```
RRRRRRRRRRR      MMM          MMM      SSSSSSSSSSS
RRRRRRRRRRRR     MMM          MMM      SSSSSSSSSSSS
RRRRRRRRRRRR     MMM          MMM      SSSSSSSSSSSS
RRR          RRR MMMMMMM    MMMMMMM   SSS
RRR          RRR MMMMMMM    MMMMMMM   SSS
RRR          RRR MMMMMMM    MMMMMMM   SSS
RRR          RRR MMM   MMM   MMM   MMM SSS
RRR          RRR MMM   MMM   MMM   MMM SSS
RRR          RRR MMM   MMM   MMM   MMM SSS
RRRRRRRRRRR      MMM          MMM      SSSSSSSSS
RRRRRRRRRRRR     MMM          MMM      SSSSSSSSS
RRRRRRRRRRRR     MMM          MMM      SSSSSSSSS
RRR    RRR       MMM          MMM               SSS
RRR    RRR       MMM          MMM               SSS
RRR    RRR       MMM          MMM               SSS
RRR       RRR    MMM          MMM               SSS
RRR       RRR    MMM          MMM               SSS
RRR       RRR    MMM          MMM               SSS
RRR          RRR MMM          MMM  SSSSSSSSSSS
RRR       RRR    MMM          MMM               SSS
RRR          RRR MMM          MMM  SSSSSSSSSSS
RRR          RRR MMM          MMM  SSSSSSSSSSS
RRR          RRR MMM          MMM  SSSSSSSSSSS
```

```
RRRRRRRR    MM      MM    333333    BBBBBBBB    KK      KK  TTTTTTTTTT    SSSSSSSS  PPPPPPPP    LL
RRRRRRRR    MM      MM    333333    BBBBBBBB    KK      KK  TTTTTTTTTT    SSSSSSSS  PPPPPPPP    LL
RR      RR  MMMM  MMMM  33      33  BB      BB  KK      KK      TT      SS            PP      PP  LL
RR      RR  MMMM  MMMM  33      33  BB      BB  KK      KK      TT      SS            PP      PP  LL
RR      RR  MM MM MM MM        33  BB      BB  KK    KK        TT      SS            PP      PP  LL
RR      RR  MM MM MM MM        33  BB      BB  KK    KK        TT      SS            PP      PP  LL
RRRRRRRR    MM      MM      33    BBBBBBBB    KKKKK           TT        SSSSSS    PPPPPPPP    LL
RRRRRRRR    MM      MM      33    BBBBBBBB    KKKKK           TT        SSSSSS    PPPPPPPP    LL
RR  RR      MM      MM        33  BB      BB  KK    KK        TT              SS  PP          LL
RR  RR      MM      MM        33  BB      BB  KK    KK        TT              SS  PP          LL
RR    RR    MM      MM  33    33  BB      BB  KK      KK      TT              SS  PP          LL                ....
RR    RR    MM      MM  33    33  BB      BB  KK      KK      TT              SS  PP          LL                ....
RR      RR  MM      MM    333333  BBBBBBBB    KK      KK      TT      SSSSSSSS  PP          LLLLLLLLLL        ....
RR      RR  MM      MM    333333  BBBBBBBB    KK      KK      TT      SSSSSSSS  PP          LLLLLLLLLL        ....

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
;    2          0002  0 MODULE RM3BKTSPL (LANGUAGE (BLISS32) ,
;    3          0003  0                   IDENT = 'V04-000'
;    4          0004  0                   ) =
;    5          0005  1 BEGIN
;    6          0006  1 !
;    7          0007  1 !**************************************************************************
;    8          0008  1 !*                                                                        *
;    9          0009  1 !*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                              *
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;   26          0026  1 !*                                                                        *
;   27          0027  1 !*                                                                        *
;   28          0028  1 !**************************************************************************
;   29          0029  1
;   30          0030  1 !++
;   31          0031  1 !
;   32          0032  1 ! FACILITY      RMS32 INDEX SEQUENTIAL FILE ORGANIZATION
;   33          0033  1 !
;   34          0034  1 ! ABSTRACT:
;   35          0035  1 !                Routine to move out data in case of a split
;   36          0036  1 !
;   37          0037  1 !
;   38          0038  1 ! ENVIRONMENT:
;   39          0039  1 !
;   40          0040  1 !                VAX/VMS OPERATING SYSTEM
;   41          0041  1 !
;   42          0042  1 !--
;   43          0043  1
;   44          0044  1 !
;   45          0045  1 ! AUTHOR:        Wendy Koenig          17-Jul-1978
;   46          0046  1 !
;   47          0047  1 ! MODIFIED BY:
;   48          0048  1 !
;   49          0049  1 !       V03-006 MCN0014         Maria del C. Nasr       22-Mar-1983
;   50          0050  1 !               More linkages reorganization.
;   51          0051  1 !
;   52          0052  1 !       V03-005 MCN0013         Maria del C. Nasr       23-Feb-1983
;   53          0053  1 !               Reorganize linkages.
;   54          0054  1 !
;   55          0055  1 !       V03-004 KBT0155         Keith B. Thompson       31-Aug-1982
;   56          0056  1 !               Reorganize psects
;   57          0057  1 !
```

```
;    58          0058  1 ;        V03-003 TMK0001         Todd M. Katz            02-Jul-1982
;    59          0059  1 ;                Implement the RMS cluster solution for next record positioning.
;    60          0060  1 ;                There is no longer any need begin the process of updating the
;    61          0061  1 ;                NRP list as part of a bucket split because there is no longer
;    62          0062  1 ;                any NRP list to update. Next record positioning context is now
;    63          0063  1 ;                kept locally in the IRAB.
;    64          0064  1 ;
;    65          0065  1 ;                In addition, the RFA of the new record is always stored in
;    66          0066  1 ;                IRB$L_PUTUP_VBN, and IRB$W_PUTUPD_ID. This is because the
;    67          0067  1 ;                current record context never changes because of a $PUT or
;    68          0068  1 ;                $DELETE.
