  END;
;  656          3311  3              END
;  657          3312  2 UNTIL (POINTER = .LIST_ELEM_FLINK (.POINTER)) EQL 0;
;  658          3313  2
;  659          3314  1 END;


                                        007C 00000          .ENTRY  PAT$EXAMINE_CMD, Save R2,R3,R4,R5,R6          ; 3221
                            56 00000000V EF   9E 00002      MOVAB   PAT$OUT_MEM_LOC, R6                           ;
                            55 00000000G EF   9E 00009      MOVAB   PAT$GL_NEXT_LOC, R5                           ;
                            54 00000000G EF   9E 00010      MOVAB   PAT$GL_OLD_ASD, R4                            ;
                            52 00000000G EF   D0 00017      MOVL    PAT$GL_HEAD_LST, POINTER                      ; 3269
                                       0C   12 0001E        BNEQ    1$                                            ; 3270
                                       01   DD 00020        PUSHL   #1                                            ; 3276
                                       54   DD 00022        PUSHL   R4                                            ;
                                       7E   D4 00024        CLRL    -(SP)                                         ;
                                       65   DD 00026        PUSHL   PAT$GL_NEXT_LOC                               ;
                            66                 04   FB 00028        CALLS   #4, PAT$OUT_MEM_LOC                   ;
                                                    04 0002B        RET                                           ;
                            53          04     A2   D0 0002C 1$:    MOVL    4(POINTER), LAST_LOC                  ; 3287
                                        08     A2   D5 00030        TSTL    8(POINTER)                            ; 3293
                                               05   12 00033        BNEQ    2$                                    ;
```

```
                08   A2        04   A2  D0 00035          MOVL    4(POINTER), 8(POINTER)                  ; 3294
                04   A2        08   A2  D1 0003A 2$:      CMPL    8(POINTER), 4(POINTER)                  ; 3299
                                    0E  1E 0003F          BGEQU   3$                                      ;
                          006D80AA  8F  DD 00041          PUSHL   #7176362                                ; 3302
00000000G       00                  01  FB 00047          CALLS   #1, LIB$SIGNAL                          ;
                                    04  0004E          RET                                             ; 3301
                08   A2             53  D1 0004F 3$:      CMPL    LAST_LOC, 8(POINTER)                    ; 3305
                                    13  14 00053          BGTR    4$                                      ;
                                    01  DD 00055          PUSHL   #1                                      ; 3307
                                    54  DD 00057          PUSHL   R4                                      ;
                                    7E  D4 00059          CLRL    -(SP)                                   ;
                                    53  DD 0005B          PUSHL   LAST_LOC                                ;
                         66         04  FB 0005D          CALLS   #4, PAT$OUT_MEM_LOC                     ;
                         0A         50  E9 00060          BLBC    R0, 5$                                  ;
                         53         65  D0 00063          MOVL    PAT$GL_NEXT_LOC, LAST_LOC               ; 3309
                                    E7  11 00066          BRB     3$                                      ; 3305
                         52         62  D0 00068 4$:      MOVL    (POINTER), POINTER                      ; 3312
                                    BF  12 0006B          BNEQ    1$                                      ;
                                        04 0006D 5$:      RET                                             ; 3314

; Routine Size:  110 bytes,    Routine Base:  _PAT$CODE + 029C
```

```
;  661     3315  1 GLOBAL ROUTINE PAT$REPLACE_CMD : NOVALUE =
;  662     3316  1
;  663     3317  1 !++
;  664     3318  1 ! FUNCTIONAL DESCRIPTION:
;  665     3319  1 !
;  666     3320  1 !       This routine handles all REPLACE, INSERT and VERIFY commands, those for
;  667     3321  1 !       instructions and those for values.  The instruction/value specified in
;  668     3322  1 !       the command must be identical to those actually contained in the
;  669     3323  1 !       location, otherwise an error message is produced and the command
;  670     3324  1 !       ends prematurely.
;  671     3325  1 !
;  672     3326  1 !       The command argument list is made up of entries that are
;  673     3327  1 !       each three longwords long. The first is a forward link to the
;  674     3328  1 !       next entry. The second longword in the first entry in the list
;  675     3329  1 !       is the address into which some value(s) is (are) to be replaced.
;  676     3330  1 !       The third longword is unused. The second longword in successive
;  677     3331  1 !       arguments is the old values/instructions and thier replacemeents.
;  678     3332  1 !       The first value should be the contents of the specified location;
;  679     3333  1 !       the second, the contents of that location plus the current mode_length,
;  680     3334  1 !       etc.  The last old value has an EXIT_TOKEN in the third longword
;  681     3335  1 !       (all others have zero).
;  682     3336  1 !
;  683     3337  1 !       For instruction replacement, the second longword contains
;  684     3338  1 !       the address of a counted ascii stream that is to be translated
;  685     3339  1 !       into a binary instruction.
;  686     3340  1 !
;  687     3341  1 !       The VERIFY command is identical to the replace command save
;  688     3342  1 !       that it has no replacement values.  The INSERT command has only one
;  689     3343  1 !       old instruction and causes it to be moved to the patch area instead
;  690     3344  1 !       of replaced.
;  691     3345  1 !
;  692     3346  1 !       There are three label tables used to differentiate between old labels,
;  693     3347  1 !       new un-relocated labels, and new relocated labels.  The table(s) used
;  694     3348  1 !       to resolve symbols inside symbolic instructions depends updon which
;  695     3349  1 !       instruction is being encoded (old or new) and whether or not they are
;  696     3350  1 !       being relocated to patch area.  Three tables are necessary to handle
;  697     3351  1 !       relocation correctly, i.e., old labels can be used for all instructions
;  698     3352  1 !       but new labels cannot be used for relocated instructions.  No labels
;  699     3353  1 !       can be added to the user-defined symbol table until the PATCH command
;  700     3354  1 !       is successfully executed.
;  701     3355  1 !
;  702     3356  1 ! CALLING SEQUENCE:
;  703     3357  1 !
;  704     3358  1 !       PAT$REPLACE_CMD ()
;  705     3359  1 !
;  706     3360  1 ! INPUTS:
;  707     3361  1 !
;  708     3362  1 !       none
;  709     3363  1 !
;  710     3364  1 ! IMPLICIT INPUTS:
;  711     3365  1 !
;  712     3366  1 !       PAT$GL_HEAD_LST, the head of the linked PATCH command argument list.
;  713     3367  1 !       the current mode, and the current patch area descriptor.
;  714     3368  1 !
;  715     3369  1 ! OUTPUTS:
;  716     3370  1 !
;  717     3371  1 !       none
```

```
;  718          3372  1 !
;  719          3373  1 ! IMPLICIT OUTPUTS:
;  720          3374  1 !
;  721          3375  1 !       none
;  722          3376  1 !
;  723          3377  1 ! ROUTINE VALUE:
;  724          3378  1 !
;  725          3379  1 !       novalue
;  726          3380  1 !
;  727          3381  1 ! SIDE EFFECTS:
;  728          3382  1 !
;  729          3383  1 !       If a failure in a write or contents verification occurs,
;  730          3384  1 !       the routine returns immediately.  If the command is executed
;  731          3385  1 !       successfully, then the specified addresses have new values and any
;  732          3386  1 !       labels in the command are added to the user-defined symbol table.
;  733          3387  1 !
;  734          3388  1 !--
;  735          3389  1
;  736          3390  2 BEGIN
;  737          3391  2
;  738          3392  2 LITERAL
;  739          3393  2         NOP_INSTR = 1,                                  ! Fill character for instructions
;  740          3394  2         ZERO_BYTE = 0,                                  ! Fill characters for data
;  741          3395  2         MAX_INST_LEN    = 80;                           ! Maximum number of binary bytes in an instr
;  742          3396  2
;  743          3397  2 LOCAL
;  744          3398  2         BYTE_COUNT,                                     ! Count of bytesverified
;  745          3399  2         BUF_SIZE,                                       ! Size of OLD_CONTENTS to compare
;  746          3400  2         INSTRUC_BUF: VECTOR [MAX_INST_LEN, BYTE],
;  747          3401  2         OLD_CONTENTS : VECTOR[TTY_OUT_WIDTH,BYTE],      ! Buffer to hold actual contents of location
;  748          3402  2         UNMAPPED_LOC,                                   ! Unmapped address of DEPOSIT destination
;  749          3403  2         OLD_VALUE_PTR : REF VECTOR[,BYTE],              ! Pointer of actual contents of location
;  750          3404  2         VAL_SIZ,                                        ! Size of current value/instruction
;  751          3405  2         HOLE_SIZ,                                       ! Cumulative size to replace
;  752          3406  2         NEXT_LOC,                                       ! Pointer to next consecutive location
;  753          3407  2         FILL_CHAR : BYTE,                               ! Fill character for data/instructions
;  754          3408  2         POINTER,
;  755          3409  2         OLD_INS_SIZ,                                    ! Number of bytes of old instruction moved f
;  756          3410  2         NEW_INS_PTR;                                    ! Pointer to first new instruction argument
;  757          3411  2
;  758          3412  2 !++
;  759          3413  2 ! Check for required parameter.
;  760          3414  2 !--
;  761          3415  2 POINTER = .PAT$GL_HEAD_LST;
;  762          3416  3 IF  (.POINTER EQLA 0) OR (.LIST_ELEM_FLINK (.POINTER) EQLA 0)
;  763          3417  2 THEN
;  764          3418  2         SIGNAL(PAT$_INVCMD);
;  765          3419  2
;  766          3420  2 !++
;  767          3421  2 ! Set the examine bit for PAT$OUT_MEM_LOC.
;  768          3422  2 !
;  769          3423  2 PAT$GL_CONTEXT [EXAMINE_BIT] = TRUE;
;  770          3424  2 UNMAPPED_LOC = .LIST_ELEM_EXP1 (.POINTER),
;  771          3425  2 NEXT_LOC = .LIST_ELEM_EXPT (.POINTER);
;  772          3426  2 HOLE_SIZ = 0;
;  773          3427  2 PAT$GL_SYMTBPTR = .PAT$GL_OLDLABLS;                     ! Use old contents label list
;  774          3428  2
```

```
;  775          3429  2 !++
;  776          3430  2 ! Now loop, validating the old contents are the expected values.
;  777          3431  2 ! The last old value argument contains an EXIT_TOKEN in position LIST_ELEM_EXP2.
;  778          3432  2 !--
;  779          3433  2 REPEAT
;  780          3434  3         BEGIN
;  781          3435  3         POINTER = .LIST_ELEM_FLINK (.POINTER);
;  782          3436  3
;  783          3437  3         !++
;  784          3438  3         ! Now compute the binary instruction stream that should be in
;  785          3439  3         ! the location.
;  786          3440  3         !--
;  787          3441  3         IF .PAT$GB_MOD_PTR [MODE_INSTRUC]
;  788          3442  3         THEN
;  789          3443  4                 BEGIN
;  790          3444  4                 !++
;  791          3445  4                 ! This is a symbolic instruction.  It is currently
;  792          3446  4                 ! in the form of a counted ASCII string that must be translated
;  793          3447  4                 ! into binary form. The call to PAT$INS_ENCODE needs the address
;  794          3448  4                 ! into which the instruction is being deposited in order to
;  795          3449  4                 ! resolve branches correctly.
;  796          3450  4                 !--
;  797          3451  4                 IF NOT PAT$INS_ENCODE (.LIST_ELEM_EXP1 (.POINTER),
;  798          3452  4                         INSTRUC_BUF, .NEXT_LOC, PAT$GL_OLD_ASD, PAT$GL_TEMP_BUF)
;  799          3453  4                 THEN
;  800          3454  4                         SIGNAL (PAT$_NOENCODE, 1, .LIST_ELEM_EXP1(.POINTER)); ! This instruction is not vali
;  801          3455  4                 OLD_VALUE_PTR = INSTRUC_BUF [1];
;  802          3456  4                 VAL_SIZ = .INSTRUC_BUF [0];
;  803          3457  4                 END
;  804          3458  3         ELSE
;  805          3459  4                 BEGIN
;  806          3460  4                 !++
;  807          3461  4                 ! Value is not an instruction.  Therefore it is on the parse
;  808          3462  4                 ! stack.  The current mode for length tells the number of bytes
;  809          3463  4                 ! of the value.  Set pointer to data and size indicator.  Then
;  810          3464  4                 ! check for a truncation error.
;  811          3465  4                 !--
;  812          3466  4                 OLD_VALUE_PTR = LIST_ELEM_EXP1 (.POINTER);
;  813          3467  4                 VAL_SIZ = .PAT$GB_MOD_PTR[MODE_LENGTH];
;  814          3468  4                 IF .LIST_ELEM_EXPT(.POINTER) LSS 0
;  815          3469  4                 THEN
;  816          3470  5                         BEGIN
;  817          3471  5                         IF .(LIST_ELEM_EXP1(.POINTER))<0, .VAL_SIZ*8, 1> NEQ .LIST_ELEM_EXP1(.POINTER)
;  818          3472  5                         THEN
;  819          3473  5                                 SIGNAL(PAT$_NUMTRUNC);
;  820          3474  5                         END
;  821          3475  4                 ELSE
;  822          3476  4                         IF .(LIST_ELEM_EXP1(.POINTER))<0, .VAL_SIZ*8, 0> NEQ .LIST_ELEM_EXP1(.POINTER)
;  823          3477  4                         THEN
;  824          3478  4                                 SIGNAL(PAT$_NUMTRUNC);
;  825          3479  3                 END;
;  826          3480  3
;  827          3481  3         PAT$FILL_BUF(PAT$GL_TEMP_BUF, .OLD_VALUE_PTR, .VAL_SIZ);
;  828          3482  3         HOLE_SIZ = .HOLE_SIZ + .VAL_SIZ;                        ! Add current size to cumulative
;  829          3483  3                                                                 ! Output old contents
;  830          3484  3         PAT$OUT_MEM_LOC(.NEXT_LOC, OLD_TAB_STG, PAT$GL_OLD_ASD, NO_CASE_TABLE);
;  831          3485  3         NEXT_LOC = .PAT$GL_NEXT_LOC;                            ! Point to next location
```

```
;  832     3486  3
;  833     3487  3          !++
;  834     3488  3          ! Check if this is the last old argument.
;  835     3489  3          !--
;  836     3490  3          IF .LIST_ELEM_EXP2(.POINTER) EQL EXIT_TOKEN
;  837     3491  3          THEN
;  838     3492  3                  EXITLOOP;
;  839     3493  2          END;
;  840     3494  2
;  841     3495  2  !++
;  842     3496  2  ! Resolve any forward references in symbolic instruction operands.
;  843     3497  2  !--
;  844     3498  2  PAT$RESOLVE_INS(PAT$GL_TEMP_BUF);
;  845     3499  2
;  846     3500  2  !++
;  847     3501  2  ! Now get the actual values in the locations and
;  848     3502  2  ! check that they equal the specified values.
;  849     3503  2  !--
;  850     3504  2  BYTE_COUNT = 0;
;  851     3505  3  WHILE (.BYTE_COUNT LSS .HOLE_SIZ)
;  852     3506  2  DO
;  853     3507  3          BEGIN
;  854     3508  4          IF ((BUF_SIZE = .HOLE_SIZ - .BYTE_COUNT) GTR TTY_OUT_WIDTH)
;  855     3509  3          THEN
;  856     3510  3                  BUF_SIZE = TTY_OUT_WIDTH;
;  857     3511  3          PAT$GET_VALUE(.LIST_ELEM_EXP1(.PAT$GL_HEAD_LST)+.BYTE_COUNT,
;  858     3512  3                          .BUF_SIZE, OLD_CONTENTS);
;  859     3513  3          IF CH$NEQ(.BUF_SIZE, .PAT$GL_TEMP_BUF[DSC$A_POINTER]+.BYTE_COUNT,
;  860     3514  3                          .BUF_SIZE, OLD_CONTENTS)
;  861     3515  3          THEN
;  862     3516  3                  SIGNAL(PAT$_DIFVAL+MSG$K_WARN);
;  863     3517  3          BYTE_COUNT = .BYTE_COUNT + .BUF_SIZE;
;  864     3518  2          END;
;  865     3519  2
;  866     3520  2  !++
;  867     3521  2  ! Release the storage holding the old instructions.
;  868     3522  2  !--
;  869     3523  2  PAT$FREERELEASE(.PAT$GL_TEMP_BUF[DSC$A_POINTER], (.PAT$GL_TEMP_BUF[DSC$W_LENGTH]+3)/4);
;  870     3524  2  PAT$GL_TEMP_BUF[DSC$W_LENGTH] = 0;
;  871     3525  2  PAT$GL_TEMP_BUF[DSC$A_POINTER] = 0;
;  872     3526  2  !++
;  873     3527  2  ! If this was a VERIFY command, we are all done.  Return for next command.
;  874     3528  2  !--
;  875     3529  2  IF .PAT$GL_CONTEXT[VERIFY_BIT]
;  876     3530  2  THEN
;  877     3531  2          RETURN;
;  878     3532  2
;  879     3533  2  !++
;  880     3534  2  ! Check if old instruction should be moved to patch area, i.e., is this an
;  881     3535  2  ! INSERT command.  Remember the number of bytes of old instructions moved
;  882     3536  2  ! in case there are forward referenced symbols to relocate in the new
;  883     3537  2  ! instructions.
;  884     3538  2  !--
;  885     3539  2  IF .PAT$GL_CONTEXT [INSERT_BIT]
;  886     3540  2  THEN
;  887     3541  3          BEGIN
;  888     3542  3          PAT$FILL_BUF(PAT$GL_TEMP_BUF, INSTRUC_BUF[1], .INSTRUC_BUF[0]);
```

```
;  889          3543  3          OLD_INS_SIZ = .PAT$GL_TEMP_BUF[DSC$W_LENGTH];           ! Remember # of bytes of old instructions mo
;  890          3544  3          END
;  891          3545  2 ELSE
;  892          3546  3          BEGIN
;  893          3547  3          OLD_INS_SIZ = 0;                                        ! No old instructions moved
;  894          3548  3          NEXT_LOC = .UNMAPPED_LOC;                               ! Set next deposit location for REPLACE comm
;  895          3549  2          END;
;  896          3550  2
;  897          3551  2 !++
;  898          3552  2 ! Now fit the replacement value/instruction into the location.
;  899          3553  2 !--
;  900          3554  2 IF (NEW_INS_PTR = .LIST_ELEM_FLINK(.POINTER)) EQLA 0           ! If no replacement argument
;  901          3555  2 THEN                                                           ! then report error
;  902          3556  2          SIGNAL(PAT$_INVCMD);
;  903          3557  2 PAT$GL_SYMTBPTR = .PAT$GL_NEWLABLS;                           ! Use the new contents label table
;  904          3558  2
;  905          3559  2 !++
;  906          3560  2 ! Now build a buffer containing the new values to be deposited.  The deposits
;  907          3561  2 ! are not done directly to memory in case part of the command is invalid.
;  908          3562  2 !--
;  909          3563  2 WHILE (POINTER = .LIST_ELEM_FLINK(.POINTER)) NEQA 0           ! Point to next argument
;  910          3564  2 DO
;  911          3565  3          BEGIN
;  912          3566  3          IF .PAT$GB_MOD_PTR [MODE_INSTRUC]                       ! Test for instruction or data replacement
;  913          3567  3          THEN
;  914          3568  4                  BEGIN
;  915          3569  4                  !++
;  916          3570  4                  ! Now encode the replacement instruction.
;  917          3571  4                  !--
;  918          3572  4                  FILL_CHAR = NOP_INSTR;                          ! Set the fill character
;  919          3573  4                  IF NOT PAT$INS_ENCODE(.LIST_ELEM_EXP1(.POINTER), INSTRUC_BUF,
;  920          3574  4                                  .NEXT_LOC, PAT$GL_NEW_ASD, PAT$GL_TEMP_BUF)
;  921          3575  4                  THEN
;  922          3576  4                          SIGNAL(PAT$_NOENCODE, 1, .LIST_ELEM_EXP1(.POINTER));
;  923          3577  4                  PAT$FILL_BUF(PAT$GL_TEMP_BUF, INSTRUC_BUF[1], .INSTRUC_BUF[0]); ! Insert instruction into te
;  924          3578  4                  NEXT_LOC = .NEXT_LOC + .INSTRUC_BUF[0];
;  925          3579  4                  END
;  926          3580  3          ELSE
;  927          3581  3                  !++
;  928          3582  3                  ! The replacement is for a value.  Therefore it is on the parse
;  929          3583  3                  ! stack.  Check for a truncation error.  Then set the fill
;  930          3584  3                  ! character and write the value to the temporary buffer.
;  931          3585  3                  !--
;  932          3586  4                  BEGIN
;  933          3587  4                  IF .LIST_ELEM_EXP1(.POINTER) LSS 0
;  934          3588  4                  THEN
;  935          3589  5                          BEGIN
;  936          3590  5                          IF .(LIST_ELEM_EXP1(.POINTER))<0, .VAL_SIZ*8, 1> NEQ .LIST_ELEM_EXP1(.POINTER)
;  937          3591  5                          THEN
;  938          3592  5                                  SIGNAL(PAT$_NUMTRUNC);
;  939          3593  5                          END
;  940          3594  4                  ELSE
;  941          3595  4                          IF .(LIST_ELEM_EXP1(.POINTER))<0, .VAL_SIZ*8, 0> NEQ .LIST_ELEM_EXP1(.POINTER)
;  942          3596  4                          THEN
;  943          3597  4                                  SIGNAL(PAT$_NUMTRUNC);
;  944          3598  4                  FILL_CHAR = ZERO_BYTE;                          ! Set the fill character
;  945          3599  4                  PAT$FILL_BUF(PAT$GL_TEMP_BUF, LIST_ELEM_EXP1(.POINTER), .VAL_SIZ);
```