;    69          0069  1 ;
;    70          0070  1 ;        V03-002 KBT0064         Keith B. Thompson       17-Jun-1982
;    71          0071  1 ;                Remove ref. to rm$sig_chars
;    72          0072  1 ;
;    73          0073  1 ;        V03-001 LJA0007         Laurie Anderson         25-Mar-1982
;    74          0074  1 ;                Change KBUFSZ to reference a macro when computing buffer
;    75          0075  1 ;                size and make IFB$B_KBUFSZ a word, now: IFB$W_KBUFSZ.
;    76          0076  1 ;
;    77          0077  1 ;        V02-014 KPL0001         Peter Lieberwirth       19-Aug-1981
;    78          0078  1 ;                Preserve NEW_BKT NXTRECID field as it was set up by
;    79          0079  1 ;                RM$ALLOC_BKT instead of resetting it to 1.  This
;    80          0080  1 ;                permits space reclamation to work by not reusing old
;    81          0081  1 ;                IDs in any new incarnations of the bucket.
;    82          0082  1 ;
;    83          0083  1 ;        V02-013 MCN0012         Maria del C. Nasr       07-Jul-1981
;    84          0084  1 ;                Recompress key of record which follows record inserted.
;    85          0085  1 ;                Also, fix some problems with 4-bucket splits and significant
;    86          0086  1 ;                characters.
;    87          0087  1 ;
;    88          0088  1 ;        V02-012 MCN0011         Maria del C. Nasr       26-May-1981
;    89          0089  1 ;                Add support for prologue 3 files.
;    90          0090  1 ;
;    91          0091  1 ;        V02-011 MCN0006         Maria del C. Nasr       16-Mar-1981
;    92          0092  1 ;                Increase size of record identifier to a word in NRP.
;    93          0093  1 ;
;    94          0094  1 ;        V02-010 REFORMAT        Frederick E. Deen, Jr.      23-Jul-1980
;    95          0095  1 ;                This code was reformatted to adhere to RMS standards
;    96          0096  1 ;
;    97          0097  1 ;
;    98          0098  1 ; REVISION HISTORY:
;    99          0099  1 ;
;   100          0100  1 ;   Wendy Koenig,       21-Sep-1978
;   101          0101  1 ;   X0002 - Don't zero NRP list for each new bucket
;   102          0102  1 ;
;   103          0103  1 ;   Wendy Koenig,       25-Sep-1978
;   104          0104  1 ;   X0003 - Don't update RP on split -- it's an RRV
;   105          0105  1 ;
;   106          0106  1 ;   Christian Saether,  4-Oct-1978
;   107          0107  1 ;   X0004 - Modifications for UPDATE
;   108          0108  1 ;
;   109          0109  1 ;   Wendy Koenig,       12-Oct-1978
;   110          0110  1 ;   X0005 - Take all the NRP stuff out of here
;   111          0111  1 ;
;   112          0112  1 ;   Wendy Koenig,       19-Oct-1978
;   113          0113  1 ;   X0006 - Make some changes for the NEW_VBN entry in the NRP list
;   114          0114  1 ;
```

```
;  115          0115  1 !   Wendy Koenig,       24-Oct-1978
;  116          0116  1 !   X0007 - Make changes caused by sharing conventions
;  117          0117  1 !
;  118          0118  1 !   Christian Saether,  19-Dec-1978
;  119          0119  1 !   X0008 - Bliss does not like using AP as block structure
;  120          0120  1 !
;  121          0121  1 !   Wendy Koenig,       25-Jan-1979
;  122          0122  1 !   X0009 - Get rid of setting valid
;  123          0123  1 !
;  124          0124  1 !*****
;  125          0125  1
;  126          0126  1 LIBRARY 'RMSLIB:RMS';
;  127          0127  1
;  128          0128  1 REQUIRE 'RMSSRC:RMSIDXDEF';
;  129          0193  1
;  130          0194  1 ! define default psects for code
;  131          0195  1 !
;  132          0196  1
;  133          0197  1 PSECT
;  134          0198  1     CODE = RM$RMS3(PSECT_ATTR),
;  135          0199  1     PLIT = RM$RMS3(PSECT_ATTR);
;  136          0200  1
;  137          0201  1 ! Linkages
;  138          0202  1 !
;  139          0203  1
;  140          0204  1 LINKAGE
;  141          0205  1     L_JSB01,
;  142          0206  1     L_RABREG_4567,
;  143          0207  1     L_RABREG_67,
;  144          0208  1     L_REC_OVHD;
;  145          0209  1
;  146          0210  1 ! External Routines
;  147          0211  1 !
;  148          0212  1 EXTERNAL ROUTINE
;  149          0213  1     RM$BLDUDR           : RL$RABREG_4567,
;  150          0214  1     RM$EXPAND_KEY       : RL$JSB01,
;  151          0215  1     RM$GETNEXT_REC      : RL$RABREG_67,
;  152          0216  1     RM$REC_OVHD         : RL$REC_OVHD,
;  153          0217  1     RM$RECOMPR_KEY      : RL$JSB01;
;  154          0218  1
```

```
;  156          0219  1 %SBTTL  'RM$BKT_SPL'
;  157          0220  1 GLOBAL ROUTINE RM$BKT_SPL(RECSZ) : RL$RABREG_67 NOVALUE =
;  158          0221  1
;  159          0222  1 !++
;  160          0223  1 !
;  161          0224  1 ! FUNCTIONAL DESCRIPTION:
;  162          0225  1 !
;  163          0226  1 !       Move data records out a bucket that's splitting.
;  164          0227  1 !
;  165          0228  1 ! CALLING SEQUENCE:
;  166          0229  1 !       BSBW RM$BKT_SPL()
;  167          0230  1 !
;  168          0231  1 ! INPUT PARAMETERS:
;  169          0232  1 !
;  170          0233  1 !       RECSZ - record size of record to be inserted
;  171          0234  1 !
;  172          0235  1 ! IMPLICIT INPUTS:
;  173          0236  1 !
;  174          0237  1 !       IRAB    SPLIT, SPLIT_1, SPLIT_2, POS_INS,
;  175          0238  1 !               NEW_BKTS, BKT_NO, REC_W_LO,
;  176          0239  1 !               CURBDB -- ORIGINAL BUCKET, NXTBDB -- NEW BUCKET
;  177          0240  1 !       IN NEW BUCKET, NXTRECID
;  178          0241  1 !       IFAB -- prologue version number
;  179          0242  1 !       RAB for RSZ, RBF
;  180          0243  1 !