```
;  946     3600  4                 NEXT_LOC = .NEXT_LOC + .VAL_SIZ;
;  947     3601  3                 END;
;  948     3602  2         END;
;  949     3603  2 !++
;  950     3604  2 ! Resolve the forward references in symbolic instruction operands.
;  951     3605  2 !--
;  952     3606  2 PAT$RESOLVE_INS(PAT$GL_TEMP_BUF);
;  953     3607  2
;  954     3608  2 !++
;  955     3609  2 ! Now check the replacement size against old instruction size.
;  956     3610  2 !--
;  957     3611  2 IF .PAT$GL_TEMP_BUF[DSC$W_LENGTH] LSS .HOLE_SIZ                ! Make temporary buffer at least as large as
;  958     3612  2 THEN
;  959     3613  3         BEGIN
;  960     3614  3         LOCAL
;  961     3615  3                 TEMP_PTR;                                     ! Temporary pointer to temporary buffer
;  962     3616  3
;  963     3617  3         TEMP_PTR = PAT$FREEZ((.HOLE_SIZ + A_LONGWORD - 1)/A_LONGWORD);
;  964     3618  3         CH$COPY(.PAT$GL_TEMP_BUF[DSC$W_LENGTH], .PAT$GL_TEMP_BUF[DSC$A_POINTER],
;  965     3619  3                 .FILL_CHAR, .HOLE_SIZ, .TEMP_PTR);
;  966     3620  3         PAT$FREERELEASE(.PAT$GL_TEMP_BUF[DSC$A_POINTER], (.PAT$GL_TEMP_BUF[DSC$W_LENGTH] +3)/4);
;  967     3621  3         PAT$GL_TEMP_BUF[DSC$A_POINTER] = CH$PTR(.TEMP_PTR, 0);
;  968     3622  3         PAT$GL_TEMP_BUF[DSC$W_LENGTH] = .HOLE_SIZ;
;  969     3623  2         END;
;  970     3624  2
;  971     3625  2 !++
;  972     3626  2 ! Now write the temporary buffer over the mapped input image.
;  973     3627  2 !--
;  974     3628  2 IF .PAT$GL_TEMP_BUF[DSC$W_LENGTH] EQL .HOLE_SIZ
;  975     3629  2 THEN
;  976     3630  3         BEGIN
;  977     3631  3         !++
;  978     3632  3         ! Replacement data fits.  Write it to memory and output new contents.
;  979     3633  3         !--
;  980     3634  3         PAT$WRITE_MEM(.UNMAPPED_LOC, .PAT$GL_TEMP_BUF[DSC$A_POINTER], .PAT$GL_TEMP_BUF[DSC$W_LENGTH]);
;  981     3635  3         NEXT_LOC = .UNMAPPED_LOC + .HOLE_SIZ;
;  982     3636  3         PAT$GL_NEXT_LOC = .UNMAPPED_LOC;
;  983     3637  3         WHILE .PAT$GL_NEXT_LOC LSSA .NEXT_LOC                   ! Output new contents
;  984     3638  3         DO
;  985     3639  3                 PAT$OUT_MEM_LOC(.PAT$GL_NEXT_LOC, NEW_TAB_STG, PAT$GL_NEW_ASD, CASE_TABLE);
;  986     3640  3         END
;  987     3641  2 ELSE
;  988     3642  3         BEGIN
;  989     3643  3         !++
;  990     3644  3         ! The replacement instruction is too large.  It
;  991     3645  3         ! must be relocated to the patch area.
;  992     3646  3         !--
;  993     3647  3         IF .PAT$GB_MOD_PTR [MODE_INSTRUC]
;  994     3648  3         THEN
;  995     3649  3                 RELOCAT_INS(.UNMAPPED_LOC, .HOLE_SIZ, .OLD_INS_SIZ, .NEW_INS_PTR)
;  996     3650  3         ELSE
;  997     3651  3                 SIGNAL(PAT$_REPLACEERR);                      ! Internal error if patch area needed for da
;  998     3652  2         END;
;  999     3653  2 !++
; 1000     3654  2 ! Now add all the new labels to the user-defined symbol table.
; 1001     3655  2 !--
; 1002     3656  2 PAT$ADD_LABELS(PAT$GL_OLDLABLS);
```

```
; 1003        3657  2 PAT$ADD_LABELS(PAT$GL_NEWLABLS);
; 1004        3658  2 PAT$ADD_LABELS(PAT$GL_RLCLABLS);
; 1005        3659  2 RETURN;
; 1006        3660  1 END;                                           ! End of PAT$REPLACE_CMD


                                    0FFC 00000       .ENTRY  PAT$REPLACE_CMD, Save R2,R3,R4,R5,R6,R7,R8,-; 3315
                                                             R9,R10,R11                                  ;
                 5E       FF2C  CE   9E 00002        MOVAB   -212(SP), SP                                ;
                 57  00000000G  EF   D0 00007        MOVL    PAT$GL_HEAD_LST, POINTER                    ; 3415
                                04   13 0000E        BEQL    1$                                          ; 3416
                                67   D5 00010        TSTL    (POINTER)                                   ;
                                0D   12 00012        BNEQ    2$                                          ;
                      006D80DA  8F   DD 00014 1$:    PUSHL   #7176410                                    ; 3418
       00000000G  00            01   FB 0001A        CALLS   #1, LIB$SIGNAL                              ;
       00000000G  EF            01   88 00021 2$:    BISB2   #1, PAT$GL_CONTEXT+1                        ; 3423
                 5B         04  A7   D0 00028        MOVL    4(POINTER), UNMAPPED_LOC                    ; 3424
                 59         04  A7   D0 0002C        MOVL    4(POINTER), NEXT_LOC                        ; 3425
                                56   D4 00030        CLRL    HOLE_SIZ                                    ; 3426
       00000000G  EF  00000000G EF   D0 00032        MOVL    PAT$GL_OLDLABLS, PAT$GL_SYMTBPTR            ; 3427
                 57             67   D0 0003D 3$:    MOVL    (POINTER), POINTER                          ; 3435
                 52         04  A7   9E 00040        MOVAB   4(POINTER), R2                              ; 3451
                 50  00000000G  EF   D0 00044        MOVL    PAT$GB_MOD_PTR, R0                          ; 3441
                 38         03  A0   E9 0004B        BLBC    3(R0), 5$                                   ;
                     00000000G  EF   9F 0004F        PUSHAB  PAT$GL_TEMP_BUF                             ; 3451
                     00000000G  EF   9F 00055        PUSHAB  PAT$GL_OLD_ASD                              ;
                                59   DD 0005B        PUSHL   NEXT_LOC                                    ; 3452
                            B0  AD   9F 0005D        PUSHAB  INSTRUC_BUF                                 ; 3451
                                62   DD 00060        PUSHL   (R2)                                        ;
       00000000G  EF            05   FB 00062        CALLS   #5, PAT$INS_ENCODE                          ;
                  11            50   E8 00069        BLBS    R0, 4$                                      ;
                                62   DD 0006C        PUSHL   (R2)                                        ; 3454
                                01   DD 0006E        PUSHL   #1                                          ;
                      006D810A  8F   DD 00070        PUSHL   #7176458                                    ;
       00000000G  00            03   FB 00076        CALLS   #3, LIB$SIGNAL                              ;
                 53         B1  AD   9E 0007D 4$:    MOVAB   INSTRUC_BUF+1, OLD_VALUE_PTR                ; 3455
                 54         B0  AD   9A 00081        MOVZBL  INSTRUC_BUF, VAL_SIZ                        ; 3456
                                2D   11 00085        BRB     8$                                          ; 3441
                 53             52   D0 00087 5$:    MOVL    R2, OLD_VALUE_PTR                           ; 3466
                 54         01  A0   9A 0008A        MOVZBL  1(R0), VAL_SIZ                              ; 3467
            50   54             03   78 0008E        ASHL    #3, VAL_SIZ, R0                             ; 3471
                                62   D5 00092        TSTL    (R2)                                        ; 3468
                                07   18 00094        BGEQ    6$                                          ;
  51        62        50        00   EE 00096        EXTV    #0, R0, (R2), R1                            ; 3471
                                05   11 0009B        BRB     7$                                          ;
  51        62        50        00   EF 0009D 6$:    EXTZV   #0, R0, (R2), R1                            ; 3476
                      62        51   D1 000A2 7$:    CMPL    R1, (R2)                                    ;
                                0D   13 000A5        BEQL    8$                                          ;
                      006D8023  8F   DD 000A7        PUSHL   #7176227                                    ; 3478
       00000000G  00            01   FB 000AD        CALLS   #1, LIB$SIGNAL                              ;
                                18   BB 000B4 8$:    PUSHR   #^M<R3,R4>                                  ; 3481
                     00000000G  EF   9F 000B6        PUSHAB  PAT$GL_TEMP_BUF                             ;
       00000000V  EF            03   FB 000BC        CALLS   #3, PAT$FILL_BUF                            ;
                  56            54   C0 000C3        ADDL2   VAL_SIZ, HOLE_SIZ                           ; 3482
```

```
                         7E  D4 000C6          CLRL     -(SP)                                        ; 3484
            00000000G  EF  9F 000C8          PUSHAB   PAT$GL_OLD_ASD                               ;
            00000000'  EF  9F 000CE          PUSHAB   OLD_TAB_STG                                  ;
                         59  DD 000D4          PUSHL    NEXT_LOC                                     ;
    00000000V  EF        04  FB 000D6          CALLS    #4, PAT$OUT_MEM_LOC                          ;
         59 00000000G  EF  D0 000DD          MOVL     PAT$GL_NEXT_LOC, NEXT_LOC                    ; 3485
         0A          08  A7  D1 000E4          CMPL     8(POINTER), #10                              ; 3490
                         03  13 000E8          BEQL     9$                                           ;
                       FF50  31 000EA          BRW      3$                                           ;
            00000000G  EF  9F 000ED 9$:      PUSHAB   PAT$GL_TEMP_BUF                              ; 3498
    00000000G  EF        01  FB 000F3          CALLS    #1, PAT$RESOLVE_INS                          ;
                         55  D4 000FA          CLRL     BYTE_COUNT                                   ; 3504
               56        55  D1 000FC 10$:     CMPL     BYTE_COUNT, HOLE_SIZ                         ; 3505
                         44  18 000FF          BGEQ     13$                                          ;
 58            56        55  C3 00101          SUBL3    BYTE_COUNT, HOLE_SIZ, BUF_SIZE               ; 3508
    00000084   8F        58  D1 00105          CMPL     BUF_SIZE, #132                               ;
                         04  15 0010C          BLEQ     11$                                          ;
               58    84  8F  9A 0010E          MOVZBL   #132, BUF_SIZE                               ; 3510
                   4100  8F  BB 00112 11$:     PUSHR    #^M<R8,SP>                                   ; 3512
         50 00000000G  EF  D0 00116          MOVL     PAT$GL_HEAD_LST, R0                          ; 3511
                 04 B045  9F 0011D          PUSHAB   @4(R0)[BYTE_COUNT]                           ;
    00000000G  EF        03  FB 00121          CALLS    #3, PAT$GET_VALUE                            ;
 6E 00000000GFF45        58  29 00128          CMPC3    BUF_SIZE, @PAT$GL_TEMP_BUF+4[BYTE_COUNT], -  ; 3513
                                                        OLD_CONTENTS                                 ;
                         0D  13 00131          BEQL     12$                                          ;
            006D8290   8F  DD 00133          PUSHL    #7176848                                     ; 3516
    00000000G  00        01  FB 00139          CALLS    #1, LIB$SIGNAL                               ;
               55        58  C0 00140 12$:     ADDL2    BUF_SIZE, BYTE_COUNT                         ; 3517
                         B7  11 00143          BRB      10$                                          ; 3505
         50 00000000G  EF  3C 00145 13$:     MOVZWL   PAT$GL_TEMP_BUF, R0                          ; 3523
               50        03  C0 0014C          ADDL2    #3, R0                                       ;
 7E            50        04  C7 0014F          DIVL3    #4, R0, -(SP)                                ;
            00000000G  EF  DD 00153          PUSHL    PAT$GL_TEMP_BUF+4                            ;
    00000000G  EF        02  FB 00159          CALLS    #2, PAT$FREERELEASE                          ;
            00000000G  EF  B4 00160          CLRW     PAT$GL_TEMP_BUF                              ; 3524
            00000000G  EF  D4 00166          CLRL     PAT$GL_TEMP_BUF+4                            ; 3525
 01 00000000G  EF        05  E1 0016C          BBC      #5, PAT$GL_CONTEXT+2, 14$                    ; 3529
                             04 00174          RET                                                   ;
            00000000G  EF  95 00175 14$:     TSTB     PAT$GL_CONTEXT+2                             ; 3539
                         1D  18 0017B          BGEQ     15$                                          ;
               7E    B0  AD  9A 0017D          MOVZBL   INSTRUC_BUF, -(SP)                           ; 3542
                     B1  AD  9F 00181          PUSHAB   INSTRUC_BUF+1                                ;
            00000000G  EF  9F 00184          PUSHAB   PAT$GL_TEMP_BUF                              ;
    00000000V  EF        03  FB 0018A          CALLS    #3, PAT$FILL_BUF                             ;
         5A 00000000G  EF  3C 00191          MOVZWL   PAT$GL_TEMP_BUF, OLD_INS_SIZ                 ; 3543
                         05  11 00198          BRB      16$                                          ; 3539
                         5A  D4 0019A 15$:     CLRL     OLD_INS_SIZ                                  ; 3547
               59        5B  D0 0019C          MOVL     UNMAPPED_LOC, NEXT_LOC                       ; 3548
               58        67  D0 0019F 16$:     MOVL     (POINTER), NEW_INS_PTR                       ; 3554
                         0D  12 001A2          BNEQ     17$                                          ;
            006D80DA   8F  DD 001A4          PUSHL    #7176410                                     ; 3556
    00000000G  00        01  FB 001AA          CALLS    #1, LIB$SIGNAL                               ;
    00000000G  EF 00000000G  EF  D0 001B1 17$:   MOVL     PAT$GL_NEWLABLS, PAT$GL_SYMTBPTR             ; 3557
               57        67  D0 001BC 18$:     MOVL     (POINTER), POINTER                           ; 3563
                         03  12 001BF          BNEQ     19$                                          ;
                       0099  31 001C1          BRW      26$                                          ;
               52    04  A7  9E 001C4 19$:     VAB      4(POINTER), R2                               ; 3573
```

```
                                50 00000000G   EF   D0 001C8          MOVL    PAT$GB_MOD_PTR, R0                              ; 3566
                                4E       03    A0   E9 001CF          BLBC    3(R0), 22$                                      ;
                                53             01   90 001D3          MOVB    #1, FILL_CHAR                                   ; 3572
                                   00000000G   EF   9F 001D6          PUSHAB  PAT$GL_TEMP_BUF                                 ; 3573
                                   00000000G   EF   9F 001DC          PUSHAB  PAT$GL_NEW_ASD                                  ;
                                               59   DD 001E2          PUSHL   NEXT_LOC                                        ; 3574
                                         B0    AD   9F 001E4          PUSHAB  INSTRUC_BUF                                     ; 3573
                                               62   DD 001E7          PUSHL   (R2)                                            ;
                          00000000G  EF                05   FB 001E9  CALLS   #5, PAT$INS_ENCODE                           ;
                                     11                50   E8 001F0  BLBS    R0, 20$                                         ;
                                               62   DD 001F3          PUSHL   (R2)                                            ; 3576
                                               01   DD 001F5          PUSHL   #1                                              ;
                                   006D810A    8F   DD 001F7          PUSHL   #7176458                                        ;
                          00000000G  00                03   FB 001FD  CALLS   #3, LIB$SIGNAL                                 ;
                                     7E        B0   AD   9A 00204 20$: MOVZBL  INSTRUC_BUF, -(SP)                             ; 3577
                                         B1    AD   9F 00208          PUSHAB  INSTRUC_BUF+1                                   ;
                                   00000000G   EF   9F 0020B          PUSHAB  PAT$GL_TEMP_BUF                                 ;
                          00000000V  EF                03   FB 00211  CALLS   #3, PAT$FILL_BUF                            ;
                                     50        B0   AD   9A 00218          MOVZBL  INSTRUC_BUF, R0                         ; 3578
                                     59             50   C0 0021C          ADDL2   R0, NEXT_LOC                            ;
                                                    9B   11 0021F 21$:      BRB     18$                                     ; 3566
                                50             54   03   78 00221 22$:      ASHL    #3, VAL_SIZ, R0                         ; 3590
                                                    62   D5 00225          TSTL    (R2)                                    ; 3587
                                                    07   18 00227          BGEQ    23$                                     ;
                             51 62             50   00   EE 00229          EXTV    #0, R0, (R2), R1                        ; 3590
                                                    05   11 0022E          BRB     24$                                     ;
                             51 62             50   00   EF 00230 23$:      EXTZV   #0, R0, (R2), R1                        ; 3595
                                               62   51   D1 00235 24$:      CMPL    R1, (R2)                                ;
                                                    0D   13 00238          BEQL    25$                                     ;
                                   006D8023    8F   DD 0023A          PUSHL   #7176227                                        ; 3597
                          00000000G  00                01   FB 00240  CALLS   #1, LIB$SIGNAL                                ;
                                               53   94 00247 25$:      CLRB    FILL_CHAR                                       ; 3598
                                               14   BB 00249          PUSHR   #^M<R2,R4>                                      ; 3599
                                   00000000G   EF   9F 0024B          PUSHAB  PAT$GL_TEMP_BUF                                 ;
                          00000000V  EF                03   FB 00251  CALLS   #3, PAT$FILL_BUF                            ;
                                     59                54   C0 00258  ADDL2   VAL_SIZ, NEXT_LOC                              ; 3600
                                                    C2   11 0025B          BRB     21$                                     ; 3563
                                   00000000G   EF   9F 0025D 26$:      PUSHAB  PAT$GL_TEMP_BUF                                 ; 3606
                          00000000G  EF                01   FB 00263  CALLS   #1, PAT$RESOLVE_INS                          ;
                       56 00000000G  EF                10   ED 0026A  CMPZV   #0, #16, PAT$GL_TEMP_BUF, HOLE_SIZ           ; 3611
                                                    49   18 00273          BGEQ    27$                                     ;
                                               50       03   A6 9F 00275  MOVAB   3(R6), R0                                 ; 3617
                                     7E             50   04   C7 00279  DIVL3   #4, R0, -(SP)                              ;
                                         00000000G  EF   01   FB 0027D  CALLS   #1, PAT$FREEZ                               ;
                                               57   50   D0 00284          MOVL    R0, TEMP_PTR                            ;
                       56                53 00000000G  FF 00000000G EF   2C 00287  MOVC5   PAT$GL_TEMP_BUF, @PAT$GL_TEMP_BUF+4, -  ; 3619
                                                                   67       00294          FILL_CHAR, HOLE_SIZ, (TEMP_PTR)         ;
                                               50 00000000G  EF   3C 00295          MOVZWL  PAT$GL_TEMP_BUF, R0             ; 3620
                                               50   03   C0 0029C          ADDL2   #3, R0                                  ;
                                     7E             50   04   C7 0029F          DIVL3   #4, R0, -(SP)                           ;
                                                   00000000G  EF   DD 002A3          PUSHL   PAT$GL_TEMP_BUF+4               ;
                                         00000000G  EF   02   FB 002A9  CALLS   #2, PAT$FREERELEASE                        ;
                                         00000000G  EF   57   D0 002B0          MOVL    TEMP_PTR, PAT$GL_TEMP_BUF+4             ; 3621
                                         00000000G  EF   56   B0 002B7          MOVW    HOLE_SIZ, PAT$GL_TEMP_BUF               ; 3622
                       56 00000000G  EF                10   ED 002BE 27$:      CMPZV   #0, #16, PAT$GL_TEMP_BUF, HOLE_SIZ      ; 3628
                                                    47   12 002C7          BNEQ    29$                                     ;
                                               7E 00000000G  EF   3C 002C9          MOVZWL  PAT$GL_TEMP_BUF, -(SP)          ; 3634
```

```
                    00000000G   EF   DD 002D0          PUSHL   PAT$GL_TEMP_BUF+4                        ;
                                5B   DD 002D6          PUSHL   UNMAPPED_LOC                            ;
          00000000G EF          03   FB 002D8          CALLS   #3, PAT$WRITE_MEM                       ;
                59  5B          56   C1 002DF          ADDL3   HOLE_SIZ, UNMAPPED_LOC, NEXT_LOC        ; 3635
          00000000G EF          5B   D0 002E3          MOVL    UNMAPPED_LOC, PAT$GL_NEXT_LOC           ; 3636
                    59 00000000G EF   D1 002EA 28$:     CMPL    PAT$GL_NEXT_LOC, NEXT_LOC               ; 3637
                                46   1E 002F1          BGEQU   31$                                     ;
                                01   DD 002F3          PUSHL   #1                                      ; 3639
                    00000000G   EF   9F 002F5          PUSHAB  PAT$GL_NEW_ASD                          ;
                    00000000'   EF   9F 002FB          PUSHAB  NEW_TAB_STG                             ;
                    00000000G   EF   DD 00301          PUSHL   PAT$GL_NEXT_LOC                         ;
          00000000V EF          04   FB 00307          CALLS   #4, PAT$OUT_MEM_LOC                     ;
                                DA   11 0030E          BRB     28$                                     ;
                    50 00000000G EF   D0 00310 29$:     MOVL    PAT$GB_MOD_PTR, R0                      ; 3647
                    11      03   A0   E9 00317          BLBC    3(R0), 30$                              ;
                                58   DD 0031B          PUSHL   NEW_INS_PTR                             ; 3649
                          0440   8F   BB 0031D          PUSHR   #^M<R6,R10>                             ;
                                5B   DD 00321          PUSHL   UNMAPPED_LOC                            ;
          00000000V EF          04   FB 00323          CALLS   #4, RELOCAT_INS                         ;
                                0D   11 0032A          BRB     31$                                     ;
                    006D815A    8F   DD 0032C 30$:     PUSHL   #7176538                                ; 3651
          00000000G 00          01   FB 00332          CALLS   #1, LIB$SIGNAL                          ;
                    00000000G   EF   9F 00339 31$:     PUSHAB  PAT$GL_OLDLABLS                         ; 3656
          00000000G EF          01   FB 0033F          CALLS   #1, PAT$ADD_LABELS                      ;
                    00000000G   EF   9F 00346          PUSHAB  PAT$GL_NEWLABLS                         ; 3657
          00000000G EF          01   FB 0034C          CALLS   #1, PAT$ADD_LABELS                      ;
                    00000000G   EF   9F 00353          PUSHAB  PAT$GL_RLCLABLS                         ; 3658
          00000000G EF          01   FB 00359          CALLS   #1, PAT$ADD_LABELS                      ;
                                04   00360          RET                                             ; 3660

; Routine Size:  865 bytes,    Routine Base:  _PAT$CODE + 030A
```

```
;1008     3661  1 ROUTINE RELOCAT_INS (OLD_LOC, HOLE_SIZE, OLD_INS_SIZ  ASC_INS_PTR) : NOVALUE =
;1009     3662  1
;1010     3663  1 !++
;1011     3664  1 ! FUNCTIONAL DESCRIPTION:
;1012     3665  1 !
;1013     3666  1 !       This routine relocates an instruction from an old address to the patch
;1014     3667  1 !       area.  It then moves in any new instructions, specified as an argument
;1015     3668  1 !       list for a patch command.  A branch or jump instruction is then put
;1016     3669  1 !       into the old address.  If there is not enough room left by the
;1017     3670  1 !       removal of the instruction, then more instructions are moved to the
;1018     3671  1 !       patch area until the branch instruction iwll fit.  Lastly, a return
;1019     3672  1 !       branch instruction is placed in the patch area to return execution
;1020     3673  1 !       to the next sequential instruction past the old address.
;1021     3674  1 !
;1022     3675  1 !       Any new instructions to be inserted are in a command argument
;1023     3676  1 !       list, created by the parser.  Each argument entry is made up of
;1024     3677  1 !       three longwords. The first is a forward link to the next entry.
;1025     3678  1 !       The second longword contains the address of a counted byte stream
;1026     3679  1 !       that is to be translated into a binary instruction which is
;1027     3680  1 !       to be inserted into the patch area.  The third longword is unused.
;1028     3681  1 !
;1029     3682  1 ! CALLING SEQUENCE:
;1030     3683  1 !
;1031     3684  1 !       RELOCATE_CMD (OLD_LOCATION, NEW_INSTRUCTION_PTR)
;1032     3685  1 !
;1033     3686  1 ! INPUTS:
;1034     3687  1 !
;1035     3688  1 !       OLD_LOC - Unmapped address of instruction to be moved
;1036     3689  1 !       HOLE_SIZE - Number of free bytes at OLD_LOC
;1037     3690  1 !       OLD_INS_SIZ - Number of bytes of old instruction preceding new instruction
;1038     3691  1 !       ASC_INS_PTR - Pointer to first new instruction on command argument list
;1039     3692  1 !
;1040     3693  1 ! IMPLICIT INPUTS:
;1041     3694  1 !
;1042     3695  1 !       PAT$GL_TEMP_BUI - String descriptor for counted binary instructions
;1043     3696  1 !
;1044     3697  1 !       The head of the linked list, the current mode, and
;1045     3698  1 !       the current patch area descriptor.
;1046     3699  1 !
;1047     3700  1 ! OUTPUTS:
;1048     3701  1 !
;1049     3702  1 !       none
;1050     3703  1 !
;1051     3704  1 ! IMPLICIT OUTPUTS:
;1052     3705  1 !
;1053     3706  1 !       NONE
;1054     3707  1 !
;1055     3708  1 ! ROUTINE VALUE:
;1056     3709  1 !
;1057     3710  1 !       novalue
;1058     3711  1 !
;1059     3712  1 ! SIDE EFFECTS:
;1060     3713  1 !
;1061     3714  1 !       If the default patch area is to be used and it does not currently
;1062     3715  1 !       exist when PAT$EXP_AREA is called PAT$BUILD_ISE is invoked which
;1063     3716  1 !       given the address of the instructions to be moved will propagate
;1064     3717  1 !       the image section attributes of the old image section to the newly
```

```
;  1065          3718  1 !       created default patch area image section descriptor.
;  1066          3719  1 !
;  1067          3720  1 !       The patch area now contains the moved instruction and the new ones
;  1068          3721  1 !       plus a branch instruction back to the inline code.  The old
;  1069          3722  1 !       instruction location contains a branch to the patch area.
;  1070          3723  1 !       If a failure in a write or contents verification occurs,
;  1071          3724  1 !       the routine returns immediately.
;  1072          3725  1 !
;  1073          3726  1 !--
;  1074          3727  1
;  1075          3728  2 BEGIN
;  1076          3729  2
;  1077          3730  2 LITERAL
;  1078          3731  2         MAX_BYTE_DISP = 127,                          ! Maximum displacement for BRB
;  1079          3732  2         MIN_BYTE_DISP = -128,                         ! Minimum displacement for BRB
;  1080          3733  2         MAX_WORD_DISP = 32767,                        ! Maximum displacement for BRW
;  1081          3734  2         MIN_WORD_DISP = -32768,                       ! Minimum displacement for BRW
;  1082          3735  2         BRB_OPCODE = %X'11',                          ! Opcode for BRB
;  1083          3736  2         BRW_OPCODE = %X'31',                          ! Opcode for BRW
;  1084          3737  2         JMP_OPCODE = %X'17',                          ! Opcode for JMP
;  1085          3738  2         BRB_INS_SIZ = 2,                              ! Size of BRB instruction
;  1086          3739  2         BRW_INS_SIZ = 3,                              ! Size of BRW instruction
;  1087          3740  2         JMP_INS_SIZ = 6,                              ! Size of JMP instruction
;  1088          3741  2         PC_DEFERRED = %X'EF',                         ! PC deferred instruction mode
;  1089          3742  2         NOP_INSTR = 1,                                ! Fill character for instruction
;  1090          3743  2         MAX_INST_LEN    = 80;                         ! Maximum number of binary bytes in an instr
;  1091          3744  2
;  1092          3745  2 LOCAL
;  1093          3746  2         SUCC_OLD_INS,                                 ! Number of bytes of successive old instruct
;  1094          3747  2         DECODED_INS,                                  ! Pointer to ascii instruction
;  1095          3748  2         NXT_ASC_INS,                                  ! Pointer to next ascii instruction in argum
;  1096          3749  2         NEXT_PC,                                      ! PC of next instruction to decode
;  1097          3750  2         NEW_INS_PTR : REF VECTOR[,BYTE],              ! Pointer to relocated instruction stream
;  1098          3751  2         BR_DISPLACEMENT : SIGNED LONG,                ! Displacement for branch instruction
;  1099          3752  2         BR_INSTRUC : VECTOR[JMP_INS_SIZ+1,BYTE],      ! Encoded counted string branch instruction
;  1100          3753  2         NEW_LOC,                                      ! Address in patch area for relocated instru
;  1101          3754  2         NEXT_LOC,                                     ! Address of next instruction of inline code
;  1102          3755  2         CUR_LOC,                                      ! Address of current instruction to be moved
;  1103          3756  2         LOCAL_BUF : VECTOR[MAX_INST_LEN, BYTE],       ! Local buffer for binary instruction stream
;  1104          3757  2         INSTRUC_BUF: VECTOR [MAX_INST_LEN, BYTE];     ! Local buffer for ascic instructions
;  1105          3758  2
;  1106          3759  2 !++
;  1107          3760  2 ! Enable instruction substitution.
;  1108          3761  2 !--
;  1109          3762  2 PAT$GL_CONTEXT[INST_SUBST] = TRUE;
;  1110          3763  2 PAT$GL_SYMTBPTR = .PAT$GL_RLCLABLS;
;  1111          3764  2
;  1112          3765  2 !++
;  1113          3766  2 ! Check that there is enough room in the patch area for the instructions
;  1114          3767  2 ! encoded in the temporary buffer, PAT$GL_TEMP_BUF.  This is the minimum size
;  1115          3768  2 ! that may be required.  Instruction substitution may enlarge this size.  This
;  1116          3769  2 ! will also insure that a patch area address is defined.
;  1117          3770  2 !--
;  1118          3771  3 IF (.PAT$GL_PATAREA[DSC$W_LENGTH] LSS .PAT$GL_TEMP_BUF[DSC$W_LENGTH])
;  1119          3772  2 THEN
;  1120          3773  3         BEGIN
;  1121          3774  4         IF (.PAT$GL_PATAREA[DSC$A_POINTER] EQLA .PAT$GL_IHPPTR[IHP$L_RW_PATADR])
```

```
;  1122          3775  3          THEN
;  1123          3776  4                  BEGIN
;  1124          3777  4                  PAT$EXP_AREA((.PAT$GL_TEMP_BUF[DSC$W_LENGTH] + A_PAGE - 1)/A_PAGE, .OLD_LOC);
;  1125          3778  5                  IF (.PAT$GL_PATAREA[DSC$W_LENGTH] LSS .PAT$GL_TEMP_BUF[DSC$W_LENGTH])
;  1126          3779  4                  THEN
;  1127          3780  4                          SIGNAL(PAT$_INSUFPAT, 3, .PAT$GL_TEMP_BUF[DSC$W_LENGTH],
;  1128          3781  4                           .PAT$GL_PATAREA[DSC$A_POINTER], .PAT$GL_PATAREA[DSC$W_LENGTH]);
;  1129          3782  4                  END
;  1130          3783  3          ELSE
;  1131          3784  3                  SIGNAL(PAT$_INSUFPAT, 3, .PAT$GL_TEMP_BUF[DSC$W_LENGTH],
;  1132          3785  3                   .PAT$GL_PATAREA[DSC$A_POINTER], .PAT$GL_PATAREA[DSC$W_LENGTH]);
;  1133          3786  2          END;
;  1134          3787  2
;  1135          3788  2 !++
;  1136          3789  2 ! Set pointer to relocation address.
;  1137          3790  2 !--
;  1138          3791  2 NEW_LOC = CH$PTR(.PAT$GL_PATAREA[DSC$A_POINTER], 0);
;  1139          3792  2
;  1140          3793  2 !++
;  1141          3794  2 ! Now compute the branch displacement size.  Then build the binary code
;  1142          3795  2 ! based on the displacement.
;  1143          3796  2 !--
;  1144          3797  2 BR_DISPLACEMENT = .NEW_LOC - .OLD_LOC - BRB_INS_SIZ;
;  1145          3798  3 IF (.BR_DISPLACEMENT LEQ MAX_BYTE_DISP) AND (.BR_DISPLACEMENT GEQ MIN_BYTE_DISP)
;  1146          3799  2 THEN
;  1147          3800  3          BEGIN
;  1148          3801  3          BR_INSTRUC[0] = BRB_INS_SIZ;
;  1149          3802  3          BR_INSTRUC[1] = BRB_OPCODE;
;  1150          3803  3          CH$MOVE(.BR_INSTRUC[0], CH$PTR(BR_DISPLACEMENT,0), CH$PTR(BR_INSTRUC[2],0));
;  1151          3804  3          END
;  1152          3805  2 ELSE
;  1153          3806  3          IF (.BR_DISPLACEMENT LEQ MAX_WORD_DISP) AND (.BR_DISPLACEMENT GEQ MIN_WORD_DISP)
;  1154          3807  2          THEN
;  1155          3808  3                  BEGIN
;  1156          3809  3                  BR_INSTRUC[0] = BRW_INS_SIZ;
;  1157          3810  3                  BR_INSTRUC[1] = BRW_OPCODE;
;  1158          3811  3                  BR_DISPLACEMENT = .BR_DISPLACEMENT - (BRW_INS_SIZ - BRB_INS_SIZ);
;  1159          3812  3                  CH$MOVE(.BR_INSTRUC[0], CH$PTR(BR_DISPLACEMENT,0), CH$PTR(BR_INSTRUC[2],0));
;  1160          3813  3                  END
;  1161          3814  2          ELSE
;  1162          3815  3                  BEGIN
;  1163          3816  3                  BR_INSTRUC[0] = JMP_INS_SIZ;
;  1164          3817  3                  BR_INSTRUC[1] = JMP_OPCODE;
;  1165          3818  3                  BR_INSTRUC[2] = PC_DEFERRED;
;  1166          3819  3                  BR_DISPLACEMENT = .BR_DISPLACEMENT - (JMP_INS_SIZ - BRB_INS_SIZ);
;  1167          3820  3                  CH$MOVE(.BR_INSTRUC[0], CH$PTR(BR_DISPLACEMENT,0), CH$PTR(BR_INSTRUC[3],0));
;  1168          3821  2                  END;
;  1169          3822  2
;  1170          3823  2 !++
;  1171          3824  2 ! Now see if the branch instruction will fit in the hole left at the old
;  1172          3825  2 ! location.  If not, then move more instructions to the patch area until it
;  1173          3826  2 ! will fit.
;  1174          3827  2 !--
;  1175          3828  2 NEXT_LOC = .OLD_LOC + .HOLE_SIZE;                    ! Compute address of next inline instruction
;  1176          3829  2 NEXT_PC = .OLD_LOC + .HOLE_SIZE;                     ! Compute address of next inline instruction
;  1177          3830  2 SUCC_OLD_INS = .PAT$GL_TEMP_BUF[DSC$W_LENGTH];       ! Remember where extra old instructions move
;  1178          3831  2 WHILE .BR_INSTRUC[0] GTR .HOLE_SIZE
```

```
;  1179          3832  2 DO
;  1180          3833  3         BEGIN
;  1181          3834  3         !++
;  1182          3835  3         ! First decode the instruction at the next old location.  Then
;  1183          3836  3         ! re-encode it to get the binary stream.  Then insert it into
;  1184          3837  3         ! the temporary buffer.
;  1185          3838  3         !--
;  1186          3839  3         PAT$OUT_MEM_LOC(.NEXT_LOC, OLD_TAB_STG, PAT$GL_OLD_ASD, NO_CASE_TABLE);
;  1187          3840  3         PAT$GL_BUF_SIZ = 0;
;  1188          3841  3         PAT$CP_OUT_STR = CH$PTR(LOCAL_BUF[1]);
;  1189          3842  3
;  1190          3843  3         !++
;  1191          3844  3         ! Because the instruction is actually in the code, the PC is the
;  1192          3845  3         ! same as the address of the byte stream.  PAT$INS_DECODE will update
;  1193          3846  3         ! the NEW_PC automatically.  To determine the length of the instruction
;  1194          3847  3         ! binary stream just decoded (for updating the HOLE_SIZE), NEXT_LOC must
;  1195          3848  3         ! be preserved.  Therefore, the return value from the routine is written
;  1196          3849  3         ! into NEW_PC not NEXT_LOC.  This will be the same value, unless the
;  1197          3850  3         ! routine failed.
;  1198          3851  3         !--
;  1199          3852  3         IF (NEXT_PC = PAT$INS_DECODE(.NEXT_LOC, 0, NEXT_PC, PAT$GL_OLD_ASD, NO_CASE_TABLE)) EQL 0
;  1200          3853  3         THEN
;  1201          3854  3                 SIGNAL(PAT$_NODECODE);
;  1202          3855  3         LOCAL_BUF[0] = .PAT$GL_BUF_SIZ;
;  1203          3856  3         NEW_INS_PTR = CH$PTR(INSTRUC_BUF, 0);
;  1204          3857  3         IF NOT PAT$INS_ENCODE(LOCAL_BUF, INSTRUC_BUF,
;  1205          3858  3                  .OLD_LOC + .PAT$GL_TEMP_BUF[DSC$W_LENGTH], PAT$GL_NEW_ASD, PAT$GL_TEMP_BUF)
;  1206          3859  3         THEN
;  1207          3860  4                 IF (.PAT$GB_SUBST_IN[0] NEQ 0)
;  1208          3861  3                 THEN
;  1209          3862  3                         NEW_INS_PTR = CH$PTR(PAT$GB_SUBST_IN, 0)
;  1210          3863  3                 ELSE
;  1211          3864  3                         SIGNAL(PAT$_NOENCODE, 1, LOCAL_BUF);
;  1212          3865  3                 !++
;  1213          3866  3                 ! There is a temporary restriction on relocation of CASE instruction:
;  1214          3867  3                 !--
;  1215          3868  3                 IF (.NEW_INS_PTR[1] EQL OP_CASEB) OR
;  1216          3869  3                    (.NEW_INS_PTR[1] EQL OP_CASEW) OR
;  1217          3870  4                    (.NEW_INS_PTR[1] EQL OP_CASEL)
;  1218          3871  3                 THEN
;  1219          3872  3                         SIGNAL(PAT$_NORELOC + MSG$K_SEVERE);
;  1220          3873  3                 PAT$FILL_BUF(PAT$GL_TEMP_BUF, NEW_INS_PTR[1], .NEW_INS_PTR[0]);
;  1221          3874  3                 HOLE_SIZE = .HOLE_SIZE + .NEXT_PC - .NEXT_LOC;
;  1222          3875  3                 NEXT_LOC = .NEXT_PC;
;  1223          3876  2                 END;
;  1224          3877  2
;  1225          3878  2 !++
;  1226          3879  2 ! Decode the instructions in the temporary buffer and re-encode them at the
;  1227          3880  2 ! patch area address.  This will alter the addresses within the instructions.
;  1228          3881  2 !--
;  1229          3882  2 CUR_LOC = .PAT$GL_TEMP_BUF[DSC$A_POINTER];
;  1230          3883  2 NEXT_PC = .OLD_LOC;
;  1231          3884  2 NXT_ASC_INS = .ASC_INS_PTR;                                   ! Get pointer to next new instruction argume
;  1232          3885  3 WHILE .CUR_LOC LSSA (.PAT$GL_TEMP_BUF[DSC$A_POINTER] + .PAT$GL_TEMP_BUF[DSC$W_LENGTH])
;  1233          3886  2 DO
;  1234          3887  3         BEGIN
;  1235          3888  3         PAT$GL_BUF_SIZ = 0;
```

```
;  1236     3889  3          PAT$CP_OUT_STR = CH$PTR(LOCAL_BUF[1]);
;  1237     3890  3          IF (.CUR_LOC GEQA .PAT$GL_TEMP_BUF[DSC$A_POINTER] + .OLD_INS_SIZ) AND
;  1238     3891  4             (.CUR_LOC LSSA .PAT$GL_TEMP_BUF[DSC$A_POINTER] + .SUCC_OLD_INS)
;  1239     3892  3          THEN
;  1240     3893  4                  BEGIN
;  1241     3894  4                  !++
;  1242     3895  4                  ! Take the new instructions out of the argument list in
;  1243     3896  4                  ! case there are any labels which will be relocated.
;  1244     3897  4                  ! This is only done for new instructions being deposited.
;  1245     3898  4                  ! The old instructions being relocated are decoded and re-encoded.
;  1246     3899  4                  !--
;  1247     3900  4                  DECODED_INS = .LIST_ELEM_EXP1(.NXT_ASC_INS);
;  1248     3901  4                  NXT_ASC_INS = .LIST_ELEM_FLINK(.NXT_ASC_INS);
;  1249     3902  4                  PAT$GL_SYMTBPTR = .PAT$GL_RLCLABLS;                 ! Use reolcated label table
;  1250     3903  4                  END
;  1251     3904  3          ELSE
;  1252     3905  4                  BEGIN
;  1253     3906  4                  !++
;  1254     3907  4                  ! The instruction is an old instruction.  Therefore use the
;  1255     3908  4                  ! old label table and encode it from the decoded instruction.
;  1256     3909  4                  !--
;  1257     3910  4                  DECODED_INS = LOCAL_BUF;                            ! Point to ascii instruction
;  1258     3911  4                  PAT$GL_SYMTBPTR = .PAT$GL_OLDLABLS;                 ! Assume this is an old instruction
;  1259     3912  3                  END;
;  1260     3913  3          IF (CUR_LOC = PAT$INS_DECODE(.CUR_LOC, 0, NEXT_PC, PAT$GL_NEW_ASD, NO_CASE_TABLE)) EQL 0
;  1261     3914  3          THEN
;  1262     3915  3                  SIGNAL(PAT$_NODECODE);
;  1263     3916  3          LOCAL_BUF[0] = .PAT$GL_BUF_SIZ;
;  1264     3917  3          NEW_INS_PTR = CH$PTR(INSTRUC_BUF, 0);                       ! Set pointer to counted stream buffer
;  1265     3918  3          IF NOT PAT$INS_ENCODE(.DECODED_INS, INSTRUC_BUF,
;  1266     3919  3                   .NEW_LOC + .PAT$GL_PLOC_BUF[DSC$W_LENGTH], PAT$GL_NEW_ASD, PAT$GL_RLOC_BUF)
;  1267     3920  3          THEN
;  1268     3921  4                  IF (.PAT$GB_SUBST_IN[0] NEQ 0)
;  1269     3922  3                  THEN
;  1270     3923  3                          NEW_INS_PTR = CH$PTR(PAT$GB_SUBST_IN, 0)
;  1271     3924  3                  ELSE
;  1272     3925  3                          SIGNAL(PAT$_NOENCODE, 1, LOCAL_BUF);
;  1273     3926  3                  !++
;  1274     3927  3                  ! There is a temporary restriction on re'ocation of CASE instructions
;  1275     3928  3                  !--
;  1276     3929  3                  IF (.NEW_INS_PTR[1] EQL OP_CASEB) OR
;  1277     3930  3                     (.NEW_INS_PTR[1] EQL OP_CASEW) OR
;  1278     3931  4                     (.NEW_INS_PTR[1] EQL OP_CASEL)
;  1279     3932  3                  THEN
;  1280     3933  3                          SIGNAL(PAT$_NORELOC + MSG$K_SEVERE);
;  1281     3934  3                  PAT$FILL_BUF(PAT$GL_RLOC_BUF, NEW_INS_PTR[1], .NEW_INS_PTR[0]);
;  1282     3935  2                  END;
;  1283     3936  2 PAT$GL_SYMTBPTR = .PAT$GL_RLCLABLS;                                 ! Set relocated labels as default (old alway
;  1284     3937  2 PAT$RESOLVE_INS(PAT$GL_RLOC_BUF);
;  1285     3938  2
;  1286     3939  2 !++
;  1287     3940  2 ! Now a return branch instruction must be placed in the relocation buffer.
;  1288     3941  2 ! Compute the branch displacement size.  Then build the binary code based on
;  1289     3942  2 ! the displacement.
;  1290     3943  2 !--
;  1291     3944  3 BR_DISPLACEMENT = .NEXT_LOC - (.PAT$GL_PATAREA[DSC$A_POINTER] +
;  1292     3945  2                              .PAT$GL_RLOC_BUF[DSC$W_LENGTH]) - BRB_INS_SIZ;
```

```
;1293     3946  3 IF (.BR_DISPLACEMENT LEQ MAX_BYTE_DISP) AND (.BR_DISPLACEMENT GEQ MIN_BYTE_DISP)
;1294     3947  2 THEN
;1295     3948  3         BEGIN
;1296     3949  3         INSTRUC_BUF[0] = BRB_INS_SIZ;
;1297     3950  3         INSTRUC_BUF[1] = BRB_OPCODE;
;1298     3951  3         CH$MOVE(.INSTRUC_BUF[0], CH$PTR(BR_DISPLACEMENT,0), CH$PTR(INSTRUC_BUF[2],0));
;1299     3952  3         END
;1300     3953  2 ELSE
;1301     3954  3         IF (.BR_DISPLACEMENT LEQ MAX_WORD_DISP) AND (.BR_DISPLACEMENT GEQ MIN_WORD_DISP)
;1302     3955  2         THEN
;1303     3956  3                 BEGIN
;1304     3957  3                 INSTRUC_BUF[0] = BRW_INS_SIZ;
;1305     3958  3                 INSTRUC_BUF[1] = BRW_OPCODE;
;1306     3959  3                 BR_DISPLACEMENT = .BR_DISPLACEMENT - (BRW_INS_SIZ - BRB_INS_SIZ);
;1307     3960  3                 CH$MOVE(.INSTRUC_BUF[0], CH$PTR(BR_DISPLACEMENT,0), CH$PTR(INSTRUC_BUF[2],0));
;1308     3961  3                 END
;1309     3962  2         ELSE
;1310     3963  3                 BEGIN
;1311     3964  3                 INSTRUC_BUF[0] = JMP_INS_SIZ;
;1312     3965  3                 INSTRUC_BUF[1] = JMP_OPCODE;
;1313     3966  3                 INSTRUC_BUF[2] = PC_DEFERRED;
;1314     3967  3                 BR_DISPLACEMENT = .BR_DISPLACEMENT - (JMP_INS_SIZ - BRB_INS_SIZ);
;1315     3968  3                 CH$MOVE(.INSTRUC_BUF[0], CH$PTR(BR_DISPLACEMENT,0), CH$PTR(INSTRUC_BUF[3],0));
;1316     3969  2                 END;
;1317     3970  2 PAT$FILL_BUF(PAT$GL_RLOC_BUF, INSTRUC_BUF[1], .INSTRUC_BUF[0]);
;1318     3971  2
;1319     3972  2 !++
;1320     3973  2 ! Now insert all new instructions into the patch area.
;1321     3974  2 !--
;1322     3975  3 IF (.PAT$GL_RLOC_BUF[DSC$W_LENGTH] GTR .PAT$GL_PATAREA[DSC$W_LENGTH])
;1323     3976  2 THEN
;1324     3977  3         BEGIN
;1325     3978  4         IF (.PAT$GL_PATAREA[DSC$A_POINTER] EQLA .PAT$GL_IHPPTR[IHP$L_RW_PATADR])
;1326     3979  3         THEN
;1327     3980  4                 BEGIN
;1328     3981  4                 PAT$EXP_AREA((.PAT$GL_RLOC_BUF[DSC$W_LENGTH] + A_PAGE - 1)/A_PAGE, .OLD_LOC);
;1329     3982  5                 IF (.PAT$GL_PATAREA[DSC$W_LENGTH] LSS .PAT$GL_RLOC_BUF[DSC$W_LENGTH])
;1330     3983  4                 THEN
;1331     3984  4                         SIGNAL(PAT$_INSUFPAT, 3, .PAT$GL_RLOC_BUF[DSC$W_LENGTH],
;1332     3985  4                          .PAT$GL_PATAREA[DSC$A_POINTER], .PAT$GL_PATAREA[DSC$W_LENGTH]);
;1333     3986  4                 END
;1334     3987  3         ELSE
;1335     3988  3                 SIGNAL(PAT$_INSUFPAT, 3, .PAT$GL_RLOC_BUF[DSC$W_LENGTH],
;1336     3989  3                  .PAT$GL_PATAREA[DSC$A_POINTER], .PAT$GL_PATAREA[DSC$W_LENGTH]);
;1337     3990  2         END;
;1338     3991  2 PAT$WRITE_MEM(.PAT$GL_PATAREA[DSC$A_POINTER], .PAT$GL_RLOC_BUF[DSC$A_POINTER], .PAT$GL_RLOC_BUF[DSC$W_LENGTH
;1339     3992  2 PAT$GL_PATAREA[DSC$W_LENGTH] = .PAT$GL_PATAREA[DSC$W_LENGTH] - .PAT$GL_RLOC_BUF[DSC$W_LENGTH];
;1340     3993  2 PAT$GL_PATAREA[DSC$A_POINTER] = .PAT$GL_PATAREA[DSC$A_POINTER] + .PAT$GL_RLOC_BUF[DSC$W_LENGTH];
;1341     3994  2
;1342     3995  2 !++
;1343     3996  2 ! Now there is room for the branch instruction at the old location hole.
;1344     3997  2 ! Set up a buffer with the encoded branch instruction followed by NOP's to
;1345     3998  2 ! insert there.  Then write it to the old location hole.
;1346     3999  2 !--
;1347     4000  3 IF (.HOLE_SIZE GTR .BR_INSTRUC[0])
;1348     4001  2 THEN
;1349     4002  3         BEGIN
```