;  181          0244  1 ! OUTPUT PARAMETERS:
;  182          0245  1 !       NONE
;  183          0246  1 !
;  184          0247  1 ! IMPLICIT OUTPUTS:
;  185          0248  1 !       BKT_NO is decremented
;  186          0249  1 !       FREESPACE and NXTID in new bkt is set
;  187          0250  1 !
;  188          0251  1 ! ROUTINE VALUE:
;  189          0252  1 !       nothing
;  190          0253  1 !
;  191          0254  1 ! SIDE EFFECTS:
;  192          0255  1 !       Data records are moved from one bucket to another.
;  193          0256  1 !       The records are assigned new ids, in numerical order.
;  194          0257  1 !       The RFA address of current record becomes the RFA address of the new
;  195          0258  1 !         record if the new record was inserted into the new bucket.
;  196          0259  1 !       Mark new bucket dirty and valid.
;  197          0260  1 !       If the primary key is compressed, the key in the first record of the
;  198          0261  1 !         new bucket undergoes expansion.
;  199          0262  1 !       AP is clobbered.
;  200          0263  1 !
;  201          0264  1 !--
;  202          0265  1
;  203          0266  2     BEGIN
;  204          0267  2
;  205          0268  2     EXTERNAL REGISTER
;  206          0269  2         R_REC_ADDR_STR,
;  207          0270  2         R_IDX_DFN_STR,
;  208          0271  2         R_IFAB_STR,
;  209          0272  2         R_IRAB_STR,
;  210          0273  2         R_RAB_STR;
;  211          0274  2
;  212          0275  2     GLOBAL REGISTER
```

```
;  213          0276  2          R_IMPURE;
;  214          0277  2
;  215          0278  2      LOCAL
;  216          0279  2          NEW_BKT : REF BBLOCK,
;  217          0280  2          OLD_BKT : REF BBLOCK,
;  218          0281  2          NEXT_REC: REF BBLOCK,
;  219          0282  2          EOB,
;  220          0283  2          SPLIT_PT        : WORD,
;  221          0284  2          FLAG    : BLOCK [1];
;  222          0285  2
;  223          0286  2      BUILTIN
;  224          0287  2          AP;
;  225          0288  2
;  226          0289  2      MACRO
;  227          0290  2          NEW_VBN = 0,0,2,0 %,
;  228          0291  2          ALONE = 0,2,1,0 %;
;  229          0292  2
;  230          0293  2      BUILTIN
;  231          0294  2          TESTBITCC;
;  232          0295  2
;  233          0296  2      ! Set up NEW_BKT and OLD_BKT addresses.
;  234          0297  2      !
;  235          0298  2      NEW_BKT = .BBLOCK[.IRAB[IRB$L_NXTBDB], BDB$L_ADDR];
;  236          0299  2      OLD_BKT = .BBLOCK[.IRAB[IRB$L_CURBDB], BDB$L_ADDR];
;  237          0300  2
;  238          0301  2      ! Set up SPLIT_PT and EOB for this move. Also set up AP to signal if the new
;  239          0302  2      ! record belongs by itself. If this is the only new bucket, the new record
;  240          0303  2      ! may be positioned at the end of the new bucket w/o REC_W_LO being set.
;  241          0304  2      ! Therefore we can set it.
;  242          0305  2      !
;  243          0306  2      FLAG = 1;                       ! one indicates VBN_RIGHT ( '' the default'')
;  244          0307  2
;  245          0308  2      CASE .IRAB[IRB$V_BKT_NO] FROM 1 TO 3 OF
;  246          0309  2          SET
;  247          0310  2
;  248          0311  2          [3] :
;  249          0312  2
;  250          0313  3              BEGIN
;  251          0314  3              SPLIT_PT = .IRAB[IRB$W_SPLIT_2];
;  252          0315  3              REC_ADDR = .OLD_BKT + BKT$C_OVERHDSZ;
;  253          0316  3              EOB = .OLD_BKT + .OLD_BKT[BKT$W_FREESPACE];
;  254          0317  3
;  255          0318  3              DO
;  256          0319  4                  BEGIN
;  257          0320  4
;  258          0321  4                  IF .REC_ADDR[IRC$V_RRV]
;  259          0322  4                  THEN
;  260          0323  4                      EXITLOOP;
;  261          0324  4
;  262          0325  4                  RM$GETNEXT_REC()
;  263          0326  4                  END
;  264          0327  3              UNTIL .REC_ADDR GEQU .EOB;
;  265          0328  3
;  266          0329  3              EOB = .REC_ADDR - .OLD_BKT;
;  267          0330  2              END;
;  268          0331  2          [2] :
;  269          0332  3              BEGIN
```

```
;  270     0333  3                SPLIT_PT = .IRAB[IRB$W_SPLIT_1];
;  271     0334  3                EOB = .IRAB[IRB$W_SPLIT_2];
;  272     0335  3
;  273     0336  4                BEGIN
;  274     0337  4
;  275     0338  4                    IF .SPLIT_PT EQLU .IRAB[IRB$W_POS_INS]
;  276     0339  4                    AND
;  277     0340  4                    .SPLIT_PT EQLU .IRAB[IRB$W_SPLIT]
;  278     0341  4                    THEN
;  279     0342  4                        FLAG[ALONE] = 1;
;  280     0343  3                    END;
;  281     0344  3
;  282     0345  3                IF .IRAB[IRB$L_VBN_MID] NEQ 0
;  283     0346  3                THEN
;  284     0347  3                    FLAG[NEW_VBN] = 3;
;  285     0348  2                END;
;  286     0349  2
;  287     0350  2            [1] :
;  288     0351  2
;  289     0352  3                BEGIN
;  290     0353  3                SPLIT_PT = .IRAB[IRB$W_SPLIT];
;  291     0354  3                EOB = .IRAB[IRB$W_SPLIT_1];
;  292     0355  3
;  293     0356  3                IF .IRAB[IRB$L_VBN_MID] NEQ 0
;  294     0357  3                THEN
;  295     0358  3                    FLAG[NEW_VBN] = 2;
;  296     0359  3
;  297     0360  4                IF (.EOB<0, 16> EQLU .IRAB[IRB$W_POS_INS])
;  298     0361  3                    AND
;  299     0362  4                    (.SPLIT_PT NEQU .EOB<0, 16>)
;  300     0363  3                    AND
;  301     0364  4                    ( NOT .IRAB[IRB$V_BIG_SPLIT])
;  302     0365  3                THEN
;  303     0366  3                    IRAB[IRB$V_REC_W_LO] = 1;
;  304     0367  2                END;
;  305     0368  2
;  306     0369  2            TES;
;  307     0370  2
;  308     0371  2            ! If the new record belongs in the middle of the new bucket, we have to do
;  309     0372  2            ! the move in three pieces; 1) Move out the "hi set", 2) build record in
;  310     0373  2            ! the new bucket, and 3) move out "lo set". Note that the hi set and / or
;  311     0374  2            ! lo set may be non-existent.