```
; 1350        4003  3          NEW_INS_PTR = PAT$FREEZ((.HOLE_SIZE + A_LONGWORD - 1)/A_LONGWORD);
; 1351        4004  3          CH$COPY(.BR_INSTRUC[0], CH$PTR(BR_INSTRUC[1], 0), NOP_INSTR,
; 1352        4005  3                  .HOLE_SIZE, CH$PTR(.NEW_INS_PTR, 0));
; 1353        4006  3          PAT$WRITE_MEM(.OLD_LOC, CH$PTR(.NEW_INS_PTR, 0), .HOLE_SIZE);
; 1354        4007  3          PAT$FREERELEASE(CH$PTR(.NEW_INS_PTR, 0), (.HOLE_SIZE + 3)/4);
; 1355        4008  3          END
; 1356        4009  2 ELSE
; 1357        4010  2          PAT$WRITE_MEM(.OLD_LOC, CH$PTR(BR_INSTRUC[1], 0), .HOLE_SIZE);
; 1358        4011  2
; 1359        4012  2 !++
; 1360        4013  2 ! Now write out all the new instructions deposited.
; 1361        4014  2 !--
; 1362        4015  2 NEXT_LOC = .OLD_LOC;
; 1363        4016  3 WHILE (.NEXT_LOC LSS .OLD_LOC+.HOLE_SIZE)
; 1364        4017  2 DO
; 1365        4018  3          BEGIN
; 1366        4019  3          PAT$OUT_MEM_LOC(.NEXT_LOC, NEW_TAB_STG, PAT$GL_NEW_ASD, NO_CASE_TABLE);
; 1367        4020  3          NEXT_LOC = .PAT$GL_NEXT_LOC;
; 1368        4021  2          END;
; 1369        4022  2 NEXT_LOC = .NEW_LOC;
; 1370        4023  3 WHILE (.NEXT_LOC LSS .PAT$GL_PATAREA[DSC$A_POINTER])
; 1371        4024  2 DO
; 1372        4025  3          BEGIN
; 1373        4026  3          PAT$OUT_MEM_LOC(.NEXT_LOC, NEW_TAB_STG, PAT$GL_NEW_ASD, NO_CASE_TABLE);
; 1374        4027  3          NEXT_LOC = .PAT$GL_NEXT_LOC;
; 1375        4028  2          END;
; 1376        4029  2
; 1377        4030  2 RETURN;
; 1378        4031  1 END;                                                    ! End of RELOCAT_INS


                                 0FFC 00000 RELOCAT_INS:
                                            .WORD   Save R2,R3,R4,R5,R6,R7,R8,R9,R10,R11        ; 3661
                    5B 00000000G  EF  9E 00002  MOVAB   PAT$GL_RLOC_BUF, R11                    ;
                    5E      FF50  CE  9E 00009  MOVAB   -176(SP), SP                            ;
    00000000G       EF            10  88 0000E  BISB2   #16, PAT$GL_CONTEXT+2                   ; 3762
    00000000G       EF 00000000G  EF  D0 00015  MOVL    PAT$GL_RLCLABLS, PAT$GL_SYMTBPTR        ; 3763
                    50 00000000G  EF  D0 00020  MOVL    PAT$GL_PATAREA, R0                      ; 3771
                    52 00000000G  EF  3C 00027  MOVZWL  PAT$GL_TEMP_BUF, R2                     ;
                    52            60  B1 0002E  CMPW    (R0), R2                              ;
                                  5B  1E 00031  BGEQU   3$                                    ;
                    51 00000000G  EF  D0 00033  MOVL    PAT$GL_IHPPTR, R1                       ; 3774
          14        A1      04    A0  D1 0003A  CMPL    4(R0), 20(R1)                         ;
                                  36  12 0003F  BNEQ    1$                                    ;
                              04  AC  DD 00041  PUSHL   OLD_LOC                               ; 3777
                    52      01FF  C2  9E 00044  MOVAB   511(R2), R2                           ;
    7E              52 00000200  8F  C7 00049  DIVL3   #512, R2, -(SP)                        ;
    00000000G       EF            02  FB 00051  CALLS   #2, PAT$EXP_AREA                      ;
                    50 00000000G  EF  D0 00058  MOVL    PAT$GL_PATAREA, R0                      ; 3778
    00000000G       EF            60  B1 0005F  CMPW    (R0), PAT$GL_TEMP_BUF                 ;
                                  26  1E 00066  BGEQU   3$                                    ;
                    7E            60  3C 00068  MOVZWL  (R0), -(SP)                           ; 3781
                              04  A0  DD 0006B  PUSHL   4(R0)                                 ;
                    7E 00000000G  EF  3C 0006E  MOVZWL  PAT$GL_TEMP_BUF, -(SP)                ; 3780
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                                  08   11 00075          BRB     2$                                          ;
                    7E            60   3C 00077 1$:      MOVZWL  (R0), -(SP)                                 ; 3785
                          04      A0   DD 0007A          PUSHL   4(R0)                                       ;
                                  52   DD 0007D          PUSHL   R2                                          ; 3784
                                  03   DD 0007F 2$:      PUSHL   #3                                          ;
                     006D80C2     8F   DD 00081          PUSHL   #7176386                                    ;
           00000000G 00           05   FB 00087          CALLS   #5, LIB$SIGNAL                              ;
                    50 00000000G  EF   D0 0008E 3$:      MOVL    PAT$GL_PATAREA, R0                          ; 3791
                    56    04      A0   D0 00095          MOVL    4(R0), NEW_LOC                              ;
                    59    04      AC   D0 00099          MOVL    OLD_LOC, R9                                 ; 3797
        50          56            59   C3 0009D          SUBL3   R9, NEW_LOC, R0                             ;
                04  AE    FE      A0   9E 000A1          MOVAB   -2(R0), BR_DISPLACEMENT                     ;
           0000007F 8F    04      AE   D1 000A6          CMPL    BR_DISPLACEMENT, #127                       ; 3798
                                  12   14 000AE          BGTR    4$                                          ;
           FFFFFF80 8F    04      AE   D1 000B0          CMPL    BR_DISPLACEMENT, #-128                      ;
                                  08   19 000B8          BLSS    4$                                          ;
                F8  AD    1102    8F   B0 000BA          MOVW    #4354, BR_INSTRUC                           ; 3801
                                  1D   11 000C0          BRB     5$                                          ; 3803
           00007FFF 8F    04      AE   D1 000C2 4$:      CMPL    BR_DISPLACEMENT, #32767                     ; 3806
                                  1F   14 000CA          BGTR    6$                                          ;
           FFFF8000 8F    04      AE   D1 000CC          CMPL    BR_DISPLACEMENT, #-32768                    ;
                                  15   19 000D4          BLSS    6$                                          ;
                F8  AD    3103    8F   B0 000D6          MOVW    #12547, BR_INSTRUC                          ; 3809
                          04      AE   D7 000DC          DECL    BR_DISPLACEMENT                             ; 3811
                    50    F8      AD   9A 000DF 5$:      MOVZBL  BR_INSTRUC, R0                              ; 3812
        FA  AD      04  AE            50   28 000E3          MOVC3   R0, BR_DISPLACEMENT, BR_INSTRUC+2           ;
                                  18   11 000E9          BRB     7$                                          ; 3806
                F8  AD    1706    8F   B0 000EB 6$:      MOVW    #5894, BR_INSTRUC                           ; 3816
                FA  AD            11   8E 000F1          MNEGB   #17, BR_INSTRUC+2                           ; 3818
                04  AE            04   C2 000F5          SUBL2   #4, BR_DISPLACEMENT                         ; 3819
                    50    F8      AD   9A 000F9          MOVZBL  BR_INSTRUC, R0                              ; 3820
        FB  AD      04  AE            50   28 000FD          MOVC3   R0, BR_DISPLACEMENT, BR_INSTRUC+3           ;
            50      59    08      AC   C1 00103 7$:      ADDL3   HOLE_SIZE, R9, R0                           ; 3828
                    5A            50   D0 00108          MOVL    R0, NEXT_LOC                                ;
                    6E            50   D0 0010B          MOVL    R0, NEXT_PC                                 ; 3829
                    55 00000000G  EF   3C 0010E          MOVZWL  PAT$GL_TEMP_BUF, SUCC_OLD_INS               ; 3830
 08  AC     F8  AD            08  00   ED 00115 8$:      CMPZV   #0, #8, BR_INSTRUC, HOLE_SIZE               ; 3831
                                  03   14 0011C          BGTR    9$                                          ;
                          00E7    31 0011E          BRW     15$                                         ;
                                  7E   D4 00121 9$:      CLRL    -(SP)                                       ; 3839
                     00000000G    EF   9F 00123          PUSHAB  PAT$GL_OLD_ASD                              ;
                     00000000'    EF   9F 00129          PUSHAB  OLD_TAB_STG                                 ;
                                  5A   DD 0012F          PUSHL   NEXT_LOC                                    ;
           00000000V EF           04   FB 00131          CALLS   #4, PAT$OUT_MEM_LOC                         ;
                     00000000G    EF   D4 00138          CLRL    PAT$GL_BUF_SIZ                              ; 3840
           00000000G EF   59      AE   9E 0013E          MOVAB   LOCAL_BUF+1, PAT$CP_OUT_STR                 ; 3841
                                  7E   D4 00146          CLRL    -(SP)                                       ; 3852
                     00000000G    EF   9F 00148          PUSHAB  PAT$GL_OLD_ASD                              ;
                          08      AE   9F 0014E          PUSHAB  NEXT_PC                                     ;
                                  7E   D4 00151          CLRL    -(SP)                                       ;
                                  5A   DD 00153          PUSHL   NEXT_LOC                                    ;
           00000000G EF           05   FB 00155          CALLS   #5, PAT$INS_DECODE                          ;
                     6E           50   D0 0015C          MOVL    R0, NEXT_PC                                 ;
                                  0D   12 0015F          BNEQ    10$                                         ;
                     006D8102     8F   DD 00161          PUSHL   #7176450                                    ; 3854
           00000000G 00           01   FB 00167          CALLS   #1, LIB$SIGNAL                              ;
                58  AE 00000000G  EF   90 0016E 10$:     MOVB    PAT$GL_BUF_SIZ, LOCAL_BUF                   ; 3855
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                        57        08    AE   9E 00176          MOVAB   INSTRUC_BUF, NEW_INS_PTR                        ; 3856
                   00000000G      EF    9F 0017A          PUSHAB  PAT$GL_TEMP_BUF                                  ; 3857
                   00000000G      EF    9F 00180          PUSHAB  PAT$GL_NEW_ASD
                        50 00000000G     EF   3C 00186          MOVZWL  PAT$GL_TEMP_BUF, R0                             ; 3858
                                    6049  9F 0018D          PUSHAB  (R0)[R9]
                                  14      AE   9F 00190          PUSHAB  INSTRUC_BUF                                     ; 3857
                                  68      AE   9F 00193          PUSHAB  LOCAL_BUF
                00000000G       EF              05   FB 00196          CALLS   #5, PAT$INS_ENCODE
                        23                      50   E8 00199          BLBS    R0, 12$
                   00000000G      EF    95 001A0          TSTB    PAT$GB_SUBST_IN                                 ; 3860
                                            09   13 001A6          BEQL    11$
                        57 00000000G     EF   9E 001A8          MOVAB   PAT$GB_SUBST_IN, NEW_INS_PTR                    ; 3862
                                            12   11 001AF          BRB     12$
                                  58      AE   9F 001B1 11$:     PUSHAB  LOCAL_BUF                                       ; 3864
                                            01   DD 001B4          PUSHL   #1
                              006D810A      8F   DD 001B6          PUSHL   #7176458
                00000000G       00              03   FB 001BC          CALLS   #3, LIB$SIGNAL
                      8F        8F        01    A7   91 001C3 12$:     CMPB    1(NEW_INS_PTR), #143                    ; 3868
                                            0E   13 001C8          BEQL    13$
                      AF        8F        01    A7   91 001CA          CMPB    1(NEW_INS_PTR), #175                    ; 3869
                                            07   13 001CF          BEQL    13$
                      CF        8F        01    A7   91 001D1          CMPB    1(NEW_INS_PTR), #207                    ; 3870
                                            0D   12 001D6          BNEQ    14$
                              006D82CA      8F   DD 001D8 13$:     PUSHL   #7176906                                ; 3872
                00000000G       00              01   FB 001DE          CALLS   #1, LIB$SIGNAL
                                7E              67   9A 001E5 14$:     MOVZBL  (NEW_INS_PTR), -(SP)                    ; 3873
                                        01      A7   9F 001E8          PUSHAB  1(NEW_INS_PTR)
                                   00000000G    EF   9F 001EB          PUSHAB  PAT$GL_TEMP_BUF
                00000000V       EF              03   FB 001F1          CALLS   #3, PAT$FILL_BUF
                     50         08        AC   6E   C1 001F8          ADDL3   NEXT_PC, HOLE_SIZE, R0                  ; 3874
                08   AC                   50   5A   C3 001FD          SUBL3   NEXT_LOC, R0, HOLE_SIZE
                                            5A   6E   D0 00202          MOVL    NEXT_PC, NEXT_LOC                       ; 3875
                                                 FF0D 31 00205          BRW     8$                                      ; 3831
                                   53 00000000G     EF   D0 00208 15$:     MOVL    PAT$GL_TEMP_BUF+4, CUR_LOC              ; 3882
                                   6E               59   D0 0020F          MOVL    R9, NEXT_PC                             ; 3883
                                   52         10    AC   D0 00212          MOVL    ASC_INS_PTR, NXT_ASC_INS                ; 3884
                                   50 00000000G     EF   D0 00216 16$:     MOVL    PAT$GL_TEMP_BUF+4, R0                   ; 3885
                                   51 00000000G     EF   3C 0021D          MOVZWL  PAT$GL_TEMP_BUF, R1
                                   51               50   C0 00224          ADDL2   R0, R1
                                   51               53   D1 00227          CMPL    CUR_LOC, R1
                                                    03   1F 0022A          BLSSU   17$
                                                 00EB 31 0022C          BRW     25$
                                      00000000G     EF   D4 0022F 17$:     CLRL    PAT$GL_BUF_SIZ                          ; 3888
                   00000000G          EF        59   AE   9E 00235          MOVAB   LOCAL_BUF+1, PAT$CP_OUT_STR             ; 3889
                51                    50        0C   AC   C1 0023D          ADDL3   OLD_INS_SIZ, R0, R1                     ; 3890
                                      51               53   D1 00242          CMPL    CUR_LOC, R1
                                                       1C   1F 00245          BLSSU   18$
                                      50               55   C0 00247          ADDL2   SUCC_OLD_INS, R0                        ; 3891
                                      50               53   D1 0024A          CMPL    CUR_LOC, R0
                                                       14   1E 0024D          BGEQU   18$
                                      54         04    A2   D0 0024F          MOVL    4(NXT_ASC_INS), DECODED_INS             ; 3900
                                      52               62   D0 00253          MOVL    (NXT_ASC_INS), NXT_ASC_INS              ; 3901
                   00000000G          EF 00000000G     EF   D0 00256          MOVL    PAT$GL_RELABLS, PAT$GL_SYMTBPTR         ; 3902
                                                       0F   11 00261          BRB     19$                                     ; 3890
                                      54         58    AE   9E 00263 18$:     MOVAB   LOCAL_BUF, DECODED_INS                  ; 3910
                   00000000G          EF 00000000G     EF   D0 00267          MOVL    PAT$GL_OLDLABLS, PAT$GL_SYMTBPTR        ; 3911
                                                       7E   D4 00272 19$:     CLRL    -(SP)                                   ; 3913
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                 00000000G  EF  9F 00274          PUSHAB  PAT$GL_NEW_ASD                        ;
                        08  AE  9F 0027A          PUSHAB  NEXT_PC                               ;
                            7E  D4 0027D          CLRL    -(SP)                                 ;
                            53  DD 0027F          PUSHL   CUR_LOC                               ;
     00000000G  EF          05  FB 00281          CALLS   #5, PAT$INS_DECODE                    ;
                53          50  D0 00288          MOVL    R0, CUR_LOC                           ;
                            0D  12 0028B          BNEQ    20$                                   ;
                 006D8102   8F  DD 0028D          PUSHL   #7176450                              ; 3915
     00000000G  00          01  FB 00293          CALLS   #1, LIB$SIGNAL                        ;
        58  AE   00000000G  EF  90 0029A  20$:    MOVB    PAT$GL_BUF_SIZ, LOCAL_BUF             ; 3916
            57          08  AE  9E 002A2          MOVAB   INSTRUC_BUF, NEW_INS_PTR              ; 3917
                            5B  DD 002A6          PUSHL   R11                                   ; 3918
                 00000000G  EF  9F 002A8          PUSHAB  PAT$GL_NEW_ASD                        ;
            50              6B  3C 002AE          MOVZWL  PAT$GL_RLOC_BUF, R0                   ; 3919
                          6046  9F 002B1          PUSHAB  (R0)[NEW_LOC]                         ;
                        14  AE  9F 002B4          PUSHAB  INSTRUC_BUF                           ; 3918
                            54  DD 002B7          PUSHL   DECODED_INS                           ;
     00000000G  EF          05  FB 002B9          CALLS   #5, PAT$INS_ENCODE                    ;
                23          50  E8 002C0          BLBS    R0, 22$                               ;
                 00000000G  EF  95 002C3          TSTB    PAT$GB_SUBST_IN                       ; 3921
                            09  13 002C9          BEQL    21$                                   ;
            57   00000000G  EF  9E 002CB          MOVAB   PAT$GB_SUBST_IN, NEW_INS_PTR          ; 3923
                            12  11 002D2          BRB     22$                                   ;
                        58  AE  9F 002D4  21$:    PUSHAB  LOCAL_BUF                             ; 3925
                            01  DD 002D7          PUSHL   #1                                    ;
                 006D810A   8F  DD 002D9          PUSHL   #7176458                              ;
     00000000G  00          03  FB 002DF          CALLS   #3, LIB$SIGNAL                        ;
            8F  8F      01  A7  91 002E6  22$:    CMPB    1(NEW_INS_PTR), #143                  ; 3929
                            0E  13 002EB          BEQL    23$                                   ;
            AF  8F      01  A7  91 002ED          CMPB    1(NEW_INS_PTR), #175                  ; 3930
                            07  13 002F2          BEQL    23$                                   ;
            CF  8F      01  A7  91 002F4          CMPB    1(NEW_INS_PTR), #207                  ; 3931
                            0D  12 002F9          BNEQ    24$                                   ;
                 006D82CA   8F  DD 002FB  23$:    PUSHL   #7176906                              ; 3933
     00000000G  00          01  FB 00301          CALLS   #1, LIB$SIGNAL                        ;
                7E          67  9A 00308  24$:    MOVZBL  (NEW_INS_PTR), -(SP)                  ; 3934
                        01  A7  9F 0030B          PUSHAB  1(NEQ_INS_PTR)                        ;
                            5B  DD 0030E          PUSHL   R11                                   ;
     00000000V  EF          03  FB 00310          CALLS   #3, PAT$FILL_BUF                      ;
                          FEFC  31 00317          BRW     16$                                   ; 3885
     00000000G  EF  00000000G  EF  D0 0031A  25$: MOVL    PAT$GL_RLCLABLS, PAT$GL_SYMTBPTR      ; 3936
                            5B  DD 00325          PUSHL   R11                                   ; 3937
     00000000G  EF          01  FB 00327          CALLS   #1, PAT$RESOLVE_INS                   ;
                50  00000000G  EF  D0 0032E       MOVL    PAT$GL_PATAREA, R0                    ; 3944
                51          6B  3C 00335          MOVZWL  PAT$GL_RLOC_BUF, R1                   ; 3945
50              51      04  A0  C1 00338          ADDL3   4(R0), R1, R0                         ;
                50          5A  C2 0033D          SUBL2   NEXT_LOC, R0                          ; 3944
        04      AE          50  CE 00340          MNEGL   R0, BR_DISPLACEMENT                   ; 3945
        04      AE          02  C2 00344          SUBL2   #2, BR_DISPLACEMENT                   ;
  0000007F      8F      04  AE  D1 00348          CMPL    BR_DISPLACEMENT, #127                 ; 3946
                            12  14 00350          BGTR    26$                                   ;
  FFFFFF80      8F      04  AE  D1 00352          CMPL    BR_DISPLACEMENT, #-128                ;
                            08  19 0035A          BLSS    26$                                   ;
        08      AE    1102  8F  B0 0035C          MOVW    #4354, INSTRUC_BUF                    ; 3949
                            1D  11 00362          BRB     27$                                   ; 3951
  00007FFF      8F      04  AE  D1 00364  26$:    CMPL    BR_DISPLACEMENT, #32767               ; 3954
                            1F  14 0036C          BGTR    28$                                   ;
```

```
                    FFFF8000   8F        04   AE   D1 0036E          CMPL    BR_DISPLACEMENT, #-32768            ;
                                              15   19 00376          BLSS    28$                                 ;
                          08   AE      7103   8F   B0 00378          MOVW    #12547, INSTRUC_BUF                 ; 3957
                                         04   AE   D7 0037E          DECL    BR_DISPLACEMENT                     ; 3959
                               50        08   AE   9A 00381  27$:    MOVZBL  INSTRUC_BUF, R0                     ; 3960
          0A    AE        04   AE             50   28 00385          MOVC3   R0, BR_DISPLACEMENT, INSTRUC_BUF+2  ;
                                              18   11 0038B          BRB     29$                                 ; 3954
                          08   AE      1706   8F   B0 0038D  28$:    MOVW    #5894, INSTRUC_BUF                  ; 3964
                          0A   AE             11   8E 00393          MNEGB   #17, INSTRUC_BUF+2                  ; 3966
                          04   AE             04   C2 00397          SUBL2   #4, BR_DISPLACEMENT                 ; 3967
                               50        08   AE   9A 0039B          MOVZBL  INSTRUC_BUF, R0                     ; 3968
          0B    AE        04   AE             50   28 0039F          MOVC3   R0, BR_DISPLACEMENT, INSTRUC_BUF+3  ;
                               7E        08   AE   9A 003A5  29$:    MOVZBL  INSTRUC_BUF, -(SP)                  ; 3970
                                         0D   AE   9F 003A9          PUSHAB  INSTRUC_BUF+1                       ;
                                              5B   DD 003AC          PUSHL   R11                                 ;
                    00000000V  EF             03   FB 003AE          CALLS   #3, PAT$FILL_BUF                    ;
                               52             6B   3C 003B5          MOVZWL  PAT$GL_RLOC_BUF, R2                 ; 3975
                               50 00000000G   EF   D0 003B8          MOVL    PAT$GL_PATAREA, R0                  ;
                               52             60   B1 003BF          CMPW    (R0), R2                            ;
                                              52   1E 003C2          BGEQU   32$                                 ;
                               51 00000000G   EF   D0 003C4          MOVL    PAT$GL_IHPPTR, R1                   ; 3978
                          14   A1        04   A0   D1 003CB          CMPL    4(R0), 20(R1)                       ;
                                              2D   12 003D0          BNEQ    30$                                 ;
                                              59   DD 003D??         PUSHL   R9                                  ; 3981
                               52      01FF   C2   9E 003??          MOVAB   511(R2), R2                         ;
                7E             52 00000200    8F   C7 003D9          DIVL3   #512, R2, -(SP)                     ;
                    00000000G  EF             02   FB 003E1          CALLS   #2, PAT$EXP_AREA                    ;
                               50 00000000G   EF   D0 003E8          MOVL    PAT$GL_PATAREA, R0                  ; 3982
                               6B             60   B1 003EF          CMPW    (R0), PAT$GL_RLOC_BUF               ;
                                              22   1E 003F2          BGEQU   32$                                 ;
                               7E             60   3C 003F4          MOVZWL  (R0), -(SP)                         ; 3985
                                         04   A0   DD 003F7          PUSHL   4(R0)                               ;
                               7E             6B   3C 003FA          MOVZWL  PAT$GL_RLOC_BUF, -(SP)              ; 3984
                                              08   11 003FD          BRB     31$                                 ;
                               7E             60   3C 003FF  30$:    MOVZWL  (R0), -(SP)                         ; 3989
                                         04   A0   DD 00402          PUSHL   4(R0)                               ;
                                              52   DD 00405          PUSHL   R2                                  ; 3988
                                              03   DD 00407  31$:    PUSHL   #3                                  ;
                                  006D80C2    8F   DD 00409          PUSHL   #7176386                            ;
                    00000000G  00             05   FB 0040F          CALLS   #5, LIB$SIGNAL                      ;
                               7E             6B   3C 00416  32$:    MOVZWL  PAT$GL_RLOC_BUF, -(SP)              ; 3991
                                         04   AB   DD 00419          PUSHL   PAT$GL_RLOC_BUF+4                   ;
                               50 00000000G   EF   D0 0041C          MOVL    PAT$GL_PATAREA, R0                  ;
                                         04   A0   DD 00423          PUSHL   4(R0)                               ;
                    00000000G  EF             03   FB 00426          CALLS   #3, PAT$WRITE_MEM                   ;
                               50 00000000G   EF   D0 0042D          MOVL    PAT$GL_PATAREA, R0                  ; 3992
                               60             6B   A2 00434          SUBW2   PAT$GL_RLOC_BUF, (R0)               ;
                               51             6B   3C 00437          MOVZWL  PAT$GL_RLOC_BUF, R1                 ; 3993
                          04   A0             51   C0 0043A          ADDL2   R1, 4(R0)                           ;
                               58        08   AC   D0 0043E          MOVL    HOLE_SIZE, R8                       ; 4000
  58            F8   AD        08             00   ED 00442          CMPZV   #0, #8, BR_INSTRUC, R8              ;
                                              3C   18 00448          BGEQ    33$                                 ;
                               50        03   A8   9E 0044A          MOVAB   3(R8), R0                           ; 4003
                7E             50             04   C7 0044E          DIVL3   #4, R0, -(SP)                       ;
                    00000000G  EF             01   FB 00452          CALLS   #1, PAT$FREEZ                       ;
                               57             50   D0 00459          MOVL    R0, NEW_INS_PTR                     ;
                               50        F8   AD   9A 0045C          MOVZBL  BR_INSTRUC, R0                      ; 4004
```

```
                58              01      F9      AD              50  2C 00460            MOVC5   R0, BR_INSTRUC+1, #1, R8, (NEW_INS_PTR)     ; 4005
                                                                67     00466
                                        7E                      57  7D 00467            MOVQ    NEW_INS_PTR, -(SP)                          ; 4006
                                                                59  DD 0046A            PUSHL   R9
                                    00000000G   EF              03  FB 0046C            CALLS   #3, PAT$WRITE_MEM
                                                50          03  A8  9E 00473            MOVAB   3(R8), R0                                   ; 4007
                                7E              50              04  C7 00477            DIVL3   #4, R0, -(SP)
                                                                57  DD 0047B            PUSHL   NEW_INS_PTR
                                    00000000G   EF              02  FB 0047D            CALLS   #2, PAT$FREERELEASE
                                                                0E  11 00484            BRB     34$                                         ; 4000
                                                                58  DD 00486 33$:       PUSHL   R8                                          ; 4010
                                                        F9      AD  9F 00488            PUSHAB  BR_INSTRUC+1
                                                                59  DD 0048B            PUSHL   R9
                                    00000000G   EF              03  FB 0048D            CALLS   #3, PAT$WRITE_MEM
                                                5A              59  D0 00494 34$.       MOVL    R9, NEXT_LOC                                ; 4015
                                                59              58  C0 00497            ADDL2   R8, R9                                      ; 4016
                                                59              5A  D1 0049A 35$:       CMPL    NEXT_LOC, R9
                                                                20  18 0049D            BGEQ    36$
                                                                7E  D4 0049F            CLRL    -(SP)                                       ; 4019
                                                    00000000G   EF  9F 004A1            PUSHAB  PAT$GL_NEW_ASD
                                                    00000000'   EF  9F 004A7            PUSHAB  NEW_TAB_STG
                                                                5A  DD 004AD            PUSHL   NEXT_LOC
                                    00000000V   EF              04  FB 004AF            CALLS   #4, PAT$OUT_MEM_LOC
                                                5A 00000000G    EF  D0 004B6            MOVL    PAT$GL_NEXT_LOC, NEXT_LOC                   ; 4020
                                                                DB  11 004BD            BRB     35$                                         ; 4016
                                                5A              56  D0 004BF 36$:       MOVL    NEW_LOC, NEXT_LOC                           ; 4022
                                                50 00000000G    EF  D0 004C2 37$:       MOVL    PAT$GL_PATAREA, R0                          ; 4023
                                        04      A0                  5A  D1 004C9            CMPL    NEXT_LOC, 4(R0)
                                                                20  18 004CD            BGEQ    38$
                                                                7E  D4 004CF            CLRL    -(SP)                                       ; 4026
                                                    00000000G   EF  9F 004D1            PUSHAB  PAT$GL_NEW_ASD
                                                    00000000'   EF  9F 004D7            PUSHAB  NEW_TAB_STG
                                                                5A  DD 004DD            PUSHL   NEXT_LOC
                                    00000000V   EF              04  FB 004DF            CALLS   #4, PAT$OUT_MEM_LOC
                                                5A 00000000G    EF  D0 004E6            MOVL    PAT$GL_NEXT_LOC, NEXT_LOC                   ; 4027
                                                                D3  11 004ED            BRB     37$                                         ; 4023
                                                                    04 004EF 38$:       RET                                                 ; 4031

; Routine Size:  1264 bytes,    Routine Base:  _PAT$CODE + 066B
```

```
;1380     4032  1 GLOBAL ROUTINE PAT$SUBST_INS (OLD_INS_PTR, INS_PC) =
;1381     4033  1
;1382     4034  1 !++
;1383     4035  1 ! FUNCTIONAL DESCRIPTION:
;1384     4036  1 !
;1385     4037  1 ! This routine substitutes other instruction sequences for branch-type
;1386     4038  1 ! instructions that have been relocated to a new address and whose branch
;1387     4039  1 ! displacements are now too small.  The following table describes the
;1388     4040  1 ! possible substitutions.  If the branch in the first replacement choice does
;1389     4041  1 ! not reach, then the second replacement choice is used.  Notice that the blank
;1390     4042  1 ! lines in the table separate groups of instructions that are handled
;1391     4043  1 ! similarly for substitutions.
;1392     4044  1 !
;1393     4045  1 ! OPC   INSTRUC        REPLACEMENT 1                 REPLACEMENT 2
;1394     4046  1 ! ---   -------        -------------                 -------------
;1395     4047  1 !
;1396     4048  1 ! 12    BNEQ <X>       BEQL .+03, BRW <X>            BEQL .+06, JMP <X>
;1397     4049  1 ! 13    BEQL <X>       BNEQ .+03, BRW <X>            BNEQ .+06, JMP <X>
;1398     4050  1 ! 14    BGTR <X>       BLEQ .+03, BRW <X>            BLEQ .+06, JMP <X>
;1399     4051  1 ! 15    BLEQ <X>       BGTR .+03, BRW <X>            BGTR .+06, JMP <X>
;1400     4052  1 ! 18    BGEQ <X>       BLSS .+03, BRW <X>            BLSS .+06, JMP <X>
;1401     4053  1 ! 19    BLSS <X>       BLSS .+03, BRW <X>            BLSS .+06, JMP <X>
;1402     4054  1 ! 1A    BGTRU <X>      BLEQU .+03, BRW <X>           BLEQU .+06, JMP <X>
;1403     4055  1 ! 1B    BLEQU <X>      BGTRU .+03, BRW <X>           BGTRU .+06, JMP <X>
;1404     4056  1 ! 1C    BVC <X>        BVS .+03, BRW <X>             BVS .+06, JMP <X>
;1405     4057  1 ! 1D    BVS <X>        BVC .+03, BRW <X>             BVC .+06, JMP <X>
;1406     4058  1 ! 1E    BGEQU <X>      BLSSU .+03, BRW <X>           BLSSU .+06, JMP <X>
;1407     4059  1 ! 1F    BLSSU <X>      BGEQU .+03, BRW <X>           BGEQU .+06, JMP <X>
;1408     4060  1 ! E0    BBS <X>        BBC .+03, BRW <X>             BBC .+06, JMP <X>
;1409     4061  1 ! E1    BBC <X>        BBS .+03, BRW <X>             BBS .+06, JMP <X>
;1410     4062  1 ! E2    BBSS <X>       BBCS .+03, BRW <X>            BBCS .+06, JMP <X>
;1411     4063  1 ! E3    BBCS <X>       BBSS .+06, BRW <X>            BBSS .+03, JMP <X>
;1412     4064  1 ! E4    BBSC <X>       BBCC .+03, BRW <X>            BBCC .+06, JMP <X>
;1413     4065  1 ! E5    BBCC <X>       BBSC .+03, BRW <X>            BBSC .+06, JMP <X>
;1414     4066  1 ! E8    BLBS <X>       BLBC .+03, BRW <X>            BLBC .+06, JMP <X>
;1415     4067  1   E9    BLBC <X>       BLBS .+03, BRW <X>            BLBS .+06, JMP <X>
;1416     4068  1 !
;1417     4069  1 ! E6    BBSSI <X>      BBSSI .+02, BRB .+03, BRW <X>  BBSSI .+02, BRB .+06, JMP <X>
;1418     4070  1 ! E7    BBCCI <X>      BBCCI .+02, BRB .+03, BRW <X>  BBCCI .+02, BRB .+06, JMP <X>
;1419     4071  1 ! F2    AOBLSS <X>     AOBLSS .+02, BRB .+03, BRW <X> AOBLSS .+02, BRB .+06, JMP <X>
;1420     4072  1 ! F3    AOBLEQ <X>     AOBLEQ .+02, BRB .+03, BRW <X> AOBLEQ .+02, BRB .+06, JMP <X>
;1421     4073  1 ! F4    SOBGEQ <X>     SOBGEQ .+02, BRB .+03, BRW <X> SOBGEQ .+02, BRB .+06, JMP <X>
;1422     4074  1 ! F5    SOBGTR <X>     SOBGTR .+02, BRB .+03, BRW <X> SOBGTR .+02, BRB .+06, JMP <X>
;1423     4075  1 !
;1424     4076  1 ! 9D    ACBB <X>       ACBB .+02, BRB .+06, JMP <X>
;1425     4077  1 ! 3D    ACBW <X>       ACBW .+02, BRB .+06, JMP <X>
;1426     4078  1 ! F1    ACBL <X>       ACBL .+02, BRB .+06, JMP <X>
;1427     4079  1 ! 4F    ACBF <X>       ACBF .+02, BRB .+06, JMP <X>
;1428     4080  1 ! 6F    ACBD <X>       ACBD .+02, BRB .+06, JMP <X>
;1429     4081  1 ! 4FFD  ACBG <X>       ACBG .+02, BRB .+06, JMP <X>
;1430     4082  1 ! 6FFD  ACBH <X>       ACBH .+02, BRB .+06, JMP <X>
;1431     4083  1 !
;1432     4084  1 ! 11    BRB <X>        BRW <X>                       JMP <X>
;1433     4085  1 ! 10    BSBB <X>       BSBW <X>                      JSB <X>
;1434     4086  1 !
;1435     4087  1 ! 31    BRW <X>        JMP <X>
;1436     4088  1 ! 30    BSBW <X>       JSB <X>
```

```
;  1437     4089  1 !
;  1438     4090  1 ! In addition to the above instructions, there are also three case
;  1439     4091  1 ! instructions.  None of these has a replacement.  (In fact, the encoder
;  1440     4092  1 ! does not know how to insert a case instruction correctly; it will only
;  1441     4093  1 ! insert the instruction parameters.  The branch displacements must be
;  1442     4094  1 ! inserted as .WORD directives.)
;  1443     4095  1 !
;  1444     4096  1 ! CALLING SEQUENCE:
;  1445     4097  1 !
;  1446     4098  1 !       PAT$SUBST_INS (OLD-ENCODED-INSTRUCTION-ADDRESS, PC-OF-INSTRUCTION)
;  1447     4099  1 !
;  1448     4100  1 ! INPUTS:
;  1449     4101  1 !
;  1450     4102  1 !       OLD_INS_PTR - Address of counted instruction stream to be substituted
;  1451     4103  1 !       INS_PC = Unmapped address of where to put instruction
;  1452     4104  1 !
;  1453     4105  1 ! IMPLICIT INPUTS:
;  1454     4106  1 !
;  1455     4107  1 !       PAT$GB_SUBST_IN - Buffer for substitution counted byte stream
;  1456     4108  1 !
;  1457     4109  1 ! OUTPUTS:
;  1458     4110  1 !
;  1459     4111  1 !       NONE
;  1460     4112  1 !
;  1461     4113  1 ! IMPLICIT OUTPUTS:
;  1462     4114  1 !
;  1463     4115  1 !       The substitution binary stream is written into INSTRUC_BUF
;  1464     4116  1 !       as a counted byte stream.
;  1465     4117  1 !
;  1466     4118  1 ! ROUTINE VALUE:
;  1467     4119  1 !
;  1468     4120  1 !       FALSE if no substitution instructions were possible.
;  1469     4121  1 !       TRUE if substitution was successful.
;  1470     4122  1 !
;  1471     4123  1 ! SIDE EFFECTS:
;  1472     4124  1 !
;  1473     4125  1 !       A substitution stream can now be written to memory, or an error
;  1474     4126  1 !       reported.  However, if an instruction had a label associated with it
;  1475     4127  1 !       any branches elsewhere in the code to it will no longer work!!!
;  1476     4128  1 !
;  1477     4129  1 !--                                                                        ; I
;  1478     4130  1
;  1479     4131  2 BEGIN
;  1480     4132  2
;  1481     4133  2 MAP
;  1482     4134  2         OLD_INS_PTR : REF VECTOR[,BYTE];                ! Old binary instruction stream
;  1483     4135  2
;  1484     4136  2 LITERAL
;  1485     4137  2         MIN_WORD_DISP = -32768,                         ! Minimum displacement for BRW
;  1486     4138  2         MAX_WORD_DISP = 32767,                          ! Maximum displacement for BRW
;  1487     4139  2         BRB_OPCODE = %X'11',                            ! Opcode for BRB instruction
;  1488     4140  2         BRW_OPCODE = %X'31',                            ! Opcode for BRW instruction
;  1489     4141  2         JMP_OPCODE = %X'17',                            ! Opcode forJMP instruction
;  1490     4142  2         BNEQ_OPCODE = %X'12',                           ! Opcode for BNEQ instruction
;  1491     4143  2         BLEQ_OPCODE = %X'15',                           ! Opcode for BLEQ instruction
;  1492     4144  2         BGEQ_OPCODE = %X'18',                           ! Opcode for BGEQ instruction
;  1493     4145  2         BLSSU_OPCODE = %X'1F',                          ! Opcode for BLSSU instruction
```