;  312     0375  2            !
;  313     0376  2            NEXT_REC = 0;                       ! assume record does not go in this bucket
;  314     0377  2
;  315     0378  2            IF .SPLIT_PT LEQU .IRAB[IRB$W_POS_INS]
;  316     0379  2                AND
;  317     0380  2                .IRAB[IRB$W_POS_INS] LEQU .EOB<0, 16>
;  318     0381  2            THEN
;  319     0382  3                BEGIN
;  320     0383  3                REC_ADDR = CH$MOVE(.IRAB[IRB$W_POS_INS] - .SPLIT_PT,
;  321     0384  3                    .SPLIT_PT + .OLD_BKT, .NEW_BKT + BKT$C_OVERHDSZ);
;  322     0385  4                BEGIN
;  323     0386  4
;  324     0387  4                LABEL
;  325     0388  4                    BUILD;
;  326     0389  4
```

```
;  327     0390  4          GLOBAL REGISTER
;  328     0391  4              COMMON_IOREG;
;  329     0392  4
;  330     0393  4          BKT_ADDR = .NEW_BKT;
;  331     0394  4          BDB = .IRAB[IRB$L_NXTBDB];
;  332     0395  4 BUILD :
;  333     0396  4
;  334     0397  4          ! If so desired, now is the time to build the user data record in the
;  335     0398  4          ! new bkt.  The ID for this record will be zeroed, and filled when
;  336     0399  4          ! the record ID's for the other records are reassigned.
;  337     0400  4          !
;  338     0401  5          BEGIN
;  339     0402  5
;  340     0403  5          IF .SPLIT_PT EQLU .IRAB[IRB$W_POS_INS]
;  341     0404  5          THEN
;  342     0405  6              BEGIN
;  343     0406  6
;  344     0407  6              IF NOT .IRAB[IRB$V_REC_W_LO]
;  345     0408  6                  AND
;  346     0409  6                  NOT .FLAG[ALONE]
;  347     0410  6              THEN
;  348     0411  7                  BEGIN
;  349     0412  7                  NEXT_REC = 1;
;  350     0413  7                  RM$BLDUDR(.RECSZ);
;  351     0414  6                  END;
;  352     0415  6
;  353     0416  6              LEAVE BUILD
;  354     0417  6
;  355     0418  5              END;
;  356     0419  5
;  357     0420  5          IF .EOB<0, 16> EQLU .IRAB[IRB$W_POS_INS]
;  358     0421  5          THEN
;  359     0422  6              BEGIN
;  360     0423  6
;  361     0424  6              IF .IRAB[IRB$V_REC_W_LO]
;  362     0425  6              THEN
;  363     0426  7                  BEGIN
;  364     0427  7                  NEXT_REC = 1;
;  365     0428  7                  RM$BLDUDR(.RECSZ);
;  366     0429  6                  END;
;  367     0430  6
;  368     0431  6              LEAVE BUILD;
;  369     0432  6
;  370     0433  5              END;
;  371     0434  5
;  372     0435  5          ! At this point the only case is that POS_INS is in the middle of the
;  373     0436  5          ! bucket so we always want to insert the new record.
;  374     0437  5          !
;  375     0438  5          NEXT_REC = 1;
;  376     0439  5          RM$BLDUDR(.RECSZ);
;  377     0440  4          END;                                    ! (end of build )
;  378     0441  3          END;
;  379     0442  3
;  380     0443  3          ! If the record was written to this bucket, and there will be a hi set
;  381     0444  3          ! to move, then set the flag to the address of the record after the one
;  382     0445  3          ! inserted.  Otherwise, clear indicator.
;  383     0446  3          !
```

```
;  384          0447  3
;  385          0448  3          IF .NEXT_REC
;  386          0449  3            AND (.EOB<0,16> - .IRAB[IRB$W_POS_INS]) NEQU 0
;  387          0450  3          THEN
;  388          0451  3              NEXT_REC = .REC_ADDR
;  389          0452  3          ELSE
;  390          0453  3              NEXT_REC = 0;
;  391          0454  3          REC_ADDR = CH$MOVE(.EOB<0, 16> - .IRAB[IRB$W_POS_INS],
;  392          0455  3                            .IRAB[IRB$W_POS_INS] + .OLD_BRT,
;  393          0456  3                            .REC_ADDR);
;  394          0457  3          END
;  395          0458  2      ELSE
;  396          0459  2
;  397          0460  2          ! The new record does not go into new bucket so just move data out in
;  398          0461  2          ! one chunk.
;  399          0462  2          !
;  400          0463  2          REC_ADDR = CH$MOVE(.EOB<0, 16> - .SPLIT_PT,
;  401          0464  2                            .SPLIT_PT + .OLD_BKT,
;  402          0465  2                            .NEW_BRT + BKT$C_OVERHDSZ);
;  403          0466  2
;  404          0467  2      ! Re-allocate the ID's, in numerical order, for the new bucket. While RMS
;  405          0468  2      ! is doing this it assigns the ID to the new record, if the new record
;  406          0469  2      ! goes in the new bucket.
;  407          0470  2      !
;  408          0471  3      BEGIN
;  409          0472  3
;  410          0473  3      EOB = .REC_ADDR;
;  411          0474  3
;  412          0475  3      ! If the record was inserted into this bucket, BLDUDR incremented NXTRECID.