```
;  1494          4146  2          BBS_OPCODE = %X'E0',                    ! Opcode for BBS instruction
;  1495          4147  2          BBCC_OPCODE = %X'E5',                   ! Opcode for BBCC instruction
;  1496          4148  2          BLBS_OPCODE = %X'E8',                   ! Opcode for BLBS instruction
;  1497          4149  2          BLBC_OPCODE = %X'E9',                   ! Opcode for BLBC instruction
;  1498          4150  2          BBSSI_OPCODE = %X'E6',                  ! Opcode for BBSSI instruction
;  1499          4151  2          BBCCI_OPCODE = %X'E7',                  ! Opcode for BBCCI instruction
;  1500          4152  2          AOBLSS_OPCODE = %X'F2',                 ! Opcode for AOBLSS instruction
;  1501          4153  2          SOBGTR_OPCODE = %X'F5',                 ! Opcode for SOBGTR instruction
;  1502          4154  2          ACBB_OPCODE = %X'9D',                   ! Opcode for ACBB instruction
;  1503          4155  2          ACBW_OPCODE = %X'3D',                   ! Opcode for ACBW instruction
;  1504          4156  2          ACBL_OPCODE = %X'F1',                   ! Opcode for ACBL instruction
;  1505          4157  2          ACBF_OPCODE = %X'4F',                   ! Opcode for ACBF instruction
;  1506          4158  2          ACBD_OPCODE = %X'6F',                   ! Opcode for ACBD instruction
;  1507          4159  2          ACBG_HICODE = %X'4F',                   ! High byte of Opcode for ACBG instruction
;  1508          4160  2          ACBH_HICODE = %X'6F',                   ! High byte of Opcode for ACBH instruction
;  1509          4161  2          CASEB_OPCODE = %X'8F',                  ! Opcode for CASEB instruction
;  1510          4162  2          CASEW_OPCODE = %X'AF',                  ! Opcode for CASEW instruction
;  1511          4163  2          CASEL_OPCODE = %X'CF',                  ! Opcode for CASEL instruction
;  1512          4164  2          BSBW_OPCODE = %X'30',                   ! Opcode for BSBW instruction
;  1513          4165  2          BSBB_OPCODE = %X'10',                   ! Opcode for BSBB instruction
;  1514          4166  2          JSB_OPCODE = %X'16',                    ! Opcode for JSB instruction
;  1515          4167  2          BRB_INS_SIZ = 2,                        ! Size of BRB instruction
;  1516          4168  2          BRW_INS_SIZ = 3,                        ! Size of BRW instruction
;  1517          4169  2          JMP_INS_SIZ = 6,                        ! Size of JMP instruction
;  1518          4170  2          PC_DEFERRED = %X'EF',                   ! PC deferred instruction mode
;  1519          4171  2          MAX_INST_LEN    = 80;                   ! Maximum number of binary bytes in an instr
;  1520          4172  2
;  1521          4173  2 LOCAL
;  1522          4174  2          BR_DISPLACEMENT : SIGNED LONG;          ! Displacement for branch instruction
;  1523          4175  2
;  1524          4176  2 !++
;  1525          4177  2 ! Handle the first group of substitutions.  These may be replaced with
;  1526          4178  2 ! their complement and a BRW, i.e., opcodes BGTR through BLBC in the above
;  1527          4179  2 ! table.  The complement instruction must be set to branch around the BRW
;  1528          4180  2 ! instruction.  Therefore, the instruction stream changes from:
;  1529          4181  2 !               <BR INS> TO <X>
;  1530          4182  2 ! TO:
;  1531          4183  2 !               <BR COM INS> TO .+03            BRW <X>
;  1532          4184  2 !--
;  1533          4185  2 IF (.OLD_INS_PTR[1] GEQU BNEQ_OPCODE AND .OLD_INS_PTR[1] LEQU BLEQ_OPCODE) OR
;  1534          4186  2    (.OLD_INS_PTR[1] GEQU BGEQ_OPCODE AND .OLD_INS_PTR[1] LEQU BLSSU_OPCODE) OR
;  1535          4187  2    (.OLD_INS_PTR[1] GEQU BBS_OPCODE  AND .OLD_INS_PTR[1] LEQU BBCC_OPCODE ) OR
;  1536          4188  3    (.OLD_INS_PTR[1] GEQU BLBS_OPCODE AND .OLD_INS_PTR[1] LEQU BLBC_OPCODE )
;  1537          4189  2 THEN
;  1538          4190  3          BEGIN
;  1539          4191  3          !++
;  1540          4192  3          ! Build the binary instruction stream for the complement branch.
;  1541          4193  3          ! Then build the BRW instruction with the old branch's displacement.
;  1542          4194  3          !--
;  1543          4195  3          PAT$GB_SUBST_IN[0] = BRW_INS_SIZ + .OLD_INS_PTR[0];     ! Set the entire stream length
;  1544          4196  5          PAT$GB_SUBST_IN[1] = (IF .OLD_INS_PTR[1] THEN (.OLD_INS_PTR[1] - 1)
;  1545          4197  3                                ELSE (.OLD_INS_PTR[1] + 1));   ! Set complement opcode
;  1546          4198  3          CH$MOVE(.OLD_INS_PTR[0]-2, CH$PTR(OLD_INS_PTR[2]), CH$PTR(PAT$GB_SUBST_IN[2])); ! Move in instructio
;  1547          4199  3          PAT$GB_SUBST_IN[.OLD_INS_PTR[0]] = BRB_INS_SIZ;         ! Set complement branch around BRW instructi
;  1548          4200  3          PAT$GB_SUBST_IN[.OLD_INS_PTR[0]+1] = BRW_OPCODE;        ! Set BRW instruction opcode
;  1549          4201  3          BR_DISPLACEMENT = .PAT$GL_BR_DISPL + .OLD_INS_PTR[0] - .PAT$GB_SUBST_IN[0]; ! Compute new PC-relativ
;  1550          4202  3          IF (.BR_DISPLACEMENT LEQ MAX_WORD_DISP) AND
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; 1551          4203  4            (.BR_DISPLACEMENT GEQ MIN_WORD_DISP)                    ! Does displacement fit
; 1552          4204  3        THEN
; 1553          4205  3            (PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+2 ])<0,16,1> = .BR_DISPLACEMENT       ! Yes, move it into
; 1554          4206  3        ELSE
; 1555          4207  4            BEGIN
; 1556          4208  4            !++
; 1557          4209  4            ! No, it did not fit.  Use a JMP instead of a BRW, which
; 1558          4210  4            ! is the second choice in the table.  The complement branch
; 1559          4211  4            ! displacement must be changed, too.
; 1560          4212  4            !--
; 1561          4213  4            PAT$GB_SUBST_IN[0] = .PAT$GB_SUBST_IN[0] + (JMP_INS_SIZ - BRW_INS_SIZ); ! Set new instructio
; 1562          4214  4            PAT$GB_SUBST_IN[ .OLD_INS_PTR[0] ] = JMP_INS_SIZ; ! Set complement branch around JMP instruc
; 1563          4215  4            PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+1 ] = JMP_OPCODE; ! Set JMP opcode
; 1564          4216  4            PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+2 ] = PC_DEFERRED; ! Set instruction mode
; 1565          4217  4            (PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+3 ])<0,32,1> = .BR_DISPLACEMENT -
; 1566          4218  4                                    (JMP_INS_SIZ - BRW_INS_SIZ); ! Set new branch displacement
; 1567          4219  4
; 1568          4220  4            END
; 1569          4221  3        END
; 1570          4222  2    ELSE
; 1571          4223  2    !++
; 1572          4224  2    ! The opcode was not one of the first group, therefore check to see if
; 1573          4225  2    ! it was one of the second group.
; 1574          4226  2    !--
; 1575          4227  2    IF (.OLD_INS_PTR[1] EQLU BBSSI_OPCODE) OR
; 1576          4228  2       (.OLD_INS_PTR[1] EQLU BBCCI_OPCODE) OR
; 1577          4229  3       (.OLD_INS_PTR[1] GEQU AOBLSS_OPCODE AND .OLD_INS_PTR[1] LEQU SOBGTR_OPCODE)
; 1578          4230  2    THEN
; 1579          4231  3        BEGIN
; 1580          4232  3        !++
; 1581          4233  3        ! Handle the second group of substitutions.  THese may be replaced with
; 1582          4234  3        ! the instruction branch, a BRB instruction, and a BRW or JMP
; 1583          4235  3        ! instruction.  This group includes instructions BBSSI through ACBD in
; 1584          4236  3        ! the above table.  The instruction branch must be set to branch around
; 1585          4237  3        ! the BRB instruction.  The BRB instruction must be set to branch around
; 1586          4238  3        ! the BRW instruction.  Therefore, the instruction stream changes from:
; 1587          4239  3        !       <BR INS> TO <X>
; 1588          4240  3        ! TO:
; 1589          4241  3        !       <BR INS> TO .+02        BRB TO .+03     BRW <X>
; 1590          4242  3        !--
; 1591          4243  3        PAT$GB_SUBST_IN[0] = .OLD_INS_PTR[0] + BRB_INS_SIZ + BRW_INS_SIZ; ! Set the stream length
; 1592          4244  3        CH$MOVE(.OLD_INS_PTR[0]-1, CH$PTR(OLD_INS_PTR[1]), CH$PTR(PAT$GB_SUBST_IN[1])); ! Copy old ins strea
; 1593          4245  3        PAT$GB_SUBST_IN[ .OLD_INS_PTR[0] ] = BRB_INS_SIZ;       ! Set displ to br around BRB ins
; 1594          4246  3        PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+1 ] = BRB_OPCODE;      ! Set BRB opcode
; 1595          4247  3        PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+2 ] = BRW_INS_SIZ;     ! Set BRB around BRW ins
; 1596          4248  3        PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+3 ] = BRW_OPCODE;      ! Set BRW opcode
; 1597          4249  3        BR_DISPLACEMENT = .PAT$GL_BR_DISPL + .OLD_INS_PTR[0] - .PAT$GB_SUBST_IN[0]; ! Compute new PC-relativ
; 1598          4250  3        IF (.BR_DISPLACEMENT LEQ MAX_WORD_DISP) AND
; 1599          4251  4           (.BR_DISPLACEMENT GEQ MIN_WORD_DISP)                 ! Does displacement fit?
; 1600          4252  3        THEN
; 1601          4253  3            (PAT$GB_SUBST_IN[ .PAT$GB_SUBST_IN[0]-1 ])<0,16,1> = .BR_DISPLACEMENT ! Yes, move in displac
; 1602          4254  3        ELSE
; 1603          4255  4            BEGIN
; 1604          4256  4            !++
; 1605          4257  4            ! No, displacement did not fit, therefore use the
; 1606          4258  4            ! second substitution choice.  This includes changing
; 1607          4259  4            ! the BRW to a JMP, and altering the branch around it.
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;  1608          4260  4                   !--
;  1609          4261  4                   PAT$GB_SUBST_IN[0] = .PAT$GB_SUBST_IN[0] + (JMP_INS_SIZ - BRW_INS_SIZ); ! Set a new stream s
;  1610          4262  4                   PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+2 ] = JMP_INS_SIZ; ! Change BRB displacement around JMP
;  1611          4263  4                   PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+3 ] = JMP_OPCODE; ! Replace the BRW opcode
;  1612          4264  4                   PAT$GB_SUBST_IN[ .OLD_INS_PTR[0]+4 ] = PC_DEFERRED; ! Set the instruction mode
;  1613          4265  4                   (PAT$GB_SUBST_IN[ .PAT$GB_SUBST_IN[0] + A_BYTE - A_LONGWORD ])<0,32,1> =
;  1614          4266  4                           .BR_DISPLACEMENT - (JMP_INS_SIZ - BRW_INS_SIZ); ! Adjust the displ
;  1615          4267  3                   END;
;  1616          4268  3           END
;  1617          4269  2 ELSE
;  1618          4270  2 !++
;  1619          4271  2 ! The opcode was not one of the second group, therefore check to see if it
;  1620          4272  2 ! was one of the third group.
;  1621          4273  2 !--
;  1622          4274  2 IF (.OLD_INS_PTR[1] EQLU ACBB_OPCODE) OR
;  1623          4275  2    (.OLD_INS_PTR[1] EQLU ACBW_OPCODE) OR
;  1624          4276  2    (.OLD_INS_PTR[1] EQLU ACBL_OPCODE) OR
;  1625          4277  2    (.OLD_INS_PTR[1] EQLU ACBF_OPCODE) OR
;  1626          4278  2    (.OLD_INS_PTR[1] EQLU ACBD_OPCODE) OR
;  1627          4279  2    (.OLD_INS_PTR[1] EQLU %X'FD' AND .OLD_INS_PTR[2] EQLU ACBG_HICODE) OR
;  1628          4280  3    (.OLD_INS_PTR[1] EQLU %X'FD' AND .OLD_INS_PTR[2] EQLU ACBH_HICODE)
;  1629          4281  2 THEN
;  1630          4282  3           BEGIN
;  1631          4283  3           !++
;  1632          4284  3           ! Handle the third group of substitutions.  These may be replaced with
;  1633          4285  3           ! the instruction branch, a BRB instruction, and a JMP instruction.
;  1634          4286  3           ! This group includes instructions ACBB through ACBD in the above table.
;  1635          4287  3           ! The instruction branch must be set to branch around the BRB
;  1636          4288  3           ! instruction.  The BRB instruction must be set to branch around the
;  1637          4289  3           ! BRW instruction.  THerefore, the instruction stream changes from:
;  1638          4290  3           !
;  1639          4291  3           ! CHANGES FROM:
;  1640          4292  3           !       <BR INS> TO <X>
;  1641          4293  3           ! TO:
;  1642          4294  3           !       <BR INS> TO .+02        BRB TO .+06     JMP <X>
;  1643          4295  3           !--
;  1644          4296  3           PAT$GB_SUBST_IN[0] = .OLD_INS_PTR[0] + (JMP_INS_SIZ + BRB_INS_SIZ); ! Set the stream length
;  1645          4297  3           CH$MOVE(.OLD_INS_PTR[0]-2, CH$PTR(OLD_INS_PTR[1]), CH$PTR(PAT$GB_SUBST_IN[1])); ! Copy old ins strea
;  1646          4298  3           PAT$GB_SUBST_IN[.OLD_INS_PTR[0]-1] = BRB_INS_SIZ;       ! Set displ to br around BRB ins
;  1647          4299  3           PAT$GB_SUBST_IN[.OLD_INS_PTR[0]] = 0;                   ! Clear other byte of displ word
;  1648          4300  3           PAT$GB_SUBST_IN[.OLD_INS_PTR[0]+1] = BRB_OPCODE;        ! Set BRB opcode
;  1649          4301  3           PAT$GB_SUBST_IN[.OLD_INS_PTR[0]+2] = JMP_INS_SIZ;       ! Set BRB around JMP instruction
;  1650          4302  3           PAT$GB_SUBST_IN[.OLD_INS_PTR[0]+3] = JMP_OPCODE;        ! Set BRW opcode
;  1651          4303  3           PAT$GB_SUBST_IN[.OLD_INS_PTR[0]+4] = PC_DEFERRED;       ! Set instruction mode
;  1652          4304  3           BR_DISPLACEMENT = .PAT$GB_BR_DISPL + .OLD_INS_PTR[0] - .PAT$GB_SUBST_IN[0]; ! Compute new PC-relativ
;  1653          4305  3           (PAT$GB_SUBST_IN[ .PAT$GB_SUBST_IN[0] + A_BYTE - A_LONGWORD ])<0,32,1> = .BR_DISPLACEMENT; ! Adjust
;  1654          4306  3           END
;  1655          4307  2 ELSE
;  1656          4308  2 !++
;  1657          4309  2 ! The opcode was not one of the third group, therefore check to see if it
;  1658          4310  2 ! was one of the fourth group.
;  1659          4311  2 !--
;  1660          4312  3 IF (.OLD_INS_PTR[1] EQL BRB_OPCODE) OR (.OLD_INS_PTR[1] EQL BSBB_OPCODE)
;  1661          4313  2 THEN
;  1662          4314  3           BEGIN
;  1663          4315  3           !++
;  1664          4316  3           ! Handle the fourth group of substitutions.  THese may be replaced with
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;1665     4317  3          ! the next larger displacement branch instruction of the same type.
;1666     4318  3          ! This group includes instrucitons BRB and BSBB.  These instructions
;1667     4319  3          ! can be handled similarly because:
;1668     4320  3          ! (1) They have the same binary format, and
;1669     4321  3          ! (2) The difference in opcodes for this branch
;1670     4322  3          !       displacement and the next larger is the same.
;1671     4323  3          ! Therefore, because of (1), the variables BRB_INS_SIZ and
;1672     4324  3          ! BRW_INS_SIZ would be identical to BSBB_INS_SIZ and
;1673     4325  3          ! BSBW_INS_SIZ.  Also, because of (2), (BRW_OPCODE - BRB_OPCODE)
;1674     4326  3          ! is the same as (BSBW_OPCODE - BSBB_OPCODE).
;1675     4327  3          !--
;1676     4328  3          PAT$GB_SUBST_IN[0] = BRW_INS_SIZ;                       ! Set ins stream size
;1677     4329  3          PAT$GB_SUBST_IN[1] = .OLD_INS_PTR[1] + (BRW_OPCODE - BRB_OPCODE); ! Set new opcode
;1678     4330  3          BR_DISPLACEMENT = .PAT$GL_BR_DISPL + .OLD_INS_PTR[0] - .PAT$GB_SUBST_IN[0]; ! Compute new displ
;1679     4331  3          IF (.BR_DISPLACEMENT LEQ MAX_WORD_DISP) AND
;1680     4332  4             (.BR_DISPLACEMENT GEQ MIN_WORD_DISP)                 ! Does displ fit?
;1681     4333  3          THEN
;1682     4334  3                  (PAT$GB_SUBST_IN[2])<0,16,1> = .BR_DISPLACEMENT ! Yes, move displ into stream
;1683     4335  3          ELSE
;1684     4336  4                  BEGIN
;1685     4337  4                  !++
;1686     4338  4                  ! No, displacement did not fit.  A longword displacement must be
;1687     4339  4                  ! used.  Therefore, convert to a JSB or JMP instruction.
;1688     4340  4                  !--
;1689     4341  4                  PAT$GB_SUBST_IN[0] = JMP_INS_SIZ;               ! Set new stream size
;1690     4342  4                  PAT$GB_SUBST_IN[1] = .PAT$GB_SUBST_IN[1] + (JMP_OPCODE - BRW_OPCODE); ! Set new opcode
;1691     4343  4                  PAT$GB_SUBST_IN[2] = PC_DEFERRED;               ! Set instruction mode
;1692     4344  4                  (PAT$GB_SUBST_IN[3])<0,32,1> = .BR_DISPLACEMENT -
;1693     4345  4                          (JMP_INS_SIZ - BRW_INS_SIZ);            ! Compute new displacement
;1694     4346  4                  END
;1695     4347  3          END
;1696     4348  2 ELSE
;1697     4349  2 !++
;1698     4350  2 ! The opcode was not one of the fourth group, therefore check to see if it
;1699     4351  2 ! was one of the fifth group.
;1700     4352  2 !--
;1701     4353  3 IF (.OLD_INS_PTR[1] EQL BRW_OPCODE) OR (.OLD_INS_PTR[1] EQL BSBW_OPCODE)
;1702     4354  2 THEN
;1703     4355  3          BEGIN
;1704     4356  3          !++
;1705     4357  3          ! Handle the fifth group of substitutions.  These may be replaced with
;1706     4358  3          ! the next larger displacement branch instruction of the same type.
;1707     4359  3          ! This group includes instructions BRW and BSBW.  These instructions
;1708     4360  3          ! can be handled similarly because:
;1709     4361  3          ! (1) They have the same binary format, and
;1710     4362  3          ! (2) The difference in opcodes for this branch displacement
;1711     4363  3          !       and the next larger is the same.
;1712     4364  3          ! Therefore, beacuse of (1), the variables JSB_INS_SIZ and JMP_INS_SIZ
;1713     4365  3          ! would be identical.  Also, because of (2), (JMP_OPCODE - BRW_OPCODE)
;1714     4366  3          ! is the same as (JSB_OPCODE - BSBW_OPCODE).
;1715     4367  3          !--
;1716     4368  3          PAT$GB_SUBST_IN[0] = JMP_INS_SIZ;                       ! Set ins stream size
;1717     4369  3          PAT$GB_SUBST_IN[1] = .OLD_INS_PTR[1] + (JMP_OPCODE - BRW_OPCODE); ! Set opcode
;1718     4370  3          PAT$GB_SUBST_IN[2] = PC_DEFERRED;                       ! Set ins mode
;1719     4371  3          BR_DISPLACEMENT = .PAT$GL_BR_DISPL + .OLD_INS_PTR[0] - .PAT$GB_SUBST_IN[0]; ! Get displacement
;1720     4372  3          (PAT$GB_SUBST_IN[3])<0,32,1> = .BR_DISPLACEMENT;        ! Compute br displ
;1721     4373  3          END
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; 1722        4374  2 ELSE
; 1723        4375  2         RETURN (FALSE);
; 1724        4376  2
; 1725        4377  2 RETURN (TRUE);
; 1726        4378  1 END;                                              ! End of PAT$SUBST_INS


                                     0FFC 00000        .ENTRY  PAT$SUBST_INS, Save R2,R3,R4,R5,R6,R7,R8,-  ; 4032
                                                               R9,R10,R11                                   ;
               5B 00000000G   EF   9E 00002        MOVAB   PAT$GL_BR_DISPL, R11                          ;
               5A 00000000G   EF   9E 00009        MOVAB   PAT$GB_SUBST_IN, R10                          ;
               59        04   AC   D0 00010        MOVL    OLD_INS_PTR, R9                               ; 4185
               57        01   A9   9A 00014        MOVZBL  1(R9), R7                                     ;
               12             57   91 00018        CMPB    R7, #18                                       ;
                              05   1F 0001B        BLSSU   1$                                            ;
               15             57   91 0001D        CMPB    R7, #21                                       ;
                              22   1B 00020        BLEQU   4$                                            ;
               18             57   91 00022 1$:    CMPB    R7, #24                                       ; 4186
                              05   1F 00025        BLSSU   2$                                            ;
               1F             57   91 00027        CMPB    R7, #31                                       ;
                              18   1B 0002A        BLEQU   4$                                            ;
           E0   8F            57   91 0002C 2$:    CMPB    R7, #224                                      ; 4187
                              06   1F 00030        BLSSU   3$                                            ;
           E5   8F            57   91 00032        CMPB    R7, #229                                      ;
                              0C   1B 00036        BLEQU   4$                                            ;
           E8   8F            57   91 00038 3$:    CMPB    R7, #232                                      ; 4188
                              6B   1F 0003C        BLSSU   8$                                            ;
           E9   8F            57   91 0003E        CMPB    R7, #233                                      ;
                              65   1A 00042        BGTRU   8$                                            ;
               56             69   9A 00044 4$:    MOVZBL  (R9), R6                                      ; 4195
       6A      56             03   81 00047        ADDB3   #3, R6, PAT$GB_SUBST_IN                       ;
               06             57   E9 0004B        BLBC    R7, 5$                                        ; 4196
               50        FF   A7   9E 0004E        MOVAB   -1(R7), R0                                    ;
                              04   11 00052        BRB     6$                                            ;
               50        01   A7   9E 00054 5$:    MOVAB   1(R7), R0                                     ; 4197
          01   AA             50   90 00058 6$:    MOVB    R0, PAT$GB_SUBST_IN+1                         ; 4196
               50        FE   A6   9E 0005C        MOVAB   -2(R6), R0                                    ; 4198
  02   AA   02 A9             50   28 00060        MOVC3   R0, 2(R9), PAT$GB_SUBST_IN+2                  ;
             6A46             03   90 00066        MOVB    #3, PAT$GB_SUBST_IN[R6]                       ; 4199
          01 AA46             31   90 0006A        MOVB    #49, PAT$GB_SUBST_IN+1[R6]                    ; 4200
       50      6B             56   C1 0006F        ADDL3   R6, PAT$GL_BR_DISPL, R0                       ; 4201
               58             6A   9A 00073        MOVZBL  PAT$GB_SUBST_IN, BR_DISPLACEMENT              ;
       58      50             58   C3 00076        SUBL3   BR_DISPLACEMENT, R0, BR_DISPLACEMENT          ;
       00007FFF   8F          58   D1 0007A        CMPL    BR_DISPLACEMENT, #32767                       ; 4202
                              0F   14 00081        BGTR    7$                                            ;
       FFFF8000   8F          58   D1 00083        CMPL    BR_DISPLACEMENT, #-32768                      ; 4203
                              06   19 0008A        BLSS    7$                                            ;
                    02 AA46   9F 0008C        PUSHAB  PAT$GB_SUBST_IN+2[R6]                 ; 4205
                              77   11 00090        BRB     10$                                           ;
               6A             03   80 00092 7$:    ADDB2   #3, PAT$GB_SUBST_IN                           ; 4213
             6A46             06   90 00095        MOVB    #6, PAT$GB_SUBST_IN[R6]                       ; 4214
          01 AA46             17   90 00099        MOVB    #23, PAT$GB_SUBST_IN+1[R6]                    ; 4215
          02 AA46             11   8E 0009E        MNEGB   #17, PAT$GB_SUBST_IN+2[R6]                    ; 4216
                    03 AA46   9F 000A3        PUSHAB  PAT$GB_SUBST_IN+3[R6]                 ; 4217
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                                7E 11 000A7       BRB     12$                                      ;
          E6    8F              57 91 000A9 8$:   CMPB    R7, #230                                 ; 4227
                                12 13 000AD       BEQL    9$                                       ;
          E7    8F              57 91 000AF       CMPB    R7, #231                                 ; 4228
                                0C 13 000B3       BEQL    9$                                       ;
          F2    8F              57 91 000B5       CMPB    R7, #242                                 ; 4229
                                72 1F 000B9       BLSSU   14$                                      ;
          F5    8F              57 91 000BB       CMPB    R7, #245                                 ;
                                6C 1A 000BF       BGTRU   14$                                      ;
                56              69 9A 000C1 9$:   MOVZBL  (R9), R6                                 ; 4243
     6A         56              05 81 000C4       ADDB3   #5, R6, PAT$GB_SUBST_IN                  ;
                50      FF      A6 9E 000C8       MOVAB   -1(R6), R0                               ; 4244
01   AA      01 A9              50 28 000CC       MOVC3   R0, 1(R9), PAT$GB_SUBST_IN+1             ;
              6A46              02 90 000D2       MOVB    #2, PAT$GB_SUBST_IN[R6]                  ; 4245
           01 AA46              11 90 000D6       MOVB    #17, PAT$GB_SUBST_IN+1[R6]               ; 4246
           02 AA46              03 90 000DB       MOVB    #3, PAT$GB_SUBST_IN+2[R6]                ; 4247
           03 AA46              31 90 000E0       MOVB    #49, PAT$GB_SUBST_IN+3[R6]               ; 4248
     50         6B              56 C1 000E5       ADDL3   R6, PAT$GL_BR_DISPL, R0                  ; 4249
                58              6A 9A 000E9       MOVZBL  PAT$GB_SUBST_IN, BR_DISPLACEMENT         ;
     58         50              58 C3 000EC       SUBL3   BR_DISPLACEMENT, R0, BR_DISPLACEMENT     ;
        00007FFF 8F             58 D1 000F0       CMPL    BR_DISPLACEMENT, #32767                  ; 4250
                                15 14 000F7       BGTR    11$                                      ;
        FFFF8000 8F             58 D1 000F9       CMPL    BR_DISPLACEMENT, #-32768                 ; 4251
                                0C 19 00100       BLSS    11$                                      ;
                50              6A 9A 00102       MOVZBL  PAT$GB_SUBST_IN, R0                      ; 4253
                        FF AA40    9F 00105       PUSHAB  PAT$GB_SUBST_IN-1[R0]                    ;
                9E              58 B0 00109 10$:  MOVW    BR_DISPLACEMENT, @(SP)+                  ;
                                1D 11 0010C       BRB     13$                                      ;
                6A              03 80 0010E 11$:  ADDB2   #3, PAT$GB_SUBST_IN                      ; 4261
           02 AA46              06 90 00111       MOVB    #6, PAT$GB_SUBST_IN+2[R6]                ; 4262
           03 AA46              17 90 00116       MOVB    #23, PAT$GB_SUBST_IN+3[R6]               ; 4263
           04 AA46              11 8E 0011B       MNEGB   #17, PAT$GB_SUBST_IN+4[R6]               ; 4264
                50              6A 9A 00120       MOVZBL  PAT$GB_SUBST_IN, R0                      ; 4265
                        FD AA40    9F 00123       PUSHAB  PAT$GB_SUBST_IN-3[R0]                    ; 4266
                9E      FD      A8 9E 00127 12$:  MOVAB   -3(R8), @(SP)+                           ;
                                79 11 0012B 13$:  BRB     17$                                      ; 4227
          9D    8F              57 91 0012D 14$:  CMPB    R7, #157                                 ; 4274
                                31 13 00131       BEQL    16$                                      ;
                3D              57 91 00133       CMPB    R7, #61                                  ; 4275
                                2C 13 00136       BEQL    16$                                      ;
          F1    8F              57 91 00138       CMPB    R7, #241                                 ; 4276
                                26 13 0013C       BEQL    16$                                      ;
          4F    8F              57 91 0013E       CMPB    R7, #79                                  ; 4277
                                20 13 00142       BEQL    16$                                      ;
          6F    8F              57 91 00144       CMPB    R7, #111                                 ; 4278
                                1A 13 00148       BEQL    16$                                      ;
          FD    8F              57 91 0014A       CMPB    R7, #253                                 ; 4279
                                07 12 0014E       BNEQ    15$                                      ;
          4F    8F      02      A9 91 00150       CMPB    2(R9), #79                               ;
                                0D 13 00155       BEQL    16$                                      ;
          FD    8F              57 91 00157 15$:  CMPB    R7, #253                                 ; 4280
                                4B 12 0015B       BNEQ    18$                                      ;
          6F    8F      02      A9 91 0015D       CMPB    2(R9), #111                              ;
                                44 12 00162       BNEQ    18$                                      ;
                56              69 9A 00164 16$:  MOVZBL  (R9), R6                                 ; 4296
     6A         56              08 81 00167       ADDB3   #8, R6, PAT$GB_SUBST_IN                  ;
                50      FE      A6 9E 0016B       MOVAB   -2(R6), R0                               ; 4297
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    01   AA        01   A9          50  28 0016F         MOVC3   R0, 1(R9), PAT$GB_SUBST_IN+1                    ;
                   FF AA46          02  90 00175         MOVB    #2, PAT$GB_SUBST_IN-1[R6]                      ; 4298
                               6A46 94 0017A             CLRB    PAT$GB_SUBST_IN[R6]                            ; 4299
                   01 AA46          11  90 0017D         MOVB    #17, PAT$GB_SUBST_IN+1[R6]                     ; 4300
                   02 AA46          06  90 00182         MOVB    #6, PAT$GB_SUBST_IN+2[R6]                      ; 4301
                   03 AA46          17  90 00187         MOVB    #23, PAT$GB_SUBST_IN+3[R6]                     ; 4302
                   04 AA46          11  8E 0018C         MNEGB   #17, PAT$GB_SUBST_IN+4[R6]                     ; 4303
         50               6B        56  C1 00191         ADDL3   R6, PAT$GL_BR_DISPL, R0                        ; 4304
                          58        6A  9A 00195         MOVZBL  PAT$GB_SUBST_IN, BR_DISPLACEMENT               ;
         58               50        58  C3 00198         SUBL3   BR_DISPLACEMENT, R0, BR_DISPLACEMENT           ;
                          50        6A  9A 0019C         MOVZBL  PAT$GB_SUBST_IN, R0                            ; 4305
                               FD AA40 9F 0019F          PUSHAB  PAT$GB_SUBST_IN-3[R0]                          ;
                          9E        58  D0 001A3         MOVL    BR_DISPLACEMENT, @(SP)+                        ;
                                    70  11 001A6 17$:    BRB     23$                                            ; 4274
                          11        57  91 001A8 18$:    CMPB    R7, #17                                        ; 4312
                                    05  13 001AB         BEQL    19$                                            ;
                          10        57  91 001AD         CMPB    R7, #16                                        ;
                                    3F  12 001B0         BNEQ    21$                                            ;
                          6A        03  90 001B2 19$:    MOVB    #3, PAT$GB_SUBST_IN                            ; 4328
    01   AA               57        20  81 001B5         ADDB3   #32, R7, PAT$GB_SUBST_IN+1                     ; 4329
                          50        69  9A 001BA         MOVZBL  (R9), R0                                       ; 4330
                          50        6B  C0 001BD         ADDL2   PAT$GL_BR_DISPL, R0                            ;
                          58        6A  9A 001C0         MOVZBL  PAT$GB_SUBST_IN, BR_DISPLACEMENT               ;
         58               50        58  C3 001C3         SUBL3   BR_DISPLACEMENT, R0, BR_DISPLACEMENT           ;
              00007FFF    8F        58  D1 001C7         CMPL    BR_DISPLACEMENT, #32767                        ; 4331
                                    0F  14 001CE         BGTR    20$                                            ;
              FFFF8000    8F        58  D1 001D0         CMPL    BR_DISPLACEMENT, #-32768                       ; 4332
                                    06  19 001D7         BLSS    20$                                            ;
                   02     AA        58  B0 001D9         MOVW    BR_DISPLACEMENT, PAT$GB_SUBST_IN+2             ; 4334
                                    39  11 001DD         BRB     23$                                            ;
                          6A        06  90 001DF 20$:    MOVB    #6, PAT$GB_SUBST_IN                            ; 4341
                   01     AA        1A  82 001E2         SUBB2   #26, PAT$GB_SUBST_IN+1                         ; 4342
                   02     AA        11  8E 001E6         MNEGB   #17, PAT$GB_SUBST_IN+2                         ; 4343
                   03     AA   FD   A8  9E 001EA         MOVAB   -3(R8), PAT$GB_SUBST_IN+3                      ; 4344
                                    27  11 001EF         BRB     23$                                            ; 4331
                          31        57  91 001F1 21$:    CMPB    R7, #49                                        ; 4353
                                    05  13 001F4         BEQL    22$                                            ;
                          30        57  91 001F6         CMPB    R7, #48                                        ;
                                    21  12 001F9         BNEQ    24$                                            ;
                          6A        06  90 001FB 22$:    MOVB    #6, PAT$GB_SUBST_IN                            ; 4368
    01   AA               57        1A  83 001FE         SUBB3   #26, R7, PAT$GB_SUBST_IN+1                     ; 4369
                   02     AA        11  8E 00203         MNEGB   #17, PAT$GB_SUBST_IN+2                         ; 4370
                          50        69  9A 00207         MOVZBL  (R9), R0                                       ; 4371
                          50        6B  C0 0020A         ADDL2   PAT$GL_BR_DISPL, R0                            ;
                          58        6A  9A 0020D         MOVZBL  PAT$GB_SUBST_IN, BR_DISPLACEMENT               ;
         58               50        58  C3 00210         SUBL3   BR_DISPLACEMENT, R0, BR_DISPLACEMENT           ;
                   03     AA        58  D0 00214         MOVL    BR_DISPLACEMENT, PAT$GB_SUBST_IN+3             ; 4372
                          50        01  D0 00218 23$:    MOVL    #1, R0                                         ; 4377
                                        04 0021B         RET                                                    ;
                                    50  D4 0021C 24$:    CLRL    R0                                             ; 4378
                                        04 0021E         RET                                                    ;