;  413          0476  3      ! Renumber the IDs in the new bucket.  Do it differently, depending on
;  414          0477  3      ! prologue version number.
;  415          0478  3      !
;  416          0479  3      REC_ADDR = .NEW_BKT + BKT$C_OVERHDSZ;
;  417          0480  3
;  418          0481  3      IF .IFAB[IFB$B_PLG_VER] LSSU PLG$C_VER_3
;  419          0482  3      THEN
;  420          0483  3          WHILE .REC_ADDR LSSU .EOB
;  421          0484  3          DO
;  422          0485  4              BEGIN
;  423          0486  4
;  424          0487  4              ! If the ID of the record RMS is currently positioned to is 0,
;  425          0488  4              ! then it is the new record. In this case, the ID of the RRV also
;  426          0489  4              ! has to be set as well as the ID field of the RFA address of the
;  427          0490  4              ! next record positioning context's current record.
;  428          0491  4              !
;  429          0492  4              IF .REC_ADDR[IRC$B_ID] EQLU 0
;  430          0493  4              THEN
;  431          0494  5                  BEGIN
;  432          0495  5                  (.REC_ADDR + IRC$C_DATOVHDSZ)<0, 8> = .NEW_BKT[BKT$B_NXTRECID];
;  433          0496  5                  IRAB[IRB$W_PUTUP_ID] = .NEW_BKT[BKT$B_NXTRECID];
;  434          0497  4                  END;
;  435          0498  4
;  436          0499  4              REC_ADDR[IRC$B_ID] = .NEW_BKT[BKT$B_NXTRECID];
;  437          0500  4              NEW_BKT[BKT$B_NXTRECID] = .NEW_BKT[BKT$B_NXTRECID] + 1;
;  438          0501  4              RM$GETNEXT_REC()
;  439          0502  4              END                             ! end of while loop
;  440          0503  3      ELSE
```

```
;  441          0504  3          WHILE .REC_ADDR LSSU .EOB
;  442          0505  3          DO
;  443          0506  4              BEGIN
;  444          0507  4
;  445          0508  4              ! If the ID of the record RMS is currently positioned to is 0,
;  446          0509  4              ! then it is the new record. In this case, the ID of the RRV also
;  447          0510  4              ! has to be set as well as the ID field of the RFA address of the
;  448          0511  4              ! next record positioning context's current record.
;  449          0512  4              !
;  450          0513  4              IF .REC_ADDR[IRC$W_ID] EQLU 0
;  451          0514  4              THEN
;  452          0515  5                  BEGIN
;  453          0516  5                  (.REC_ADDR + IRC$C_DATOVHSZ3)<0,16> = .NEW_BKT[BKT$W_NXTRECID];
;  454          0517  5                  IRAB[IRB$W_PUTUP_ID] = .NEW_BKT[BKT$W_NXTRECID];
;  455          0518  4                  END;
;  456          0519  4
;  457          0520  4              REC_ADDR[IRC$W_ID] = .NEW_BKT[BKT$W_NXTRECID];
;  458          0521  4              NEW_BKT[BKT$W_NXTRECID] = .NEW_BKT[BKT$W_NXTRECID] + 1;
;  459          0522  4              RM$GETNEXT_REC()
;  460          0523  3              END;                                ! end of while loop
;  461          0524  3
;  462          0525  2      END;                                        ! { end of block redefining eob }
;  463          0526  2
;  464          0527  2      BBLOCK[.IRAB[IRB$L_NXTBDB], BDB$V_DRT] = 1;
;  465          0528  2      NEW_BKT[BKT$W_FREESPACE] = .REC_ADDR - .NEW_BKT;
;  466          0529  2
;  467          0530  2      ! If the record was inserted in this bucket followed by another record
;  468          0531  2      ! which is not an RRV, and the key is compressed, then recompress the key
;  469          0532  2      ! of the record which follows the inserted record.
;  470          0533  2      !
;  471          0534  2
;  472          0535  2      IF .NEXT_REC NEQU 0
;  473          0536  2        AND .IDX_DFN[IDX$V_KEY_COMPR]
;  474          0537  2      THEN
;  475          0538  2
;  476          0539  2          IF NOT .NEXT_REC[IRC$V_RRV]
;  477          0540  2          THEN
;  478          0541  3              BEGIN
;  479          0542  3
;  480          0543  3              GLOBAL REGISTER
;  481          0544  3                  R_BKT_ADDR;
;  482          0545  3
;  483          0546  3              LOCAL
;  484          0547  3                  TMP_REC_ADDR;
;  485          0548  3
;  486          0549  3              BKT_ADDR = .NEW_BKT;
;  487          0550  3              TMP_REC_ADDR = .REC_ADDR;
;  488          0551  3              REC_ADDR = .NEXT_REC;
;  489          0552  3              RM$RECOMPR_KEY ( .IRAB[IRB$L_RECBUF],
;  490          0553  3                               .REC_ADDR + RM$REC_OVHD(0) );
;  491          0554  3              REC_ADDR = .TMP_REC_ADDR;
;  492          0555  2              END;
;  493          0556  2
;  494          0557  3      BEGIN
;  495          0558  3
;  496          0559  3      LOCAL
;  497          0560  3          SIG_FLG,
```

```
;  498          0561  3          KEY_ADDR1,
;  499          0562  3          KEY_ADDR2;
;  500          0563  3
;  501          0564  3      ! Determine which key buffer contains the last key of the previous bucket.
;  502          0565  3      ! If we are allocating bucket 2 or 3 of a big split, then keybuffer3 (and
;  503          0566  3      ! keybuffer5) contains the key.  Otherwise, it is in keybuffer2.
;  504          0567  3      !
;  505          0568  3
;  506          0569  3      IF .IRAB[IRB$V_BKT_NO] GTRU 1
;  507          0570  3      THEN
;  508          0571  4          BEGIN
;  509          0572  4          SIG_FLG = 0;
;  510          0573  4          KEY_ADDR1 = KEYBUF_ADDR(5);
;  511          0574  4          KEY_ADDR2 = KEYBUF_ADDR(3);
;  512          0575  4          END
;  513          0576  3      ELSE
;  514          0577  4          BEGIN
;  515          0578  4          SIG_FLG = 2;
;  516          0579  4          KEY_ADDR1 = KEY_ADDR2 = KEYBUF_ADDR(2);
;  517          0580  3          END;
;  518          0581  3
;  519          0582  3      ! If the primary key is compressed, we must expand the first key of the
;  520          0583  3      ! new bucket, since it cannot be front end compressed.  Base this expansion
;  521          0584  3      ! on what will be the last key of the previous bucket, obtained from the
;  522          0585  3      ! right key buffer.