; Routine Size:  543 bytes,    Routine Base:  _PAT$CODE + 0B5B
```

```
;1728     4379  1 GLOBAL ROUTINE PAT$OUT_MEM_LOC (LOCATION, PREFIX_STG, ASM_DIR_TBL, CASE_TBL) =
;1729     4380  1
;1730     4381  1 !++
;1731     4382  1 ! FUNCTIONAL DESCRIPTION:
;1732     4383  1 !
;1733     4384  1 !       Outputs the value of a memory location to the output
;1734     4385  1 !       device. If this routine is called as a result of an EXAMINE
;1735     4386  1 !       command, the location itself is also displayed, followed by
;1736     4387  1 !       a colon and a tab.
;1737     4388  1 !
;1738     4389  1 !       The appropriate mode settings are used to control the output
;1739     4390  1 !       style.
;1740     4391  1 !
;1741     4392  1 ! CALLING SEQUENCE:
;1742     4393  1 !
;1743     4394  1 !       PAT$OUT_MEM_LOC ()
;1744     4395  1 !
;1745     4396  1 ! INPUTS:
;1746     4397  1 !
;1747     4398  1 !       LOCATION        - Unmapped location whose contents are to be displayed.
;1748     4399  1 !       PREFIX_STG      - Prefix string to output before the location
;1749     4400  1 !                         0 = NONE
;1750     4401  1 !       ASM_DIR_TBL     - Address of assembler directive table descriptor
;1751     4402  1 !       CASE_TBL        - TRUE => Print CASE dispatch tables
;1752     4403  1 !
;1753     4404  1 ! IMPLICIT INPUTS:
;1754     4405  1 !
;1755     4406  1 !       PAT$GL_CONTEXT [EXAMINE_BIT]    - If this bit is set, the address of the
;1756     4407  1 !                                         value is also displayed.
;1757     4408  1 !       PAT$GL_MOD_PTR                  - Pointer to the current mode level
;1758     4409  1 !
;1759     4410  1 ! OUTPUTS:
;1760     4411  1 !
;1761     4412  1 !       TRUE for success, FALSE for failure.
;1762     4413  1 !
;1763     4414  1 ! IMPLICIT OUTPUTS:
;1764     4415  1 !
;1765     4416  1 !       NONE
;1766     4417  1 !
;1767     4418  1 ! ROUTINE VALUE:
;1768     4419  1 !
;1769     4420  1 !       TRUE or FALSE
;1770     4421  1 !
;1771     4422  1 ! SIDE EFFECTS:
;1772     4423  1 !
;1773     4424  1 !       Data is output to the data device.  An error message is produced if the
;1774     4425  1 !       memory location is not readable.
;1775     4426  1 !
;1776     4427  1 !--
;1777     4428  1
;1778     4429  2 BEGIN
;1779     4430  2 LOCAL
;1780     4431  2         MAPPED_LOC : REF VECTOR[,BYTE],                 ! Mapped address of deposit location
;1781     4432  2         ISE_ADDR: REF VECTOR[,BYTE],                    ! ISE address for deposit location
;1782     4433  2         OUT_VALUES : VECTOR[ TTY_OUT_WIDTH, BYTE],
;1783     4434  2         OUTPUT_BUFFER : VECTOR[ TTY_OUT_WIDTH, BYTE];
;1784     4435  2
```

```
; 1785        4436  2 !++
; 1786        4437  2 ! Initialize buffer address and size.
; 1787        4438  2 !--
; 1788        4439  2 PAT$CP_OUT_STR = OUTPUT_BUFFER + 1;
; 1789        4440  2 PAT$GL_BUF_SIZ = 0;
; 1790        4441  2
; 1791        4442  2 !++
; 1792        4443  2 ! First check if there is a prefix string to be output.
; 1793        4444  2 !--
; 1794        4445  3 IF (.PREFIX_STG NEQ 0)
; 1795        4446  2 THEN
; 1796        4447  2         PAT$FAO_PUT(.PREFIX_STG);
; 1797        4448  2
; 1798        4449  2 !++
; 1799        4450  2 ! Now if the examine bit is set then output a location which is mapped
; 1800        4451  2 ! by PATCH.  If the examine bit is not set, then output an expression
; 1801        4452  2 ! for the EVALUATE command.
; 1802        4453  2 !--
; 1803        4454  2 IF .PAT$GL_CONTEXT [EXAMINE_BIT]
; 1804        4455  2 THEN
; 1805        4456  3         BEGIN
; 1806        4457  3         !++
; 1807        4458  3         ! Print the address, making it come out as a longword regardless of
; 1808        4459  3         ! the current output mode length.
; 1809        4460  3         !--
; 1810        4461  3         PAT$MAP_ADDR(.LOCATION,MAPPED_LOC,ISE_ADDR);            ! Compute mapped address
; 1811        4462  3         PAT$OUT_SYM_VAL(.LOCATION, LONG_LENGTH, 0);
; 1812        4463  3         PAT$GL_LAST_LOC = .LOCATION;
; 1813        4464  3         PAT$GB_LOC_TYPE = MEMORY_LOC;
; 1814        4465  3         PAT$FAO_PUT ( COLON_TAB_STG );
; 1815        4466  3
; 1816        4467  3         !++
; 1817        4468  3         ! Handle output as symbolic instructions separately.
; 1818        4469  3         !--
; 1819        4470  4         IF( .PAT$GB_MOD_PTR[ MODE_INSTRUC ] )
; 1820        4471  3         THEN
; 1821        4472  4                 IF ((LOCATION = PAT$INS_DECODE (.LOCATION, OUTPUT_BUFFER, LOCATION, .ASM_DIR_TBL, .CASE_TBL)
; 1822        4473  3                 THEN
; 1823        4474  4                         BEGIN
; 1824        4475  4                         SIGNAL (PAT$_NODECODE);
; 1825        4476  4                         RETURN(FALSE);
; 1826        4477  4                         END
; 1827        4478  3                 ELSE
; 1828        4479  4                         BEGIN
; 1829        4480  4                         PAT$MAP_ADDR (.LOCATION, MAPPED_LOC, ISE_ADDR);
; 1830        4481  4                         IF .PAT$GL_CONTEXT [EXAMINE_BIT]
; 1831        4482  4                         THEN
; 1832        4483  4                                 PAT$GL_NEXT_LOC = .LOCATION;
; 1833        4484  4
; 1834        4485  4                         !++
; 1835        4486  4                         ! PAT$GL_LAST_VAL may be set within PAT$INS_DECODE.
; 1836        4487  4                         !--
; 1837        4488  4                         END
; 1838        4489  3         ELSE
; 1839        4490  4                 BEGIN
; 1840        4491  4                 !++
; 1841        4492  4                 ! Special attention for ascii output.
```

```
; 1842    4493  4                 !--
; 1843    4494  5                 IF (.PAT$GB_MOD_PTR [MODE_ASCII])
; 1844    4495  4                 THEN
; 1845    4496  4                         !++
; 1846    4497  4                         ! Simply output the number of characters
; 1847    4498  4                         ! implied by the current MODE_LENGTH setting.
; 1848    4499  4                         !--
; 1849    4500  5                         BEGIN
; 1850    4501  5                         PAT$GET_VALUE (.LOCATION, .PAT$GB_MOD_PTR[MODE_LENGTH], OUT_VALUES);
; 1851    4502  5                         PAT$FAO_PUT (CS_ASCII, .PAT$GB_MOD_PTR[MODE_LENGTH], OUT_VALUES);
; 1852    4503  5                         PAT$GL_NEXT_LOC = .LOCATION + .PAT$GB_MOD_PTR [MODE_LENGTH];
; 1853    4504  5                         PAT$GL_LAST_VAL = .(.MAPPED_LOC) <0, .PAT$GB_MOD_PTR [MODE_LENGTH] * 8>;
; 1854    4505  5                         END
; 1855    4506  4                 ELSE                                    ! Otherwise we have one of the usual modes
; 1856    4507  4                         IF .PAT$GL_CONTEXT [EXAMINE_BIT]
; 1857    4508  4                         THEN
; 1858    4509  5                                 BEGIN
; 1859    4510  5                                 PAT$GET_VALUE(.LOCATION, .PAT$GB_MOD_PTR[MODE_LENGTH], OUT_VALUES);
; 1860    4511  5                                 PAT$OUT_NUM_VAL(.OUT_VALUES, 0, 0, TRUE);
; 1861    4512  5                                 PAT$GL_NEXT_LOC = .LOCATION + .PAT$GB_MOD_PTR [MODE_LENGTH];
; 1862    4513  5                                 PAT$GL_LAST_VAL = .OUT_VALUES <0, .PAT$GB_MOD_PTR [MODE_LENGTH] * 8>;
; 1863    4514  4                                 END;
; 1864    4515  4                 END
; 1865    4516  3         END
; 1866    4517  2 ELSE
; 1867    4518  3         BEGIN
; 1868    4519  3         !++
; 1869    4520  3         ! Output the value for the EVALUATE command here then return.
; 1870    4521  3         ! All other commands have set the examine bit.  Check for different
; 1871    4522  3         ! output modes, literal or instruction.
; 1872    4523  3         !--
; 1873    4524  4         IF (.PAT$GL_CONTEXT[LITERAL_BIT])
; 1874    4525  3         THEN
; 1875    4526  4                 BEGIN
; 1876    4527  4                 !++
; 1877    4528  4                 ! Call a routine which does the whole thing - including
; 1878    4529  4                 ! flushing the output and producing an error message if no
; 1879    4530  4                 ! such literal translation can be found.
; 1880    4531  4                 !--
; 1881    4532  4                 DISPLAY_LVTS(..LOCATION);
; 1882    4533  4
; 1883    4534  4                 !++
; 1884    4535  4                 ! If the above routine returns then at least one literal
; 1885    4536  4                 ! translation was found.  This form of evaluate sets the
; 1886    4537  4                 ! psuedo '\' (last value displayed) only.
; 1887    4538  4                 !--
; 1888    4539  4                 PAT$GL_LAST_VAL = ..LOCATION;
; 1889    4540  4                 RETURN(TRUE);
; 1890    4541  3                 END;
; 1891    4542  3
; 1892    4543  3         !++
; 1893    4544  3         ! Instruction mode works only if /LITERAL was not specified.
; 1894    4545  3         !--
; 1895    4546  4         IF (.PAT$GB_MOD_PTR[MODE_INSTRUC])
; 1896    4547  3         THEN
; 1897    4548  4                 BEGIN
; 1898    4549  4                 LOCAL
```

```
; 1899          4550  4                       COUNT,
; 1900          4551  4                       ENCODED_BUF : VECTOR[38,BYTE];
; 1901          4552  5                   IF (NOT PAT$INS_ENCODE(..LOCATION, ENCODED_BUF, 0))
; 1902          4553  4                   THEN
; 1903          4554  4                       SIGNAL(PAT$_NOENCODE, 1, ..LOCATION);
; 1904          4555  4                   COUNT = .ENCODED_BUF[0];
; 1905          4556  4                   DO
; 1906          4557  5                       BEGIN
; 1907          4558  5                       PAT$OUT_NUM_VAL(.ENCODED_BUF[.COUNT], BYTE_LENGTH, HEX_RADIX, FALSE);
; 1908          4559  5                       COUNT = .COUNT - 1;
; 1909          4560  5                       END
; 1910          4561  4                   UNTIL .COUNT EQL 0;
; 1911          4562  4                   END
; 1912          4563  3           ELSE
; 1913          4564  4                   BEGIN
; 1914          4565  4                   PAT$OUT_NUM_VAL(..LOCATION, 0, 0, TRUE);
; 1915          4566  4                   PAT$GL_LAST_VAL = .(LOCATION) <0, .PAT$GB_MOD_PTR [MODE_LENGTH] * 8>;
; 1916          4567  3                   END;
; 1917          4568  2           END;
; 1918          4569  2
; 1919          4570  2 !++
; 1920          4571  2 ! Write out the string and return.
; 1921          4572  2 !--
; 1922          4573  2 PAT$OUT_PUT( OUTPUT_BUFFER );
; 1923          4574  2
; 1924          4575  2 RETURN TRUE
; 1925          4576  1 END;


                                OFFC 00000          .ENTRY  PAT$OUT_MEM_LOC, Save R2,R3,R4,R5,R6,R7,R8,-  ; 4379
                                                            R9,R10,R11                                        :
                    5B 00000000G   00   9E 00002    MOVAB   LIB$SIGNAL, R11                                   :
                    5A 00000000G   EF   9E 00009    MOVAB   PAT$MAP_ADDR, R10                                 :
                    59 00000000G   EF   9E 00010    MOVAB   PAT$OUT_NUM_VAL, R9                               :
                    58 00000000G   EF   9E 00017    MOVAB   PAT$GL_NEXT_LOC, R8                               :
                    57 00000000G   EF   9E 0001E    MOVAB   PAT$FAO_PUT, R7                                   :
                    56 00000000G   EF   9E 00025    MOVAB   PAT$GL_LAST_VAL, R6                               :
                    55 00000000G   EF   9E 0002C    MOVAB   PAT$GL_CONTEXT, R5                                :
                    54 00000000G   EF   9E 00033    MOVAB   PAT$GB_MOD_PTR, R4                                :
                    5E      FEC8   CE   9E 0003A    MOVAB   -312(SP), SP                                      :
00000000G           EF        31   AE   9E 0003F    MOVAB   OUTPUT_BUFFER+1, PAT$CP_OUT_STR                   ; 4439
                        00000000G  EF   D4 00047    CLRL    PAT$GL_BUF_SIZ                                    ; 4440
                              08   AC   D5 0004D    TSTL    PREFIX_STG                                        ; 4445
                                   06   13 00050    BEQL    1$                                                :
                              08   AC   DD 00052    PUSHL   PREFIX_STG                                        ; 4447
                    67             01   FB 00055    CALLS   #1, PAT$FAO_PUT                                   :
                    53        04   AC   D0 00058 1$: MOVL    LOCATION, R3                                      ; 4461
                    03        01   A5   E8 0005C    BLBS    PAT$GL_CONTEXT+1, 2$                              ; 4454
                                 00EB   31 00060    BRW     7$                                                :
                                   5E   DD 00063 2$: PUSHL   SP                                                ; 4461
                              08   AE   9F 00065    PUSHAB  MAPPED_LOC                                        :
                                   53   DD 00068    PUSHL   R3                                                :
                    6A             03   FB 0006A    CALLS   #3, PAT$MAP_ADDR                                  :
                    7E             04   7D 0006D    MOVQ    #4, -(SP)                                         ; 4462
```

```
                                              53  DD 00070          PUSHL   R3                                              ;
                   00000000G  EF              03  FB 00072          CALLS   #3, PAT$OUT_SYM_VAL                             ;
                   00000000G  EF              53  D0 00079          MOVL    R3, PAT$GL_LAST_LOC                             ; 4463
                              00000000G  EF   94 00080          CLRB    PAT$GB_LOC_TYPE                                 ; 4464
                              00000000'  EF   9F 00086          PUSHAB  COLON_TAB_STG                                   ; 4465
                              67          01  FB 0008C          CALLS   #1, PAT$FAO_PUT                                 ;
                              52          64  D0 0008F          MOVL    PAT$GB_MOD_PTR, R2                              ; 4470
                              3A    03    A2  E9 00092          BLBC    3(R2), 4$                                       ;
                              7E    0C    AC  7D 00096          MOVQ    ASM_DIR_TBL, -(SP)                              ; 4472
                                    04    AC  9F 0009A          PUSHAB  LOCATION                                        ;
                                    3C    AE  9F 0009D          PUSHAB  OUTPUT_BUFFER                                   ;
                                              53  DD 000A0          PUSHL   R3                                              ;
                   00000000G  EF              05  FB 000A2          CALLS   #5, PAT$INS_DECODE                              ;
                          04  AC              50  D0 000A9          MOVL    R0, LOCATION                                    ;
                                              0C  12 000AD          BNEQ    3$                                              ;
                              006D8102    8F  DD 000AF          PUSHL   #7176450                                        ; 4475
                              6B          01  FB 000B5          CALLS   #1, LIB$SIGNAL                                  ;
                                        010B  31 000B8          BRW     14$                                             ; 4476
                                          5E  DD 000BB 3$:      PUSHL   SP                                              ; 4480
                                    08    AE  9F 000BD          PUSHAB  MAPPED_LOC                                      ;
                                    04    AC  DD 000C0          PUSHL   LOCATION                                        ;
                              6A          03  FB 000C3          CALLS   #3, PAT$MAP_ADDR                                ;
                              49    01    A5  E9 000C6          BLBC    PAT$GL_CONTEXT+1, 5$                            ; 4481
                              68    04    AC  D0 000CA          MOVL    LOCATION, PAT$GL_NEXT_LOC                       ; 4483
                                          7C  11 000CE          BRB     6$                                              ; 4472
                              3F    04    A2  E9 000D0 4$:      BLBC    4(R2), 5$                                       ; 4494
                                  FF7C    CD  9F 000D4          PUSHAB  OUT_VALUES                                      ; 4501
                              7E    01    A2  9A 000D8          MOVZBL  1(R2), -(SP)                                    ;
                                          53  DD 000DC          PUSHL   R3                                              ;
                   00000000G  EF          03  FB 000DE          CALLS   #3, PAT$GET_VALUE                               ;
                                  FF7C    CD  9F 000E5          PUSHAB  OUT_VALUES                                      ; 4502
                              50          64  D0 000E9          MOVL    PAT$GB_MOD_PTR, R0                              ;
                              7E    01    A0  9A 000EC          MOVZBL  1(R0), -(SP)                                    ;
                              00000000'   EF  9F 000F0          PUSHAB  CS_ASCII                                        ;
                              67          03  FB 000F6          CALLS   #3, PAT$FAO_PUT                                 ;
                              50          64  D0 000F9          MOVL    PAT$GB_MOD_PTR, R0                              ; 4503
                              51    01    A0  9A 000FC          MOVZBL  1(R0), R1                                       ;
                    68        53          51  C1 00100          ADDL3   R1, R3, PAT$GL_NEXT_LOC                         ;
                              50    01    A0  9A 00104          MOVZBL  1(R0), R0                                       ; 4504
                              50          08  C4 00108          MULL2   #8, R0                                          ;
   66        04     BE        50          00  EF 0010B          EXTZV   #0, R0, @MAPPED_LOC, PAT$GL_LAST_VAL            ;
                                          39  11 00111          BRB     6$                                              ; 4494
                              35    01    A5  E9 00113 5$:      BLBC    PAT$GL_CONTEXT+1, 6$                            ; 4507
                                  FF7C    CD  9F 00117          PUSHAB  OUT_VALUES                                      ; 4510
                              7E    01    A2  9A 0011B          MOVZBL  1(R2), -(SP)                                    ;
                                          53  DD 0011F          PUSHL   R3                                              ;
                   00000000G  EF          03  FB 00121          CALLS   #3, PAT$GET_VALUE                               ;
                                          01  DD 00128          PUSHL   #1                                              ; 4511
                                          7E  7C 0012A          CLRQ    -(SP)                                           ;
                                  FF7C    CD  DD 0012C          PUSHL   OUT_VALUES                                      ;
                              69          04  FB 00130          CALLS   #4, PAT$OUT_NUM_VAL                             ;
                              50          64  D0 00133          MOVL    PAT$GB_MOD_PTR, R0                              ; 4512
                              51    01    A0  9A 00136          MOVZBL  1(R0), R1                                       ;
                    68        53          51  C1 0013A          ADDL3   R1, R3, PAT$GL_NEXT_LOC                         ;
                              50    01    A0  9A 0013E          MOVZBL  1(R0), R0                                       ; 4513
                              50          08  C4 00142          MULL2   #8, R0                                          ;
   66      FF7C     CD        50          00  EF 00145          EXTZV   #0, R0, OUT_VALUES, PAT$GL_LAST_VAL             ;
```

```
                                        6A   11 0014C 6$:       BRB      12$                                          ; 4470
            10       03   A5            01   E1 0014E 7$:       BBC      #1, PAT$GL_CONTEXT+3, 8$                     ; 4524
                                   04   BC   DD 00153           PUSHL    @LOCATION                                    ; 4532
                 00000000V  EF          01   FB 00156           CALLS    #1, DISPLAY_LVTS                             ;
                            66     04   BC   D0 0015D           MOVL     @LOCATION, PAT$GL_LAST_VAL                   ; 4539
                                        5F   11 00161           BRB      13$                                          ; 4540
                            50          64   D0 00163 8$:       MOVL     PAT$GB_MOD_PTR, R0                           ; 4546
                            35     03   A0   E9 00166           BLBC     3(R0), 11$                                   ;
                                        7E   D4 0016A           CLRL     -(SP)                                        ; 4552
                                   0C   AE   9F 0016C           PUSHAB   ENCODED_BUF                                  ;
                                        63   DD 0016F           PUSHL    (R3)                                         ;
                 00000000G  EF          03   FB 00171           CALLS    #3, PAT$INS_ENCODE                           ;
                            0D          50   E8 00178           BLBS     R0, 9$                                       ;
                                        63   DD 0017B           PUSHL    (R3)                                         ; 4554
                                        01   DD 0017D           PUSHL    #1                                           ;
                              006D810A  8F   DD 0017F           PUSHL    #7176458                                     ;
                            6B          03   FB 00185           CALLS    #3, LIB$SIGNAL                               ;
                            52     08   AE   9A 00188 9$:       MOVZBL   ENCODED_BUF, COUNT                           ; 4555
                            7E          10   7D 0018C 10$:      MOVQ     #16, -(SP)                                   ; 4558
                                        01   DD 0018F           PUSHL    #1                                           ;
                            7E     14 AE42   9A 00191           MOVZBL   ENCODED_BUF[COUNT], -(SP)                    ;
                            69          04   FB 00196           CALLS    #4, PAT$OUT_NUM_VAL                          ;
                                        52   D7 00199           DECL     COUNT                                        ; 4559
                                        EF   12 0019B           BNEQ     10$                                          ; 4561
                                        19   11 0019D           BRB      12$                                          ; 4546
                                        01   DD 0019F 11$:      PUSHL    #1                                           ; 4565
                                        7E   7C 001A1           CLRQ     -(SP)                                        ;
                                        63   DD 001A3           PUSHL    (R3)                                         ;
                            69          04   FB 001A5           CALLS    #4, PAT$OUT_NUM_VAL                          ;
                            50          64   D0 001A8           MOVL     PAT$GB_MOD_PTR, R0                           ; 4566
                            50     01   A0   9A 001AB           MOVZBL   1(R0), R0                                    ;
                            50          08   C4 001AF           MULL2    #8, R0                                       ;
       66        04   AC    50          00   EF 001B2           EXTZV    #0, R0, LOCATION, PAT$GL_LAST_VAL            ;
                                   30   AE   9F 001B8 12$:      PUSHAB   OUTPUT_BUFFER                                ; 4573
                 00000000G  EF          01   FB 001BB           CALLS    #1, PAT$OUT_PUT                              ;
                            50          01   D0 001C2 13$:      MOVL     #1, R0                                       ; 4575
                                             04 001C5           RET                                                   ;
                                        50   D4 001C6 14$:      CLRL     R0                                           ; 4576
                                             04 001C8           RET                                                   ;

; Routine Size:  457 bytes,    Routine Base:  _PAT$CODE + 0D7A
```

```
;1927     4577  1 ROUTINE DISPLAY_LVTS (VALUE) : NOVALUE =
;1928     4578  1
;1929     4579  1 !++
;1930     4580  1 !
;1931     4581  1 ! FUNCTIONAL DESCRIPTION:
;1932     4582  1 !
;1933     4583  1 !       Given a value, display the pathnames of all literals in the LVT which
;1934     4584  1 !       have this value.
;1935     4585  1 !
;1936     4586  1 ! CALLING SEQUENCE:
;1937     4587  1 !
;1938     4588  1 !       CALLS #1, DISPLAY_LVTS
;1939     4589  1 !
;1940     4590  1 ! INPUTS:
;1941     4591  1 !
;1942     4592  1 !       VALUE - Literal value to be translated to symbols
;1943     4593  1 !
;1944     4594  1 ! IMPLICIT INPUTS:
;1945     4595  1 !
;1946     4596  1 !       The initial set up for standard PATCH I/O has already been done.
;1947     4597  1 !       This routine (re)uses this buffer for its output.
;1948     4598  1 !
;1949     4599  1 ! OUTPUTS:
;1950     4600  1 !
;1951     4601  1 !       none
;1952     4602  1 !
;1953     4603  1 ! IMPLICIT OUTPUTS:
;1954     4604  1 !
;1955     4605  1 !       All the literal symbols associated with the value are printed.
;1956     4606  1 !
;1957     4607  1 ! ROUTINE VALUE:
;1958     4608  1 !
;1959     4609  1 !       novalue
;1960     4610  1 !
;1961     4611  1 ! SIDE EFFECTS:
;1962     4612  1 !
;1963     4613  1 !       Either output is sent to SYS$OUTPUT or a SIGNAL is generated and
;1964     4614  1 !       no return is done.
;1965     4615  1 !
;1966     4616  1 !--
;1967     4617  1
;1968     4618  2 BEGIN
;1969     4619  2
;1970     4620  2 LOCAL
;1971     4621  2         OUTPUT_BUFFER : REF VECTOR[,BYTE],                      ! Output buffer for SYS$OUTPUT writes
;1972     4622  2         LVT_PTR : REF LVT_RECORD,                               ! Pointer to LVT match
;1973     4623  2         ONE_FOUND;                                              ! Indicator if at least one symbol was found
;1974     4624  2
;1975     4625  2 !++
;1976     4626  2 ! Initialize a flag which is used to know whether or not at least one match
;1977     4627  2 ! to the given value has been found.  Also save a pointer to current output
;1978     4628  2 ! buffer so that it can be reused.
;1979     4629  2 !--
;1980     4630  2 ONE_FOUND = FALSE;
;1981     4631  2 OUTPUT_BUFFER = .PAT$CP_OUT_STR;
;1982     4632  2
;1983     4633  2 !++
```

```
2 ! Access to the LVT is via a 'canned' function.  Before using it, this routine
2 ! must signal its intention to do so.
2 !--
2 PAT$GET_NXT_LVT(SL_ACCE_INIT);
2
2 !++
2 ! Loop through the LVT sequentially, asking to see all currently valid records.
2 !--
3 WHILE ((LVT_PTR = PAT$GET_NXT_LVT(SL_ACCE_RECS)) NEQA 0)
2         DO
3         BEGIN
4         IF (.LVT_PTR[LVT_VALUE] EQL .VALUE)
3         THEN
4                 BEGIN
4                 LOCAL
4                         NT_PTR : REF NT_RECORD,
4                         PATH_VEC : PATHNAME_VECTOR;
4
4                 !++
4                 ! Found a match.  Print out the corresponding pathname by
4                 ! first building a pathname vector based on the returned NT_PTR.
4                 !--
4                 ONE_FOUND = TRUE;
4                 NT_PTR = .LVT_PTR[LVT_NT_PTR];
4                 PAT$ADD_NT_T_PV(.NT_PTR, PATH_VEC);
4                 PAT$PRINT_PATH(PATH_VEC);
4
4                 !++
4                 ! Write out the string and reset the global buffer pointers.
4                 !--
4                 PAT$OUT_PUT(.OUTPUT_BUFFER-1);
4                 PAT$CP_OUT_STR = .OUTPUT_BUFFER;
4                 PAT$GL_BUF_SIZ = 0;
3                 END;
2         END;                                            ! Loop back to consider the next LVT record
2
2 !++
2 ! At this point, the LVT has been completely searched.  If no matches were
2 ! found, then signal a warning.
2 !--
3 IF (NOT .ONE_FOUND)
2 THEN
2         SIGNAL(PAT$_NOLITERAL+MSG$K_WARN, 1, .VALUE);
2 RETURN;
1 END;                                                    ! End of DISPLAY_LVTS


                        007C 00000 DISPLAY_LVTS:
                                       .WORD   Save R2,R3,R4,R5,R6                     ; 4577
56 00000000G   EF   9E 00002           MOVAB   PAT$CP_OUT_STR, R6                      ;
55 00000000G   EF   9E 00009           MOVAB   PAT$GET_NXT_LVT, R5                     ;
5E             2C   C2 00010           SUBL2   #44, SP                                 ;
               54   D4 00013           CLRL    ONE_FOUND                               ; 4630
53             66   D0 00015           MOVL    PAT$CP_OUT_STR, OUTPUT_BUFFER           ; 4631
```

```
                                     7E  D4 00018        CLRL    -(SP)                              ; 4637
                    65               01  FB 0001A        CALLS   #1, PAT$GET_NXT_LVT                ;
                                     01  DD 0001D 1$:    PUSHL   #1                                 ; 4642
                    65               01  FB 0001F        CALLS   #1, PAT$GET_NXT_LVT                ;
                    52               50  D0 00022        MOVL    R0, LVT_PTR                        ;
                                     36  13 00025        BEQL    2$                                 ;
          04        AC         02    A2  D1 00027        CMPL    2(LVT_PTR), VALUE                  ; 4645
                                     EF  12 0002C        BNEQ    1$                                 ;
                    54               01  D0 0002E        MOVL    #1, ONE_FOUND                      ; 4656
                    50               62  3C 00031        MOVZWL  (LVT_PTR), NT_PTR                  ; 4657
                             4001    8F  BB 00034        PUSHR   #^M<R0,SP>                         ; 4658
   00000000G        EF               02  FB 00038        CALLS   #2, PAT$ADD_NT_T_PV                ;
                                     5E  DD 0003F        PUSHL   SP                                 ; 4659
   00000000G        EF               01  FB 00041        CALLS   #1, PAT$PRINT_PATH                 ;
                               FF    A3  9F 00048        PUSHAB  -1(OUTPUT_BUFFER)                  ; 4664
   00000000G        EF               01  FB 0004B        CALLS   #1, PAT$OUT_PUT                    ;
                    66               53  D0 00052        MOVL    OUTPUT_BUFFER, PAT$CP_OUT_STR      ; 4665
                       00000000G     EF  D4 00055        CLRL    PAT$GL_BUF_SIZ                     ; 4666
                                     C0  11 0005B        BRB     1$                                 ; 4642
                    12               54  E8 0005D 2$:    BLBS    ONE_FOUND, 3$                      ; 4674
                               04    AC  DD 00060        PUSHL   VALUE                              ; 4676
                                     01  DD 00063        PUSHL   #1                                 ;
                       006D82B8      8F  DD 00065        PUSHL   #7176888                           ;
   00000000G        00               03  FB 0006B        CALLS   #3, LIB$SIGNAL                     ;
                                         04 00072 3$:    RET                                        ; 4678

; Routine Size:  115 bytes,    Routine Base:  _PAT$CODE + 0F43
```

```
;2030          4679  1 GLOBAL ROUTINE PAT$REG_MATCH (STRING_DESC) =
;2031          4680  1
;2032          4681  1 !++
;2033          4682  1 !
;2034          4683  1 ! FUNCTIONAL DESCRIPTION:
;2035          4684  1 !
;2036          4685  1 !       Compares a string described by the string descriptor passed as the
;2037          4686  1 !       routine formal to each of the names of the machine registers.  If the
;2038          4687  1 !       string matches a register name, return the number of the register (0-16,
;2039          4688  1 !       where 16 is the PSL).  Otherwise return a -1.
;2040          4689  1 !
;2041          4690  1 ! CALLING SEQUENCE:
;2042          4691  1 !
;2043          4692  1 !       CALLS #1, PAT$REG_MATCH
;2044          4693  1 !
;2045          4694  1 ! INPUTS:
;2046          4695  1 !
;2047          4696  1 !       STRING_DESC - String descriptor to symbol string
;2048          4697  1 !
;2049          4698  1 ! IMPLICIT INPUTS:
;2050          4699  1 !
;2051          4700  1 !       The VAX machine register table.
;2052          4701  1 !
;2053          4702  1 ! OUTPUTS:
;2054          4703  1 !
;2055          4704  1 !       The number of the register whose name matched the string.
;2056          4705  1 !
;2057          4706  1 ! IMPLICIT OUTPUTS:
;2058          4707  1 !
;2059          4708  1 !       none
;2060          4709  1 !
;2061          4710  1 ! ROUTINE VALUE:
;2062          4711  1 !
;2063          4712  1 !       0-16 for the corresponding register
;2064          4713  1 !       -1 for no match
;2065          4714  1 !
;2066          4715  1 ! SIDE EFFECTS:
;2067          4716  1 !
;2068          4717  1 !       none
;2069          4718  1 !
;2070          4719  1 !--
;2071          4720  1
;2072          4721  2 BEGIN
;2073          4722  2
;2074          4723  2 MAP
;2075          4724  2         STRING_DESC : REF BLOCK [, BYTE];
;2076          4725  2
;2077          4726  2 LOCAL
;2078          4727  2         INDEX;
;2079          4728  2
;2080          4729  2 INDEX = 0;
;2081          4730  2 REPEAT
;2082          4731  3         BEGIN
;2083          4732  3         IF CH$EQL (.STRING_DESC [DSC$W_LENGTH], CH$PTR (.STRING_DESC [DSC$A_POINTER]),
;2084          4733  3                         .REGISTER_TABLE [.INDEX, REG_CH_CNT],
;2085          4734  3                         CH$PTR (REGISTER_TABLE [.INDEX, REG_NAME]))
;2086          4735  3         THEN RETURN .INDEX
```

```
; 2087          4736  3          ELSE
; 2088          4737  4                  BEGIN
; 2089          4738  4                  INDEX = .INDEX + 1;
; 2090          4739  4                  IF .INDEX GTR REGISTER_COUNT - 1
; 2091          4740  4                  THEN RETURN -1
; 2092          4741  3                  END;
; 2093          4742  2          END;
; 2094          4743  1 END;
; INFO#212                 L1:4729
; Null expression appears in value-required context
```

```
                                                  003C 00000          .ENTRY  PAT$REG_MATCH, Save R2,R3,R4,R5                 ; 4679
                                             54   D4 00002          CLRL    INDEX                                           ; 4729
                                        55        AC   D0 00004          MOVL    STRING_DESC, R5                                 ; 4732
                                   00000000'EF44  DF 00008 1$:     PUSHAL  REGISTER_TABLE[INDEX]                           ; 4733
                                        50        9E   9A 0000F          MOVZBL  @(SP)+, R0                                      ;
                                   00000000'EF44  DF 00012          PUSHAL  REGISTER_TABLE+1[INDEX]                         ; 4734
        50              00        04   B5        04   BC  2D 00019          CMPC5   @STRING_DESC, @4(R5), #0, R0, @(SP)+            ;
                                                  9E       00020                                                               ;
                                                  04   12 00021          BNEQ    2$                                      ;
                                        50        54   D0 00023          MOVL    INDEX, R0                               ; 4735
                                                  04 00026          RET                                                     ;
                                             54   D6 00027 2$:     INCL    INDEX                                           ; 4738
                                        10        54   D1 00029          CMPL    INDEX, #16                              ; 4739
                                             DA   15 0002C          BLEQ    1$                                      ;
                                        50        01   CE 0002E          MNEGL   #1, R0                                  ; 4740
                                                  04 00031          RET                                                     ; 4743
```

; Routine Size: 50 bytes,   Routine Base: _PAT$CODE + 0FB6

```
;  2096     4744  1 GLOBAL ROUTINE PAT$FILL_BUF(BUF_DESC, DATA_PTR, DATA_SIZ) : NOVALUE =
;  2097     4745  1
;  2098     4746  1 !++
;  2099     4747  1 !
;  2100     4748  1 ! FUNCTIONAL DESCRIPTION:
;  2101     4749  1 !
;  2102     4750  1 !       Takes the data defined as the input arguments and puts them in the
;  2103     4751  1 !       temporary deposit buffer.  This is accomplished by allocating a new
;  2104     4752  1 !       larger buffer, copying in the old buffer, and then deallocating it.
;  2105     4753  1 !       Then the buffer descriptor is updated.
;  2106     4754  1 !
;  2107     4755  1 ! CALLING SEQUENCE:
;  2108     4756  1 !
;  2109     4757  1 !       CALLS #2, PAT$FILL_BUF
;  2110     4758  1 !
;  2111     4759  1 ! INPUTS:
;  2112     4760  1 !
;  2113     4761  1 !       BUF_DESC - Buffer descriptor
;  2114     4762  1 !       DATA_PTR - Address of the data to be put in the buffer
;  2115     4763  1 !       DATA_SIZ - Number of bytes of data to be put in the buffer
;  2116     4764  1 !
;  2117     4765  1 ! IMPLICIT INPUTS:
;  2118     4766  1 !
;  2119     4767  1 !       none
;  2120     4768  1 !
;  2121     4769  1 ! OUTPUTS:
;  2122     4770  1 !
;  2123     4771  1 !       none
;  2124     4772  1 !
;  2125     4773  1 ! IMPLICIT OUTPUTS:
;  2126     4774  1 !
;  2127     4775  1 !       The buffer descriptor is updated.
;  2128     4776  1 !
;  2129     4777  1 ! ROUTINE VALUE:
;  2130     4778  1 !
;  2131     4779  1 !       none
;  2132     4780  1 !
;  2133     4781  1 ! SIDE EFFECTS:
;  2134     4782  1 !
;  2135     4783  1 !       The data is written into the buffer.
;  2136     4784  1 !
;  2137     4785  1 !--
;  2138     4786  1
;  2139     4787  2 BEGIN
;  2140     4788  2
;  2141     4789  2 MAP
;  2142     4790  2         BUF_DESC : REF BLOCK[,BYTE];                            ! Buffer descriptor
;  2143     4791  2
;  2144     4792  2 LOCAL
;  2145     4793  2         TEMP_PTR;                                               ! Pointer to new buffer
;  2146     4794  2
;  2147     4795  2 TEMP_PTR = PAT$FREEZ((.BUF_DESC[DSC$W_LENGTH] + .DATA_SIZ + A_LONGWORD -1)/A_LONGWORD); ! Allocate larger bu
;  2148     4796  2 IF .BUF_DESC[DSC$W_LENGTH] NEQ 0
;  2149     4797  2 THEN
;  2150     4798  3         BEGIN
;  2151     4799  3         CH$MOVE(.BUF_DESC[DSC$W_LENGTH], .BUF_DESC[DSC$A_POINTER], .TEMP_PTR); ! Move in previous data
;  2152     4800  3         PAT$FREERELEASE(.BUF_DESC[DSC$A_POINTER], (.BUF_DESC[DSC$W_LENGTH] +3)/4); ! Release old buffer
```

```
;  2153          4801  2          END;
;  2154          4802  2 CH$MOVE(.DATA_SIZ, .DATA_PTR, CH$PTR(.TEMP_PTR, .BUF_DESC[DSC$W_LENGTH])); ! Move in new data
;  2155          4803  2 BUF_DESC[DSC$A_POINTER] = CH$PTR(.TEMP_PTR);                ! Reset buffer dsc addr
;  2156          4804  2 BUF_DESC[DSC$W_LENGTH] = .BUF_DESC[DSC$W_LENGTH] + .DATA_SIZ;   ! Reset buf dsc siz
;  2157          4805  1 END;


                                                  01FC 00000          .ENTRY  PAT$FILL_BUF, Save R2,R3,R4,R5,R6,R7,R8      ; 4744
                                        56    04  AC   D0 00002          MOVL    BUF_DESC, R6                                 ; 4795
                                        58        66   3C 00006          MOVZWL  (R6), R8                                     ;
                                  50    58    0C  AC   C1 00009          ADDL3   DATA_SIZ, R8, R0                             ;
                                        50        03   C0 0000E          ADDL2   #3, R0                                       ;
                                  7E    50        04   C7 00011          DIVL3   #4, R0, -(SP)                                ;
                                     00000000G  EF   01   FB 00015          CALLS   #1, PAT$FREEZ                                ;
                                        57        50   D0 0001C          MOVL    R0, TEMP_PTR                                 ;
                                                  58   D5 0001F          TSTL    R8                                           ; 4796
                                                  17   13 00021          BEQL    1$                                           ;
                                  67    04    B6        58   28 00023          MOVC3   R8, @4(R6), (TEMP_PTR)                       ; 4799
                                        50    03  A8   9E 00028          MOVAB   3(R8), R0                                    ; 4800
                                  7E    50        04   C7 0002C          DIVL3   #4, R0, -(SP)                                ;
                                              04  A6   DD 00030          PUSHL   4(R6)                                        ;
                                     00000000G  EF   02   FB 00033          CALLS   #2, PAT$FREERELEASE                          ;
                                6847    08    BC    0C  AC   28 0003A 1$:     MOVC3   DATA_SIZ, @DATA_PTR, (R8)[TEMP_PTR]          ; 4802
                                        04    A6        57   D0 00041          MOVL    TEMP_PTR, 4(R6)                              ; 4803
                                        66        0C  AC   A0 00045          ADDW2   DATA_SIZ, (R6)                               ; 4804
                                                      04   00049          RET                                                  ; 4805

; Routine Size:  74 bytes,    Routine Base:  _PAT$CODE + 0FE8
```

```
; 2159          4806  1 END
; 2160          4807  0 ELUDOM


                                                        .EXTRN  LIB$SIGNAL

;                               PSECT SUMMARY
;
;       Name                    Bytes                           Attributes
;
;  _PAT$PLIT                      100  NOVEC,NOWRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(0)
;  _PAT$CODE                     4146  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;  .  ABS  .                        0  NOVEC,NOWRT,NORD ,NOEXE,NOSHR,  LCL,  ABS,  CON,NOPIC,ALIGN(0)


;                           Library Statistics
;                                       -------- Symbols --------      Pages       Processing
;       File                            Total    Loaded   Percent      Mapped      Time
;
;  _$255$DUA28:[SYSLIB]LIB.L32;1         18619        7         0      1000          00:01.8


; Information:  1
; Warnings:     0
; Errors:       0


;                                       COMMAND QUALIFIERS

;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/VARIANT:1/LIS=LIS$:PATEXA/OBJ=OBJ$:PATEXA MSRC$:PATEXA/UPDATE=(ENH$:PATEXA)

; Size:          4146 code + 100 data bytes
; Run Time:         01:20.5
; Elapsed Time:     04:10.7
; Lines/CPU Min:     3581
; Lexemes/CPU-Min: 28636
; Memory Used:  406 pages
; Compilation Complete
```

PATINT
LIS

PATINS
LIS

PATERR
LIS

PATIHD
LIS

PATEXA
LIS

PATFRE
LIS