;  523          0586  3      !
;  524          0587  3      IF .IDX_DFN[IDX$V_KEY_COMPR]
;  525          0588  3      THEN
;  526          0589  4          BEGIN
;  527          0590  4
;  528          0591  4          GLOBAL REGISTER
;  529          0592  4              R_BKT_ADDR;
;  530          0593  4
;  531          0594  4          RM$EXPAND_KEY ( .KEY_ADDR1, .NEW_BKT );
;  532          0595  3          END;
;  533          0596  3
;  534          0597  2      END;                ! end of local definition for KEY_ADDR
;  535          0598  2
;  536          0599  2      ! Since I know that BKT_NO is a 2-bit digit ranging from 1 to 3, I can
;  537          0600  2      ! optimize the decr desired, so bear with me. Note: BKT_NO_LO refers to
;  538          0601  2      ! the low bit of BKT_NO.
;  539          0602  2      !
;  540          0603  2      !! TESTBITCC(IRAB[IRB$V_BKT_NO_LO])
;  541          0604  2      THEN
;  542          0605  2          IRAB[IRB$V_BKT_NO] = 1;
;  543          0606  2
;  544          0607  2      RETURN;
;  545          0608  2
;  546          0609  1      END;                                    ! ( end of rm$bkt_spl )


                                                                     .TITLE  RM3BKTSPL
                                                                     .IDENT  \V04-000\

                                                                     .EXTRN  RM$BLDUDR, RM$EXPAND_KEY
                                                                     .EXTRN  RM$GETNEXT_REC, RM$REC_OVHD
                                                                     .EXTRN  RM$RECOMPR_KEY
```

```
                                                        .PSECT  RM$RMS3,NOWRT,  GBL,  PIC,2

                                                083C    8F   BB 00000 RM$BKT_SPL::
                                                                      PUSHR   #^M<R2,R3,R4,R5,R11>                    ; 0220
                                                        5E       18  C2 00004          SUBL2   #24, SP
                                                        50    3C 18  A9 D0 00007          MOVL    60(IRAB), R0        ; 0298
                                                  0C    AE    18  A0 D0 0000B          MOVL    24(R0), NEW_BKT
                                                        50    20  A9 D0 00010          MOVL    32(IRAB), R0        ; 0299
                                                  08    AE    18  A0 D0 00014          MOVL    24(R0), OLD_BKT
                                                  04    AE        01 D0 00019          MOVL    #1, FLAG            ; 0306
                                        52    44  A9          02     00 EF 0001D      EXTZV   #0, #2, 68(IRAB), R2    ; 0308
                                              02              01     52 CF 00023      CASEL   R2, #1, #2
                                            0006            0032     0057    00027 1$:  .WORD   7$-1$,-
                                                                                               5$-1$,-
                                                                                               2$-1$
                                                        6E    4E  A9 B0 0002D 2$:      MOVW    78(IRAB), SPLIT_PT  ; 0314
                                                  56    08    AE     0E C1 00031      ADDL3   #14, OLD_BKT, REC_ADDR  ; 0315
                                                  51    08    AE     04 C1 00036      ADDL3   #4, OLD_BKT, R1     ; 0316
                                                        50          61 3C 0003B      MOVZWL  (R1), R0
                                                  10    AE    08 BE40 9E 0003E       MOVAB   @OLD_BKT[R0], EOB
                                                  09          66     03 E0 00044 3$:  BBS     #3, (REC_ADDR), 4$  ; 0321
                                                            0000G    30 00048       BSBW    RM$GETNEXT_REC      ; 0325
                                                  10    AE          56 D1 0004B      CMPL    REC_ADDR, EOB       ; 0327
                                                              F3     1F 0004F       BLSSU   3$
                                            10    AE              56    08  AE C3 00051 4$:  SUBL3   OLD_BKT, REC_ADDR, EOB  ; 0329
                                                                  50    11 00057       BRB     9$                  ; 0308
                                                        6E    4C  A9 B0 00059 5$:      MOVW    76(IRAB), SPLIT_PT  ; 0333
                                                  10    AE    4E  A9 3C 0005D          MOVZWL  78(IRAB), EOB       ; 0334
                                                  48    A9          6E B1 00062      CMPW    SPLIT_PT, 72(IRAB)  ; 0338
                                                                    0A 12 00066      BNEQ    6$
                                                  4A    A9          6E B1 00068      CMPW    SPLIT_PT, 74(IRAB)  ; 0340
                                                                    04 12 0006C      BNEQ    6$
                                                  04    AE          04 88 0006E      BISB2   #4, FLAG            ; 0342
                                                              0090  C9 D5 00072 6$:  TSTL    144(IRAB)           ; 0345
                                                                    31 13 00076      BEQL    9$
                                                  04    AE          03 88 00078      BISB2   #3, FLAG            ; 0347
                                                                    2B 11 0007C      BRB     9$                  ; 0308
                                                        6E    4A  A9 B0 0007E 7$:      MOVW    74(IRAB), SPLIT_PT  ; 0353
                                                  10    AE    4C  A9 3C 00082          MOVZWL  76(IRAB), EOB       ; 0354
                                                              0090  C9 D5 00087        TSTL    144(IRAB)           ; 0356
                                                                    06 13 0008B      BEQL    8$
                                  04    AE              02        00 F0 0008D      INSV    #2, #0, #2, FLAG    ; 0358
                                                  48    A9    10  AE B1 00093 8$:      CMPW    EOB, 72(IRAB)       ; 0360
                                                                    0F 12 00098      BNEQ    9$
                                                  10    AE          6E B1 0009A      CMPW    SPLIT_PT, EOB       ; 0362
                                                                    09 13 0009E      BEQL    9$
                                              04    44  A9          02 E0 000A0      BBS     #2, 68(IRAB), 9$    ; 0364
                                                    44  A9          08 88 000A5      BISB2   #8, 68(IRAB)        ; 0366
                                                              14    AE D4 000A9 9$:  CLRL    NEXT_REC            ; 0376
                                                        50          6E 3C 000AC      MOVZWL  SPLIT_PT, R0        ; 0384
                                                  48    A9          6E B1 000AF      CMPW    SPLIT_PT, 72(IRAB)  ; 0378
                                                                    79 1A 000B3      BGTRU   15$
                                                  10    AE    48    A9 B1 000B5      CMPW    72(IRAB), EOB       ; 0380
                                                                    72 1A 000BA      BGTRU   15$
                                                        51    48    A9 3C 000BC      MOVZWL  72(IRAB), R1        ; 0383
                                                        52          6E 3C 000C0      MOVZWL  SPLIT_PT, R2
```

```
                51              52  C2 000C3          SUBL2   R2, R1                                  ;
             7E    0C    AE       0E  C1 000C6          ADDL3   #14, NEW_BKT, -(SP)                    ; 0384
             9E    0C BE40        51  28 000CB          MOVC3   R1, @OLD_BKT[R0], @(SP)                 ;
                56              53  D0 000D1          MOVL    R3, REC_ADDR                            ;
                55        0C    AE  D0 000D4          MOVL    NEW_BKT, BKT_ADDR                       ; 0393
                54        3C    A9  D0 000D8          MOVL    60(IRAB), BDB                           ; 0394
             48    A9              6E  B1 000DC          CMPW    SPLIT_PT, 72(IRAB)                      ; 0403
                                   0C  12 000E0          BNEQ    10$                                     ;
             20    44    A9        03  E0 000E2          BBS     #3, 68(IRAB), 12$                       ; 0407
             1B    04    AE        02  E0 000E7          BBS     #2, FLAG, 12$                           ; 0409
                                   0C  11 000EC          BRB     11$                                     ; 0412
             48    A9        10    AE  B1 000EE  10$:    CMPW    EOB, 72(IRAB)                           ; 0420
                                   05  12 000F3          BNEQ    11$                                     ;
             0D    44    A9        03  E1 000F5          BBC     #3, 68(IRAB), 12$                       ; 0424
                14    AE        01  D0 000FA  11$:    MOVL    #1, NEXT_REC                            ; 0438
                            30    AE  DD 000FE          PUSHL   RECSZ                                   ; 0439
                                0000G 30 00101          BSBW    RM$BLDUDR                               ;
                5E              04  C0 00104          ADDL2   #4, SP                                  ;
                0D        14    AE  E9 00107  12$:    BLBC    NEXT_REC, 13$                           ; 0448
             48    A9        10    AE  B1 0010B          CMPW    EOB, 72(IRAB)                           ; 0449
                                   06  13 00110          BEQL    13$                                     ;
             14    AE              56  D0 00112          MOVL    REC_ADDR, NEXT_REC                      ; 0451
                                   03  11 00116          BRB     14$                                     ;
                14    AE        D4  00118  13$:    CLRL    NEXT_REC                                ; 0453
                50    48    A9  3C  0011B  14$:    MOVZWL  72(IRAB), R0                            ; 0454
                51    10    AE  3C  0011F          MOVZWL  EOB, R1                                 ;
                51              50  C2 00123          SUBL2   R0, R1                                  ;
             66        08 BE40        51  28 00126          MOVC3   R1, @OLD_BKT[R0], (REC_ADDR)            ; 0456
                                   15  11 0012C          BRB     16$                                     ;
                51        10    AE  3C  0012E  15$:    MOVZWL  EOB, R1                                 ; 0463
                52              6E  3C  00132          MOVZWL  SPLIT_PT, R2                            ;
                51              52  C2 00135          SUBL2   R2, R1                                  ;
             7E    0C    AE       0E  C1 00138          ADDL3   #14, NEW_BKT, -(SP)                     ; 0465
             9E    0C BE40        51  28 0013D          MOVC3   R1, @OLD_BKT[R0], @(SP)+                ;
                56              53  D0 00143  16$:    MOVL    R3, REC_ADDR                            ;
             10    AE              56  D0 00146          MOVL    REC_ADDR, EOB                           ; 0473
             50    0C    AE        0E  C1 0014A          ADDL3   #14, NEW_BKT, R0                        ; 0479
                56              60  9E 0014F          MOVAB   (R0), REC_ADDR                          ;
             50    0C    AE        06  C1 00152          ADDL3   #6, NEW_BKT, R0                         ; 0499
                52              60  9E 00157          MOVAB   (R0), R2                                ;
                03        00B7  CA  91 0015A          CMPB    183(IFAB), #3                           ; 0481
                                   29  1E 0015F          BGEQU   19$                                     ;
             10    AE              56  D1 00161  17$:    CMPL    REC_ADDR, EOB                           ; 0483
                                   4C  1E 00165          BGEQU   21$                                     ;
                            01    A6  95 00167          TSTB    1(REC_ADDR)                             ; 0492
                                   13  12 0016A          BNEQ    18$                                     ;
             50    0C    AE        06  C1 0016C          ADDL3   #6, NEW_BKT, R0                         ; 0495
             02    A6              60  90 00171          MOVB    (R0), 2(REC_ADDR)                       ;
             50    0C    AE        06  C1 00175          ADDL3   #6, NEW_BKT, R0                         ; 0496
          0080    C9              60  9B 0017A          MOVZBW  (R0), 128(IRAB)                         ;
             01    A6              62  90 0017F  18$:    MOVB    (R2), 1(REC_ADDR)                       ; 0499
                                   62  96 00183          INCB    (R2)                                    ; 0500
                                0000G 30 00185          BSBW    RM$GETNEXT_REC                          ; 0501
                                   D7  11 00188          BRB     17$                                     ;
             10    AE              56  D1 0018A  19$:    CMPL    REC_ADDR, EOB                           ; 0504
                                   23  1E 0018E          BGEQU   21$                                     ;
                            01    A6  B5 00190          TSTW    1(REC_ADDR)                             ; 0513
```

```
                                          13  12 00193          BNEQ    20$                                              ;
                     50     0C   AE       06  C1 00195          ADDL3   #6, NEW_BKT, R0                                  ; 0516
                            03   A6       60  B0 0019A          MOVW    (R0), 3(REC_ADDR)                                ;
                     50     0C   AE       06  C1 0019E          ADDL3   #6, NEW_BKT, R0                                  ; 0517
                          0080   C9       60  B0 001A3          MOVW    (R0), 128(IRAB)                                  ;
                            01   A6       62  B0 001A8 20$:     MOVW    (R2), 1(REC_ADDR)                                ; 0520
                                          62  B6 001AC          INCW    (R2)                                             ; 0521
                                       0000G  30 001AE          BSBW    RM$GETNEXT_REC                                   ; 0522
                                          D7  11 001B1          BRB     19$                                              ;
                     50            3C     A9  D0 001B3 21$:     MOVL    60(IRAB), R0                                     ; 0527
                            0A   A0       02  88 001B7          BISB2   #2, 10(R0)                                       ;
                     50     0C   AE       04  C1 001BB          ADDL3   #4, NEW_BKT, R0                                  ; 0528
                     60          56   0C  AE  A3 001C0          SUBW3   NEW_BKT, REC_ADDR, (R0)                          ;
                                      14  AE  D5 001C5          TSTL    NEXT_REC                                         ; 0535
                                          28  13 001C8          BEQL    22$                                              ;
                     23     1C   A7       06  E1 001CA          BBC     #6, 28(IDX_DFN), 22$                             ; 0536
                     1E     14   BE       03  E0 001CF          BBS     #3, @NEXT_REC, 22$                               ; 0539
                                 55   0C  AE  D0 001D4          MOVL    NEW_BKT, BKT_ADDR                                ; 0549
                                 52       56  D0 001D8          MOVL    REC_ADDR, TMP_REC_ADDR                           ; 0550
                                 56   14  AE  D0 001DB          MOVL    NEXT_REC, REC_ADDR                               ; 0551
                                          51  D4 001DF          CLRL    R1                                               ; 0553
                                       0000G  30 001E1          BSBW    RM$REC_OVHD                                      ;
                     51          56       50  C1 001E4          ADDL3   R0, REC_ADDR, R1                                 ;
                                 50   68  A9  D0 001E8          MOVL    104(IRAB), R0                                    ; 0552
                                       0000G  30 001EC          BSBW    RM$RECOMPR_KEY                                   ;
                                 56       52  D0 001EF          MOVL    TMP_REC_ADDR, REC_ADDR                           ; 0554
                                 52 00B4  CA  9E 001F2 22$:     MOVAB   180(IFAB), R2                                    ; 0573
     01        44    A9          02       00  ED 001F7          CMPZV   #0, #2, 68(IRAB), #1                             ; 0569
                                          11  1B 001FD          BLEQU   23$                                              ;
                                          50  D4 001FF          CLRL    SIG_FLG                                          ; 0572
                                 51       62  3C 00201          MOVZWL  (R2), R1                                         ; 0573
                                 50 60 B941   DE 00204          MOVAL   @96(IRAB)[R1], KEY_ADDR1                         ;
                                 51 60 B941   3E 00209          MOVAW   @96(IRAB)[R1], KEY_ADDR2                         ; 0574
                                          0D  11 0020E          BRB     24$                                              ; 0569
                                 50       02  D0 00210 23$:     MOVL    #2, SIG_FLG                                      ; 0578
                                 51       62  3C 00213          MOVZWL  (R2), KEY_ADDR2                                  ; 0579
                                 51   60  A9  C0 00216          ADDL2   96(IRAB), KEY_ADDR2                              ;
                                 50       51  D0 0021A          MOVL    KEY_ADDR2, KEY_ADDR1                             ;
                     07     1C   A7       06  E1 0021D 24$:     BBC     #6, 28(IDX_DFN), 25$                             ; 0587
                                 51   0C  AE  D0 00222          MOVL    NEW_BKT, R1                                      ; 0594
                                       0000G  30 00226          BSBW    RM$EXPAND_KEY                                    ;
                     06     44   A9       00  E4 00229 25$:     BBSC    #0, 68(IRAB), 26$                                ; 0603
   44    A9          02          00       01  F0 0022E          INSV    #1, #0, #2, 68(IRAB)                             ; 0605
                                 5E       18  C0 00234 26$:     ADDL2   #24, SP                                          ; 0609
                                    083C  8F  BA 00237          POPR    #^M<R2,R3,R4,R5,R11>                             ;
                                          05     0023B          RSB                                                      ;

; Routine Size:  572 bytes,    Routine Base:  RM$RMS3 + 0000


;    547         0610  1
;    548         0611  1 END
;    549         0612  1
;    550         0613  0 ELUDOM
```

```
;                                   PSECT SUMMARY
;
;       Name                    Bytes                           Attributes
;
;  RM$RMS3                       572  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  GBL,  REL,  CON,  PIC,ALIGN(2)
;
;
;                                 Library Statistics
;
;                                                 -------- Symbols --------      Pages       Processing
;       File                                      Total    Loaded   Percent      Mapped      Time
;
;  _$255$DUA28:[RMS.OBJ]RMS.L32;1                  3109        51         1         154        00:00.4
;
;
;
;                                   COMMAND QUALIFIERS
;
;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/LIS=LIS$:RM3BKTSPL/OBJ=OBJ$:RM3BKTSPL MSRC$:RM3BKTSPL/UPDATE=(ENH$:RM3BKTSPL)
;
; Size:          5/2 code + 0 data bytes
; Run Time:        00:13.5
; Elapsed Time:    00:37.6
; Lines/CPU Min:    2722
; Lexemes/CPU-Min: 16410
; Memory Used:  214 pages
; Compilation Complete
```

RM2UPDDEL
LIS

RM3CLOSE
LIS

RM3ALLBKT
LIS

RM2CREATE
LIS

RM2GET
LIS

RM2PUT
LIS

RM3BKTIO
LIS

RM3BKTSPL
LIS

RM3CMPKEY
LIS

RM3CMPRSS
LIS

RM2EXTEND
LIS

RM2FMTBKT
LIS

RM3BUG
LIS

RM2OPEN
LIS